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IN-DEPTH REVIEW OF THE APPLICATION OF THE ECOSYSTEM APPROACH

Activities of organizations in the application of the ecosystem approach

I. INTRODUCTION

1. In decision VIII/11, the Conference of the Parties, in the refined multi-year programme of work (annex II), decided to undertake the in-depth review of the ecosystem approach at its ninth meeting and in decision VIII/15 (annex III) provided guidelines for the review of the programmes of work of the Convention which include, *inter alia*, consideration of information from relevant United Nations agencies, international and regional organizations, and other partners regarding the degree of implementation of the programme of work.

2. In decision VII/11, paragraph 12, the Conference of the Parties requested the Executive Secretary, in collaboration with Parties and relevant international and regional organizations, to assess the implementation of the ecosystem approach, in the light of experiences gained, for the consideration of the Subsidiary Body on Scientific, Technical and Technological Advice prior to the ninth meeting of the Conference of the Parties.

3. In response to these decisions, the Executive Secretary has prepared this document in collaboration with partners. Section II reports on activities of relevant United Nations agencies and Section III on activities of relevant international organizations.

II. RELEVANT UNITED NATIONS AGENCIES

4. Although the mandate of the CBD originates from the General Assembly of the UN, which has the general oversight of the functional UN organizations as well, the diffusion of the concept of the ecosystem approach to these agencies depends on their specific functions and the interpretation of these functions by the management and supervisory councils. The functional UN agencies can be characterized as elements of a decentralized system of specialized agencies with partially overlapping authorities. The agencies with an environmental mandate with activities in biodiversity management and their adoption of the ecosystem approach are summarized in Table 1.

* UNEP/CBD/SBSTTA/12/1.

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Table 1: UN agencies with explicit biodiversity activities and their adoption of the ecosystem approach[1]

UN organization	Areas of activity in biodiversity management	On a policy, planning & programme level	By managing projects	Role of Ecosystem management
UNEP	Host to CBD Secretariat	Central function	Minor role	Key actor
	GEF implementing agency Biodiversity focal area	Scientific, technical analysis guidance	Extensive GEF project support	Applies EA principles in biodiversity related GEF Operational Programs 1,2,3,4,and 12
	Biodiversity Planning Support Programme	Information, Guidelines, best practices	Prepares for funding proposals	Emphasizes multisectoral approach for planning
	Administrator of specific species conventions	Coordinating function	Minor importance	Species and habitat focus
UNDP	GEF implementing agency	Scientific, tech-nical analysis guidance	Extensive GEF project support	Applies EA principles in Operational Programmes 1,2,3,4, and 12
	Biodiversity Planning Support Programme (BPSP)	Information, Guidelines, best practices	Prepares for funding proposal	Emphasizes multi-sectoral approach for planning
	Water Governance	Capacity development; networking	Considerable, unquantified no. of projects mostly in water supply/sanitation	Emphasizes IWRM and freshwater, coastal ecosystems
	Capacity development in Sustainable Development; sustainable livelihoods	Strategy papers, guidelines	Country pro - grammes - Small volume	Emphasis on sustain able living connection to World Social Summit 1995
FAO	Biodiversity activities within the Priority Areas for Integrated Action (PAIA)	Case studies; guidelines	limited project activities on biodiversity directly	EA as an PAIA Major emphasis on genetic resources for food and agriculture

[1] Updated from Hartje, V., Klaphake, A. and Schliep, R. 2003. The international debate on the ecosystem approach, critical review, international actors, obstacles and challenges. BfN-Skripten 80.

UN organization	Areas of activity in biodiversity management	On a policy, planning & programme level	By managing projects	Role of Ecosystem management
	Agriculture related biodiversity actions	Policy Advice, Technical Guidelines, Codes of Con- duct	Limited technical cooperation activities	Little impact, ecosystem view, but EA perspective not central; biodiversity debate dominated by access to genetic resources for agriculture issues
	Forestry related biodiversity actions	Policy Advice, Technical Guidelines, Codes of Con duct	Limited technical cooperation activities	Forestry dominated by sustainability issues biodiversity linked to poverty reduction
	Fisheries related biodiversity actions	Policy Advice, Guidelines; Codes of conduct; FAO regional fisheries bodies	Limited technical cooperation activities	EA perspective central; change in fisheries management views: cp. Reykjavik Declaration2001
UNESCO	MAB Programme Secretariat	Action Plan 1984 Seville Strategy 1995	Certifies Bio- sphere Reserves	Biosphere Reserves emphasized as proto- types for EA
	World Water Assessment Programme	World Water Development Report (I and II)	Case studies for report	No direct management role
	International Hydrological Programme	Technical support to water policy and planning	Limited in relation to biodiversity	Hydrological cycles, water resources management, databases and modelling

United Nations Environment Programme (UNEP)

5. In the area of biodiversity management, UNEP became the lead agency for the conservation side, based on its function as the host of the CBD Secretariat, as one of the GEF implementing agencies and as the administrator of a number of regional and/or species-specific biodiversity related Conventions. With the CBD Secretariat, as one of the key actors of the ecosystem approach approach located within UNEP, the support for the ecosystem approach approach is highly developed. There is additional support for this direction by the role of UNEP as an implementing agency for GEF. Its five biodiversity-relevant Operational Programmes include references to the ecosystem approach, but they were developed before the fifth CBD COP in Nairobi in 2000 and the references are rather general.

6. The Biodiversity Planning Support Programme of the GEF was established for the needs of the Parties of the CBD to prepare and implement the National Biodiversity Strategies and Action Plans. UNEP and UNDP are involved jointly in the development of guidelines, dissemination of best practice and in the funding of national activities. The thematic guidelines cover a broad range of topics, but the

ecosystem approach is not considered relevant for the guidelines. Instead, a separate multi-sectoral planning is proposed together with a matrix covering all issues of the CBD[2].

