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SUSTAINABLE FOREST MANAGEMENT AND THE ECOSYSTEM APPROACH:

TWO CONCEPTS, ONE GOAL

by

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ABBREVIATIONS

CBD	Convention on Biological Diversity
COP	Conference of the Parties
COP 6	Sixth Conference of the Parties
EA	Ecosystem Approach
FAO	Food and Agriculture Organization of the United Nations
FRA	Forest Resources Assessment
IFF	Intergovernmental Forum on Forests
IPF	Intergovernmental Panel on Forests
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union
MAB	Man and Biosphere
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-Governmental Organization
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SFM	Sustainable Forest Management
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFF	United Nations Forum on Forests
WWF	World Wide Fund for Nature

ABSTRACT

This paper, prepared as a response to recent decisions by the Sixth Conference of the Parties of the Convention on Biological Diversity and the third meeting of the United National Forum on Forests, traces the development of two concepts central to the international dialogue on forests: (a) Sustainable Forest Management and (b) the Ecosystem Approach as applied to forests. A comparative analysis of the principles underlying the two concepts is presented, illustrating the extent to which they are similar and/or compatible. The paper also reviews how and to what extent the concepts provide guidance and have been applied for the management of forest resources and provides suggestions for their integration. It is concluded that, overall, sustainable forest management and the ecosystem approach express similar goals and ambitions for forest management, focusing on environmental, social and economic sustainability and on generating and maintaining benefits for both present and future generations. It is thus possible to fully integrate the two concepts leading to synergies in policy and planning processes at international and national levels and improved forest management practices at the field level. Attention should now be focused on providing support to the actual implementation - building upon existing best practices and tools - and to monitor progress on the ground to provide feedback to the national and international policy processes.

Key words: Sustainable forest management, ecosystem approach, forest principles, criteria and indicators

INTRODUCTION

Developments in forest management over the past decade have focused on progress towards Sustainable Forest Management (SFM), an approach that balances environmental, socio-cultural and economic objectives of management in line with the “*Forest Principles*”¹ adopted at the United Nations Conference on Environment and Development (UNCED) in 1992.

Parallel efforts in environmental conservation, particularly within the framework of the Convention on Biological Diversity, have led to the development of the Ecosystem Approach (EA) as a framework and holistic approach for the conservation and sustainable use of biological diversity and its components in all types of ecosystems.

This paper traces the development, since UNCED, of these two concepts. A comparative analysis of the concepts is presented, illustrating the extent to which they are similar and/or compatible. Suggestions for their full integration are also provided.

The paper is prepared as a response to recent decisions by the Sixth Conference of the Parties (COP 6) of the Convention on Biological Diversity (CBD)², which called for a comparison of the concepts of the ecosystem approach and sustainable forest management, and by the third meeting of the United National Forum on Forests (UNFF 3)³, which invited member states and relevant organisations to provide their views with the aim of clarifying the two concepts.

At the national and international level a clarification and potential full integration of the two concepts may enable a better coordination and correlation between the Expanded Programme of Work on Forest Biological Diversity of the CBD and the Proposals for Action on forests developed by the Intergovernmental Panel on Forests (IPF) and the Intergovernmental Forum on Forests (IFF) and thus reduce reporting burdens on countries. It may also help clarify the linkages and synergies between National Biodiversity Strategy and Action Plans (NBSAPs), promoted by the CBD, and national forest programmes promoted by the IPF/IFF/UNFF process. In addition, some of the IPF/IFF Proposals for Action call for the ecosystem approach to be taken into consideration, e.g. IPF 17 (a), IPF 89 (h) and IFF 85 (e) dealing with national forest programmes, the identification of the full range of forest benefits and protected areas respectively.

It is also hoped that this analysis will contribute to the identification of insights and lessons learned which may support the further conceptual refinement and practical application of both concepts. It should be noted that the ecosystem approach is a broader concept than SFM in that it applies to all types of ecosystems. Only forestry aspects of EA are dealt with in this paper.

¹ The full title is the Non-Legally Binding Authoritative Statement on Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forest. (United Nations, 1992b)

² Decision VI/12: “Within the availability of resources and in collaboration with relevant organizations and bodies, in particular the United Nations Forum of Forests, to convene a meeting of experts to compare the ecosystem approach with sustainable forest management, and develop proposals for their integration” (CBD 2002)

³ “Invites Member States of the Forum and CPF members to provide their views by the end of February 2004 to the UNFF Secretariat on the following issues ... (i) clarifying the concept of the ecosystem approach and the concept of sustainable forest management.”

SUSTAINABLE FOREST MANAGEMENT

UNCED, the Forest Principles and the international forest policy dialogue

The term Sustainable Forest Management can be traced to the so-called *Forest Principles* and Chapter 11 of Agenda 21, which were prominent outputs from UNCED.

The guiding objective of the *Forest Principles* is to contribute to the management, conservation and sustainable development of all types of forests and to provide for their multiple and complementary functions and uses. Principle 2b specifically states that:

“Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations.”

It goes on to specify that:

“These needs are for forest products and services, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products.”

And that:

“Appropriate measures should be taken to protect forests against harmful effects of pollution, including air-borne pollution, fires, pests and diseases, in order to maintain their full multiple value.”

A summary version of the *Forest Principles* is provided in Table 1 below. The full text can be found in Annex 1.

Although the *Forest Principles* form a “non-legally binding statement of principles”, they bear the marks of a negotiated text with some repetitions and passages with ambiguous or very general wording and are, in places, focusing on guidance for the establishment of an enabling framework for SFM, rather than principles for field level application of forest management.

The concept of SFM has continued to evolve since 1992 through the international forest policy dialogue within IPF, IFF and UNFF and through a large number of country-led and eco-regional initiatives aimed at translating the concept into practice - including the development of criteria and indicators of sustainable forest management supported by international organisations such as the Food and Agriculture Organization of the United Nations (FAO), the International Tropical Timber Organization (ITTO), United Nations Environment Programme (UNEP) and other members of the Collaborative Partnership on Forests⁴.

⁴ The CPF is comprised of 14 international forestry-related organizations: Center for International Forestry Research (CIFOR); FAO; ITTO; International Union of Forest Research Organizations (IUFRO); Secretariat of the CBD; Secretariat of the Global Environmental Facility (GEF); Secretariat of the United Nations Convention to Combat Desertification (UNCCD); Secretariat of the United Nations Forum on Forests (UNFF); Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC); United Nations Development Programme (UNDP); United Nations Environment Programme (UNEP); World Agroforestry Centre (ICRAF); World Bank and World Conservation Union (IUCN).

