

**CONVENTION ON
BIOLOGICAL
DIVERSITY**

Distr.
GENERAL

UNEP/CBD/SBSTTA/9/INF/4
29 September 2003

ORIGINAL: ENGLISH

**SUBSIDIARY BODY ON SCIENTIFIC, TECHNICAL
AND TECHNOLOGICAL ADVICE**

Ninth meeting

Montreal, 10-14 November 2003

Item 5.1 on the provisional agenda*

**ECOSYSTEM APPROACH: FURTHER ELABORATION, GUIDELINES FOR
IMPLEMENTATION AND RELATIONSHIP WITH SUSTAINABLE
FOREST MANAGEMENT**

Report of the Expert Meeting on the Ecosystem Approach

Note by the Executive Secretary

1. Further to his note on the ecosystem approach: further elaboration, guidelines for implementation and relationship with sustainable forest management (UNEP/CBD/SBSTTA/9/8), the Executive Secretary is circulating herewith, for the information of participants in the ninth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), the complete report of the Expert Meeting on the Ecosystem Approach, held in Montreal from 7 to 11 July 2003. The report includes an introduction, a procedural report and the main conclusions of the Expert Meeting. It also includes two substantive annexes:

(a) Annex I, which enlarges upon annex I of the above-mentioned note by the Executive Secretary by including case-studies to illustrate the application of the ecosystem approach; and

(b) Annex II, which contains a consideration of the relationship between sustainable forest management and the ecosystem approach, as well as a review and development of strategies for, the integration of the ecosystem approach into the programmes of work of the Convention. This annex incorporates comments received from participants in the Expert Meeting on the equivalent text in annex I to the note by the Executive Secretary.

2. The report is available in English only.

* UNEP/CBD/SBSTTA/9/1.

REPORT OF THE EXPERT MEETING ON THE ECOSYSTEM APPROACH

I. INTRODUCTION

1. At its second meeting the Conference of the Parties recognized that the ecosystem approach was the primary framework for the implementation of the Convention on Biological Diversity and acknowledged the need for further guidance both in formulating a conceptual basis for understanding the ecosystem approach, as well as for providing practical approach for its application. The mandate of the Expert Meeting on the Ecosystem Approach has its origin in that need, and is based on the decisions of the Conference of the Parties detailed below.
2. In its decision V/6, paragraph 4, the Conference of the Parties requested the Executive Secretary to collect, analyse, and compare identified case-studies and lessons learned on the ecosystem approach, and to prepare a synthesis for presentation to the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA) prior to the seventh meeting of the Conference of the Parties.
3. In its decision VI/12, the Conference of the Parties further requested the Executive Secretary to continue the collection, compilation and dissemination of case-studies and lessons learned (paragraph 2 (a)), and develop proposals for the refinement of the principles and operational guidance of the ecosystem approach (paragraph 2 (c)) on the basis of the analysis mentioned in paragraph 3 of the decision, and for their further integration into the programmes of work of the Convention and its cross-cutting themes.
4. In its decision VI/22, paragraph 19 (a), the Conference of the Parties requested the Executive Secretary to carry out a comparative study to clarify the conceptual basis of the ecosystem approach in relation to the concept of sustainable forest management with a view to improve, through an integrated approach, the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from the utilization of genetic resources.
5. Based on these decisions, and with the financial support of the Government of the Netherlands, the Executive Secretary convened a meeting in order to:
 - (a) Review the analysis of case-studies and lessons learned on the ecosystem approach;
 - (b) Develop proposals for the refinement of the principles and operational guidance of the ecosystem approach on the basis of case-studies and lessons learned, including indicators and strategies for the integration of the ecosystem approach into the programmes of work of the Convention; and
 - (c) Clarify the conceptual basis of the ecosystem approach in relation to the concept of sustainable forest management and develop proposals for their integration.
6. The meeting of the Expert Group was held from 7 to 11 July 2003 at the premises of the Secretariat of the Convention on Biological Diversity in Montreal.
7. The members of the expert group were selected from nominations provided by national focal points, in accordance with the *modus operandi* of SBSTTA (decision IV/ 16, annex I). In addition, a number of relevant organizations were invited to participate in the meeting as observers. A full list of participants is available in annex III to the report.

II. PROCEDURAL REPORT

8. The meeting was opened by a representative of the Executive Secretary of the Convention on Biological Diversity at 9:30 a.m. on Monday 7 July 2003.

9. Thirty-three participants were present, including representatives of Governments (Australia, Burundi, Canada, Costa Rica, Czech Republic, Egypt, Haiti, Hungary, Mexico, Mozambique, Nicaragua, Norway, Palau, Russian Federation, The Netherlands, and United Kingdom of Great Britain and Northern Ireland), United Nations Organizations (Food and Agriculture Organization of the United Nations, Secretariat of the United Nations Forum on Forests, United Nations Development Programme, and United Nations Environment Programme), Inter-governmental organizations (International Tropical Timber Organization, IUCN-The World Conservation Union, IUCN Commission for Ecosystem Management, Ramsar Convention on Wetlands), and other observers and resource persons (Germany, The Netherlands, United States of America, New Zealand, Center for International Forestry Research, Royal Holloway Institute for Environmental Research, IUCN and Université du Québec à Montréal).

10. The meeting elected two co-chairs: Mr. Jan Plesnik from the Czech Republic and Mr. Ole Hendrickson from Canada.

11. The meeting adopted its agenda on the basis of the provisional agenda proposed by the Executive Secretary in document UNEP/CBD/EM-EA/1/1. The agenda was adopted with the understanding that a degree of flexibility would be needed throughout the meeting to allow for productive discussions of all agenda items.

12. The work was undertaken in plenary, with smaller drafting groups being formed as needed.

13. The Secretariat introduced the background to the work undertaken to date under the Convention on Biological Diversity on the ecosystem approach. The presentations are available on the web page of the Convention at <http://www.biodiv.org/doc/meeting.asp?wg=ECOSYS-01>. A list of relevant background documentation is included in annex III.

14. Under agenda item 3 on the synthesis of case-studies and lessons learned, the meeting considered the main results from the Pathfinder Workshop; the Workshop on Further Development of the Ecosystem Approach, held in Vilm, Germany, in October 2002; and other case studies compiled by the Center for International Forestry Research (CIFOR), and presentations by country representatives (<http://www.biodiv.org/doc/case-studies/>). The lessons learned from case-studies were discussed in the context of deliberations relating to items 4 and 5 on the agenda. A number of illustrative case-studies were selected to exemplify implementation of particular guidelines (annex I). The meeting also recommended the development of a searchable database of case studies to enhance their utility in implementing the ecosystem approach in the future.

15. Under agenda item 4 on the review of principles and guidelines, the meeting considered the main results of the Workshop on Further Development of the Ecosystem Approach (Vilm, October 2002) as well as the review of principles undertaken by CIFOR (as contained in document UNEP/CBD/EM-EA/1/3). Presentations on these items were delivered by Horst Korn (Resource person, Germany) and Peter Frost (Resource person, CIFOR). The Secretariat introduced the work on "practical principles and operational guidelines on sustainable use", which were further developed during a workshop held from 6 to 8 May 2003, in Addis Ababa, Ethiopia, (<http://www.biodiv.org/doc/meeting.asp?wg=ECOSYS-01>). It was decided that major revision of the principles would not provide any added benefits at this time, and that the work of the meeting should rather focus on facilitating the implementation of the ecosystem approach. As a result, the meeting drafted guidelines for implementation of the ecosystem approach. Additional explanatory material for the principles, in the form of annotations to the rationale, was also drafted in order to provide clarification to

the user community. Furthermore, in the context of the discussions under agenda item 5 on the agenda, the group decided to elaborate on tools for the implementation of the ecosystem approach under each principle. The results of this work are contained in annex I to this document. The original text on the principles, rationale and operational guidance was not modified, however further elaborated through annotations.

16. Under agenda item 5, the meeting also considered the relationship between sustainable forest management and the ecosystem approach (agenda item 5.2). The Secretariat of the UN Forum on Forests (UNFF) presented relevant background to the conceptual basis for sustainable forest management (<http://www.biodiv.org/doc/meeting.asp?wg=ECOSYS-01>). Building on the preceding discussions under agenda item 4, the meeting further considered available tools for applying the ecosystem approach into various sectors and biomes (agenda item 5.1). Gaps in the availability of such tools were identified and further recommendations for their development provided. Strategies of how to best achieve sectoral integration of the ecosystem approach were discussed, by simultaneously reviewing the integration of the ecosystem approach into various programmes of work of the convention (agenda item 5.3; <http://www.biodiv.org/doc/meetings/esa/ecosys-01/official/ecosys-01-05-en.doc>). The results of this work are contained in annex II to this document.

17. The Group adopted its draft report in principle, and requested the co-chairs and the Secretariat to finalize the report on the basis of the meeting discussions, and send it to the Group for final revision and approval.

18. The meeting was closed at 5 p.m. on Friday, 11 July 2003.

III. MAIN CONCLUSIONS

19. The ecosystem approach is a strategy for the integrated management of land, water and living resources. It provides a framework for decision-making at various levels, including national policy-making and site-level management. There has been significant experience in implementation of the ecosystem approach by Parties operating under the Convention, as well as considerable experience in the implementation of similar approaches to management under other national and international processes. Compilation and analysis of such approaches could enhance the further application and development of the ecosystem approach of the Convention on Biological Diversity.

20. Most case-studies analysed to date were not designed explicitly to implement the ecosystem approach of the Convention on Biological Diversity, but many of them illustrate some application of the ecosystem approach, including many of its principles.

21. Case-study collection and documentation should continue. A database, searchable by biome/ecoregion and sector, would increase their usefulness in providing lessons learned. Additionally, some case studies illustrating application of the ecosystem approach and aiding understanding of the approach should be identified.

22. The implementation of the ecosystem approach is ongoing. A formal review and potential revision of the principles and operational guidance should take place at a later stage, when the application of the ecosystem approach has been more fully tested.

23. In application of the ecosystem approach, all principles need to be considered, with appropriate weight given to each.

24. The priority at this time should be on facilitating implementation of the approach. Further, the development of tools and techniques enabling such implementation should be a main concern.

Additionally, a better understanding of the ecosystem approach ought to be promoted through programmes of communication, education and public awareness.

25. To this end, the Expert Meeting has developed:

- Further explanatory material on the approach;
- Further explanatory material for each of the principles; and
- Guidelines and identified tools for implementation
- Guidance on cross-cutting issues

26. These are contained in annex I.

27. Sustainable forest management (SFM) has been defined within the framework established by the Forest Principles adopted at the United Nations Conference for Environment and Development (UNCED). SFM can be considered as a means of applying the ecosystem approach to forests. Further, there is potential for the tools developed under SFM to be used to help implement the ecosystem approach. These tools include, *inter alia*, the criteria and indicators for SFM developed under various regional and international processes, national forest programmes, and forest certification schemes. There is substantial potential for mutual learning among those implementing both the ecosystem approach and SFM. It was considered that some inter-sectoral issues are less-well reflected in SFM, and there is potential to address more fully scale-dependent factors, risks and threats. It was also noted that the IPF/IFF plan of action calls for further elaboration of biodiversity indicators.

28. In addition to SFM, many other existing approaches, including “ecosystem approaches”, “ecosystem-based management”, as well as “integrated river-basin management”, “integrated marine and coastal area management” and others are consistent with the application of the ecosystem approach of the Convention, and support its implementation in various sectors or biomes. Some of them operate on different levels and belong to a variety of sectors/communities. The process of the Convention can learn from the experience of these approaches, and make use of the tools developed for them. Implementation of the ecosystem approach in various sectors can be promoted by building upon the approaches and tools developed specifically for such sectors.

29. Annex II provides further examples of approaches and tools used in the various sectors or for particular biomes. The range of existing tools employed under other approaches should be analysed to identify any significant gaps. There seems to be fewer applications of the ecosystem approach in the agricultural sector than in other sectors. ^{1/} There is a need to mainstream the ecosystem approach in the various sectors, while emphasising the cross-sectoral nature of the ecosystem approach. The various sectors/communities concerned might be invited to identify additional insights that the ecosystem approach might provide.

30. A web-based “sourcebook” for the ecosystem approach should be developed, drawing upon, *inter alia*, annexes I and II, as well as further case studies. This should provide resources to aid decision makers and managers in the practical implementation of the approach. It should be non-prescriptive and allow adaptation to differing regional, national and local needs. The sourcebook should be developed through a process involving collaboration with other relevant organizations. It should also be available in hard-copy and on CD-Rom, periodically-revised.

^{1/} It was suggested that the following activity be added to the programme of work on agricultural biodiversity (as adopted by decision V/5): Activity 4.5: Apply the Ecosystem Approach to the agricultural sector by integrating its principles and operational guidance in national and regional agricultural sector policies, plans and programmes.

31. The ecosystem approach has been recognized as the primary framework for action under the Convention. The Addis Ababa Principles on Sustainable Use are consistent with and support implementation of aspects of the ecosystem approach principles. Many of the tools identified as useful in supporting implementation of the ecosystem approach may be equally relevant in promoting sustainable use.
32. Application of the ecosystem approach should contribute to sustainable development and contribute to attaining the Millennium Development Goals (MDGs); however, this linkage requires further development. The ecosystem approach and the Sustainable Livelihoods Approach are considered to be complementary and mutually supporting, though with somewhat different perspectives.
33. The concept of adaptive management is critical to the implementation of the ecosystem approach.
34. GEF could be encouraged to enhance its contribution to adaptive management, including through support to applied research vital to adaptive management, and by providing additional feedback on lessons learned to the bodies of the Convention on Biological Diversity.
35. The Meeting recommended that the Conference of the Parties should:
- (a) Give priority to promoting implementation of the ecosystem approach at this time; and
 - (b) Acknowledge the potential of a range of approaches developed under different processes, consistent with the ecosystem approach, to contribute to achieving the aims of the ecosystem approach. These include: sustainable forest management; responsible fisheries approaches; integrated marine and coastal management; integrated natural resources management; and integrated river basin management.
36. Parties, governments and organizations should be encouraged to:
- (a) Continue or start to implement the ecosystem approach, and to feed their experience back into the work of the Executive Secretary and to other Parties, including by providing further annotated case studies and lessons learned, and disseminating their experience through the clearing house mechanism;
 - (b) Provide technical input to the development and field testing of the sourcebook;
 - (c) Promote the application of the ecosystem approach in all sectors with potential impacts on biodiversity and ecosystems as well as inter-sectoral integration;
 - (d) Undertake workshops to bring together experts and practitioners working under these different approaches and in different sectors, in order to enhance the sharing of experiences and expertise; and provide the necessary support to conduct such workshops;
 - (e) Promote financial support for application of the ecosystem approach;
 - (f) Promote better understanding of the ecosystem approach through programmes of communication, education, public awareness and capacity building.

Annex I

**REFINEMENT AND ELABORATION OF THE ECOSYSTEM APPROACH, BASED ON
ASSESSMENT OF EXPERIENCE OF PARTIES IN IMPLEMENTATION**

A. *Further guidance on the implementation of the ecosystem approach principles*

1. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. The application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. In addition the ecosystem approach has been recognized by the World Summit on Sustainable Development as an important instrument for enhancing sustainable development and poverty alleviation.
2. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organisation, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems.
3. The ecosystem approach provides an integrating framework for implementation of objectives of the Convention on Biological Diversity. The approach incorporates three important considerations:
 - (a) Management of living components is considered alongside economic and social considerations at the ecosystem level of organisation, not simply a focus on managing species and habitats;
 - (b) If management of land, water, and living resources in equitable ways is to be sustainable, it must be integrated and work within the natural limits and utilize the natural functioning of ecosystems;
 - (c) Ecosystem management is a social process. There are many interested communities, which must be involved through the development of efficient and effective structures and processes for decision-making and management.
4. The approach is an overall methodological framework for supporting decisions in policy-making and planning, within which those implementing the Convention can develop more specific approaches appropriate to their particular circumstances. The ecosystem approach is a tool that contributes to the implementation of various issues addressed under the Convention, including the work on, *inter alia*, protected areas and ecological networks. There is no single correct way to achieve an ecosystem approach to management of land, water, and living resources. The underlying principles can be translated flexibly to address management issues in different social contexts. Already, there are sectors and governments that have developed sets of guidelines that are partially consistent, complementary or even equivalent to the ecosystem approach (*e.g.* the Code for Responsible Fisheries, the Sustainable Forest Management approach, adaptive forest management).
5. There are a number of options for implementing the ecosystem approach. One is the incorporation of the principles into the design and implementation of national biodiversity strategies and action plans and regional strategies. Others include incorporation of the ecosystem approach principles into policy instruments, mainstreaming in planning processes, and sectoral plans (*e.g.*, in forest, fisheries, agriculture). In addition, Parties and the various bodies of the Convention on Biological Diversity should be encouraged to work to achieve synergies between the ecosystem approach and the various programmes of work of the Convention on Biological Diversity, as well as promoting linkages with other international initiatives. To implement the ecosystem approach, countries should incorporate its

principles or identify pre-existing, consistent or equivalent guidelines, in the appropriate institutional, legal and budgetary channels. Work by Convention bodies and other relevant organizations should be focused on supporting local and regional efforts as a contribution to achieving the Millennium Development Goals.

6. It should be stressed that in applying the ecosystem approach, all its principles need to be considered in a holistic way, and appropriate weight given to each, according to local circumstances.

7. Notwithstanding the need for implementation to be designed to fit with the particular circumstances of the relevant problems, there is strong potential for shared experiences and expertise between ecosystems and countries. The clearing-house mechanism established under Article 18 should be the primary focus for facilitating that cooperation. A solid and broad understanding of the principles, their intentions and their consequences, is an essential condition for their application. A communication strategy for promoting the ecosystem approach to relevant target groups, within and outside the conservation sector, can be a useful tool.

8. The donor community, like governments, while noting the value of the ecosystem approach in fostering better ecosystem stewardship, should also be encouraged to be flexible in promoting its application in setting priorities and funding decisions, to allow for other perspectives, and different capacities to respond to the principles.