Table 1. Summary version of the *Forest Principles*

1 & 2a	States have the sovereign right to use, manage and develop their own resources and must ensure that activities do not cause damage to the environment of other States/areas. The incremental cost of achieving sustainable development should be equitably shared by the international community.
2	Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations and should be protected against harmful effects of pollution, fires, pests and diseases. Timely, reliable and accurate information on forests and forest ecosystems should be provided. Governments should promote and provide opportunities for the participation of all interested parties in the development and implementation of national forest policies.
3	National policies and strategies should provide a framework for increased efforts for the management, conservation and sustainable development of forests and forest lands. International institutional arrangements should facilitate international cooperation in the field of forests. Environmental protection and social and economic development should be integrated in SFM.
4	The vital role of all types of forests in maintaining the ecological processes and balance should be recognized.
5	National forest policies should support indigenous people, other communities and forest dwellers. Participation of women in all aspects of SFM should be actively promoted.
6	The role of forests in the provision of bio-energy and industrial wood should be recognised and aspects related to production, consumption and disposal of forest products taken into account. Decisions should benefit from environmental cost-benefit assessments and methodologies for economic evaluations should be promoted. Planted as well as natural forests play important roles for provision of goods and services and SFM should be promoted.
7	Economic incentives for SFM should be developed and a supportive international economic climate promoted.
8	Efforts to maintain and increase forest cover and forest productivity should be undertaken. Implementation of national forest policies and programmes should be supported by international financial and technical cooperation. SFM should be based on sound national policies and guidelines taking into account internationally agreed methodologies and criteria. Forest management should be integrated with management of adjacent areas so as to maintain ecological balance and sustainable productivity. Protection of ecologically viable representative or unique forests should be secured including cultural, spiritual, historical or religious values. Access to biological resources shall be with due regard to sovereign rights and sharing of technology and profits from biotechnology products shall be on mutually agreed terms. Environmental impact assessments should be carried out where actions are likely to have significant impacts on important forest resources.
9, 10 & 11	Developing countries should be financially supported to enhance their capacity to implement SFM. Forest policies should take account of pressures and demands on forest ecosystems from outside the sector and establish intersectoral means to deal with these. Access to and transfer of environmentally sound technologies and know-how should be facilitated.
12	Scientific research, institutional capabilities and knowledge sharing should be strengthened. Benefits arising from use of indigenous knowledge should be equitably shared.
13	Trade in forest products should be open and free. Environmental costs and benefits should be incorporated into market forces and mechanisms.
14	Unilateral measures to restrict international trade in forest products should be avoided.
15	Pollutants that are harmful to forest ecosystems should be controlled.

These efforts have stimulated changes in forest policy and legislation and in forest management practices throughout the world. Public participation in forest management has increased in many countries and broader approaches to forest management, such as ecosystem and landscape management, are becoming more widely accepted and applied. Integrated strategies for forest conservation, in which conservation of forest resources and biological diversity entails management both inside and outside protected areas, are increasingly being developed. (FAO 2001b)

It should be noted that sound forest management, taking into account social, economical and environmental values now and for the future, was widely applied in a number of countries also before UNCED. Regarding the productive and environmental functions of forests, the principle of sustained yield has been commonly applied in forestry for more than a century and, together with watershed management practices and other soil and water conservation measures and forest protection activities, has helped maintain the continuous vitality and productivity of production forests, while the system of Protected Areas has led to the establishment of a large network of conserved forest ecosystems, currently totalling about 12 percent of the total forest area in the world (FAO 2001a).

Criteria and indicators for sustainable forest management

Nine regional and eco-regional forestry initiatives or processes⁵ involving 149 countries⁶, whose combined forest area equals 97.5 percent of the total forest area in the world, have been established since 1992 with the aim of translating the concept of sustainable forest management into practice. Countries involved continue to meet on a regular basis to further refine the concept through the development of criteria - or elements - defining SFM and sets of indicators for each of these aimed at facilitating monitoring of progress in the practical application of the concept. Refer to Figure 1 below for a geographical overview and to Annex 3 for additional information.

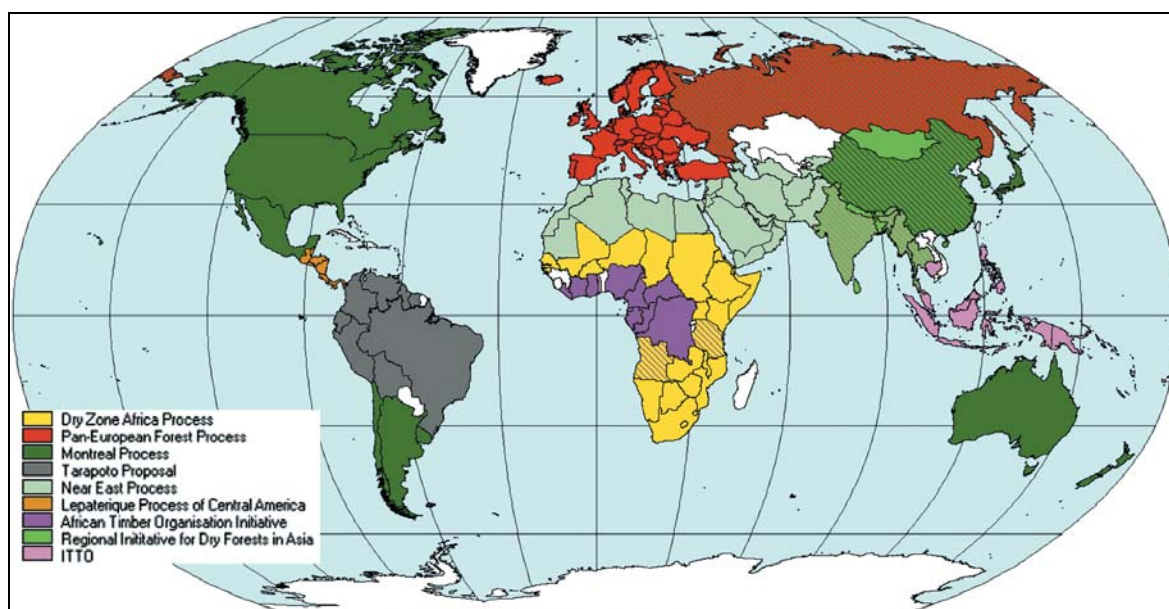


Figure 1. Geographical coverage of nine criteria and indicator processes

⁵ Temperate and boreal forests are covered by the Pan-European and the Montreal processes; arid zone forests by the Dry Zone Africa Process, the Near East Process and the Regional Initiative for Dry Forests in Asia; and tropical moist forests are covered by the Lepaterique Process of Central America; the Tarapoto Proposal for Amazonia, ITTO and the African Timber Organization (ATO). Some of the regionally based processes cover also other forest types in the region. Several countries are member of more than one process.

⁶ At least two additional countries (Cuba and the Lao People's Democratic Republic) have developed national-level criteria and indicators for sustainable forest management without being members of any of the aforementioned eco-regional processes.

Although evolving separately, these regional and eco-regional processes are conceptually similar in objectives and overall approach and have shared information and experiences resulting in a convergence as regards the main elements constituting SFM.

Recently, the International Conference on the Contribution of Criteria and Indicators for Sustainable Forest Management: *The way forward* (CICI 2003), held in Guatemala, gathered representatives from all of the above processes, government officials, international inter-governmental and non-governmental organisations and experts in the field. In considering the potential benefits of a common set of criteria for sustainable forest management based on existing sets elaborated by regional and eco-regional processes, participants at this Conference acknowledged the following seven common thematic areas (FAO/ITTO/INAB, 2003):

- (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

Of these, four are related to the environmental aspects of SFM and the remaining 3 to the social and economic aspects – the two other “legs” of SFM.

Each criterion is defined by quantitative or qualitative indicators, which are measured and monitored regularly to determine the effects of forest management interventions, or non-intervention, with the aim of gradual improvement of current practices. As would be expected, the indicators vary widely among initiatives owing to differences in forest types and environmental, social, economic, political and cultural conditions. Indicators must be dynamic and are likely to change over time in light of experiences and know-how and in line with changing needs and values.

National-level sets of criteria and indicators are being complemented by the development and implementation of indicators defined at the forest management unit level in a number of the processes as well as by other actors such as NGOs, community-based organisations and the private sector.

The degree of implementation of criteria and indicators at the national and sub-national level varies considerably. In many developed countries criteria and indicators form a basis for measuring progress towards sustainable forest management and are increasingly being incorporated into national forest programmes and policies. In many developing countries, action is limited by the lack of funds and trained personnel for collecting and analysing information and for the development, implementation and monitoring of improved management prescriptions based on the information obtained.

The results of CICI 2003 and other technical meetings held since UNCED demonstrate a move from the focus on whether conservation and sustainable development of the world’s forest resources is possible, to a focus on how to combine the two and to implement sustainable forest management practices.

Translating the SFM concept into action

The concept of SFM has influenced many initiatives at various levels, has led to the revision of forest policies and legislation and has been mainstreamed by local, national, regional and international forestry organisations.

While criteria and indicators have helped translate the concept into practice and establish a framework for monitoring progress in implementation and the effects of actions taken or not taken, a number of recent initiatives in forestry are aimed at translating the specific elements of SFM into practice under different circumstances and for different forest management objectives and levels of scale. These include, among many others:

- National forest programmes;
- Integrated mountain development;
- Integrated, participatory watershed management;
- Protected area management;
- Model and demonstration forests;
- Participatory/community forestry;
- Adaptive collaborative forest management;
- Model codes of forest harvesting practice/Reduced impact logging;
- Integrated pest management in forestry;
- Integrated and participatory forest fire management;
- Landscape restoration;
- *In situ* conservation of biological diversity and forest genetic resources in production forests;
- Forest auditing and certification.

Recent developments: Monitoring progress towards sustainable forest management at the global level

Reporting on the state of forest resources globally has been undertaken by FAO at more or less regular intervals since 1947. While the early assessments focused on the extent of forest area and commercial timber volume, these assessments have become broader over time and the latest – the Global Forest Resources Assessment 2000 (FRA 2000) – contained detailed information on the status and trends of the extent of natural and planted forests and their management, on forest ownership and on some of the products and environmental services provided by forests. (FAO 2001a)

A recent Forest Resources Assessment Expert Meeting (Kotka IV), held in 2002, as well as the above mentioned International Conference on Criteria and Indicators, held in 2003, recommended closer integration of the FRA process and the criteria and indicator processes aimed at including additional aspects and common indicators in global reporting on forest resources. As a result, the common thematic areas of SFM identified by the nine regional and eco-regional criteria and indicator processes are now being used as the framework for country reports for the planned FRA 2005 update.

A monitoring and reporting framework for assessing progress in the implementation of the concept of sustainable forest management thus exists at national, eco-regional as well as global level.

Conclusions

The *Forest Principles* were developed and agreed to more than ten years ago. Although the text is, in places, repetitive or ambiguous, substantial efforts have been made to translate the principles into operational terms and implement the concept of sustainable forest management at the field level.

At the conceptual level, most of the discussions have taken place at the international level under the IPF/IFF/UNFF framework and at regional and eco-regional level through the criteria and indicator processes. Although the criteria and indicator processes evolved separately, there has been a large degree of exchange of information and experiences between them and a strong convergence is appearing. Seven common thematic areas covering the main aspects of sustainable forest management have thus been identified. Through the development and application of indicators for each of these thematic areas, or criteria, the concept is made operational at national as well as local level.

The concept of SFM has influenced many new initiatives, has led to the revision of forest policies and practices, and has been mainstreamed by local, national, regional and international forestry organisations.

A monitoring and reporting framework now exists at national, regional, eco-regional and global levels to assess progress in the application of the concept.

Forest auditing and certification, although not yet widely applied in developing countries, are examples of market-based tools for third party verification of sustainable management practices in individual production forests.

THE ECOSYSTEM APPROACH AND ITS APPLICATION TO FORESTS

UNCED and the Convention on Biological Diversity

One of the key outcomes of UNCED was the Convention on Biological Diversity (CBD). This legally binding agreement had 168 signatories as of 5 June 2003 (CBD, 2003). The Convention has three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources.

The Ecosystem Approach (EA) is not mentioned in the convention text of CBD. However, the term was introduced at the first SBSTTA meeting and at the second meeting of the Conference of the Parties (COP) of the Convention, held in Jakarta, November 1995, delegates decided that "...the conservation and sustainable use of biological diversity and its components should be addressed in a holistic manner, taking into account the three levels of biological diversity and fully considering socio-economic and cultural factors". They further agreed that "...the ecosystem approach should be the primary framework of action to be taken under the Convention." (Decision II/8. CBD, 1995). No definition of the EA was provided at this stage.

The first draft CBD definition and description of the EA and a set of twelve underlying principles (The "*Malawi Principles*") were developed in a workshop of experts sponsored by the Governments of the Netherlands and Malawi and held in 1998 (CBD, 1998).

A number of subsequent expert meetings and workshops discussed and refined these and provided substantive inputs to Decision V/6 of COP 5 in 2000 which includes a description of the ecosystem approach, twelve “principles” and five points of “operational guidance” (CBD, 2000).

The Ecosystem Approach, as developed under the CBD, builds on previous, similar approaches such as the so-called “systemic approach” applied to the management of natural resources by the Man and Biosphere (MAB) programme of the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the 1970, the ecosystem management approach, developed in the US forestry sector in the 1980s, similar developments in Canada and other countries as well as work undertaken by the Commission on Ecosystem Management of the World Conservation Union (IUCN), the World Wide Fund for Nature (WWF) and other environmental non-governmental organizations.

The CBD describes the Ecosystem Approach as follows (CBD 2000):

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.

And further:

An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, 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.

As concerns the term “ecosystem”:

...the term "ecosystem" ...can refer to any functioning unit at any scale. Indeed, the scale of analysis and action should be determined by the problem being addressed. It could, for example, be a grain of soil, a pond, a forest, a biome or the entire biosphere.

The Ecosystem Approach Principles

Table 2 below lists the twelve principles of the Ecosystem Approach as contained in Decision V/6 of the fifth meeting of the Conference of the Parties to the CBD. (See Annex 2 for the full text of Decision V/6.)

Translating the EA into action

In addition to the twelve principles, the following five operational guidance points are provided for the Ecosystem Approach:

1. Focus on the functional relationships and processes within ecosystems;
2. Enhance benefit-sharing;
3. Use adaptive management practices;
4. Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate;
5. Ensure intersectoral cooperation.

Table 2. The twelve principles of the Ecosystem Approach

1	The objectives of management of land, water and living resources are a matter of societal choices.
2	Management should be decentralized to the lowest appropriate level.
3	Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
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.
5	Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.
6	Ecosystems must be managed within the limits of their functioning.
7	The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
8	Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
9	Management must recognize the change is inevitable.
10	The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
11	The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
12	The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

Application of the ecosystem approach to forests

The EA principles were only adopted in 2000 and it is too early to judge the feasibility and medium to long term effects of their application. On the other hand, similar concepts have been applied for a number of years. "Ecosystem management" was e.g. adopted by the US Forest Service and the Bureau of Land Management to guide their natural resource management decisions for over 300 million acres of federal land in 1992. A large scale, participatory process to synthesize and integrate existing scientific knowledge and management experience was initiated in 1995 culminating in the *Keystone National Policy Dialogue on Ecosystem Management* report issued in 1996. (Sexton, Johnson and Szaro, 1997.)

A number of recent case studies have been prepared in response to a request by COP 6 and as voluntary papers for the World Forestry Congress, 2003. Most of these analysed the extent to which the EA principles had been adhered to in current practices and the lessons learned, rather than describing examples of conscious attempts to apply the full set of principles and operational guidance points to a given forest ecosystem.

Recent developments

In response to Decision V/6 of COP 5, which called for the "...*further conceptual elaboration, and practical verification*" of the EA, three regional "*Pathfinder Workshops*" were held in late 2000 for Southern Africa, South America and Southeast Asia respectively.

These workshops were organised by the Royal Holloway Institute for Environmental Research, University of London on behalf of the IUCN Commission on Ecosystem Management in collaboration with the CBD Secretariat, UNESCO-MAB, Ramsar Secretariat and WWF International. The main objective was to compile and analyse case studies of the application of the EA. Three regional workshop reports and a global synthesis report (Smith and Maltby, 2001) have been prepared.