9. After assessing the experience of Parties in implementing the ecosystem approach decisions of the Conference of the Parties, it was noted that while the principles were not always precisely worded expressions of the concepts they incorporated, they nevertheless reflected the meaning of important concepts. The experience of Parties did not suggest a need for change to the decisions of the Conference of the Parties, but simply for the provision of additional advice and elaboration to overcome any problems of clarity and interpretation.

10. With this in mind, the following text provides some suggestions on approaches for implementation and implementation support. These include annotations to the rationale, implementation guidelines for each principle and clarification of cross-cutting aspects of the ecosystem approach.

B. Additional explanatory notes on cross-cutting issues related to operational guidance

11. In applying the operational guidance of the ecosystem approach ecosystem approach, the following cross-cutting issues need to be considered.

Initiating the approach

12. When initiating an ecosystem approach the first task is to define the problem and the task to be undertaken. The strategy to be followed to promote an ecosystem approach has to be clearly defined with contingencies for unforeseen situations incorporated into the strategy. The approach should consider all twelve principles as a package but depending upon the task at hand emphasis on particular principles may be warranted. A collective ownership for the vision, strategy and parameters for the ecosystem approach relevant to the task has to be developed, communicated, and facilitated among partners and sponsors. Collectively developing the overarching goals, objectives, and targets for the exercise is important before applying the ecosystem approach.

Capacity-building and collegiate will

13. To apply an ecosystem approach successfully it is critical to investigate what resources and sponsorship are required to undertake the exercise. This can be in the form of capacity-building and fostering collegiate will.

14. Collegiate will can be in terms of community partnerships, stakeholder engagement, political and institutional will, and the commitment of international donors or sponsors. An important consideration is the length of time such collegiate will is required; that is, it may be required in the initiation phase, assessment phase or the phase associated with implementation of outcomes. Examples exist where an ecosystem approach has been compromised from a loss of allegiance from one or more of the community, other stakeholders, the political establishment and institutions, or sponsors and donors.

15. Capacity-building is also important for the success of an ecosystem approach. Adequate financial support and appropriate infrastructure support are important requirements to the success of an approach. So too is access to suitable expertise and the sharing of knowledge and experience. In undertaking an ecosystem approach it is useful to build from lessons learnt from other undertakings applying an ecosystem approach. Technologies, including decision support tools and inventory systems, which have been developed in other applications of the ecosystem approach, may be transferable or can be adapted.

Information, research and development

16. The collection of resource, biophysical, social, and economic information is important to the successful completion of an ecosystem approach. Research and development is needed to target strategic gaps in knowledge that are important for addressing the exercise at hand. Knowledge derived from research and information from other sources has to be integrated and packaged into information products (including decision-support systems) that allow and provide for interpretation, and which facilitate their use in applying an ecosystem approach. Information products are necessary for communicating with stakeholders, planners, managers and decision makers. Consideration should be given to enhancing the access of stakeholders to information because the more transparent the decision-making is, based on information at hand, the better the ownership of the resultant decisions between partners, stakeholders and sponsors. Priorities for research and development are likely to be clearer once the ecosystem approach begins to be applied and implementing actions are put in place.

Monitoring and review

17. Monitoring and review are crucial components in implementing an ecosystem approach. They allow a responsive and adaptive management capability to be developed. Monitoring and review are also useful in reporting performance and the resultant outcomes of the approach. Indicators of performance should be defined, developed and implemented. Appropriate monitoring and auditing systems need to be implemented to support reporting on indicators of performance. Periodic reviews of these indicators need to be undertaken to assess performance and whether adaptive management needs to be applied. Strategies, practices and processes may need to be modified depending upon the findings from monitoring and auditing.

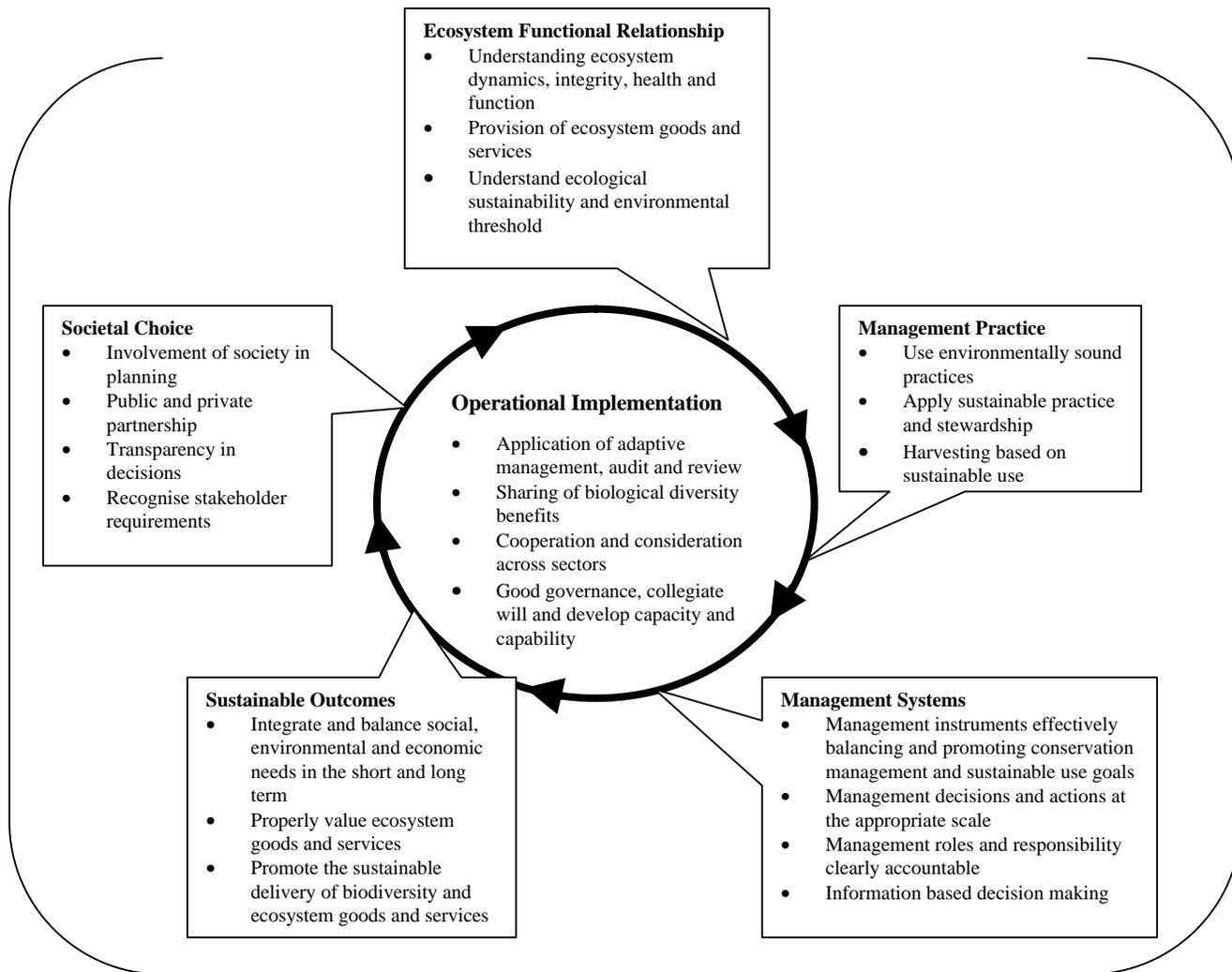
Governance

18. Good governance is essential for successful application of the ecosystem approach. Good governance includes sound environmental, resource and economic policies and administrative institutions that are responsive to the needs of the people. Robust and sound resource management systems and practices are required to support these policies and institutions. Decision-making should account for societal choices, be transparent and accountable and involve society. Accountability for making decisions has to be placed at the appropriate level that reflects that community of interest. For example strategic landuse planning and management might be taken by central government, operational decisions taken by local government or management agency, whereas decisions associated with the sharing of benefits could be taken by a community organisation.

19. Good governance at all levels is fundamental for achieving sustainable use and conservation of biodiversity. It is important to ensure intersectoral cooperation. There is a need to integrate the ecosystem approach into agriculture, fisheries, forestry and other production systems that have an effect

on biodiversity. Management of natural resources, according to the ecosystem approach, calls for increased intersectoral communication and cooperation at a range of levels (government ministries, management agencies).

THE ECOSYSTEM APPROACH



Box 1: A summary of the elements and rationale of the Ecosystem Approach contains the above elements, however is not limited to them. The operational implementation of the ecosystem approach foresees the implementation of all principles of the ecosystem approach together. The application of the ecosystem approach should be adapted to specific situations and frame conditions.

Principle 1: The objectives of management of land, water and living resources are a matter of societal choice.

Rationale: Different sectors of society view ecosystems in terms of their own economic, cultural and societal needs. Indigenous peoples and other local communities living on the land are important stakeholders and their rights and interests should be recognized. Both cultural and biological diversity are central components of the ecosystem approach, and management should take this into account. Societal choices should be expressed as clearly as possible. Ecosystems should be managed for their intrinsic values and for the tangible or intangible benefits for humans, in a fair and equitable way.

Annotations to the rationale:

The objectives for managing land, water, and living resources are a matter of societal choice, determined through negotiations and trade-offs among stakeholders having different perceptions, interests, and intentions. In this regard it should be noted that:

- *Human society is diverse in the kind and manner of relationships that different groups have with the natural world, each viewing the world around them in different ways and emphasising their own economic, cultural, and societal interests and needs.*
- *All relevant sectors of society need to have their interests equitably treated, which may involve providing for different outcomes in separate locations or at different times.*
- *It is also necessary to ensure that the needs of future generations and the natural world are adequately represented.*
- *Given this diversity, good decision-making processes that provide for negotiations and trade-offs are necessary to establish broadly acceptable objectives for the management of particular areas and their living resources.*
- *Good decision-making processes incorporate the following characteristics:*
 - *All interested parties (particularly including indigenous and local communities) should be involved in the process,*
 - *It needs to be clear how decisions are reached and who the decision-maker(s) is(are),*
 - *The decision-makers should be accountable to the appropriate communities of interest,*
 - *The criteria for decisions should be appropriate and transparent, and*
 - *Decisions should be based on, and contribute to, inter-sectoral communication and coordination.*
- *Good decisions depend on those involved having access to accurate and timely information and the capacity to apply this knowledge.*

Case-study example[‡] - Principle 1: The Zambezi River Basin - "dialogue for building a common vision"

The Zambezi River Basin encompasses some 1.300 km² throughout the Southern African Development Community (SADC) region, including a dense network of tributaries and associated wetland systems in eight countries (Angola, Namibia, Botswana, Zimbabwe, Zambia, Malawi, Tanzania, Mozambique). The livelihoods of approximately 26 million people are directly dependent on this basin, deriving benefits from its water, hydro-electric power, irrigation developments, fisheries and great wealth of related natural resources, including grazing areas, wildlife, and tourism. Over the past forty years, however, the communities and ecosystems of the lower Zambezi have been constrained by the management of large upstream dams. The toll is particularly high on Mozambique, as it the last country on the journey of the Zambezi; Mozambicans have to live with the consequences of upriver management. By eliminating natural flooding and greatly increasing dry season flows in the lower Zambezi, Kariba Dam (completed in 1959) and especially Cahora Bassa Dam (completed in 1974) cause great hardship for hundreds of thousands of Mozambican villagers whose livelihoods depend on the ebb and flow of the Zambezi River. Although these hydropower dams generate important revenues and support development however, at the expense of other resource users, subsistence fishing, farming, and livestock grazing activities have collapsed with the loss of the annual flood. The productivity of the prawn fishery has declined by \$10 - 20 million per year -- this in a country that ranks as one of the world's poorest nations (per capita income in 2000 was USD230). Changes in the flooding regime have affected the availability of water supplies, fuel wood, building materials, and medicinal plants, as well as general public health and the cultural relationship between local people and the river.

In 1985 the Zambezi Action Plan (ZACPLAN) was developed, with the objective to promote environmentally sound water resources management, while increasing long-term sustainable development in the basin. The SADC Protocol on shared watercourse systems was drafted as a follow-up in 1991, and in 1994 the Permanent River Basin Water Commission was established and subsequently joined by a number of SADC states. Projects that focus on drawing up regional legislation, establishing a unified monitoring system for water quality and quantity and setting standards for these, starting environmental education and developing integrated water management plans with broad stakeholder participation have been amongst the key initiatives. In Mozambique, a series of workshops and participatory projects are underway, engaging local resource users making their voices and needs heard in defining the objectives for integrated basin management. Participants have reached consensus on an ecologically sustainable framework for managing the water resources of the lower Zambezi and improving the living standards of thousands of riverine households. The extensive dialogue has resulted in the political will and commitment necessary to now take advantage of this unique window of opportunity to implement a common vision for future of the Zambezi system, both nationally and throughout the SADC region.

References: University of Eduardo Mondlane, Mozambique (<http://www.uem.mz/>); Museum of Natural History, Mozambique (<http://www.museum.org.mz/index.htm>); International Crane Foundation (http://www.savingcranes.org/abouticf/Africa_Program_Lower_Zambezi_Valley.asp); and Southern Waters Ecological Research and Consulting (<http://www.southernwaters.co.za/sw/index.php>); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 1.1 Involve all stakeholders (interested parties) (including indigenous and local communities) in:
 - clearly articulating, defining and agreeing upon the goals of management
 - defining problems
 - making choices (in principle 12).
- 1.2 There need to be clearly defined boundaries (in time and space) for the management unit that is the subject of the societal choice process.
- 1.3 Ensure that those stakeholders that cannot directly represent themselves (e.g. future generations, the natural world) are adequately represented by someone else.
- 1.4 Ensure that all stakeholders have an equitable capacity to be effectively involved, including through ensuring equitable access to information, ability to participate in the processes, etc.
- 1.5 Ensure that the decision-making process compensates for any inequities of power in society, in order to ensure that those who are normally marginalized (e.g. women, the poor, indigenous people) are not excluded or stifled in their participation.

[‡] It is recognised that the presented case studies address more than one principle of the ecosystem approach, optimally all of them. The cases were selected here to illustrate a real case example of an individual principle, only.

- 1.6 Identify the decision-makers are for each decision, how the decisions will be taken (what process will be used), and what are the limits on the discretion of the decision-maker (e.g. what are the criteria for the decision in law, what is the overall policy guidance within which the decision must fit, etc).
- 1.7 Ensure that the recognition of stakeholder interests occurs within the full range of decisions over time and space and levels. In doing so, however, ensure that “stakeholder fatigue” does not develop, by incorporating known stakeholder views into future decisions, and allowing efficient stakeholder input.
- 1.8 Where possible, use existing societal mechanisms, or build new mechanisms that are compatible with existing or desired societal conditions.
- 1.9 Ensure that decision-makers are accountable to the appropriate communities of interest.
- 1.10 Develop the capacity to broker negotiations and trade-offs, and manage conflicts, among relevant stakeholder groups in reaching decisions about management, use and conservation of biological resources.
- 1.11 There need to be mechanisms in place to ensure that, once an appropriate societal choice has been made, the decision will be able to be implemented over the long term, (policy, legislative and control structures need to be in place).

Indicative list of tools and sources‡

Sustainable Livelihood Approach (SLA); local development approaches supported by by bi-lateral cooperation; various types of community participation mechanisms; participatory rural appraisal (PRA); outcome pictures methodology (New Zealand); multi-criteria analysis involving stakeholders; conflict management methodologies; GIS tools, and other imaging methods to allow people to envisage their ecosystem; community mapping; strategic environmental analysis which includes a stakeholder analysis; communication strategy, plan and tools; education to empower communities to understand the relationship between their fundamental goals and ecosystem management; feedback and validation mechanisms on results of research and monitoring; democratic tools, good governance arrangements; institutional analysis tools, business systems theory, management theory; NGOs, advocates, and other to represent particular interests (ensuring that they continue to represent that interest not their own); policies to define off site interests and future interests to ensure those interests are not neglected; glossary of terms.

Principle 2: Management should be decentralized to the lowest appropriate level.

Rationale: Decentralized systems may lead to greater efficiency, effectiveness and equity. Management should involve all stakeholders and balance local interests with the wider public interest. The closer management is to the ecosystem, the greater the responsibility, ownership, accountability, participation, and use of local knowledge.

Annotations to the rationale:

Decisions should be made by those who represent the appropriate communities of interest, while management should be undertaken by those with the capacity to implement the decisions. In this regard it should be noted that:

‡ Kindly note that the listings under this heading are indicative only; draft recommendation paragraph 10 (f) in document UNEP/CBD/SBSTTA/9/8 foresees that the Executive Secretary, in collaboration with Parties and international and regional organisations, undertake a more comprehensive analysis of the range of existing tools and approaches.

- *There are usually many communities-of-interest in ecosystem management. These can be compatible, complimentary, or contradictory. It is important to ensure that the level of decision-making and management selected maintains an appropriate balance among these interests.*
- *Often, but not always, the closer the decision-making and management are to the ecosystem, the greater the participation, responsibility, ownership, accountability and use of local knowledge will be, all of which are critical to the success of management.*
- *Because there are several levels of interests with people who have varying capacities to address different aspects of ecosystem management, there are often multiple decision-makers and managers with different roles for any individual place or resource.*
- *Decisions made by local resource managers are often affected by, or even subordinate to, environmental, social, economic and political processes that lie outside their sphere of influence, at higher levels of organisation. Therefore there is a need for mechanisms to coordinate decisions and management actions at a number of different organisational levels.*

Case-study example - Principle 2: Organic coffee production in Mexico - "small farmers need extension support to successfully build their opportunities"

Coffee is amongst the key cash crops in southern Mexico. Although the global price for a pound of beans has fallen to historic lows, making it simply no longer worth the money for small farmers to harvest their crops, the potential of organic coffee is being realised. The rapidly growing markets for especially organic shade-grown coffee and cacao, are projected to potentially generate hundreds of millions of dollars in revenues for the Central American region, substantially contributing to the improvement of incomes for small farmers and indigenous people. Significant attention has been given to the positive relationship between small environmentally friendly coffee producers and biodiversity, increasing the livelihood opportunity of the former and conserving the later. To further develop the biodiversity sensitive industry in a meaningful manner, in southern Mexico management of the farming entities is left to the small farmers and producers, who are often organized in cooperatives. However, certain key issues currently impede the successful further development of the industry need to be addressed at other levels. For example, research and extension needs on issues including pest management, monitoring of organic shade-grown production systems, and the understanding of the ecological functioning thereof, quality improvement and even betterment of marketing opportunities, have to be addressed by service organisations, government extension, research institutions and others. Further, Government policies such as pesticide subsidies, which tend to favour conventionally grown crops, need to be adapted to support the development of the organic coffee industry, to allow for more environmentally friendly practices; although the small producers should have a stake in the further development of the policies, it is clearly a different stakeholder group that is acting on that level. International trade deals, which will affect the environmental offsets, will have to be managed at yet other appropriate levels.