The German Federal Agency for Nature Conservation organised a workshop on the Isle of Vilm in October 2002 entitled “*Further development of the Ecosystem Approach*” as a response to Decision VI/12, which called for “...*proposals for the refinement of the principles and operational guidance of the ecosystem approach on the basis of case studies and lessons learned...*”

One of the outcomes of the Vilm workshop was a proposal for a slight revision of the text of the principles guiding the ecosystem approach. (See Korn, Schliep and Stadler, 2003 for details.) No major changes were proposed, but the principles were reduced to ten and the order slightly rearranged. Some editorial changes to the rationale for each principle were also proposed.

An Expert Meeting on the Ecosystem Approach, hosted by the CBD Secretariat in July 2003 and tasked with a review of the EA principles and operating guidance, recommended that, although the wording of the principles could be improved, a potential revision should only take place at a later stage, when the application of the approach had been more fully tested. The priority should instead be on facilitating the implementation of the approach. (CBD, 2003) The recent ninth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice of the CBD, held in Montreal in November 2003, agreed with this recommendation.

The Expert Meeting also outlined suggested annotations to the rationale of the EA principles and possible implementation guidelines to further facilitate implementation of the approach.

Conclusions

The Ecosystem Approach has strong political backing and has been adopted as the primary framework of action taken to implement the Convention on Biological Diversity. Twelve principles have been agreed upon by the Conference of the Parties and a set of operational guidance points exist to help translate the concept into action. However, given that these were only adopted in 2000, limited experience exists with regard to lessons learned on the feasibility and outcome of field level application.

COMPARATIVE ANALYSIS OF THE TWO CONCEPTS

Goals

The guiding objective, or goal, of the *Forest Principles* is “*to contribute to the management, conservation and sustainable development of forests and to provide for their multiple and complementary functions and uses.*” (Preamble)

According to Decision V/6 of COP 5 of the CBD, 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.*” (Preamble)

Management, conservation and sustainable use of renewable, natural resources is thus the stated goal of both concepts.

Principles

Both concepts are guided by a set of principles. The two tables below present an attempt to categorise and compare the underlying principles according to the level of application and common themes.

Table 4. Principles addressing the enabling framework (international & national level)

Theme/Principle	Relevant Forest Principles	Relevant Ecosystem Approach Principles
National sovereignty over natural resources	1a, 2a	1
Duty of care	1a, 2b, 8a-b, h, 15	3
National legal and policy framework	3a, 5, 8d	
Economic incentives (Polluter pays principle)	7, 13c,e	4
Institutional capacity building	3a, 5, 12a-b	
Subsidiarity/decentralization		2
External financial support	1b, 7b, 8c, 9, 10	
International trade	13a-e, 14	
Access to and transfer of technology	11	

Table 5. Principles addressing forest management aspects (field level)

Theme	Relevant Forest Principles	Relevant Ecosystem Approach Principles
Participation and empowerment (incl. marginalised groups)	2d, 5a-b	12
Use and sharing of local knowledge and other information sources	2c, 12c-d	11
Adaptive management and social learning (incl. Precautionary principle)		9
Intergenerational equity	2	8
Appropriate scale		7, 8
Conservation of ecosystem structure & functioning/ maintain ecological balance incl. protective measures	2b, 3c, 4, 8, 15	5, 6
Sustainable use/productive functions	6, 8	10
Multiple use & values	2b, 3c, 6, 8f	10
Equitable benefit sharing	12d	
Impacts on other ecosystems/integrated management	8e	3
Intersectoral collaboration	9c	12

As can be seen from the above, the two sets of principles, although similar, differ slightly in scope. The ecosystem approach principles are, for example, less concerned with the enabling conditions and prerequisites at the national and international levels than the *Forest Principles*. Some aspects included in the *Forest Principles* are, understandably, specific to forests rather than to other ecosystems and sectors (e.g. trade in forest products, forest protection).

Other principles are not specifically mentioned in the two lists, but are found in the preamble or in the set of operational guidance points for implementation of the ecosystem approach (Intersectoral collaboration and equitable benefit sharing for example).

Principles and concepts common to both sustainable forest management and the ecosystem approach include: national sovereignty over resources; duty of care; the “polluter pays” principle; participation; intergenerational equity; conservation of ecosystem structure and functioning; multiple and sustainable use of resources; the need for environmental impact assessments; and equitable benefit sharing.

The few conceptual differences that do exist between the two sets of principles stem from different starting points.

The *Forest Principles* were developed at a sectoral level, where some of the major concerns were to incorporate conservation of non-timber species and other non-tangible benefits and values into production systems and to foster greater participation in managing both production systems and protected areas.

The main underlying goal or objective is thus:

Forest resources and forest lands should be sustainably managed to meet the **social, economic, ecological, cultural and spiritual needs** of present and future generations and should be **protected against harmful effects** of pollution, fires, pests and diseases in order to maintain their **full multiple value**.

The ecosystem approach started from an ecological point of view and moved from a focus on conservation issues towards a more holistic approach, while fostering public participation and integration of socio-economic needs.

Principle 5 lists the priority target of the ecosystem approach as: “**Conservation of ecosystem structure and functioning**, in order to maintain ecosystem services”.

Maintaining ecosystem structure and functioning is thus seen as the primary objective of the ecosystem approach, whereas sustainable forest management places multiple functions, needs and values at the forefront and, perhaps, includes socio-cultural and economic aspects more explicitly.

Applicability and outcomes

One obvious difference is the fact that the EA is applicable to all types of ecosystems, while the SFM is designed to deal with the forest ecosystem - in its many variations and including other wooded lands and trees outside forests.

Substantial efforts have gone into refining the SFM concept and making it operational at both national and forest management unit level e.g. through the development of criteria and indicators for sustainable forest management and a large range of practical guidelines and supportive initiatives. The EA, being a more recent concept in its current form, has benefited from the lessons learned in a variety of ecosystems, but detailed practical guidelines are still lacking, although a first attempt at preparing such guidelines was made at the recent CBD Expert Meeting on the Ecosystem Approach (CBD, 2003).

No examples of a comparative analysis of the outcome of applying the two concepts to a given forest have been identified. However, given that the conceptual differences are minimal, they are likely to be over-shadowed by divergent interpretations and variations in local conditions and in capabilities for implementation.

Recent developments: Conclusions from the CBD Expert Meeting and SBSTTA 9

The CBD Expert Meeting on the Ecosystem Approach held in July 2003, which discussed the two concepts of sustainable forest management and the ecosystem approach reached the following conclusions:

- Sustainable forest management can be considered as a means of applying the ecosystem approach to forests. Further, there is potential for the tools developed for sustainable forest management to be used to help implement the ecosystem approach. These tools include inter alia the criteria and indicators, national forest programmes, “model forests” and certification schemes. There is substantial potential for mutual learning among those implementing both approaches.
- There is a need for the ecosystem approach to adopt processes that are based on clear statements of visions, objectives, and goals for defined regions or issues, thereby becoming more outcome-oriented.
- Sustainable forest management could place greater emphasis on better cross-sectoral integration and intersectoral collaboration; the interactions between forests and other biomes/habitat types within a landscape; and biodiversity conservation issues.

Delegates at the recent ninth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA 9) of the CBD agreed with the above conclusions.

CONCLUSIONS

Developments in forest management over the past decade have focused on progress towards Sustainable Forest Management, an approach that balances environmental, socio-cultural and economic objectives of management in line with the “*Forest Principles*” adopted at the United Nations Conference on Environment and Development in 1992.