References: [Comisión nacional para el conocimiento y uso de la biodiversidad](http://www.conabio.gob.mx) (Mexico; <http://www.conabio.gob.mx>); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 2.1 The multiple communities of interest should be identified, and decisions about particular aspects of management assigned to the body that represents the most appropriate community of interest. If necessary, management functions/decisions should be subdivided. For example, strategic decisions might be taken by central government, operational decisions by a local government or local management agency, and decisions about allocation of benefits between members of a community by the community itself.
- 2.2 The potential adverse effects of fragmented decision-making and management responsibilities should be compensated for by:
 - ensuring that decisions are appropriately nested and linked
 - sharing information and expertise
 - ensuring good communication between the different management bodies
 - presentation of the overall combination of decisions/management to the community in an understandable and consolidated form so its members can effectively interact with the overall

- system.
- supportive relationships between the levels.
- 2.3 Good governance arrangements are essential, particularly:
- clear accountabilities of the necessary authorities; and
 - accountabilities of competent bodies or persons
- 2.4 Achieving an appropriate level of decentralisation requires taking decisions at a higher level to create an enabling and supportive environment, as well as a commitment to devolve those decision-making responsibilities that are currently situated at too high a level.
- 2.5 In choosing the appropriate level of decentralisation, the following are relevant factors that should be taken into account in choosing the appropriate body. .
- whether the body represents the appropriate community of interest
 - whether the body has a commitment to the intent of the function
 - whether the body has the necessary capacity for management
 - efficiency (e.g. moving a function to a higher level may allow maintenance of the necessary level of expertise to do the function efficiently and effectively).
 - whether the body has other functions which represent a conflict of interest
 - the effect on marginalized members of society (e.g. women, marginalised tribal groups)
- In some cases problems could be corrected, through capacity-building. If no appropriate body is available at the level, a new body might be created, or an existing body modified, or a different level chosen.
- 2.6 Where functions are to be moved to another level, it is necessary to ensure that the body receiving the responsibility has sufficient capacity to fulfil that responsibility (e.g. resources, systems, authority), and that any risks arising from the transition can be managed. This means doing capacity-building if necessary to allow the decentralisation to occur.
- 2.7 Institutional arrangements are the key. If the institutional structure that supports and coordinates the decision-making authorities is missing, then their work may be worthless.

Indicative list of tools and sources:

Many of the tools in principle 1 are relevant; recognition of the types of power structures that exist in society, and use of institutional analysis; change management tools (i.e. tools for managing changes in institutions), including tools for decentralising the money and staff resources; mechanisms to deal with lack of continuity in institutions, including clear documentation, induction processes; information sharing systems (e.g. Aarhus convention); mechanisms for identifying the appropriate community of interest and also which bodies are truly representative of those communities of interest; tools for building institutional capacity; mechanisms for identifying the various decisions and management tasks, as a basis for assigning them; gender analysis techniques, ethnicity analysis, human rights tools; democracy.

Principle 3: Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.

Rationale: Management interventions in ecosystems often have unknown or unpredictable effects on other ecosystems; therefore, possible impacts need careful consideration and analysis. This may require new arrangements or ways of organization for institutions involved in decision-making to make, if necessary, appropriate compromises.

Annotations to the rationale:

Ecosystems are not closed systems, but rather open and often connected to other ecosystems. This open structure and connectedness of ecosystems ensures that effects on ecosystem functioning are seldom confined to the point of impact or only to one system. In this regard it should be noted that:

- *The effects of management interventions, or decisions not to intervene, are therefore not confined solely to the point of impact.*
- *The effects between ecosystems are frequently non-linear and will likely have associated time-lags.*
- *Management systems need to be designed to cope with these issues.*

There is a need for this to reflect the fact that impacts are in both directions – into and out of a particular ecosystem. Not just adjacent and downstream, but those have other connections as well (e.g. systems linked by migratory species).

Case-study example - Principle 3: Austrian Forest Ecosystems - "looking beyond your own backyard "

The municipality of Dornbirn, a community situated in western Austria, used the ecosystem approach as a framework for the development of its forest use plan. One of the key concerns of the community has been that the interaction between various ecosystem types and related different resource and land uses may be conflicting. The forest areas are traditionally used for game management and hunting, commercial forestry including timber production, tourism and other recreational uses, and conservation of forest ecosystems and related biodiversity. Adjacent un-forested areas are used for agriculture. In participatory forest use plan development process first all interests and uses of the forest areas were identified, as well as those of neighbouring ecosystems and uses. Obvious areas of impacts and potential user conflicts were highlighted. The different uses and their potential impacts were discussed, quantified and addressed during the early planning phase. Impact studies were conducted to assess if the forests, from an ecosystem function point of view, could maintain the planned uses. The community, including various stakeholder groups, then identified priorities for land and resource uses for different forest areas, also considering impacts on adjacent agricultural areas (e.g. a high population of game may cause damage to the harvest, if population numbers are not rigorously controlled; on the other hand tourists appreciate game sightings on agricultural areas). Guidelines for the use of the forest areas, taking into consideration impacts on adjacent ecosystems, were defined and are now being implemented. The participatory planning process allowed stakeholders from various interest groups to voice their needs and aspirations, but also listen to and learn from each other. This allowed involved parties to look beyond their own backyard and to consider the impacts their intended use would have on adjacent ecosystems and uses.

References: Federal Environment Agency (Austria; <http://www.ubavie.gv.at/publikationen/Berichte/BE153.pdf>); document UNEP/CBD/EM-EA/INF/13: Report on an electronic consultation with SBSTTA Focal Points (<http://www.biodiv.org/doc/meeting.asp?wg=ECOSYS-01>); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 3.1 Natural resource managers, decision makers and politicians should consider the possible effects that their actions could have on adjacent and downstream ecosystems (river basins and coastal zones) so that effects inside and outside the ecosystem are determined.
- 3.2 Where management or use of one ecosystem has or is projected to have effects elsewhere, bring together relevant stakeholders and technical expertise to consider how best to minimize adverse consequences
- 3.3 Environmental impact assessment (EIAs), including strategic environmental assessments (SEAs) should be carried out for all developments taking into account all the components of biological diversity. These assessments should adequately consider the potential offsite impacts. The results of these assessments, which can also include social impact assessment, should subsequently acted upon. When identifying existing and potential risks or threats to ecosystem, different scales need to be considered.
- 3.4 Establish and maintain national and regional monitoring systems to measure the effects of selected management actions across ecosystems. (cf 5.9)

3.5 Develop specific mechanisms to address transboundary issues associated with shared ecosystems and with transboundary transfer of ecological impacts (e.g. air and water pollution).

Indicative list of tools and sources

EIA and SEA and social impact assessment tools; policy and planning and decision-making systems; higher scale management systems, such as river basin authorities, central government planning systems; monitoring protocols to allow data to be compared; modelling systems (scientific) coupled with the necessary data; incorporation into national development planning; information management structures at different levels; national conferences, workshops, etc to examine cross-boundary effects and enhance cooperation between managers of adjacent systems; ecological networks frameworks; national protected area system frameworks; regulatory processes to control the impacts; integrated land use planning.

Principle 4: Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:

- a. Reduce those market distortions that adversely affect biological diversity;**
- b. Align incentives to promote biodiversity conservation and sustainable use;**
- c. Internalize costs and benefits in the given ecosystem to the extent feasible.**

Rationale: The greatest threat to biological diversity lies in its replacement by alternative systems of land use. This often arises through market distortions, which undervalue natural systems and populations and provide perverse incentives and subsidies to favour the conversion of land to less diverse systems. Often those who benefit from conservation do not pay the costs associated with conservation and, similarly, those who generate environmental costs (e.g. pollution) escape responsibility. Alignment of incentives allows those who control the resource to benefit and ensures that those who generate environmental costs will pay.

Annotations to the rationale:

Many ecosystems provide economically valuable goods and services and it is therefore necessary to understand and manage ecosystems in an economic context. Economic systems generally do not make provision for the many, often, intangible values derived from ecological systems In this regard it should be noted that:

- *Ecosystem goods and services are frequently undervalued in economic systems.*
- *Even when valuation is complete, most environmental goods and services have the characteristic of “public goods” in an economic sense, which are difficult to incorporate into markets.*
- *It is often difficult to introduce new uses of ecosystems, even where these are less impacting or provide wider benefits to society, because economic and social systems exhibit significant inertia, particularly where strong existing interests are affected by and resist change.*
- *Many stakeholders with strong interests in the ecosystem, but having limited political and economic influence, may be marginalized from the relevant economic systems.*
- *Where those who control use of the land do not receive benefits from maintaining natural ecosystems and processes, they are likely to initiate unsustainable land use practices from which they will benefit directly in the short term. To counter this more equitable sharing of benefits is advised.*

- *International, national and sub-national policies, laws and regulations, including subsidies may provide perverse incentives for unsustainable management of ecosystems. Economic systems therefore need to be redesigned to accommodate environmental management objectives.*
- *Addressing the issue of market distortions that adversely affect biodiversity will require establishing dialogue with other sectors.*
- *Deriving economic benefits need not be inconsistent with attaining biodiversity conservation and improvement of environmental quality, provided that incentives are properly aligned.*

Case-study example - Principle 4: The Mesoamerican Biological Corridor - "payment for environmental goods and services"

Mesoamerica is richly endowed with timber, minerals, fertile volcanic soils, freshwater, and beautifully varied lands- and seascapes. The region is believed to contain some 7% of the world's biodiversity in a relatively small area of land. The natural richness of the Mesoamerican region can be explained by it being the bridge between the two great continental masses of North and South America; by its location between two oceans, the Atlantic and Pacific; and resulting from the varying geo-climatic situation a great diversity of ecosystems, including lagoons, volcanoes, mountains, reefs, islands, plains, natural ecosystems, agro ecosystems, to mention just a few. The seven Central American countries (Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica and Panama) in collaboration with the four southern states of Mexico are working together in establishing the "Mesoamerican Biological Corridor" (MBC), conceived as a super-corridor enveloping many corridors, or as a programme encompassing many projects, mainly implemented on a national level, however linked to the regional scope. The Central American Commission for the Environment and Development (CCAD) is carrying out several regional projects linked to the conservation and sustainable use of the environment and the natural resources. It is perceived that the economic benefits that can be derived from natural resources, through the use of related goods and services can provide income and employment for rural people and could be a vital source for funds to build and sustain the MBC. In this regard the MBC has started and contributed to the implementation of a "Payment for Environmental Goods and Services Programme" (PES Programme) in different countries of the region. The idea is to develop economic, legal and institutional mechanisms for the internalisation of the environmental costs, caused by human activities. The process follows 8 basic steps: 1) Identification of environmental problem (environmental impact, stakeholders, economic activities affected and ecosystem goods and services involved); 2) Determine the physical environmental variables; 3) Measure these environmental variables in physical terms; 4) Apply economic valuation methodologies; 5) Generate environmental economic indicators; 6) Propose economic mechanisms for internalising environmental costs and for capturing and distribution of environmental benefits; 7) Negotiation process among stakeholders on the mechanisms proposed and; 8) Implementation of the mechanisms that have been adopted by most of the stakeholders involved. Some successes have been made in capturing benefits from carbon-sequestration and tourism activities related to "Scenic Beauty and Biodiversity Research". But most importantly, for the new PES programmes in the Mesoamerican region, pilot projects have been carried out based on economic valuation of water resources and capturing benefits from successful management of watersheds. Some countries in the region are already providing financial incentives to landowners who allow a land use change of their fields in order to protect the ecosystems (e.g. pastures and croplands that revert to forestland). However, a number of challenges on a different level (political, institutional, technical) have to be overcome to make "Payment for environmental goods and services" initiatives a broader scale success.

References: The Central American Commission for the Environment and Development (CCAD) (<http://www.ccad.sgsica.org>, and soon <http://www.ccad.ws>); The Advisor on Environmental Economics for the Regional Project for the Consolidation of the Mesoamerican Biological Corridor (rado.barzev@biomeso.net, <http://www.biomeso.net>); Focal Point for the Convention of Biodiversity, Ministry of Environment & Natural Resources (Nicaragua; <http://www.marena.gob.ni/>); World Resources Institute - Defining Common Ground for the Mesoamerican Biological Corridor (http://pdf.wri.org/mesoamerica_english.pdf); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 4.1 Develop an understanding of the social and economic context of the issue to which the ecosystem approach is being applied
- 4.2 Apply appropriate practical economic valuation methodologies for ecosystem goods and services (direct, indirect and intrinsic values); and for the environmental impacts (effects or externalities).
- 4.3 Aim to reduce those market distortions that adversely affect biological diversity

- 4.4 Align economic and social incentives to promote biodiversity conservation and sustainable use.
- 4.5 Internalize costs and benefits in the given ecosystem to the extent feasible.
- 4.6 Evaluate the direct as well as indirect economic benefits associated with good ecosystem management including biodiversity conservation and environmental quality.
- 4.7 Enhance benefits of using biological diversity.
- 4.8 Ensure equitable sharing of costs and benefits.
- 4.9 Incorporate social and economic values of ecosystem goods and services into National Accounts, policy, planning, education and resource management decisions

Indicative list of tools and sources

Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA), Social Network analysis, Sustainable Livelihoods Approach; EIA tool and various environmental valuation methods (including willingness to pay, contingent valuation, cost-benefit analysis, travel costs, hedonic valuation, opportunity costs); Extended Domestic Resource Cost (EDRC) analysis; policy and regulation, e.g. polluter pays principle; development of markets for ecosystem services, domestication of species, value-added processing and marketing, ecolabelling; policies, agreements, empowerment; payment for environmental goods and services.

Principle 5: Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.

Rationale: Ecosystem functioning and resilience depends on a dynamic relationship within species, among species and between species and their abiotic environment, as well as the physical and chemical interactions within the environment. The conservation and, where appropriate, restoration of these interactions and processes is of greater significance for the long-term maintenance of biological diversity than simply protection of species.

Annotations to the rationale:

Biodiversity conservation and the maintenance of human wellbeing depend on the functioning and resilience of natural ecosystems. In this regard it should be noted that:

- *Ecosystem services – the benefits people obtain from ecosystems by way of resources, environmental regulation including, support of biospheric processes, inputs to culture, and the intrinsic values of the systems themselves – depend on maintaining and, where appropriate, restoring particular ecological structures and functions.*
- *Ecosystem functioning and resilience depend on inter-relationships within and among species, between species and their abiotic environments, and on the physical and chemical interactions within these environments.*
- *Given this complexity, management must focus on maintaining, and where appropriate restoring, the key structures and ecological processes (e.g., hydrological systems, pollination systems, habitats and food webs) rather than just individual species.*
- *Given that the loss of genetic diversity predisposes populations and species to local extinction, the conservation of ecosystem composition and structure requires monitoring of population sizes of vulnerable and economically important species.*

- *Management of ecosystem processes has to be carried out despite incomplete knowledge of ecosystem functioning.*

Case-study example - Principle 5: Working for water - a South African way of keeping alien invasives from undermining ecosystem processes

Working for Water is an initiative that was launched in 1995 in an effort to tackle the problem of invading alien plants in most of South Africa's river catchments to provide employment opportunities. It is a multi-departmental initiative led by the Departments of Water Affairs and Forestry, Environmental Affairs and Tourism and Agriculture. With 300 projects throughout the country, the programme aims to enhance water security, improve ecological integrity, restore the productive potential of land and promote sustainable use of natural resources and invest in the most marginalized sectors of South African society.

In much of South Africa, invading alien plants (IAPs) are the single biggest threat to plant and animal biodiversity. IAPs have become established in over 10 million hectares of land in South Africa. The cost of controlling IAPs in South Africa is estimated at R600 million a year over 20 years. If IAPs are left uncontrolled, the problem will double within 15 years. IAPs waste 7% of our water resources; reduce our ability to farm; intensify flooding and fires; cause erosion, destruction of rivers, siltation of dams and estuaries, and poor water quality and can cause a mass extinction of indigenous plants and animals.

Through an extensive social development component, which is an integral part of Working for Water, affecting all operations of the programme, 18 000 jobs are created per annum, for previously unemployed individuals, in IAP management projects. Such jobs are in IAP clearing projects, ecosystem rehabilitation and management initiatives and in associated social development projects., and mainly involve people living in the area. Of the created jobs, 60% are allocated to women; 20% to youth; and 2% (minimum) to disabled persons inline with affirmative action policies. Further the social development component aims to ensure every worker receives a minimum average of two days of training per month; ensure every project has a functional steering committee; ensure every worker receives an hour of HIV-AIDS awareness training per quarter; and ensure every project allows for access to childcare facilities.