Parallel efforts in environmental conservation, particularly within the framework of the Convention on Biological Diversity, have lead to the development of the Ecosystem Approach as a framework and holistic approach for the conservation and sustainable use of biological diversity and its components in all types of ecosystems.

Although evolving separately, the two concepts, like similar concepts in environmental management, both aim at promoting conservation and management practices which are environmentally, socially and economically sustainable and which generate and maintain benefits for both present and future generations.

Both concepts are guided by a set of principles. A comparison of these reveals few differences other than the fact that sustainable forest management deals largely with only one kind of ecosystem – forests – whereas the ecosystem approach addresses management of biological diversity in a range of ecosystems.

Management, conservation and sustainable use of renewable natural resources are the stated goals of both concepts. The guiding objective of the *Forest Principles* underlying the concept of sustainable forest management is “to contribute to the management, conservation and sustainable development of forests and to provide for their multiple and complementary functions and uses”, while COP-5 of the CBD defined the ecosystem approach as “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.”

The two set of principles differ slightly in scope. The ecosystem approach principles are, for example, less concerned with the enabling conditions and prerequisites at the national and international levels than the Forest Principles. Some aspects included in the Forest Principles are, understandably, specific to forests rather than to other ecosystems and sectors.

Principles and concepts common to both sustainable forest management and the ecosystem approach include: national sovereignty over resources; duty of care; the “polluter pays” principle; participation; intergenerational equity; conservation of ecosystem structure and functioning; multiple and sustainable use of resources; the need for environmental impact assessments; and equitable benefit sharing.

The few conceptual differences between the two sets of principles stem from different starting points (production forests and forest management versus conservation ecology) but are minimal for all practical purposes. In terms of practical, field level application the differences are likely to be over-shadowed by divergent interpretations and variations in local conditions and in capabilities for implementation.

It is thus possible to fully integrate the two concepts leading to synergies in policy and planning processes at international and national levels and improved forest management practices at the field level.

This can be done by facilitating the sharing of information and experiences between practitioners and relevant agencies in individual countries as well as between the CBD and the UNFF at the international level. Many of the tools developed to promote the field-level application of Sustainable Forest Management, may be useful for other ecosystems and the focus on conservation of biological diversity and the intersectoral collaboration within the Ecosystem Approach can provide useful inputs to the further refinement of the SFM concept and lead to improved forest management practices.

Attention should now be focused on providing support to the actual implementation of the two concepts - building upon existing best practices and tools - and to monitor progress on the ground to provide feedback to the national and international policy processes.

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ANNEXES

ANNEX 1: THE FOREST PRINCIPLES

NON-LEGALLY BINDING AUTHORITATIVE STATEMENT OF PRINCIPLES
FOR A GLOBAL CONSENSUS ON THE MANAGEMENT, CONSERVATION
AND SUSTAINABLE DEVELOPMENT OF ALL TYPES OF FORESTS

PREAMBLE

(a) The subject of forests is related to the entire range of environmental and development issues and opportunities, including the right to socio-economic development on a sustainable basis.

(b) The guiding objective of these principles is to contribute to the management, conservation and sustainable development of forests and to provide for their multiple and complementary functions and uses.

(c) Forestry issues and opportunities should be examined in a holistic and balanced manner within the overall context of environment and development, taking into consideration the multiple functions and uses of forests, including traditional uses, and the likely economic and social stress when these uses are constrained or restricted, as well as the potential for development that sustainable forest management can offer.

(d) These principles reflect a first global consensus on forests. In committing themselves to the prompt implementation of these principles, countries also decide to keep them under assessment for their adequacy with regard to further international cooperation on forest issues.

(e) These principles should apply to all types of forests, both natural and planted, in all geographical regions and climatic zones, including austral, boreal, subtemperate, temperate, subtropical and tropical.

(f) All types of forests embody complex and unique ecological processes which are the basis for their present and potential capacity to provide resources to satisfy human needs as well as environmental values, and as such their sound management and conservation is of concern to the Governments of the countries to which they belong and are of value to local communities and to the environment as a whole.

(g) Forests are essential to economic development and the maintenance of all forms of life.

(h) Recognizing that the responsibility for forest management, conservation and sustainable development is in many States allocated among federal/national, state/provincial and local levels of government, each State, in accordance with its constitution and/or national legislation, should pursue these principles at the appropriate level of government.

PRINCIPLES/ELEMENTS

1. (a) States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies and have the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

(b) The agreed full incremental cost of achieving benefits associated with forest conservation and sustainable development requires increased international cooperation and should be equitably shared by the international community.

2. (a) States have the sovereign and inalienable right to utilize, manage and develop their forests in accordance with their development needs and level of socio-economic development and on the basis of national policies consistent with sustainable development and legislation, including the conversion of such areas for other uses within the overall socio-economic development plan and based on rational land-use policies.

(b) Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. These needs are for forest products and services, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products. Appropriate measures should be taken to protect forests against harmful effects of pollution, including air-borne pollution, fires, pests and diseases, in order to maintain their full multiple value.

(c) The provision of timely, reliable and accurate information on forests and forest ecosystems is essential for public understanding and informed decision-making and should be ensured.

(d) Governments should promote and provide opportunities for the participation of interested parties, including local communities and indigenous people, industries, labour, non-governmental organizations and individuals, forest dwellers and women, in the development, implementation and planning of national forest policies.

3. (a) National policies and strategies should provide a framework for increased efforts, including the development and strengthening of institutions and programmes for the management, conservation and sustainable development of forests and forest lands.

(b) International institutional arrangements, building on those organizations and mechanisms already in existence, as appropriate, should facilitate international cooperation in the field of forests.

(c) All aspects of environmental protection and social and economic development as they relate to forests and forest lands should be integrated and comprehensive.

4. The vital role of all types of forests in maintaining the ecological processes and balance at the local, national, regional and global levels through, inter alia, their role in protecting fragile ecosystems, watersheds and freshwater resources and as rich storehouses of biodiversity and biological resources and sources of genetic material for biotechnology products, as well as photosynthesis, should be recognized.

5. (a) National forest policies should recognize and duly support the identity, culture and the rights of indigenous people, their communities and other communities and forest dwellers. Appropriate conditions should be promoted for these groups to enable them to have an economic stake in forest use, perform economic activities, and achieve and maintain cultural identity and social organization, as well as adequate levels of livelihood and well-being, through, inter alia, those land tenure arrangements which serve as incentives for the sustainable management of forests.

(b) The full participation of women in all aspects of the management, conservation and sustainable development of forests should be actively promoted.

6. (a) All types of forests play an important role in meeting energy requirements through the provision of a renewable source of bio-energy, particularly in developing countries, and the demands for fuelwood for household and industrial needs should be met through sustainable forest management, afforestation and reforestation. To this end, the potential contribution of plantations of both indigenous and introduced species for the provision of both fuel and industrial wood should be recognized.

(b) National policies and programmes should take into account the relationship, where it exists, between the conservation, management and sustainable development of forests and all aspects related to the production, consumption, recycling and/or final disposal of forest products.

(c) Decisions taken on the management, conservation and sustainable development of forest resources should benefit, to the extent practicable, from a comprehensive assessment of economic and non-economic values of forest goods and services and of the environmental costs and benefits. The development and improvement of methodologies for such evaluations should be promoted.

(d) The role of planted forests and permanent agricultural crops as sustainable and environmentally sound sources of renewable energy and industrial raw material should be recognized, enhanced and promoted. Their contribution to the maintenance of ecological processes, to offsetting pressure on primary/old-growth forest and to providing regional employment and development with the adequate involvement of local inhabitants should be recognized and enhanced.

(e) Natural forests also constitute a source of goods and services, and their conservation, sustainable management and use should be promoted.