References: Department of Water Affairs & Forestry, Working for Water (South Africa, <http://www.dwaf.pwv.gov.za/wfw/Docs/default.asp>; Report on the international workshop on the "further development of the ecosystem approach" (Government of the Federal Republic of Germany, Ministerial Division for Conservation; <http://www.bfn.de/09/skript78.pdf>); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 5.1 Improve understanding of the interrelationship among ecosystem composition, structure and function with respect to (i) human interaction, needs and values (including cultural aspects), (ii) conservation management of biodiversity, and (iii) environmental quality, integrity and vitality.
- 5.2 Determine and define conservation, social and economic objectives and goals that can be used to guide policy, management and planning using participatory processes.
- 5.3 Assess the extent to which ecosystem composition, and structure can function contribute to the delivery of goods and services to meet the desired balance of conservation, social and economic outcomes.
- 5.4 Expand knowledge of the responses of ecosystems, in terms of changes in composition, structure and function, to both internally and externally induced stresses caused by, *inter alia*, human use, disturbance, pollution, fire, alien species, disease abnormal climatic variations (drought, flood) etc.
- 5.5 Develop and promote management strategies and practices that enable and ensure conservation of ecosystem services and take account of, or minimize, risks/threats to ecosystem function and structure.
- 5.6 Apply instruments to maintain and/or restore ecosystem service.
- 5.7 Where required, develop management strategies and practices to facilitate recovery of ecosystem

structure and function (including threatened components) to generate or enhance ecosystem services and biodiversity benefits.

5.8 Develop and apply instruments that contribute to achievement of conservation management goals through a combination of managing protected area networks, ecological networks and areas outside of such networks to meet both short-term and long-term requirements and conservation outcome.

5.9 Monitoring of population sizes of vulnerable and important species should be linked to a management plan that identifies appropriate response measures and actions.

Indicative list of tools and sources:

Interdisciplinary research such as in functional analysis, ethnobotanical studies, strengthening of capacity, both individual and institutional to undertake research; national strategies, plans and programmes, management plans; inventories, assessments, surveys, growth and yield studies; translation of targeted, applied research; identification and promotion of good practices, guidelines, manuals, case studies, codes of conduct, risk assessment; legal, policy, planning, technical and financial instruments; management and restoration plans, land care strategies; landscape planning, biosphere reserves and other protected areas.

Principle 6: Ecosystems must be managed within the limits of their functioning.

Rationale: In considering the likelihood or ease of attaining the management objectives, attention should be given to the environmental conditions that limit natural productivity, ecosystem structure, functioning and diversity. The limits to ecosystem functioning may be affected to different degrees by temporary, unpredictable or artificially maintained conditions and, accordingly, management should be appropriately cautious.

Annotations to the rationale:

There are limits to the level of demand that can be placed on an ecosystem while maintaining its integrity and capacity to continue providing the goods and services that provide the basis for human wellbeing and environmental sustainability. Our current understanding is insufficient to allow these limits to be precisely defined, and therefore a precautionary approach coupled with adaptive management, is advised. In this regard it should be noted that:

- *Just as there are limits to the demands (production, off-take, assimilation, detoxification) that can be made on ecosystems, so too there are limits to the amount of disturbance that ecosystems can tolerate, depending on the magnitude, intensity, frequency and kind of disturbance.*
- *These limits are not static but may vary across sites, through time, and in relation to past circumstances and events.*
- *Cumulative effects of interventions over time and space should be assessed when considering ecosystem limits.*
- *If these limits are exceeded, an ecosystem undergoes substantial change in composition, structure and functioning, usually with a loss of biodiversity and a resulting lower productivity and capacity to process wastes and contaminants*
- *There is considerable lack of knowledge and uncertainty about the actual limits (thresholds for change) in different ecosystems. While further research can reduce these uncertainties, given the dynamic and complex nature of ecosystems we may never have perfect understanding.*
- *Given the pervasiveness of uncertainties in managing ecosystems, management will need to be adaptive, with a focus on active learning derived from monitoring the outcomes of planned*

interventions using a sound experimental approach that allow the effects of the intervention to be accurately determined.

- *Management to restore lost capacities or control use should be appropriately cautious and apply an adaptive management approach.*

Case-study example - Principle 6: The Great Barrier Reef Marine Park Representative Area Programme - "identifying and honouring productivity limits"

The Great Barrier Reef Marine Park Representative Areas Programme (RAP) provides an example of long term adaptive management that takes into account ecosystem structure, functioning and productivity - and the natural limits of the ecosystem. The objective of the RAP is to help protect biodiversity within the Great Barrier Reef World Heritage Area (GBRWHA). This will be done by protecting 'representative' examples of all the different habitats and communities in the GBRWHA and building upon the existing network of Green Zones (no-take areas).

The GBRWHA has been classified into 70 reef and non-reef bioregions. Bioregions are areas of differing marine biodiversity which have been mapped after consideration of the physical and biological diversity of the entire GBRWHA. Each bioregion contains plant and animal communities, together with physical features, that are significantly different from the surrounding areas and the rest of the GBRWHA. There is, however, a high level of 'connectivity' within the marine environment and each of these habitats plays an important role in the entire Reef ecosystem.

Virtually the entire Great Barrier Reef Marine Park is already zoned with different uses permitted in different zones. However less than 5% of the Marine Park is currently in Green Zones ('no-take' areas) that prohibit extractive uses like fishing and collecting. A panel of scientific experts analysed the existing level of no-take areas within GBR reef and non-reef bioregions and found this level was not enough to adequately protect the biodiversity of the GBRWHA. As a result of adaptive management and the implementation of all the principles of the Representative Areas Program, a minimum of 20% of each of the 70 bioregions will become Green Zones.

Contacts: The Great Barrier Reef Marine Park Authority (Australia; <http://www.gbrmpa.gov.au/>); the Representative Areas Program (Australia; <http://www.reefed.edu.au/rap/>).

Implementation guidelines

- 6.1 Identify practices that are not sustainable and develop appropriate mechanisms for improvement involving all stakeholders.
- 6.2 Given the uncertainty associated with defining the limits to ecosystem functioning under most circumstances, the precautionary principle should be applied.
- 6.3 Implement an adaptive management approach.
- 6.4 Develop understanding of the limits of ecosystem functioning and the effects of various human use on the delivery of ecosystem goods and services.
- 6.5 Where permissible limits to alteration of specific ecosystem components can be agreed, manage within these but monitor and assess the ecosystem response. Feed the information at regular intervals to those responsible for setting the off-take or other limits.
- 6.6 Encourage the use of environmental assessments and monitoring to establish ecosystem responses to disturbance, in order to provide management feedback and develop appropriate responses.
- 6.7 Develop and promote appropriate management strategies and practices that sustain resources and maintain ecosystems within the limits of their functioning.
- 6.8 Sustainable use management goals and practices should avoid or minimize adverse impacts on ecosystem services, structure and functions as well as other components of ecosystems.
- 6.9 Formulate, review and implement regulatory frameworks, codes of practice and other instruments to avoid using ecosystems beyond their limits.

Indicative list of tools and sources:

Participatory Rural Appraisal (PRA); remote sensing; keep options open and avoid actions with irreversible effects; adaptive collaborative management, participatory action research, monitoring and evaluation, criteria and indicators; interdisciplinary research such as in functional analysis, ethnobotanical studies, strengthening of capacity, both individual and institutional, to undertake research; monitoring, evaluation and review, sustainable yield, other indices, carrying capacities; criteria and indicators, performance indicators, targets.

Principle 7: The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.

Rationale: The approach should be bounded by spatial and temporal scales that are appropriate to the objectives. Boundaries for management will be defined operationally by users, managers, scientists and indigenous and local peoples. Connectivity between areas should be promoted where necessary. The ecosystem approach is based upon the hierarchical nature of biological diversity characterized by the interaction and integration of genes, species and ecosystems.

Annotations to the rationale:

The driving forces of ecosystems, including those due to human activities, vary spatially and through time, necessitating management at more than one scale to meet management objectives. In this regard it should be noted that:

- *Ecosystems are made up of biotic and abiotic components and processes, which function at a range of spatial and temporal scales, within a nested hierarchy.*
- *The dynamics of human social and economic systems also vary across scales of space, time and quality.*
- *How components are perceived spatially depends partly on the scale of observation. At one scale, individuals of a species may seem relatively regularly and continuously distributed; at another the distribution may be discontinuous. Likewise, at one time scale (e.g., monthly, annually) a component or process may appear predictable; at another, longer or shorter time scale, the temporal dynamics may be unpredictable.*
- *Management processes and institutions should be designed to match the scales of the aspects of the ecosystem being managed. More importantly, perhaps, given that ecosystem components and processes are linked across scales of both space and time, management interventions need to be planned to transcend these scales.*
- *Failure to take scale into account can result in mismatches between the spatial and time frames of the management and those of the ecosystem being managed. For example, policy makers and planners usually consider shorter time frames than the time frames of major ecosystem processes. The reverse can also be true, for example, where bureaucratic inertia can delay the quick management response needed to address a rapidly changing environmental condition. Spatial mismatches are also common, such as when administrative boundaries and those of ecosystem properties or related human activities that they are designed to regulate do not coincide.*

Case-study example - Principle 7: The Great Limpopo Transfrontier Park - "managing ecosystems at a broader scale - and building regional partnerships"

The Great Limpopo Transfrontier Park also known as the Gaza-Kruger-Gonarezhou Transfrontier Park is an international game park that brings together some of the best and most established wildlife areas in southern Africa. The park is managed as an

integrated unit across an unprecedented three international boundaries. The conservation authorities in Mozambique, South Africa and Zimbabwe will collaboratively manage wildlife and natural resources in the different areas to promote biodiversity conservation, and in a manner which will benefit local communities and regional tourism.

The park includes South Africa's Kruger National Park and Gonarezhou Park in Zimbabwe. A large wildlife area in Mozambique, the Limpopo National Park, will be added and introduced for the first time to the general public in the near future. The total surface area of the Great Limpopo park will be approximately 35 000 square kilometres. The establishment of the transfrontier park is the first phase of the establishment of a bigger transfrontier conservation area measuring a staggering 100 000 square kilometres.

Definitions vary, but essentially all a **transfrontier park** means is that the authorities responsible for areas in which the primary focus is wildlife conservation, and which border each other across international boundaries, formally agree to manage those areas as one integrated unit according to a streamlined management plan. These authorities also undertake to remove all human barriers within the Transfrontier Park so that animals can roam freely. Slightly different, a **transfrontier conservation area** usually refers to a cross-border region where the different component areas have different forms of conservation status, such as Private Game Reserves, communal natural resource management areas, and even hunting concession areas. Fences, major road highways, railway lines or other barriers may separate the various parts. Nevertheless, they border each other and they are managed for long-term sustainable use of natural resources, although free movement of animals between the different parts is not possible.

Political boundaries very rarely respect ecological systems. In the past historical animal migration routes and other ecosystem functions have been disrupted by fences and incompatible legislation. The creation of transfrontier parks aims to maintaining more natural ecosystems, jointly managed according to harmonized wildlife management policies, and thus promoting the return of larger and more resilient ecosystems with greater chances of long-term sustainability (Ministry of Environment & Tourism, South Africa).

References: Direcção Nacional de Áreas de Conservação (Mozambique; Tel: ++ 258 1 303650; Fax: ++ 258 1 306212); Department of Environmental Affairs and Tourism South Africa, <http://www.environment.gov.za>; South African National Parks (South Africa; www.parks.co.za), The Peace Parks Foundation (South Africa; <http://www.peaceparks.org>), Department of National Parks and Wildlife Management (Zimbabwe; Tel: ++ 263 4 792 786; Fax: ++ 263 4 724 914); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 7.1 Enhanced capacity is required to analyse and understand the temporal and spatial scales at which ecosystem processes operate, and the effect of management actions on these processes and the delivery of ecosystem goods and services. Identification of spatial patterns and gaps in connectivity should be included in this analysis.
- 7.2 Functional mismatches in the administration and management of natural resources should be avoided by readjusting the scale of the institutional response to coincide more closely with spatial and temporal scales of processes in the area under management. This logic underpins the current global trend towards decentralized natural resource management.
- 7.3 Given that ecosystem components and processes are linked across scales of both time and space, management interventions need to be planned to transcend these scales. Developing a nested hierarchy of spatial scales may be appropriate in some circumstances.
- 7.4 Managing large areas such as river basins or large marine areas may require development of new institutional mechanisms to engage stakeholders across administrative borders and different levels of administration.
- 7.6 Attention to spatial and temporal scales is needed in the design of assessment and monitoring efforts.
- 7.7 Concepts of stewardship, intergenerational equity and sustainable yield need to be applied to considerations of the temporal scale.
- 7.8 Regional collaboration is necessary to deal with large-scale changes.

Indicative list of tools and sources:

Remote sensing, satellites, GIS systems, aerial photographs; reconstructing history of system, including pollen, carbon dating, ice cores, traditional knowledge, folklore, and covering of cultural and economic issues; scenario building, both climate and socio-cultural; spatial land-use models, landscape visualisation; watershed and River Basin Models; collaborative learning with all levels, capacity building; information networks (online data and information), list serves, cross-sectoral roundtables, information exchange arenas, adaptive management workshops (double-loop learning); identify long-term monitoring programme such as LTER and others; World Bank and other M & E, materials on biodiversity.

Principle 8: Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.

Rationale: Ecosystem processes are characterized by varying temporal scales and lag-effects. This inherently conflicts with the tendency of humans to favour short-term gains and immediate benefits over future ones.

Annotations to the rationale:

Time needs to be considered explicitly in formulating management plans, and in longer-scale processes need to especially considered and planned for because these are otherwise often neglected. In this regard it should be noted that:

- *People find long-term trends more difficult to detect than short term trends, particularly in complex systems.*
- *Management systems tend to operate at relatively short time scales, often much shorter than the timescales for change in ecosystem processes.*
- *Where there is a lag between management actions and their outcomes, it is difficult to take reasoned management decisions.*
- *Long-term ecological processes, which can be very important, are therefore likely to be poorly accommodated in management systems, unless these are explicitly and carefully designed to address long-term issues.*
- *Awareness of long-term processes is important because it is the long-term, spatially, extensive processes that both characterize and determine the broad ecosystem properties.*

Case-study example - Principle 8: Chivi District, south-eastern Zimbabwe - "long-term natural resources management objectives are constrained by the short-term needs of the people "

To make a living by farming and harvesting natural resources in semi-arid environments, natural resource users have to respond to considerable spatial and temporal variation in these environments. This also is particularly true for Chivi district in southern Zimbabwe, an area characterized generally by relatively low and variable rainfall, frequent and recurring droughts, and nutrient poor soils. Most households depend for their daily livelihoods on agriculture (maize, groundnuts, millet, and sunflower, beans and more recently cotton, contributing on average 30% annually to a household's net income in cash or kind), animal husbandry (21%) and the use of other natural resources (bushmeat, wild plants, wood and non-timber forest products: 15% of net annual income). Wages and remittances from family members employed elsewhere make up the balance, 33%. A number of rural development and natural resource management projects have been implemented in this district over the years, many of which have taken long-term natural cycles and especially recurring drought into consideration. For local people, however, long-term natural resources management objectives are often constrained by having to meet their short-term needs, sometimes leading to apparently unsustainable use of natural resources. To cope with considerable short-term natural variability in rainfall, longer-term climate cycles and disasters generally, people have a number of strategies for overcoming the vagaries of a harsh environment, allowing them to sustain their livelihoods and actively manage some aspects of their environment. These include innovative soil and water conservation technologies and short-term resource management practices, as well as a variety of socio-economic coping mechanisms such as locally adapted and evolved saving schemes, investments and other safety nets. Interesting linkages between the ecosystem and the sustainable livelihoods approach (SLA) are apparent, that could serve to connect long-term natural resources management objectives and people's livelihoods.

References: Institute of Environmental Studies, University of Zimbabwe (<http://www.ies.ac.zw>); Center for International Forestry Research (CIFOR; <http://www.cifor.cgiar.org/>); Centre for Research and Information on Low External Input and Sustainable Agriculture (<http://www.oneworld.org/ileia/newsletters/11-4/11-4-10.htm>); CBD webpage: <http://www.biodiv.org/doc/case-studies/>; document UNEP/CBD/EM-EA/1/2

Implementation guidelines

- 8.1 Adaptive management processes should include the development of long-term visions, plans and goals that address inter-generational equity, while taking into account immediate and critical needs (e.g., hunger, poverty, shelter).
- 8.2 Adaptive management should take into account trade-offs between short-term benefits and long-term goals in decision-making processes.
- 8.3 Adaptive management should take into account the lag between management actions and their outcomes.
- 8.4 Monitoring systems should be designed to accommodate the time scale for change in the ecosystem variables selected for monitoring. Alternatively, if the monitoring cannot be adjusted, a more appropriately scaled but still relevant variable should be selected to monitor.
- 8.5 The capacity to monitor and detect long-term, low frequency changes in ecosystem structure and functioning should be strengthened.
- 8.6 To implement long-term management requires stability of institutions, legal and policy frameworks, monitoring programs, and extension and awareness-raising programs.

Indicative list of tools and sources:

Remote sensing, satellites, GIS systems, aerial photographs; reconstructing history of system, including pollen, carbon dating, ice cores, traditional knowledge, folklore, and covering of cultural and economic issues; scenario building, both climate and socio-cultural; spatial land-use models, landscape visualisation; watershed and River Basin Models; collaborative learning with all levels, capacity building; information networks (online data and information), list serves, cross-sectoral roundtables, information exchange arenas, adaptive management workshops (double-loop learning); identify long-term monitoring programme such as LTER and others; World Bank and other M & E, materials on biodiversity.

Principle 9: Management must recognize that change is inevitable.

Rationale: Ecosystems change, including species composition and population abundance. Hence, management should adapt to the changes. Apart from their inherent dynamics of change, ecosystems are beset by a complex of uncertainties and potential "surprises" in the human, biological and environmental realms. Traditional disturbance regimes may be important for ecosystem structure and functioning, and may need to be maintained or restored. The ecosystem approach must utilize adaptive management in order to anticipate and cater for such changes and events and should be cautious in making any decision that may foreclose options, but, at the same time, consider mitigating actions to cope with long-term changes such as climate change.

Annotations to the rationale:

Change in ecosystems is both natural and inevitable, and therefore management objectives should not be construed as fixed outcomes but rather the maintenance of natural ecological processes. In this regard it should be noted that:

- *Ecosystems change constantly as a result of natural processes. Those changes include shifts in species composition, population abundance, and physical characteristics.*
- *Such changes are not necessarily constant, rather they are variable, dynamic and usually difficult to predict at any point in time.*
- *It is therefore difficult to select an appropriate outcome or future state of an ecosystem as a static management goal. Instead, in addressing this and Principle 8, management should focus on maintaining the natural processes, which drive those changes.*
- *This focus on processes requires a management approach that is flexible and adaptive, both as a response to changing circumstances and to take account of new knowledge and understanding. Adaptive management should generate new knowledge and reduce uncertainties, thereby allowing the manager to anticipate and cater for change.*
- *Ecosystem management must therefore involve a learning process that will help to adapt methods and practices to improve the ways in which these systems are being managed and monitored. Flexibility is also needed in policy-making and implementation. Long-term, inflexible decisions are likely to be ineffective or detrimental.*

Case-study example - Principle 9: The Trilateral Cooperation on the Protection of the Wadden Sea (Netherlands, Germany, Denmark) - "research based decision-making and the realisation that some change is inevitable, other change not"

The Trilateral Wadden Sea Cooperation Area, in short, Wadden Sea Area, includes coastal ecosystems off the Atlantic/Northern Sea of the Netherlands, Germany and Denmark. An explicit Trilateral Monitoring and Assessment Program (TMAP) has been developed with the aims (1) To provide a scientific assessment of the status and development of the Wadden Sea ecosystem, and (2) To assess the status of implementation of the trilateral Targets of the Wadden Sea Plan. The parameters selected for incorporation in the TMAP include climate change, input of nutrients and pollutants, commercial fisheries, recreational activities and agricultural practice ([TMAP Implementation Plan 1997](#)). In regular intervals, synchronized with the Trilateral Governmental Conferences, assessment reports of the Wadden Sea are elaborated. They describe and evaluate the current ecological status of the Wadden Sea, identify issues of concern and indicate possible measures; long-term scientific research and monitoring results regularly feed into management - allowing for adaptive decision-making. The TMAP recognizes that there are avoidable and unavoidable changes in ecosystems, and these need to be clearly distinguished to identify the best management interventions. Although it is recognized that ecosystems, which are inhabited by humans will always be challenged by anthropogenic change, it is also realized that decisions should be made to minimize such anthropogenic impacts, if possible. Amongst the identified changes are impacts such as global climate change and alien invasive species. Local management measures are largely ineffective in addressing these, and global measures need to be taken.

References: Common Wadden Sea Secretariat (Germany, <http://cwss.www.de/>); Report on the international workshop on the "further development of the ecosystem approach" (Government of the Federal Republic of Germany, Ministerial Division for Conservation; <http://www.bfn.de/09/skript78.pdf>); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 9.1 Adaptive management is needed to respond to changing social and ecological conditions, and to allow management plans and actions to evolve in light of experience.
- 9.2 Natural resource managers must recognize that natural and human-induced change is inevitable and take this into account in their management plans.
- 9.3 Adaptive management should be encouraged when there is a risk of degradation or loss of habitats, as it can facilitate taking early actions in response to change.
- 9.4 Monitoring systems, both socio-economic and ecological, are an integral part of adaptive management, and should not be developed in isolation from the goals and objectives of management

activities.

- 9.5 Adaptive management must identify and take account of risks and uncertainties.
- 9.6 Where changes occur across national borders, the scale of adaptive management may need to be adjusted.
- 9.7 While ecosystems are inherently dynamic and resilient, special adaptation and mitigation measures are needed for human-induced problems such as climate change that may push ecosystems beyond the limits of natural variation. Capacity-building efforts are needed to address highly vulnerable areas such as small island states and coastal areas.
- 9.8 Traditional knowledge and practice should be used to enable better detection and understanding of ecosystem change, and to develop appropriate adaptation measures.
- 9.9 Adaptive management should recognize the resilient capacity of ecosystems in response to natural disturbances, and should be aimed at maintaining or restoring this capacity so as to reduce the risk of adverse social and economic consequences of natural variability in ecosystems.
- 9.10 Awareness-raising measures are needed to enhance public knowledge that ecosystem change is a natural phenomenon, and to build support and capacity for adaptive management.

Indicative list of tools and sources:

Remote sensing, satellites, GIS systems, aerial photographs; reconstructing history of system, including pollen, carbon dating, ice cores, traditional knowledge, folklore, and covering of cultural and economic issues; scenario building, both climate and socio-cultural; spatial land-use models, landscape visualisation; watershed and River Basin Models; collaborative learning with all levels, capacity building; information networks (online data and information), list serves, cross-sectoral roundtables, information exchange arenas, adaptive management workshops (double-loop learning); identify long-term monitoring programme such as LTER and others; World Bank and other M & E, materials on biodiversity.

Principle 10: The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.

Rationale: Biological diversity is critical both for its intrinsic value and because of the key role it plays in providing the ecosystem and other services upon which we all ultimately depend. There has been a tendency in the past to manage components of biological diversity either as protected or non-protected. There is a need for a shift to more flexible situations, where conservation and use are seen in context and the full range of measures is applied in a continuum from strictly protected to human-made ecosystems.

Annotations to the rationale:

Biological diversity provides ecosystem goods and services on which humans ultimately depend. In this regard it should be noted that:

- *The ecosystem approach is designed to support the conservation of biodiversity, the sustainable use of its components, and the equitable sharing of benefits derived from the use of biodiversity.*
- *Sustainable use and management depends on also achieving conservation objectives.*
- *Management for conservation and sustainable use are not inherently incompatible, and can potentially be integrated.*

- *Integration can be achieved at various scales and in various ways including both spatial and temporal separation across the landscape as well as through integration within a site.*

Case-study example - - Principle 10: The Gulf of Aqaba, Egypt - "determining sustainable use limits to tourism"

Although eco-tourism is generally seen as one option of sustainable use, lessons learnt from the Egyptian Gulf of Aqaba Protectorates indicate that there is a need to find a balance between conservation and sustainable use; further "sustainable use" has to be monitored in order to detect changes that may lead to unsustainability.

The abundant coral reefs in the Gulf of Aqaba have made this area one of Egypt's prime tourist attractions. Tourism developments along the coast are growing fast. Infrastructure and increase in sheer tourist numbers are impacting the coastal areas. Diving, amongst the most liked tourist activities, has been identified as being amongst the most destructive uses in the coastal and marine environments, if not properly managed and monitored.

As part of established integrated coastal zone management practices, including the Regional Organisation for the Conservation of the Environment of the Red Sea and Gulf of Aden (PERSGA), Egypt has developed coastal development guidelines along the Gulf of Aqaba to promote a balance of (sustainable) use and conservation - and the enforcement of relevant legislation in this regard. Rigorous Environmental Impact Assessment guidelines are being applied to the tourism sector. Through intensive research the Egyptian Environmental Affairs Agency (EEAA) is establishing the carrying capacity for dive sites, and has recently made proposals for the zonation, both temporal and spatial, of sustainable use and strict conservation areas.

Contacts: Egyptian Environmental Affairs Agency (Egypt, <http://www.eeaa.gov.eg/>); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 10.1 Develop integrated natural resource management systems and practices to ensure the appropriate balance between, and integration of, the conservation and use of biological diversity, taking into account long- and short-term, direct and indirect, benefits of protection and sustainable use as well as management scale.
- 10.2 Develop policy, legal, institutional and economic measures that enable the appropriate balance and integration of conservation and use of ecosystems components to be determined.
- 10.3 Promote participatory integrated planning, ensuring that the full range of possible values and use options are considered and evaluated.
- 10.4 Seek innovative mechanisms and develop suitable instruments for achieving balance appropriate to the particular problem and local circumstances.
- 10.5 Manage areas and landscapes in a way that optimizes delivery of ecosystem goods and services to meet human requirements, conservation management and environmental quality.
- 10.6 Determine and define sustainable use objectives that can be used to guide policy, management, and planning, with broad stakeholder participation.
- 10.7 Identify solutions which relieve sectoral pressure on existing resources.

Indicative list of tools and sources:

Cost benefit and cost effectiveness analysis, input-output analysis, SEA, EIA, Integrated river basin management, large marine ecosystems, natural areas, INRM, biosphere reserves, model forests; economic and other evaluation methods (see principle 4); PRA, national forest programmes, model forests, ACM; establishing fora for reaching consensus on balance, partnerships, the establishment of trusts, conflict resolution; decision support systems, community facilitation; national forest programmes, workshops; intersectoral working groups, alternative income-generating activities, benefit enhancement.

Principle 11: The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

Rationale: Information from all sources is critical to arriving at effective ecosystem management strategies. A much better knowledge of ecosystem functions and the impact of human use is desirable. All relevant information from any concerned area should be shared with all stakeholders and actors, taking into account, *inter alia*, any decision to be taken under Article 8(j) of the Convention on Biological Diversity. Assumptions behind proposed management decisions should be made explicit and checked against available knowledge and views of stakeholders.

Annotations to the rationale:

Ecosystems can be viewed at various scales and from different perspectives, each yielding unique information and insights. Good management should therefore consider all relevant information. In this regard it should be noted that:

- *The ecosystem approach is designed to accommodate a range of values and associated goals, and the information and perspectives of the communities that hold those values are therefore important in designing and implementing management.*
- *There is no single level of organisation at which one can understand and optimize management of ecosystem functioning. Different information sources will address issues at different levels, providing complementary perspectives to support integrated management.*
- *Good management therefore depends on maximising the information inputs, carefully assessing their accuracy and relevance, and integrating the information into decision-making and management.*
- *Ongoing support for understanding and information (e.g. research, monitoring, indicators, assessments, etc) is required.*

Case-study example - Principle 11: The Mekong River Commission - "including a broad range of knowledge and experiences in resources management "

The Mekong River Commission (MRC) was established on 5 April 1995. The MRC member countries are Cambodia, Lao PDR, Thailand and Viet Nam. MRC maintains regular dialogue with the two upper states of the Mekong River Basin, China and Myanmar. The MRC member countries agree to co-operate in all fields of sustainable development, utilisation, management and conservation of the water and related resources of the Mekong River Basin, such as navigation, flood control, fisheries, agriculture, hydropower and environmental protection. The various divisions and work programmes of the MRC include research based activities. Scientific research, including where feasible community-based research and knowledge is used and promoted to support resources management. "MekongInfo" is an interactive system for sharing information and knowledge about participatory natural resource management (NRM) in the Lower Mekong Basin. In addition to over 3,500 documents (full-text and abstract) in the Library, MekongInfo provides: a database of individuals, projects and organisations, news and announcements of events, relevant web links, a gallery of useful resource materials, a forum for online discussions, and a free web hosting service.

Previous initiatives of the fisheries programme have considerably enhanced awareness of the value of local ecological knowledge and the contribution that local communities can make in the research process. For example, one study of basin-wide fish migrations was based exclusively on using local knowledge and resulted in the development of ecosystem-based approaches to basin-management, particularly regarding water resources management issues. That initiative is particularly notable because it involved a network of local fishers who were distributed throughout the four countries and collectively developed information on trans-boundary fish migrations and management issues. The longer-term plan is to involve relevant communities in the four countries collectively in the long-term monitoring of trends in species and the environment and to feed this information into

regional NRM planning and management. One important project is developing and using community based indicators for sustainable fisheries management in the Lower Mekong Basin of LAO PDR where local fishers have had a long-standing involvement in local research initiatives. The overall objective of the project is to develop an affordable and effective method of evaluating fisheries sustainability through community-based indicators. Many of the fish migrate through the region from other countries and the MRC is fostering further linkages with those countries under regional management initiatives. It is acknowledged that local ecological knowledge and community-designed indicators can be useful to complement existing fisheries information, and locally derived indicators are easier to apply directly by the local resource users as tools for adaptive management. These and other regional experiences have recently prompted recommendations that local communities should be the focus of attempts to improve the reliability, relevance and sustainability of information systems for fisheries, including monitoring biodiversity.

The objectives of the MRC are essentially to manage the river basin along the lines of an “ecosystem approach” which in this case include significant trans-boundary management aspects. Major programmes adopting or based upon “ecosystem” approaches include the Water Utilisation Programme”, “Basin Development Plan” and the Environment Programme.

References: Mekong River Commission (<http://www.mrcmekong.org/>); "Using the ecosystem approach to implement the CBD: a global synthesis report drawing lessons from three regional pathfinder workshops", (<http://www.unesco.org/mab/docs/Report.pdf>); ASEAN Regional Centre for Biodiversity Conservation (http://www.arcbc.org/arcbcweb/research_projects/projects/lao/re_lao_008.htm); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 11.1 Relevant information should be shared with other stakeholders and actors and technical and scientific information be made available in an accessible way (indigenous and local knowledge should be treated with full respect of Article 8(j) and further decisions of the CBD).
- 11.2 Assumptions behind proposed management decisions should be made explicit based on the best available expertise, scenarios of future change and the knowledge and views of stakeholders.
- 11.3 Appropriate mechanisms should be developed to document and make more widely available the information from all relevant disciplines (including natural and social sciences) and from relevant knowledge systems, particularly those based on local and traditional practices. This guideline should be implemented consistent with any decision to be taken under Article 8(j) of the CBD.
- 11.4 The implications for ecosystem management of different “world views” based on different knowledge systems should be evaluated.

Indicative list of tools and sources:

National register of experts; Clearing House Mechanism (CHM) of the CBD; translation of documents into local languages and simple language, and packaging of information to make it more usable; public awareness campaigns (radio, TV, the press, publications, theatre); carrying out oral research and other research to extract information from communities and make it available to other stakeholders; workshops to allow stakeholders to come to a better understanding of other stakeholders’ perspectives; involving stakeholders in the design and implementation of research (participatory research); synthesis and usage of grey literature, summarized scientific information and popularized science to transfer scientific results to decision-makers and stakeholders; helping stakeholders adopt scientific methods and adaptive management methods.

Principle 12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

Rationale: Most problems of biological-diversity management are complex, with many interactions, side-effects and implications, and therefore should involve the necessary expertise and

stakeholders at the local, national, regional and international level, as appropriate.

Annotations to the rationale:

The complexity managing of ecosystem management for sustained use and conservation requires integrating the activities and actions of many different stakeholders. In this regard it should be noted that:

- *The activities of all sectors affect biological diversity, and can contribute to, or detract from, the achievement of the objectives of the Convention.*
- *The management of biodiversity, because of its complexity, and the significance of human impacts, requires a wide range of scientific and management skills, including those located in sectors that have not traditionally been involved in biodiversity conservation or management.*
- *For these reasons the ecosystem approach should provide a framework for fostering greater involvement of all relevant stakeholders and technical expertise in planning and carrying out coordinated activities, sharing management resources, or simply exchanging information.*

Case-study example - Principle 12: The Soufriere Marine Management Area, Saint Lucia - "demonstrating the need for co-management"

The need for co-management is well illustrated by a project underway in the Soufriere region on the west coast of Saint Lucia. Although the marine environment was designated a marine reserve area in 1986, and plans were made in 1987 to develop a national park to cover both the terrestrial and marine components, no active management was implemented. As conflict between user groups and stakeholders increased (a result of the growing importance of the area as a scuba-diving destination and increasing demand for fishery resources) it became clear that effective management would be feasible only if all those with interests in the area were involved. A process of negotiation and participatory planning was therefore initiated, which culminated in the formation of the Soufriere Marine Management Area (SMMA). At the same time, a coral reef monitoring programme has been set up, which also involves many of those who make their living from the marine environment and in particular the diving operators. In practice, SMMA has demonstrated that continuous education and positive reinforcement have proved far more effective than punishment for maintaining no-take zones. One of the most important factors in maintaining support for the no-take zones has been kept fishers and others stakeholders informed about how the protected area is performing. SMMA has reduced conflict between tourists and fishers. After all the long negotiations between the different users, a mutual respect for each other's territory has now been established.

References: Soufriere Marine Management Area (St. Lucia; [http:// www.smma.org.lc](http://www.smma.org.lc)); CBD webpage: <http://www.biodiv.org/doc/case-studies/>

Implementation guidelines

- 12.1 The integrated management of land, water and living resources requires increased communication and cooperation, (i) between sectors, (ii) at various levels of government (national, provincial, local), and (iii) among governments, civil society and private sector stakeholders. Increased communication among international and regional organisations is also needed.
- 12.2 Further incorporation of the ecosystem approach as an integral part of planning in, among others, the agriculture, fisheries, forestry and other natural resources management sectors potentially affecting biodiversity and ecosystem functioning, should be encouraged, following the example, for instance, of the Code of Conduct for Responsible Fisheries, Sustainable Forest Management or others. Sectors other than the primary production sectors may also have major effects but are often less recognized in this respect. These include sectors such as the judicial sector, which affects governance, as well as those such as energy and transport, which are managing or affecting resources either directly or indirectly.
- 12.3 Procedures and mechanisms should be established to ensure effective participation of all

relevant stakeholders and actors during the consultation processes, decision making on management goals and actions, and, where appropriate, in implementing the ecosystem approach.

- 12.4 The effective implementation of the ecosystem approach may require involving multidisciplinary professional and scientific expertise, including such disciplines as economic, social and natural sciences.
- 12.5 When assessing the costs and benefits of conserving, maintaining, using and restoring ecosystems, the interests of all relevant sectors should be taken into account for equitable sharing of the benefits according to national law.

Indicative list of tools and sources:

Community forestry and community-based forest management; approche participatif villageois; democracy; community based wetland management; integrated water management, including mathematical modelling; glossary; cross-sectoral planning and policy systems; modelling and scenario development; outsourcing of control to the private sector/NGOs (although we note that this may be a risky option in many circumstances); facilitating or allowing additional effort by private sector groups to supplement government efforts; multi-disciplinary think tank, multi-party agreements/state policies; cross-sectoral trust fund management committees, “friends of” groups, and other to support management; examples Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe and St. Lucia case-study on MPAs (see above case-study).