7. (a) Efforts should be made to promote a supportive international economic climate conducive to sustained and environmentally sound development of forests in all countries, which include, inter alia, the promotion of sustainable patterns of production and consumption, the eradication of poverty and the promotion of food security.

(b) Specific financial resources should be provided to developing countries with significant forest areas which establish programmes for the conservation of forests including protected natural forest areas. These resources should be directed notably to economic sectors which would stimulate economic and social substitution activities.

8. (a) Efforts should be undertaken towards the greening of the world. All countries, notably developed countries, should take positive and transparent action towards reforestation, afforestation and forest conservation, as appropriate.

(b) Efforts to maintain and increase forest cover and forest productivity should be undertaken in ecologically, economically and socially sound ways through the rehabilitation, reforestation and re-establishment of trees and forests on unproductive, degraded and deforested lands, as well as through the management of existing forest resources.

(c) The implementation of national policies and programmes aimed at forest management, conservation and sustainable development, particularly in developing countries, should be supported by international financial and

technical cooperation, including through the private sector, where appropriate.

(d) Sustainable forest management and use should be carried out in accordance with national development policies and priorities and on the basis of environmentally sound national guidelines. In the formulation of such guidelines, account should be taken, as appropriate and if applicable, of relevant internationally agreed methodologies and criteria.

(e) Forest management should be integrated with management of adjacent areas so as to maintain ecological balance and sustainable productivity.

(f) National policies and/or legislation aimed at management, conservation and sustainable development of forests should include the protection of ecologically viable representative or unique examples of forests, including primary/old-growth forests, cultural, spiritual, historical, religious and other unique and valued forests of national importance.

(g) Access to biological resources, including genetic material, shall be with due regard to the sovereign rights of the countries where the forests are located and to the sharing on mutually agreed terms of technology and profits from biotechnology products that are derived from these resources.

(h) National policies should ensure that environmental impact assessments should be carried out where actions are likely to have significant adverse impacts on important forest resources, and where such actions are subject to a decision of a competent national authority.

9. (a) The efforts of developing countries to strengthen the management, conservation and sustainable development of their forest resources should be supported by the international community, taking into account the importance of redressing external indebtedness, particularly where aggravated by the net transfer of resources to developed countries, as well as the problem of achieving at least the replacement value of forests through improved market access for forest products, especially processed products. In this respect, special attention should also be given to the countries undergoing the process of transition to market economies.

(b) The problems that hinder efforts to attain the conservation and sustainable use of forest resources and that stem from the lack of alternative options available to local communities, in particular the urban poor and poor rural populations who are economically and socially dependent on forests and forest resources, should be addressed by Governments and the international community.

(c) National policy formulation with respect to all types of forests should take account of the pressures and demands imposed on forest ecosystems and resources from influencing factors outside the forest sector, and intersectoral means of dealing with these pressures and demands should be sought.

10. New and additional financial resources should be provided to developing countries to enable them to sustainably manage, conserve and develop their forest resources, including through afforestation, reforestation and combating deforestation and forest and land degradation.

11. In order to enable, in particular, developing countries to enhance their endogenous capacity and to better manage, conserve and develop their forest resources, the access to and transfer of environmentally sound technologies and corresponding know-how on favourable terms, including on concessional and

preferential terms, as mutually agreed, in accordance with the relevant provisions of Agenda 21, should be promoted, facilitated and financed, as appropriate.

12. (a) Scientific research, forest inventories and assessments carried out by national institutions which take into account, where relevant, biological, physical, social and economic variables, as well as technological development and its application in the field of sustainable forest management, conservation and development, should be strengthened through effective modalities, including international cooperation. In this context, attention should also be given to research and development of sustainably harvested non-wood products.

(b) National and, where appropriate, regional and international institutional capabilities in education, training, science, technology, economics, anthropology and social aspects of forests and forest management are essential to the conservation and sustainable development of forests and should be strengthened.

(c) International exchange of information on the results of forest and forest management research and development should be enhanced and broadened, as appropriate, making full use of education and training institutions, including those in the private sector.

(d) Appropriate indigenous capacity and local knowledge regarding the conservation and sustainable development of forests should, through institutional and financial support and in collaboration with the people in the local communities concerned, be recognized, respected, recorded, developed and, as appropriate, introduced in the implementation of programmes. Benefits arising from the utilization of indigenous knowledge should therefore be equitably shared with such people.

13. (a) Trade in forest products should be based on non-discriminatory and multilaterally agreed rules and procedures consistent with international trade law and practices. In this context, open and free international trade in forest products should be facilitated.

(b) Reduction or removal of tariff barriers and impediments to the provision of better market access and better prices for higher value-added forest products and their local processing should be encouraged to enable producer countries to better conserve and manage their renewable forest resources.

(c) Incorporation of environmental costs and benefits into market forces and mechanisms, in order to achieve forest conservation and sustainable development, should be encouraged both domestically and internationally.

(d) Forest conservation and sustainable development policies should be integrated with economic, trade and other relevant policies.

(e) Fiscal, trade, industrial, transportation and other policies and practices that may lead to forest degradation should be avoided. Adequate policies, aimed at management, conservation and sustainable development of forests, including, where appropriate, incentives, should be encouraged.

14. Unilateral measures, incompatible with international obligations or agreements, to restrict and/or ban international trade in timber or other forest products should be removed or avoided, in order to attain long-term sustainable forest management.

15. Pollutants, particularly air-borne pollutants, including those responsible for acidic deposition, that are harmful to the health of forest ecosystems at the local, national, regional and global levels should be controlled.

United Nations General Assembly 1992. Report of the United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992) Annex III. A/CONF.151/26 (Vol. III)

ANNEX 2: THE ECOSYSTEM APPROACH (CBD COP 5, NAIROBI 2000)

Decision V/6

Ecosystem approach

The Conference of the Parties,

1. Endorses the description of the ecosystem approach and operational guidance contained in sections A and C of the annex to the present decision, recommends the application of the principles contained in section B of the annex, as reflecting the present level of common understanding, and encourages further conceptual elaboration, and practical verification;
2. Calls upon Parties, other Governments, and international organizations to apply, as appropriate, the ecosystem approach, giving consideration to the principles and guidance contained in the annex to the present decision, and to develop practical expressions of the approach for national policies and legislation and for appropriate implementation activities, with adaptation to local, national, and, as appropriate, regional conditions, in particular in the context of activities developed within the thematic areas of the Convention;
3. Invites Parties, other Governments and relevant bodies to identify case-studies and implement pilot projects, and to organize, as appropriate, regional, national and local workshops, and consultations aiming to enhance awareness, share experiences, including through the clearing-house mechanism, and strengthen regional, national and local capacities on the ecosystem approach;
4. Requests the Executive Secretary to collect, analyse and compare the case-studies referred to in paragraph 3 above, and prepare a synthesis of case-studies and lessons learned for presentation to the Subsidiary Body on Scientific, Technical and Technological Advice prior to the seventh meeting of the Conference of the Parties;
5. Requests the Subsidiary Body on Scientific, Technical and Technological Advice, at a meeting prior to the seventh meeting of the Conference of the Parties, to review the principles and guidelines of the ecosystem approach, to prepare guidelines for its implementation, on the basis of case-studies and lessons learned, and to review the incorporation of the ecosystem approach into various programmes of work of the Convention;
6. Recognizes the need for support for capacity-building to implement the ecosystem approach, and invites Parties, Governments and relevant organizations to provide technical and financial support for this purpose;
7. Encourages Parties and Governments to promote regional cooperation, for example through the establishment of joint declarations or memoranda of understanding in applying the ecosystem approach across national borders.

A. Description of the ecosystem approach

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. Thus, 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.
2. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, 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. This focus on structure, processes, functions and interactions is consistent with the definition of "ecosystem" provided in Article 2 of the Convention on Biological Diversity: "'Ecosystem' means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit." This definition does not specify any particular spatial unit or scale, in contrast to the Convention definition of "habitat". Thus, the term "ecosystem" does not, necessarily, correspond to the terms "biome" or "ecological zone", but can refer to any

functioning unit at any scale. Indeed, the scale of analysis and action should be determined by the problem being addressed. It could, for example, be a grain of soil, a pond, a forest, a biome or the entire biosphere.

4. The ecosystem approach requires adaptive management to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning. Ecosystem processes are often non-linear, and the outcome of such processes often shows time-lags. The result is discontinuities, leading to surprise and uncertainty. Management must be adaptive in order to be able to respond to such uncertainties and contain elements of "learning-by-doing" or research feedback. Measures may need to be taken even when some cause-and-effect relationships are not yet fully established scientifically.

5. The ecosystem approach does not preclude other management and conservation approaches, such as biosphere reserves, protected areas, and single-species conservation programmes, as well as other approaches carried out under existing national policy and legislative frameworks, but could, rather, integrate all these approaches and other methodologies to deal with complex situations. There is no single way to implement the ecosystem approach, as it depends on local, provincial, national, regional or global conditions. Indeed, there are many ways in which ecosystem approaches may be used as the framework for delivering the objectives of the Convention in practice.

B. Principles of the ecosystem approach

6. The following 12 principles are complementary and interlinked:

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.

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.

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.

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

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.

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.

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.

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.

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

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.

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.

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.

C. Operational guidance for application of the ecosystem approach

7. In applying the 12 principles of the ecosystem approach, the following five points are proposed as operational guidance.

1. Focus on the functional relationships and processes within ecosystems

8. The many components of biodiversity control the stores and flows of energy, water and nutrients within ecosystems, and provide resistance to major perturbations. A much better knowledge of ecosystem functions and structure, and the roles of the components of biological diversity in ecosystems, is required, especially to understand: (i) ecosystem resilience and the effects of biodiversity loss (species and genetic levels) and habitat fragmentation; (ii) underlying causes of biodiversity loss; and (iii) determinants of local biological diversity in management decisions. Functional biodiversity in ecosystems provides many goods and services of economic and social importance. While there is a need to accelerate efforts to gain new knowledge about functional biodiversity, ecosystem management has to be carried out even in the absence of such knowledge. The ecosystem approach can facilitate practical management by ecosystem managers (whether local communities or national policy makers).

2. Enhance benefit-sharing

9. Benefits that flow from the array of functions provided by biological diversity at the ecosystem level provide the basis of human environmental security and sustainability. The ecosystem approach seeks that the benefits derived from these functions are maintained or restored. In particular, these functions should benefit the stakeholders responsible for their production and management. This requires, inter alia: capacity-building, especially at the level of local communities managing biological diversity in ecosystems; the proper valuation of ecosystem goods and services; the removal of perverse incentives that devalue ecosystem goods and services; and, consistent with the provisions of the Convention on Biological Diversity, where appropriate, their replacement with local incentives for good management practices.

3. Use adaptive management practices

10. Ecosystem processes and functions are complex and variable. Their level of uncertainty is increased by the interaction with social constructs, which need to be better understood. Therefore, ecosystem management must involve a learning process, which helps to adapt methodologies and practices to the ways in which these systems are being managed and monitored. Implementation programmes should be designed to adjust to the unexpected, rather than to act on the basis of a belief in certainties. Ecosystem management needs to recognize the diversity of social and cultural factors affecting natural-resource use. Similarly, there is a need for flexibility in policy-making and implementation. Long-term, inflexible decisions are likely to be inadequate or even destructive. Ecosystem management should be envisaged as a long-term experiment that builds on its results as it progresses. This "learning-by-doing" will also serve as an important source of information to gain knowledge of how best to monitor the results of management and evaluate whether established goals are being attained. In this respect, it would be desirable to establish or strengthen capacities of Parties for monitoring.

4. Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate

11. As noted in section A above, an ecosystem is a functioning unit that can operate at any scale, depending upon the problem or issue being addressed. This understanding should define the appropriate level for management decisions and actions. Often, this approach will imply decentralization to the level of local communities. Effective decentralization requires proper

empowerment, which implies that the stakeholder both has the opportunity to assume responsibility and the capacity to carry out the appropriate action, and needs to be supported by enabling policy and legislative frameworks. Where common property resources are involved, the most appropriate scale for management decisions and actions would necessarily be large enough to encompass the effects of practices by all the relevant stakeholders. Appropriate institutions would be required for such decision-making and, where necessary, for conflict resolution. Some problems and issues may require action at still higher levels, through, for example, transboundary cooperation, or even cooperation at global levels.

5. Ensure intersectoral cooperation

12. As the primary framework of action to be taken under the Convention, the ecosystem approach should be fully taken into account in developing and reviewing national biodiversity strategies and action plans. There is also 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, etc.). This might be promoted through, for example, the formation of inter-ministerial bodies within the Government or the creation of networks for sharing information and experience

ANNEX 3: THE CONTRIBUTION OF CRITERIA AND INDICATORS TO SUSTAINABLE FOREST MANAGEMENT

Criteria and indicators are tools used to define, assess and monitor progress towards sustainable forest management. The term “criteria” designates the essential elements or principles against which sustainability is judged, taking into account the environmental, economic and socio-cultural roles and values of forests and forest ecosystems. Each criterion is defined by quantitative or qualitative indicators, which are measured and monitored regularly to determine the effects of forest management interventions, or non-intervention. Criteria and indicators at the national level may be used to guide countrywide policies, regulations and legislation. In addition, most criteria and indicators processes are now developing, testing and implementing criteria and indicators at the forest management unit level. Increasingly, these activities involve government agencies, non-governmental organizations (NGOs) and forest owners, including the private sector.

The International Tropical Timber Organization (ITTO) laid the foundation for the development of criteria and indicators for sustainable forest management. In December 1990, ITTO published “guidelines” for the sustainable management of natural tropical forests. This initiative to assist member countries in managing their forests sustainably was continued in March 1992 when the Organization defined criteria to assess the sustainability of forest management activities in tropical forests and complemented in 1993 when it defined the indicators for each corresponding criteria.

Since then, nine regional and eco-regional criteria and indicator processes for sustainable forest management have been established involving 149 countries (refer to the Table below for the list of these) whose combined forest area equals 97.5 percent of the total forest area in the world. However, the degree of policy-level awareness, technical commitment and field-level implementation varies both among processes and among participating countries.

FAO has collaborated with and/or supported all of the various regional and eco-regional initiatives on criteria and indicators (Pan-European, Montreal, Tarapoto, Dry-Zone Africa, Near East, Lepaterique, Dry-Zone Asia, ITTO and African Timber Organization) and was involved in the initiation of several of them. As the UN facilitator of international work on criteria and indicators, FAO, in collaboration with ITTO and the Governments of the United States and Finland, supported Guatemala’s National Forest Service in the organization of the recent International Conference on the Contribution of Criteria and Indicators for Sustainable Forest Management: *The way forward* (CICI 2003) (Guatemala City, Guatemala, February 2003).

Common thematic areas among the nine processes on criteria and indicators for sustainable forest management

- Extent of forest resources
- Biological diversity
- Forest health and vitality
- Productive functions of forest resources
- Protective functions of forest resources
- Socio-economic functions
- Legal, policy and institutional framework

This international conference gathered representatives from all of the nine existing processes, international organisations, government officials, NGOs and other experts in the field.

In considering the potential benefits of a common set of criteria based on existing sets elaborated by regional and eco-regional processes, participants at this Conference

acknowledged the seven common thematic areas listed in the box above.