Annex II

**CONSIDERATION OF THE RELATIONSHIP BETWEEN SUSTAINABLE FOREST
MANAGEMENT AND ECOSYSTEM APPROACH, AND REVIEW OF, AND
DEVELOPMENT OF STRATEGIES FOR, THE INTEGRATION OF THE
ECOSYSTEM APPROACH INTO THE PROGRAMMES OF WORK OF
THE CONVENTION**

A. Sustainable forest management (Agenda item 5.2)

1. Conceptual basis of the ecosystem approach in relation to sustainable forest management

1. In 1992, the Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forest of the United Nations Conference on Environment and Development (UNCED), also referred to as “Forest Principles”, defined a new paradigm for forest management, through a set of 15 principles in support to the overall objective of contributing to the management, conservation and sustainable development of forests and their multiple functions and uses. In this regard, the concept of sustainable forest management (SFM) anticipated the ecosystem approach, both of which are based on the tenet of sustainability. SFM incorporates the following key sustainability concepts: (i) stewardship; (ii) enabling environment; (iii) continuous flow of goods and services without undermining the resource base; (iv) maintenance of ecosystem functioning and biodiversity; (v) maintenance of economic, social, and cultural functions; (vi) benefit-sharing; and (vii) stakeholder participation in decision-making.

2. SFM can be considered as a means of applying the ecosystem approach to forests. Although the concept of SFM and the ecosystem approach are not identical, the two are similar in many respects. Both need to be applied as an integrated whole. Both are also rapidly evolving. Both have a non-legally binding nature, allowing for flexibility and experimentation. SFM and the ecosystem approach are overarching frameworks--both with due consideration to societal, ecological, and governance issues--although the former has undergone substantial refinement over the last decade, being primarily an outcome-based approach. The ecosystem approach is still in need of further elaboration to be translated into good operational practice in a particular situation. As far as challenges are concerned, both SFM and the ecosystem approach need to deal with complex issues such as law enforcement, land tenure rights, and the rights of indigenous and local communities. In this regard, implementation of both approaches requires political will, including that of institutions and communities.

3. The broad overlap between the concepts of SFM and the ecosystem approach is encouraging, but there are yet significant opportunities for mutual learning. Lessons learned should flow both ways. Country-level meetings to examine the relationship between SFM and the ecosystem approach would be useful, and should be commended to CBD Parties. These meetings should emphasize mutual learning opportunities.

4. As stated above, SFM is relatively more mature than the ecosystem approach in the sense of being more refined from an operational standpoint; thus it can feed on some aspects of the ecosystem approach to this end. Specifically, there is a clear need for the ecosystem approach to adopt processes that are based upon clear statements of visions, objectives, and goals for defined regions or issues, thereby becoming more outcome-oriented. Conceptual development of the ecosystem approach to date has emphasized a description of the content of the principles. Moving from a content-driven approach to an outcome-driven approach would be beneficial. Tools and approaches developed to implement SFM, which are discussed below, may be useful in other productive sectors as they explore ways to apply the ecosystem approach.

2. *Proposals for integration of the ecosystem approach and sustainable forest management*

5. Even though the ecosystem approach and sustainable forest management are broadly overlapping concepts, more could be done to ensure their integration. Sustainable forest management could gain insights from the ecosystem approach concepts as **cross-sectoral integration** is largely missing from SFM, reflecting restricted legal mandates mostly within forest sector institutions. Mechanisms for inter-sectoral collaboration could be strengthened within SFM. Agro-forestry integrates the forest and agriculture sectors but other linkages between the forest sector and the agriculture sector (and other sectors such as water management, transport, and conservation) need to be strengthened.

6. Although there is no pre-defined scale, the ecosystem approach can be applicable over large areas (landscape level), while SFM has historically emphasized forest management-unit levels of work at typically small spatial scales. Although the Forest Principles do not indicate that forest management should be integrated with management of adjacent areas, and some larger-scale applications (e.g. landscape restoration initiatives and model forests) have been developed within the last decade, greater emphasis could be placed on SFM within a broader spatial context, including **protected areas**, taking into consideration **conservation issues** in general, and developing stronger links to adjacent land uses and/or complementary approaches, such as extraction of non-timber forest resources, agriculture, watershed management, and ecological restoration.

7. There are areas where further conceptual development is needed in both SFM and the ecosystem approach. Both approaches, for example, should explicitly incorporate a **principle of sustainability**. The inter-generational obligation to sustain the provision of ecosystem goods and services to future generations should be clearly stated. Another area warranting further work is to incorporate issues, in both SFM and the ecosystem approach, of **consideration of risks and threats**. Global climate change creates risks and uncertainties for all sectors involved in applying the ecosystem approach. Concerns in the forest sector include insecure land tenure, increased forest fire incidence, and the spread of forest pests and diseases into higher latitudes.

8. As stated in the previous section, there is a need for the ecosystem approach to adopt a more **outcome-based approach**. As such, lessons learned from implementation of SFM through the application of criteria and indicators would be particularly beneficial. In addition, the experiences of applying the ecosystem approach through Global Environmental Facility projects should be taken into account.

9. In general, **tools** and **approaches** developed to implement SFM may be useful in other productive sectors as they explore ways to implement the ecosystem approach. The processes of developing and using criteria and indicators for sustainable forest management (including local-level indicators), designing and setting up model forests and demonstration forests, and drawing up national forest programs, action-oriented forest management plans, environmental management systems, and codes of conduct and practice, are all tools with broader potential relevance. For example, codes of practice for sustainable agricultural systems are not as advanced as for SFM. Approaches and tools developed for community forestry and social forestry to achieve broader stakeholder engagement, also have considerable potential for application in other sectors.

10. In particular, the use of **criteria and indicators** is considered a key tool for implementing and monitoring SFM, and the approach is being applied both nationally and at the forest management unit level. Criteria and indicators can be used for setting goals, assessing management outcomes and policy effectiveness, orienting forest certification systems, and for communicating progress to policy makers. Although nine regional and international processes to develop and implement criteria and indicators for sustainable forest management have largely developed independently, to date, 149 countries, encompassing 95% of the world's forests, are in the process of applying the criteria and indicators

approach. Criteria and indicators for sustainable forest management represent a detailed expression of the elements of SFM when taken as a integrated whole, and bear many points of similarity to the ecosystem approach. Criteria and indicators can be adapted towards on-the-ground action, as illustrated by the development of local-level indicators applicable at the forest management unit level by ITTO.

11. Local-level indicator work is one of the most interesting developments in the Criteria and Indicators approach. This work helps engage stakeholders in developing a longer-term vision and objectives for defined management areas, generating indicators that are meaningful to local needs. Their goal is to provide useful feedback to management, rather than to fulfil national monitoring and reporting requirements. Monitoring systems that can provide on-the-ground feedback and verify sustainability are essential for implementing adaptive management, a central concept within the ecosystem approach. These monitoring systems support the management-feedback process and allow it to evolve through time. **model forests and demonstration forests** (such as the work undertaken by ITTO) are providing further valuable opportunities to test adaptive management concepts and to promote their wider application.

12. While existing efforts in SFM/criteria and indicators are currently focused on the national level and the forest-management unit level, some recent efforts (such as work undertaken by IUCN) are focusing at the landscape level. The development of criteria and indicators for the landscape level should be further pursued. In this context, it is worth noting that restoration actions are starting to be undertaken at the landscape level, and that the ITTO Guidelines for the Restoration, Management and Rehabilitation of Degraded Secondary Tropical Forests have been developed for guiding policy makers on forest restoration at this spatial scale. The assessment through criteria and indicators tools could be used to determine flows of specific ecosystem services (e.g. carbon capture in plantations).

13. In this regard, the potential for application of forest criteria and indicators to the ecosystem approach is high, particularly in regions where forests are an integral part of the resource base being used. In a recent effort at summarizing the state of knowledge of the contribution of criteria and indicators for sustainable forest management, seven thematic areas were identified in which the development of criteria and indicators can suit specific management needs; these areas can easily be applied to many principles of the ecosystem approach. §/

14. **Forest certification** is another rapidly evolving approach that involves the use of criteria and indicators as primary tools. Globally, about 120 million hectares of forest have been certified. Certification is more limited in scope than SFM as it tends to focus on production forests only, to the exclusion of protected areas and landscape-level considerations as mentioned earlier. However, some certified forests currently exist in protected areas, and some certification schemes require, in turn, that a proportion of the managed forest be set aside for protection. Therefore the potential of forest certification to link with protected areas is high. **/ In this context, forest certification programs could benefit from moving in the direction of the ecosystem approach being broader in scope.

15. Nevertheless, certification systems have found limited application in some developing countries, notably in the tropics, where enabling conditions to implement these systems are generally lacking. There are various barriers to tropical forest certification, such as limited institutional and technical capacity, and poor development of markets for certified wood. Efforts to overcome these barriers could be a priority for the ecosystem approach. ITTO's efforts to develop a phased approach to tropical forest certification should be noted in this context.

§/ International Conference on the Contribution of criteria and indicators for sustainable forest management: the way forward. Guatemala City, 3-7 February 2003. The common thematic areas are: (1) extent of forest resources; (2) biological diversity; (3) forest health and vitality; (4) productive functions of forest resources; (5) protective functions of forest resources; (6) socio-economic functions; (7) legal, policy and institutional framework.

**/ Certification of good forest management and its relationship to protected areas. IUCN Forest case-study number 3. April 2003.

16. In addition, and of direct relevance for the integration of the ecosystem approach with SFM, ITTO has also developed **policy guidelines** for sustainable forest management. The guidelines contain a set of principles and recommended actions and relate to sustainable natural and planted tropical forests; conservation of biological diversity in tropical production forests; fire management in tropical forests; and restoration, management and rehabilitation of degraded secondary tropical forests. ITTO has also been promoting demonstration sites and demonstration watersheds.

17. If SFM were to explicitly examine tools and approaches that could be applied to other sectors - such as criteria and indicators, certification, and Model Forests - it would promote cross-fertilization, and help strengthen cross-sectoral integration. Developing institutional mechanisms to get people from different sectors around the table on an ongoing basis is a challenge in all countries. In addition to wider dissemination of useful tools, cross-sectoral meetings on SFM and the ecosystem approach would help demystify concepts and support mutual recognition, allowing people to use their own vocabulary.

18. The FAO is actively developing tools relevant to implementing SFM and the ecosystem approach. The FAO and World Bank have a support programme for facilitating stakeholder participation in the development of national forest programmes. Increased knowledge sharing is a major focus of FAO's efforts. The FAO Model Code of Forest Harvesting Practices has led to development of regional codes and country codes. The non-legally binding nature of these codes is a key to wider acceptance. Codes for integrated pest management, fire management, and integrated watershed management should also be noted. In addition, the recent FAO initiative, "In Search of Excellence in Forest Management", with its call for nominations of well-managed forests, has generated an excellent response. Multiple use, stakeholder participation, good information and monitoring systems, and good governance are recurring themes in well-managed forests, and they are as well key issues for the ecosystem approach.

19. In summary, in order to achieve greater harmonization of the SFM and ecosystem approach concepts, there is a need for SFM to strengthen cross-sectoral integration, which can be undertaken at least in part through application of SFM tools into other sectors. Developing and implementing biodiversity indicators would also help strengthen the contribution of SFM to biodiversity conservation. The development of criteria and indicators as well as certification programmes within SFM at the landscape level should also be pursued.

20. The ecosystem approach, should, in turn, consider lessons learned from application of SFM tools and approaches, such as criteria and indicators, certification systems, and model and demonstration forests in its effort to move towards an outcome-oriented approach. In addition, both approaches should explicitly incorporate the principle of sustainability.

B. Review of the integration of the ecosystem approach into the thematic programmes of work and work on cross-cutting issues of the Convention (Agenda item 5.1)

21. Participants at the expert meeting reviewed the thematic programmes of work (marine and coastal biodiversity, agricultural biodiversity, forest biodiversity, the biodiversity of inland waters, and dry and sub-humid lands). There has been considerable progress in the development of sectoral approaches and tools that incorporate many of the elements of the ecosystem approach and that are complementary to it. However, implementation of sectoral approaches and tools complementary to the ecosystem approach is at an early stage, and there are few case studies that can be used for testing, analysis and dissemination of results.

22. Further development, implementation, and mainstreaming of sector-specific tools and approaches consistent with the ecosystem approach should be encouraged. The CBD can play an important role in developing cross-cutting tools and methodologies that support and enhance sectoral efforts. Areas in which further work on cross-cutting tools and methodologies is needed include incentives and valuation,

indicators and monitoring, integrated/cross-sectoral planning at the landscape level, participatory methodologies for indigenous and local communities, and access and benefit sharing.

23. Developments relevant to the programme of work on forest biodiversity were discussed in conjunction with the previous item on sustainable forest management.

Marine and Coastal Biodiversity

24. In reviewing developments related to the programme of work on marine and coastal biological diversity, it was noted that the topic of integrated approaches to marine and coastal management could be considered under three broad headings - high seas areas outside exclusive economic zones (EEZ), marine areas within EEZs, and the land-water interface in coastal zones. For the high seas, the work of the International Whaling Commission needs to be taken into account, as well as a range of agreements on migratory fish, birds, mammals, and turtles.

25. The 1995 Code of Conduct for Responsible Fisheries developed by FAO has principles that are similar to many of those in the ecosystem approach. The code is non-binding, but reflects elements of legal instruments such as the 1995 United Nations Convention on the Law of the Sea (UNCLOS) and the Agreement on Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (Fish Stocks Agreement).

26. Some initiatives taken under the U.N. regional seas conventions are relevant to the ecosystem approach, such as the Coastal Areas Management Programme (CAMP) of the Mediterranean Action Plan, and the recent endorsement of an ecosystem approach by the Helsinki Commission in the Baltic Sea and the OSPAR commission in the North-East Atlantic. GEF is supporting Strategies and Action Plans for international waters, which could be considered as analogues to National Biodiversity Strategies and Action Plans (NBSAPs). Some NBSAPs call for new regional seas conventions in areas where these types of agreements are lacking. While these conventions focus on large marine ecosystems and do not embody all the principles of the ecosystem approach, they tend to be broadly consistent with the ecosystem approach, and complementary to the objectives of the CBD.

27. The Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention") deals with marine and coastal issues in Western Europe by incorporating many elements of the ecosystem approach. Overarching issues include improvements in governance and science, risk and uncertainty, reporting and monitoring, and developing outcome-oriented high-level objectives and indices related to governance.

28. The traditional focus in marine fisheries has been managing individual fish stocks. Pioneering work on an ecosystem approach to fisheries was undertaken by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and its Scientific Committee. The CCAMLR approach concentrated not only on the species fished, but tried to avoid situations in which the fisheries have a significant adverse effect on dependent and related species. This led CCAMLR to develop management approaches that assess the status of the ecosystem and its health, and to grapple with the difficulty of describing the full complexity of marine ecosystems. Many countries are developing national approaches similar to the ecosystem approach pioneered by CCAMLR: a stock-based approach in an ecosystem context, focused mainly on the impact of stock-based activities on other components of marine ecosystems, with an effort to avoid excessive structural changes.

29. There has recently been a movement towards the ecosystem approach in marine fisheries. The World Summit on Sustainable Development referred to the need to incorporate the ecosystem approach in responsible fisheries management, setting a target of 2010 for its achievement. The 2001 Reykjavik Declaration called for "guidelines for best practices with regard to introducing ecosystem considerations

into fisheries management”. This led FAO in 2003 to update and revise its 1995 Code in the form of a new manual called “Fisheries management: the ecosystem approach to fisheries.” The World Wide Fund for Nature (WWF) has also developed a guide to ecosystem-based management for fisheries, and helped launch an effort to develop a certification program for marine fisheries under the Marine Stewardship Council.

30. Marine protected areas (MPA) are another significant cross-cutting approach in the context of marine and coastal areas. A CBD ad-hoc technical expert group prepared detailed guidance on this topic that was discussed at SBSTTA 8. This guidance very much reflects the spirit of the ecosystem approach, and is available in document UNEP/CBD/SBSTTA/8/INF/11. A case-study on the application of an ecosystem approach through a national framework of marine and coastal protected areas, consistent with the approach developed by the CBD Ad hoc technical expert group, is provided by the Representative Areas Programme of the Great Barrier Reef Marine Park in Australia.

31. An information document was prepared for SBSTTA 8 on “Community involvement in marine and coastal protected areas: case-studies” (UNEP/CBD/SBSTTA/8/INF/14). The case-study on the Soufriere Marine Management Area, Saint Lucia, is particularly noteworthy. An inclusive stakeholder process reduced conflicts between fishers and tourists and achieved good biodiversity outcomes.

32. The IUCN World Commission on Protected Areas-Marine and WWF International have launched an initiative to improve the management of marine protected areas by providing managers, planners and other decision-makers with methods such as the use of indicators for assessing the effectiveness of MPA sites and of national systems of MPAs. In addition, guidance on establishing and managing marine protected areas has been produced by the IUCN.

33. The concept of Integrated Marine and Coastal Areas Management (IMCAM), or Integrated Coastal Zone Management, covers both marine areas and coastal portions of the land. These approaches are area-based, and are explained by detailed sets of guidelines such as those developed by Ramsar and FAO, and those under development by the CBD. UNEP is trying to bring together ocean management and river basin management in the project on Integrating Watershed and Coastal Area Management in Small Island Developing States of the Caribbean (IWCAM).

34. Current thinking emphasizes the need to combine Integrated Marine and Coastal Area Management (IMCAM) with a core network of highly protected areas, which act as baselines and an insurance policy. SBSTTA accepted this notion at its eighth meeting, while indicating that the balance between highly protected zones and other areas where extractive uses are allowed is a choice for individual countries. Science suggests two general approaches: managing the entire marine zone in a sustainable way, as in the CCAMLR approach, or using area-based protection. The use of marine protected areas may allow greater risk taking in surrounding managed areas. Given the limited scientific understanding of marine ecosystems (including food preferences and spawning locations for commercially exploited fish, and the challenge of monitoring) an emerging view is that a more precautionary, area-based approach may be preferred in most marine areas. Whether to allow extractive use across the whole marine environment is a social decision, and should be informed by science.