**LIST OF COUNTRIES PARTICIPATING IN THE MAJOR REGIONAL AND ECO-REGIONAL PROCESSES ON
CRITERIA AND INDICATORS FOR SUSTAINABLE FOREST MANAGEMENT⁷**

<p>ITTO: The Process identifies 7 criteria and 66 indicators applicable both at the national and forest management unit levels in humid tropical forests of member tropical countries. (Date when the criteria and indicators were adopted: 03/1992; Yokohama, Japan).</p>
<p>MEMBER COUNTRIES (56 countries and the EC: 31 producers, 26 consumers). PRODUCERS: Bolivia, Brazil, Cambodia, Cameroon, Central African Republic, Colombia, Congo, Cote-d'Ivoire, Democratic Republic of the Congo, Ecuador, Fiji, Gabon, Ghana, Guatemala, Guyana, Honduras, India, Indonesia, Liberia, Malaysia, Myanmar, Panama, Papua New Guinea, Peru, Philippines, Suriname, Thailand, Togo, Trinidad and Tobago, Vanuatu and Venezuela. CONSUMERS: Australia, Austria, Belgium-Luxembourg, Canada, China, Denmark, Egypt, Finland, France, Germany, Greece, Ireland, Italy, Japan, Nepal, New Zealand, Norway, Portugal, Republic of Korea, Spain, Sweden, Switzerland, The Netherlands, United Kingdom, United States of America; and the European Community.</p>
<p>The Dry-Zone Africa Process on Criteria and Indicators for Sustainable Forest Management identified 7 criteria and 47 indicators for sustainable forest management at the national level (11/1995; Nairobi, Kenya).</p>
<p>MEMBER COUNTRIES: Dry-Zone Africa Process (30). CILSS⁸ (9 countries): Burkina Faso, Cape Verde, Chad, Gambia, Guinea-Bissau, Mali, Mauritania, Niger and Senegal. IGADD (7): Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan, and Uganda. SADC (14): Angola, Botswana, D. R. of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, United Republic of Tanzania, Zambia, Zimbabwe.</p>
<p>The "Pan-European Forest Process" focuses on the sustainable development and management of forests in Europe, e.g. on the development of Pan-European Criteria and Indicators for Sustainable Forest Management in Europe. It includes boreal, temperate and Mediterranean-type forests. The European countries and the European Community have agreed on six common criteria, twenty seven quantitative indicators and 101 descriptive indicators for sustainable forest management at the regional and national levels. (06/1993 Helsinki, Finland; 06/1998 Lisbon Portugal). Operational Level Guidelines for application at the sub-national level have also been developed.</p>
<p>SIGNATORY COUNTRIES (41): Albania, Austria, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, European Community, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Norway, Poland, Portugal, Republic of Andorra, Romania, Russian Federation, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom and Yugoslavia.</p>
<p>The "Montreal Process" deals with criteria and indicators for sustainable forest management in temperate and boreal forests in 12 countries outside Europe. The 12 participating countries have agreed on a set of 7 non-legally binding, criteria and 67 indicators for sustainable forest management for national implementation. (02/1995; Santiago, Chile).</p>
<p>MEMBER COUNTRIES (12): Argentina, Australia, Canada, Chile, China, Japan, Mexico, New Zealand, Republic of Korea, Russian Federation, Uruguay and United States of America.</p>
<p>The "Tarapoto Proposal of Criteria and Indicators for Sustainability of the Amazon Forest" is sponsored by the Amazon Cooperation Treaty. The 8 participating countries propose 1 criterion and 7 indicators at the global concern. Furthermore, it identifies 7 criteria and 47 indicators for implementation at the national level. For the forest management unit level, the process recognises 4 criteria and 22 indicators. (02/1995; Tarapoto, Perú).</p>
<p>MEMBER COUNTRIES (8): Bolivia, Brasil, Colombia, Ecuador, Guyana, Perú, Suriname and Venezuela.</p>
<p>The Near East Process through an FAO/UNEP Expert Meeting on Criteria and Indicators for Sustainable Forest Management for countries in the region identified 7 criteria and 65 indicators for sustainable forest management at the regional and national levels. (10/1996; Cairo, Egypt).</p>
<p>MEMBER COUNTRIES (30): Afghanistan, Algeria, Azerbaijan, Bahrain, Cyprus, Djibouti, Egypt, Iraq, Islamic Republic of Iran, Jordan, Kuwait, Kingdom of Saudi Arabia, Kyrgyzstan, Lebanon, Libya, Malta, Mauritania, Morocco, Oman, Pakistan, Qatar, Somalia, Sudan, Syria, Tajikistan, Tunisia, Turkey, Turkmenistan, United Arab Emirates and Yemen.</p>
<p>The "Lepaterique Process of Central America" on Criteria and Indicators for Sustainable Forest Management in the region identified 4 criteria and 40 indicators at the regional level and 8 criteria and 53 indicators at the national level (Tegucigalpa, Honduras 20-24/01/97). This was the beginning of the Process which was later on complemented by 2 FAO/CCAD supported sub-regional meetings and 7 national seminars on country-level implementation and on the identification of criteria and indicators at the forest management unit level. (01/1997; Tegucigalpa, Honduras).</p>
<p>MEMBER COUNTRIES (7): Belice, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama.</p>
<p>The African Timber Organisation's (ATO) main priority since 1994 has been to "promote the implementation of sustainable forest management in ATO member countries", and "in accordance with recommendations made at international level, specially by the Intergovernmental Panel on Forests" it has chosen to use for its work five principles, two "sub-principles", 28 criteria and 60 indicators at the regional and national levels. (01/1993; Libreville, Gabon).</p>
<p>MEMBER COUNTRIES (13): Angola, Cameroon, Central African Republic, Congo, Cote-d'Ivoire, Democratic Republic of Congo, Equatorial Guinea, Gabon, Ghana, Liberia, Nigeria, Sao Tome et Principe and United Republic of Tanzania.</p>
<p>The "Regional Initiative for the Development and Implementation of National Level Criteria and Indicators for the Sustainable Management of Dry Forests in Asia" (FAO/UNEP/ITTO/IIFM Expert Meeting; 30/11- 03/12/1999; Bhopal, India) identified 8 national level criteria and 49 indicators for dry forests in Asia.</p>
<p>MEMBER Countries (9): Bangladesh, Bhutan, People's Republic of China, India, Mongolia, Myanmar, Nepal, Sri Lanka and Thailand</p>

⁷ Participating countries in this table add up to 203. The difference lies in the fact that, for example, among ITTO's member countries the first 31 listed above participate in the Organization's activities on criteria and indicators, but 25 of them also in other processes for the same purpose. Thus, for the sake of this record, those countries are recorded only once. A few examples include: (1) Bolivia, Brazil and Colombia (also in the Tarapoto Proposal); (2) China, India and Myanmar (Initiative for Dry Forests in Asia); (3) Honduras and Panama (Lepaterique Process of Central America); and (4) Liberia (ATO). Other cases of duplicity with other processes include for example: (1) Somalia and Sudan, Dry-Zone Africa and Near East Processes; (2) Turkey, Pan-European and Near East Processes; (3) China, ITTO for humid tropical, the Montreal Process for boreal and temperate and the Initiative for Dry Tropical Forests in Asia; and (4) Russia, Pan-European and the Montreal Processes. While some countries develop and implement criteria and indicators under one or more processes, the degree of activity and/or involvement in the development and implementation of criteria and indicators may vary considerably between countries.

⁸ CILSS: Permanent Interstate Committee for Drought Control in the Sahel; SADC: Southern Africa Development Community; IGADD: The Inter-Governmental Authority on Drought Control and Development.