35. Given the need to practice IMCAM across the whole marine and coastal environment, conflicts tend to arise with aquaculture. Significant areas of aquaculture can completely modify ecosystems, and aquaculture operations need to be carefully planned and implemented to ensure that they are sustainable in an overall IMCAM context. The CBD Ad hoc technical expert group on mariculture has produced guidance on methods and techniques for avoiding the adverse effects of mariculture on marine and coastal biological diversity (see document UNEP/CBD/SBSTTA/8/INF/6). Similar guidance has also been produced by the FAO.

Biodiversity of Inland Waters

36. The Ramsar Convention is a lead partner in the implementation of activities under the Convention on Biological Diversity related to wetlands, including the CBD programme of work on the biodiversity of inland water ecosystems. The three pillars of the Ramsar Convention are wise use of wetlands, designation of wetlands of international importance, and international cooperation.

37. “Wetlands” are defined very broadly in Ramsar as “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.” By this definition, wetlands are relevant to all of the thematic programmes of work in the CBD, and equally in the cross-cutting programmes.

38. Ramsar lacks an overarching concept (analogous to the ecosystem approach) that unifies its three pillars. The closest thing is wise use of the whole wetland resource. It is worth noting that many individual Ramsar “sites” are wetlands within a landscape context.

39. Wise use can be seen as synonymous with sustainable use, and is defined as the “sustainable utilization of wetland resources in such a way as to benefit the human community while maintaining their potential to meet the needs and aspirations of future generations”. Wise use handbooks (the Ramsar “toolkit”) have been produced on nine thematic topics, and five more are in preparation based on decisions taken at Ramsar COP8. An issue is whether an overarching framework is needed to link these and other Ramsar guidance documents together. Two tiers of guidance reflected in these guidance documents. Management planning handbooks stress the broader scale - river basins, integrated coastal zones, and water allocation and management to maintain ecological functions. The second tier is management planning for specific wetland areas (Ramsar sites): risk management, monitoring, restoration, etc. Of general relevance are the handbooks on “Establishing and Strengthening Local Communities’ and Indigenous People’s Participation in the Management of Wetlands,” and the “Guidelines for international cooperation under the Ramsar Convention on Wetlands”.

40. The trend in Ramsar is to work jointly with the CBD as much as possible. An example is the joint development of “Methods and guidelines for the rapid assessment of biological diversity of inland water ecosystems” (UNEP/CBD/SBSTTA/8/INF/5). This conceptual framework is derived from, and consistent with, the Ramsar Framework for Wetland Inventory. There may be merit in updating Ramsar’s general guidance on wise use in light of CBD’s development of guidance on sustainable use and the ecosystem approach. Ramsar has developed a Communication, Education and Public Awareness (CEPA) program that is more advanced the equivalent CBD program, and there may be opportunities to transfer experiences learned in this area

41. By some estimates, peatlands may represent over 50% of the world’s wetlands. They play globally significant roles, including being the major terrestrial carbon reservoir. In recognition of their importance, Ramsar COP8 developed Guidelines for Global Action on Peatlands.

42. An area of guidance under development is determining the ecological character of Ramsar sites and other wetlands, including techniques for delineating and mapping wetlands and for evaluating their values and functions and goods and services. Guidance on valuation of wetlands is urgently needed. The relationship between environmental flows, groundwater, and wetlands is another area needing more work.. There is also a need to harmonize the Ramsar criteria for designation of wetlands of international importance with annex 1 of the CBD - particularly for wetlands of cultural and social importance.

43. The Ramsar “Guidelines for allocation and management of water for maintaining the ecological functions of wetlands” make connections between ecological functions, hydrology, economic demands,

and institutional responses. Tools to implement these guidelines, such as comprehensive mathematical models that integrate various aspects of water management, are worth considering. In developing these new tools (e.g., for valuation, groundwater-wetland links, environmental flows), consideration should be given to ways of transforming scientific results into user-friendly forms. This will involve active collaboration between the science community and practitioners at various levels. The Ramsar program on communications, education and public awareness will be helpful in this regard.

44. Facilitating parties in going beyond the wise use principles to the more practical work of facilitating implementation is difficult. Care must be taken to do this without being overly prescriptive. One approach is to create a decision tree of how to choose the most practical framework for a given situation. For example, less than 10% of Ramsar parties have undertaken a national wetlands inventory, and different inventory methods should be considered carefully before a particular method is chosen.

45. Earth observation tools are highly valuable to keep track of wetlands globally, to increase scientific knowledge of individual wetland areas and their surrounding watershed areas, and to aid in their more efficient management. The European Space Agency is actively involved in developing tools related to wetland assessment and management, and has demonstrated that certain satellite-borne sensors are particularly effective for detecting open water and flooded vegetation. Monitoring of inland water ecosystems will also likely be discussed at the July 2003 Earth Observation Summit hosted by the U.S. National Oceanic and Atmospheric Administration in Washington, D.C. The outcomes of and any follow-on work from this summit, including planning for development of an integrated international earth observation system, should be taken into account under the CBD.

46. The Ramsar Convention is playing a lead role in implementing the ecosystem approach in an inland waters context. The CBD can assist this by developing advice applicable across sectors, such as valuation and incentives, invasive alien species, and access and benefit sharing. Such advice is increasingly being fed into national focal points for the Ramsar Convention as well as CBD focal points. This model is worth considering for joint work on dry and sub-humid lands between the Convention to Combat Desertification and the CBD as well. The CBD can play a pre-eminent role in cross-cutting issues, while encouraging sectors to develop more detailed tools and approaches.

Agricultural biodiversity

47. Less sector-specific guidance related to the ecosystem approach has been developed for the agricultural sector than for other natural resource sectors. While most CBD work programmes deal with commonly held resources, agriculture tends to occur largely on private land holdings. Efforts by the FAO Crop and Grassland to codify “Good Agricultural Practices” (defined as “meeting consumer needs for products that are of high quality, safe and produced in an environmentally and socially responsible way”) are in early stages, and are being done cautiously to avoid being overly prescriptive. Efforts to date have included development of a manual on Integrated Production and Protection (IPP) Crop Management, with specific IPP guidelines for various crops. A simplified IPP system is being developed for use in farmer field schools.

48. While little over-arching guidance is available for the agricultural sector, good sub-sectoral guidelines have been developed for managing plant and animal genetic resources. Cross-cutting work on integrated river basin management, integrated coastal zone management, and dry and sub-humid lands includes agricultural considerations.

49. An information document prepared for COP5 on “The ecosystem approach: toward its application to agricultural biodiversity” (UNEP/CBD/COP/5/INF/11) discussed approaches or tools that can contribute to ecosystem approach objectives, with a focus on integrated pest management and farmer field schools. One example of how these have been elaborated is in tropical rice systems. Regular

meetings of farmers allow use of techniques such as asynchronous cultivation, which allows a balance of natural enemies and pests to be maintained year-round. This illustrates the advantage of looking at the landscape scale as well as the field scale in agricultural systems. Other landscape-scale considerations in agriculture are provision of natural habitats adjacent to crop fields as alternative food sources for natural enemies, and for crop pollinators.

50. An Integrated Natural Resource Management (INRM) approach has been adopted throughout the Consultative Group on International Agricultural Research (CGIAR) system. INRM has been conceptually defined as “the responsible and broad-based management of the land, water, forest and biological resources base - including genes - needed to sustain agricultural productivity and avert degradation of potential productivity.” Research and applications development are under way related to adaptive management, multiple scales and stakeholders, and measurable outcomes. While some aspects of the INRM approach are not new, its adoption by CGIAR is significant. The aim is to be flexible rather than prescriptive, basing further development on communities of practice, and exchange of experiences and insights.

51. INRM is still largely on the drawing board and needs to move into the application phase, particularly at a landscape scale. This concept needs to be supported more broadly and implemented faster. The combined support of the CBD and FAO could help move this along. National agriculture ministries that are dominated by larger farmers’ groups can be slow to adopt concepts, such as integrated pest management, that are related to INRM and the ecosystem approach,

52. The agriculture sector is increasingly involved in issues requiring cross-sectoral cooperation. Some recent examples include persistent organic pollutants (POPs), protection against invasive alien species, and development of early warning systems for pest impacts.

53. Certification schemes, such as those for organic agriculture, are evolving in directions consistent with the ecosystem approach. Certification is developing at multiple levels. While organic agriculture has largely developed at the farm level, certification schemes for larger plantation areas are now looking at off-site impacts and social issues. The Rainforest Alliance is promoting an integrated landscape approach to farming that rewards growers who meet socio-environmental standards by encouraging consumer demand for products (including bananas, oranges, coffee and cacao) grown on certified farms. This is a good example of an initiative by a private sector organization.

54. Organic coffee and organic cacao are growing rapidly in importance in South America, partly owing to pest outbreaks and poor socio-economic conditions in other coffee/cacao growing areas such as west Africa. The Mesoamerican Biological Corridor has done an inventory of places where shade cocoa can be implemented. A number of other organizations, such as CATIE (Centro Agronómico Tropical de Investigación y Enseñanza) and Conservation International, are actively working on shade-grown and organic coffee. Certified products are going into niche markets, and increasing demand reflects a combination of environmental and social concerns.

55. Several organizations, including the Inter-American Development Bank and CATIE, are supporting research on the concept of payment for environmental goods and services. One aspect of this concept is related to the benefits of agroforestry and shade-grown coffee and cacao systems in terms of providing habitat for birds and other wildlife species. The Mesoamerican Biological Corridor initiative has developed a guide on how to value these goods and services. Choosing which environmental goods and service on which to base payments is an important issue that warrants further development.

56. Issues related to risks are not currently well addressed in the ecosystem approach and require more attention. There is a relatively well developed science of risk for agriculture, which should be acknowledged and could be expanded in an ecosystem context. Shade coffee production is an example - farmers forego productivity but decrease pest risks by maintaining the overstorey. Conversion of natural

habitats to agriculture continues to be one of the greatest risks to biodiversity. Reasons for land conversion to agriculture vary, but smallholders are responsible for much of this, and their needs and livelihood options must be taken into consideration. The development of early warning systems (e.g., for biodiversity loss) is also relevant in the context of risks.

57. Animal husbandry also poses risks to ecosystems and biodiversity. In many countries, impacts tend to be addressed in a highly regulatory way (e.g., limits on animal waste applications to protect wetlands and groundwater; limits on density of grazing animals). Incorporation of ecosystem approach concepts might help make animal husbandry more proactive rather than reactive.

Dry and sub-humid lands

58. With respect to the application of the ecosystem approach in drylands, the CBD programme of work on biodiversity of dry and sub-humid lands explicitly addresses the ecosystem approach principles. An important consideration is the interaction between the CBD and the Convention to Combat Desertification (CCD). The CCD does not use the term “ecosystem approach”, but embraces many of the principles, especially participatory aspects. There may be opportunities to bring ecosystem approach concepts into certain CCD-specific initiatives such as those in drought resistance and early warning systems. Considerations related to developing alternative livelihoods, which are conceptually similar to the ecosystem approach, are central to work in drylands.

59. The CCD can also draw upon existing CBD work programmes on agriculture and inland waters. Sectors such as agriculture and water management play a dominant role in drylands and are key targets for implementing concepts related to the ecosystem approach. Existing tools such as Integrated River Basin Management are broadly applicable in drylands. A multi-biome perspective is key in drylands. Water is the limiting resource in drylands, and is posing challenges in areas such as the Tigris-Euphrates region. One major reason for applying the ecosystem approach is to break down sectoral and institutional barriers.

60. In conjunction with CCD COP6 in August 2003, the IUCN Commission on Ecosystem Management, the CCD, and the Ramsar Bureau are sponsoring a Global Biodiversity Forum session on “The Ecosystem Approach to Dryland Management: Integrating Biodiversity Conservation and Livelihood Security”. The three themes to be addressed at this meeting are managing water resources and wetland habitats in drylands, environmental management in drylands from a community perspective, and mobilising financial resources to combat desertification.

Other issues

61. Last year’s International Year of Mountains included various international and national-level activities. Many countries created national groups and national focal points related to mountain development. A key follow-up step at the international level would be the creation of a Partnership for Integrated Mountain Development. The FAO has offered to host the international secretariat for this Partnership, but this would be led by an inter-agency group, and would not be an FAO initiative. The IUCN Commission on Ecosystem Management has an initiative on mountain ecosystems, dealing specifically with cloud forests and paramos (high-elevation grasslands).

62. Island biodiversity will be the major thematic topic for CBD COP8 in 2006. Small island states have often been identified as an opportunity to apply the ecosystem approach from the outset to address cross-cutting problems. Issues are in a compressed and more manageable state. The development of some trial areas in islands is worth exploring. The South Pacific Regional Environment Programme (SPREP) could help identify opportunities to use the ecosystem approach in that region.

63. The FAO is organizing upcoming conferences on forestry and agriculture in small island states. These events in 2004 will provide an opportunity to review the programme of action developed at the 1994 Global Conference on the Sustainable Development of Small Island Developing States in Barbados. Special attention needs to be given to small island states in the contest of risk and vulnerability to large-scale change.

64. The sustainable livelihoods approach is an emerging view of development with which the ecosystem approach needs to intersect. To the extent that people are placed at the center of the ecosystem approach, and the ecosystem approach focuses on managing peoples' activities within ecosystems, there is a need to understand why people do what they do. The sustainable livelihoods approach places people at the centre of development, based on the premise that the diversity and richness of livelihoods can be understood only by qualitative and participatory analysis at a local level. Livelihoods have been defined by the U.K. Department for International Development as comprising "the capabilities, assets (including both material and social resources) and activities required for a means of living... A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base..".

65. While the ecosystem approach and sustainable livelihoods approach are conceptually quite different, a key point of intersection is that one dimension of the sustainable livelihoods framework examines different capital assets (human, social, natural, physical, and financial); natural assets include land, water and biodiversity. A second dimension of sustainable livelihoods has to do with vulnerability to change, in terms of resource stocks, population trends, and technological trends; shocks such as extreme climate events, armed conflict, and disease pandemics; and culture and tradition (e.g., do they facilitate or constrain adaptation?). A third dimension is transforming structures and processes (levels of government, the private sector, laws, policies, cultural institutions, etc.).

66. An analysis based on this sustainable livelihoods framework proceeds to ask, "What external factors and circumstances influence the mix of strategies chosen to make a livelihood?" Out of these factors and circumstances flows a series of livelihood strategies: sedentary versus mobile, subsistence versus commercial, individual versus collective, diverse activities versus concentrated, degree of direct dependence on natural resources.

67. A sustainable livelihoods analysis is seen as critically important in the context of developing countries. It has largely replaced other approaches that lacked a broader conceptual basis, such as Integrated Conservation and Development Projects (ICDP). The ICDP approach was project based, and lacked a means of replication. There is an emerging consensus on the need to operate within a more structured framework. The sustainable livelihoods approach supports a shift in emphasis among development agencies from large individual projects to a focus on governance and capacity building.

68. After the World Summit on Sustainable Development and the CBD inter-sessional meeting on the Multi-Year Programme of Work, the need to refocus the CBD on poverty relief and sustainable development has become evident. The sustainable livelihood framework helps identify assets that buffer people from shocks. It may be seen as a means of making certain aspects of the ecosystem approach operational, particularly in terms of getting through to people as key actors in ecosystems. The United Nations Development Programme's Equator Initiative is relevant in this regard. It is designed to reduce poverty through the conservation and sustainable use of biodiversity in the equatorial belt by fostering, supporting and strengthening community partnerships.

69. The Fifth IUCN World Parks Congress held in Durban, South Africa in September, 2003, had as its theme "Benefits Beyond Boundaries". It addressed many relevant linkages between protected areas and key social policy issues, for instance indigenous peoples, sacred natural areas, human mobility, livelihoods, and gender. Also relevant from the perspective of the ecosystem approach were discussions on biosphere reserves, bioregional approaches and ecological networks. The emphasis on ecological

networks and biological corridors led to the development of recommendations to apply the ecosystem approach and similar approaches (landscape and seascape approach). All these discussions will have a considerable influence on development of the CBD programme of work on protected areas, to be discussed at SBSTTA9 and COP7. Development of landscape-scale approaches will facilitate meshing of the ecosystem approach and protected areas.

70. Transboundary conservation areas are of interest from an ecosystem approach perspective. The IUCN has developed guidelines for these areas, and there is a large ITTO program on transboundary areas in the tropics. These would provide some excellent case studies for the ecosystem approach. The World Bank has developed a protected area effectiveness tool that has been adopted by GEF. There is also a World Bank/World Wildlife Fund effort to develop a broader effectiveness tool for sustainable resource management outside protected areas.

71. The U.N. Framework Convention on Climate Change sponsored a workshop on synergies and cooperation with other conventions in Finland, July 2003. Participants discussed the ecosystem approach as a possible framework for unified action under the three Rio conventions. This is relevant to the issue of how parties will address the issue of adaptation to climate change. The concept of adaptive management embedded within the ecosystem approach could be helpful in this regard. Climate change mitigation and adaptive measures need to take into account the dynamic nature of ecosystems.

C. Development of strategies for the integration of the ecosystem approach into the programmes of work of the Convention (Agenda item 5.3)

72. Building on the foregoing discussions, participants at the expert meeting reviewed the thematic programmes of work (see Annex, Table 1, document UNEP/CBD/EM-EA/1/5) and concluded that the majority of these work programmes adequately address the implementation of the ecosystem approach. They noted in particular that the programme of work on dry and sub-humid lands explicitly addresses the twelve principles of the ecosystem approach in an integrated way. They also noted that the Ramsar Convention has developed a tool kit that includes practical guidance for integrated planning and management of river basins and coastal zones.

73. There has been considerable progress in the development of sector-specific approaches incorporating many elements of the ecosystem approach. In particular, relevant tools have been developed in forestry, fisheries management, and watershed management - sectors associated with the CBD programmes of work on forest biological diversity, marine and coastal areas, and inland water ecosystems, respectively. These sectors have recognized principles that are consistent with the ecosystem approach, and are moving to develop goal- or target-oriented approaches that include stakeholder participation, adaptive management, and monitoring/feedback systems. These sectors also deal with resources that tend to be under communal or public management rather than private management. This may help facilitate the development and implementation of sector-specific tools. The progress to date should be acknowledged, and further elaboration of the ecosystem approach in individual sectors should be encouraged.

74. The programme of work in agricultural biodiversity recognizes the ecosystem approach and addresses many of the twelve principles individually. However, there is a potential deficiency in that the agricultural biodiversity programme of work does not apply the ecosystem approach in an integrated way. Furthermore, there has been less progress in development of relevant tools within the agricultural sector than in other sectors. This may partly reflect the fact that agriculture is practiced largely on lands under private ownership. Participants at the expert meeting suggested that the issue of integrating the ecosystem approach within the agricultural sector be addressed in a comprehensive manner the next time that the programme of work in agricultural biodiversity is reviewed. Consideration might also be given to developing an addendum to the existing programme of work on use of the ecosystem approach.

75. Meeting participants did not have access to the work programmes dealing with mountains, protected areas, or islands, as none has yet been completed. They noted the opportunity to ensure that these programmes adequately support the ecosystem approach before they are finalized and adopted by the Conference of the Parties.

76. Overall it was remarked that in moving the ecosystem approach from a content-based to an outcome-based approach, the experiences of the Global Environmental Facility (GEF), the CBD's funding mechanism, should be taken into account. The CBD COP directed GEF to apply the ecosystem approach essentially in a vacuum, before it had been elaborated in Decision V/6. GEF's project-level context led it to develop an outcome-based way of applying the ecosystem approach. It defined as a general operational outcome "sustainably removing threats to biodiversity", which requires applying all twelve principles as an integrated whole. GEF could be requested to summarize its experiences in this area for CBD Parties, and to explore how it can create opportunities for the wider understanding and dissemination of the ecosystem approach, including through targeted research.

LIST OF REFERENCES

Documents are available on web page <http://www.biodiv.org/doc/meeting.asp?wg=ECOSYS-01>.

A. Working documents

<i>Symbol</i>	<i>Title</i>
UNEP/CBD/AHTEG-EA/1/1	Provisional agenda
UNEP/CBD/AHTEG-EA/1/1Add.1	Annotations to the provisional agenda
UNEP/CBD/EM-EA/1/2	Lessons learned from case studies
UNEP/CBD/EM-EA/1/3	Review of the principles of the ecosystem approach and suggestions for refinement: a framework for discussion
UNEP/CBD/EM-EA/1/4	Proposals for development/refinement of the operational guidelines of the ecosystem approach
UNEP/CBD/EM-EA/1/5	Review of the incorporation of the ecosystem approach into various programmes of work of the Convention
UNEP/CBD/EM-EA/1/6	Comparison of the conceptual basis of the ecosystem approach in relation to the concept of sustainable forest management

B. Background documents

COP Decision V/6 on the Ecosystem Approach

COP Decision VI/12 on Ecosystem Approach

COP Decision VI/22 on Forest Biological Diversity

Korn, H., Schliep, R. and J. Stadler (Eds.) (2003) Report of the International Workshop on the "Further Development of the Ecosystem Approach" at the International Academy for Nature Conservation, Isle of Vilm, Germany, October 9-11, 2002. BFN - Skripten 78, Germany

Smith, R.E. and E. Maltby (2000) Using the Ecosystem Approach to implement the CBD. A global synthesis report drawing lessons from three regional *pathfinder* workshops

/...

Hartje, V., Klaphake, A. and R. Schliep (2003) The international debate on the Ecosystem Approach. BFN – Skripten 80, Germany

Ellenberg, H. (2003) Ecosystem Approach versus sustainable forest management: Attempt at a comparison. Workreport by the Institute for World Forestry

Häusler, A. and Scherer-Lorenzen, M. (2002) Sustainable forest management in Germany: the ecosystem approach of the Biodiversity Convention reconsidered. Results of the R+D-Project 800 83 001. BFN, Germany.

White, R.P., Tunstall, D. and N. Henninger (2002) An Ecosystem Approach to Drylands: building support for new development policies. World Resources Institute Information Policy Brief No. 1.

UNEP/CBD/SBSBTA/5/11: Ecosystem Approach: Further conceptual elaboration

Pirot, J-Y., Meynell, P.J. and D. Elder (2000) Ecosystem Management: Lessons from Around the World. A Guide for Development and Conservation Practitioners. IUCN Gland, Switzerland and Cambridge, UK.

Technical advice on the establishment and management of a national system of marine and coastal protected areas. Paper prepared by the Ad Hoc Technical Expert Group on Marine and Coastal Protected Areas

WWF Australia (2002) Policy Proposals and Operational Guidance for Ecosystem-Based Management of Marine Capture Fisheries

FAO (2003) Fisheries Management – the Ecosystem Approach to Fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4.

Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity

LIST OF PARTICIPANTS

Governments Parties

Dr. Stuart Davey
Agriculture, Fisheries and Forestry Australia
Edmund Barton Building
Canberra ACT 2601

Australia

Tel.: + (612) 6272 3441
Fax: + (612) 6272 3882
E-Mail: stuart.davey@brs.gov.au

Dr. Laurent Ntahuga
Chairman
Association Burundaise pour la Protection des Oiseaux
B.P. 1855
Bujumbura

Burundi

Tel.: + (257) 22 8312 (dom) / 829 750 (cell.)
Fax: + (257) 22 3288
E-Mail: laurntahuga@yahoo.com

Mr. Ole Hendrickson
Environment Canada
351 St. Joseph Blvd. 9th Floor
Place Vincent Massey
Hull QC K1A 0H3

Canada

Tel.: + (819) 953 9161
Fax: + (819) 953 1765
E-Mail: ole.hendrickson@ec.gc.ca

Dr. José Joaquín Campos Arce
Director
Department of Natural Resources and Environment
Tropical Agricultural Research
and Higher Education Center CATIE
Turrialba 7170

Costa Rica

Tel.: + (506) 556 0401
Fax: + (506) 556 2430
E-Mail: jcampos@catie.ac.cr

Dr. Jan Plesnik
Deputy Director
Agency for Nature Conservation and Landscape Protection
Kalisnicka 4-6
CZ-13023 Prague 3

Czech Republic

Tel.: + (420 2) 2258 0562
Fax: + (420 2) 2258 0012
E-Mail: plesnik@nature.cz, janplesnik@hotmail.com

Mr. Medhat Mohamed Rabie
Deputy Manager
South Sinai Protected Areas Network
National Parks of Egypt, Ministry of State of Environment
P.O box 19,
Sharm El Sheikh, South Sinai

Egypt

Tel.: + (20 69) 660 668/559
Fax: + (20 69) 660 668/559
E-Mail: Medhatrb@yahoo.com

Dr. Horst Korn
Head of Biodiversity Unit
Federal Agency for Nature Conservation
Insel Vilm
Putbus 18581

Germany

Tel.: + (49) 38301 86130
Fax: + (49) 38301 86150
E-Mail: horst.korn@bfv-vilm.de

Mr. Joseph Ronald Toussaint
CBD National Focal Point and SBSTTA Bureau member
Ministère de l'Environnement
181, avenue Jean-Paul II
Haut de Turgeau
Port-au-Prince

Haiti

Tel.: + (509) 245 9309 / 0504 / 7572
Fax: + (509) 245 7360
E-Mail: josephronaldt@yahoo.fr

Dr. Csaba Matyas
University Professor
University of West Hungary
Institute of Environmental Sciences
P.O. Box 132
Sopron 9401

Hungary

Tel.: + (36 99) 518 395
Fax: + (36 99) 329 840
E-Mail: cm@emk.nyme.hu

Dr. Jorge Soberón-Mainero
Executive Secretary
CONABIO
Comisión Nacional para el Uso
y Conocimiento de la Biodiversidad
Av. Liga Periférico-Insurgentes Sur
No. 4903 Col. Parques del Pedregal
Mexico C.P. 14010

Mexico

Tel.: + (525) 5552 89102
Fax: + (525) 5552 89131

/...

E-Mail: jsoberon@xolo.conabio.gob.mx

Governments Parties (Cont'd)

Dr. Almeida Alberto Siteo
Professor and Head
Eduardo Mondlane University
Department of Forestry
Box 257
Maputo

Mozambique

Tel.: + (258 1) 496 238 + 258 1 494 168(h)
Fax: + (258 1) 496 238
E-Mail: sittus@zebra.uem.mz, asitoe@yahoo.com

Mr. Radoslav Barzev
Proyecto Regional Corredor Biologico Mesoamericano
Ministry of Environment
P.O. Box 4211
Managua

Nicaragua

Tel.: + (505) 886 9048
Fax: + (505) 233 4455 / 233 1848
E-Mail: radobarzev@yahoo.com, rado.barzev@biomeso.net

Mr. Arild Lindgaard
Senior Adviser
Directorate for Nature Management
Tungasletta 2
N-7485 Trondheim

Norway

Tel.: + (47) 73 580 808
Fax: + (47) 73 580 501
E-Mail: arild.lindgaard@dirnat.no
Web: <http://www.naturforvaltning.no>

Mr. Yimnang Golbuu
Chief Researcher
Palau International Coral Reef Research Center

Palau

Tel.: +(680) 488 6950
Fax: + (680) 488 6951
E-Mail: ygolbuu@picrc.org

Dr. Vladimir Gavrilovich Papchenkov
Head of laboratory of Higher Aquatic Vegetation
I. D. Papanin Institute of Biology of Inland Waters, RAS
Borok, 59-22, Nekouzsky rajon
Jaroslavskaja oblast' 152742

Russian Federation

Tel.: + (7 095) (0) 85 47 24 551
Fax: + (7 095) (0) 85 47 24 042
E-Mail: papch@mail.ru

Mr. Piet Wit
Senior Advisor to the Government of the Netherlands
Director, Syzygy
4041 AV Kesteren
Rijnband?k 161

The Netherlands

Tel.: + 31 488 48 23 69
Fax: + 31 488 48 09 18
E-Mail: wit@syzygy.nl

Prof. Edward Maltby
Professor, Environment and Physical Geography
Director
Royal Holloway Institute
for Environmental Research (RHIER)
Huntersdale Callow Hill

Virginia Water
Surrey GU25 4LN

United Kingdom of Great Britain and Northern Ireland

Tel.: + (44 1784) 477 404
Fax: + (44 1784) 477 427
E-Mail: e.maltby@rhul.ac.uk

United Nations and Specialized Agencies

Food and Agriculture Organization of the United Nations (FAO)

Ms. Mette L. Wilkie
Forestry Officer
Forest Resources Development Service (FORM)
Food and Agriculture Organization
of the United Nations (FAO)
Viale delle Terme di Caracalla
Rome 00100
Italy
Tel.: + (39 06) 5705 2091
Fax: + (39 06) 5705 5137
E-Mail: Mette.LoycheWilkie@fao.org

United Nations and Specialized Agencies (Cont'd)

Secretariat of the United Nations Forum on Forests

Ms. Susan Braatz
Senior Forest Policy Adviser
Secretariat of the United Nations
Forum on Forests (UNFFS)
Two U.N. Plaza
Room DC2-2284
New York NY 10017
United States of America
Tel.: + (1 212) 963 4219
Fax: + (1 917) 367 3186
E-Mail: braatz@un.org

United Nations Development Programme (UNDP)

Mr. Tim Boyle
United Nations Development Programme (UNDP)
304 East 45th Street
New York NY 10017
United States of America
Tel.: + (613) 744 7855
Fax: + (212) 906 6973
E-Mail: boyle2104@rogers.com
Web: <http://www.undp.org>

United Nations Environment Programme (UNEP)

Mr. Bai-Mass Taal
Senior Programme Officer
United Nations Environment Programme (UNEP)
P.O. Box 30552
Nairobi
Kenya
Tel.: + (254 2) 623 238
Fax: + (254 2) 624 260
E-Mail: bai-mass.taal@unep.org
Web: <http://www.unep.org>

Inter-Governmental Organizations

International Tropical Timber Organization (ITTO)

Dr. Eva Müller
Assistant Director
Reforestation and Forest Management
International Tropical Timber Organization (ITTO)
International Organizations Center
5th Floor, Pacifico - Yokohama
1-1-1, Minato-Mirai, Nishi-Ku
Yokohama 220-0012
Japan
Tel.: + (81) 45 223 1110
Fax: + (81) 45 223 1111
E-Mail: rfm@itto.or.jp
Web: www.itto.or.jp

IUCN - The World Conservation Union

Mr. Simon Rietbergen
Head
Ecosystem Management Programme
IUCN - The World Conservation Union
Rue Mauverney 28
Gland CH-1196
Switzerland
Tel.: + (41 22) 999 0273
Fax: + (41 22) 999 0020
E-Mail: SPR@hq.iucn.org
Web: <http://www.iucn.org>

IUCN Commission for ecosystem management

Mr. Nik Lopoukhine
Regional Vice Chair, North America
IUCN Commission for Ecosystem Management
25 Eddy Street, 4th floor
Room 344, 25-4-N
Gatineau QC
Canada K1A 0M5
Tel.: + (1-819) 994-2657
Fax: + (1-819) 994-5140
E-Mail: nik.lopoukhine@pc.gc.ca
Web: <http://parkscanada.gc.ca>

Ramsar Convention on Wetlands

Dr. Nick Davidson
Deputy Secretary General
Ramsar Convention on Wetlands
Rue Mauverney 28
Gland CH-1196
Switzerland
Tel.: + (41 22) 999 0171
Fax: + (41 22) 999 0169
E-Mail: davidson@ramsar.org
Web: <http://www.ramsar.org>

Observers

Mr. Peter Bos
Ministry of Agriculture, Nature and Food Quality
P. O. Box. 20401
The Hague 2500-EK
The Netherlands
Tel.: + (31 70) 378 5529
Fax: + (31 70) 378 6146
E-Mail: p.w.bos@n.agro.nl

Dr. Douglas Beard
Program Coordinator, Fisheries and Aquatic
Resources Node
USGS National Biological Information Infrastructure
12201 Sunrise Valley Dr.
Reston VA 20192
United States of America
Tel.: + (1 703) 648-4215
Fax: + (1 703) 648-4224
E-Mail: Dbeard@usgs.gov

Dr. Solange Chaffard-Sylla
Chercheure ICI/E-SCDB
Observatoire de l'Écopolitique Internationale
Université du Québec à Montréal
Institut des Sciences de l'Environnement
Pavillon Président-Kennedy C.P. 8988
Succursale Centre Ville
Montreal, Quebec
Canada H3C 3P8
Tel.: + (1 514) 987 3000 ext. 4512
E-Mail: solange_sylla@hotmail.com
Web: www.er.uqam.ca/nobel.oei

Ms. Paula Warren
Policy Analyst
Department of Conservation
P. O. Box 10-420,
Wellington
New Zealand
Tel.: + (64 4) 471 3135
Fax: + (64 4) 471 3130
E-Mail: pwarren@doc.govt.nz
Web: <http://www.doc.govt.nz>

Resource-persons

Dr. Steve Edwards
Senior Adviser
IUCN - The World Conservation Union
Rue Mauverney 28
Gland CH-1196
Switzerland
Tel.: + (41 22) 999 0239
Fax: + (41 22) 999 0020
E-Mail: steve.edwards@iucn.org
Web: <http://www.iucn.org>

Dr. Horst Korn
Head of Biodiversity Unit
Federal Agency for Nature Conservation
Isle of Vilm
Putbus 18581
Germany
Tel.: + (49) 38301 86130
Fax: + (49) 38301 86150
E-Mail: horst.korn@bfn-vilm.de

Prof. Edward Maltby (also UK representative)
Professor, Environment and Physical Geography
Director
Royal Holloway Institute for Environmental Research (RHIER)
Huntersdale Callow Hill
Virginia Water
Surrey GU25 4LN
United Kingdom of Great Britain and Northern Ireland
Tel.: + (44 1784) 477 404
Fax: + (44 1784) 477 427
E-Mail: e.maltby@rhul.ac.uk

Mr. Peter Frost
Representing Center for International Forestry Research
(CIFOR)
Associate Professor
Institute of Environmental Studies
University of Zimbabwe
Churchill Avenue (P.O. Box MP 167 Mount Pleasant),
Harare
Zimbabwe
Tel.: + (263) (0) 4-302 603 (office)
Fax: + (263) (0) 4-332 853
E-Mail: pfrost@science.uz.ac.zw

Secretariat

Mr. Kalemani Jo Mulongoy
Head
STTM
Secretariat of the Convention on Biological Diversity
393 St. Jacques Street
Office 300
Montreal H2Y 1N9
Canada
Tel.: + (1 514) 287 7027
Fax: + (1 514) 288 6588
E-Mail: jo.mulongoy@biodiv.org
Web: <http://www.biodiv.org>

Secretariat (Cont'd)

Mr. David Cooper
Senior Programme Officer
Programme Coordination and Inter-agency Affairs
Secretariat of the Convention on Biological Diversity
393 St. Jacques Street
Office 300
Montreal H2Y 1N9
Canada
Tel.: + (1-514) 288-2220
Fax: + (1-514) 288-6588
E-Mail: david.cooper@biodiv.org
Web: <http://www.biodiv.org>

Ms. Paola Deda
Programme Officer
Sustainable Use & Tourism
Secretariat of the Convention on Biological Diversity
393 St. Jacques Street
Office 300
Montreal H2Y 1N9
Canada
Tel.: + (1-514) 287-8710
Fax: + (1-514) 288-6588
E-Mail: paola.deda@biodiv.org
Web: <http://www.biodiv.org>

Ms. Marjo Vierros
Programme Officer
Marine and Coastal Biological Diversity
Secretariat of the Convention on Biological Diversity
393 St. Jacques Street
Office 300
Montreal H2Y 1N9
Canada
Tel.: + (1-514) 287-7036
Fax: + (1-514) 288-6588
E-Mail: marjo.vierros@biodiv.org
Web: <http://www.biodiv.org>

Ms. Juliane Zeidler
Programme Officer
Dry and sub-humid lands
Secretariat of the Convention on Biological Diversity
393 St. Jacques Street
Office 300
Montreal H2Y 1N9
Canada

Tel.: + (1-514) 287-7038
Fax: + (1-514) 288-6588
E-Mail: juliane.zeidler@biodiv.org
Web: <http://www.biodiv.org>