United Nations Development Programme (UNDP)

7. The role of UNDP in the UN system is to provide technical assistance and support enabling capacities on a project and grant basis with an emphasis on poverty reduction. It retains the development perspective, although it has increasingly developed a sustainable development perspective after the 1992 Summit, building on its cooperation with the World Bank in Water and Sanitation Programme and Energy Sector Management Assistance Programme (ESMAP): it adopted a kind of consulting perspective in environmental governance. UNDP is active across different ecosystems in its role as an implementing agency of the GEF and its role in the Biodiversity Planning Support Programme.

Food and Agriculture Organization of the United Nations (FAO)

8. FAO's mandate applies to agriculture, forestry, fisheries and nutrition in which sectors FAO provides international fora, policy advice, technical assistance and dissemination of best practice experience. Using an ecosystem approach has been a priority for FAO, throughout the different sectors it addresses. Until 2007, a cross-departmental Priority Area for Interdisciplinary Action (PAIA) existed, for "Strengthening capacity for integrated eco-system management". This PAIA fostered in-house cooperation in the use of the integrated eco-system management approach, but also included two programmes of inter-disciplinary assistance, namely in arid and semi-arid zones and mountains. The approach continues, of course, to be mainstreamed and applied in sectoral programmes where relevant, taking into account the benefits of the ecosystem approach to food and agriculture.

9. In 2002, FAO took an important step towards internalising the integrated management of biodiversity, with an ecosystem approach, when it created the Priority Area for Inter-Disciplinary Action on Integrated Management of Biological Diversity for Food and Agriculture. It was included in the Medium Term Plan to address corporate strategy D, which aims at "supporting the conservation, improvement and sustainable use of natural resources for food and agriculture." In the last decade, an inter-departmental working group has been the main mechanism for the coordination of activities on biological diversity of interest to food and agriculture.

10. FAO has both implicitly and explicitly internalised the ecosystem approach in a large number of its programmes and activities to conserve and manage ecosystem service for sustainable agriculture, food security and poverty reduction. The present report presents examples of application of the ecosystem approach within the framework of initiatives of the Agriculture and Consumer Production Department, the Forestry Department, the Fisheries and Aquaculture Department and other FAO fora and projects on natural resources management.

11. Prior to reporting on sector activities in the fisheries, forestry and agriculture sectors, it is important to highlight that the integration of the ecosystem approach applied to all types of production systems have been presented and discussed at a Satellite Event held during the Ninth Regular Session of the Commission on Genetic Resources for Food and Agriculture (CGRFA) (FAO, Rome, 12-13 October 2002) and organized by FAO's Inter-Departmental Working Group on Biological Diversity for Food and Agriculture, in support of the recommendation of the Seventh Session of the Commission on Genetic Resources for Food and Agriculture which mentioned that "countries were encouraged to develop strategies, programmes and plans for agro-biodiversity in conformity with an ecosystem approach". The proceedings of the Event, "Biodiversity and the Ecosystem Approach in Agriculture, Forestry and Fisheries as part of the Ninth Regular Session of the Commission on Genetic Resources for Food and

[2] Prescott, J. Gauthier, B. & J. Nagahuedi Mbongu Sodi. (2000): Guide to Developing a Biodiversity Strategy from a Sustainable Development Perspective / Institut de l'energie et de l'environnement de la Francophonie, Ministere de l'Environnement du Quebec, UNDP, UNEP. - Quebec.

Agriculture in Rome"[3] have been published by FAO in 2003 and comprise of a wide variety of case studies examining agriculture, fisheries and forestry practices using ecosystems approaches.

12. Moreover, it is also important to draw attention that at its Tenth Session, the CGRFA decided that a draft Multi-Year Programme of Work should be submitted to its next Session, for approval. The CGRFA requested documentation on the status and needs of the various sectors involved and also of cross-sectorial matters, including the application of the ecosystem approach. To this end, the Secretariat has prepared the document *The ecosystem approach applied to food and agriculture: Status and needs* (ftp://ftp.fao.org/ag/cgrfa/cgrfa11/r11w154r1e.pdf). The document shortly introduces the benefits of applying the ecosystem approach to food and agriculture and gives an historical background of how the approach has developed. It then focuses on the specificities of applying the ecosystem approach to food and agriculture, and in particular, on the internalisation of the ecosystem approach in FAO's work, including examples and challenges. Finally it proposes areas for future work in this field by the Commission.

Fisheries

13. Activities promoted and implemented through the Fisheries and Aquaculture Department (FI), however, have gone considerably further by embracing the concept wholeheartedly. The FI Department is responsible for policy advice, the dissemination of technical guidelines and, via international and regional fisheries bodies, involved in fisheries management. Based on a recommendation of the FAO Council, it organized a conference with the Icelandic government in 2001 which concluded with the "Reykjavik Declaration on responsible fisheries in the Marine Ecosystem", endorsing an ecosystem approach to fisheries management.

14. FAO's support for implementation of the ecosystem approach is perhaps best developed for fisheries. The Ecosystem Approach to Fisheries (EAF) was adopted in FAO in 2003, following the 2001 Reykjavik Conference. EAF falls clearly within the overall policy framework of the Code of Conduct for Responsible Fisheries (CCRF) and the EAF technical guidelines, published in 2003[4], together with other CCRF guides (including those for fisheries management, the use of sustainability indicators, precautionary approach, ecolabelling and others) provide strong operational support to the implementation of EAF. A simplified version of the EAF guidelines 'Putting into practice the ecosystem approach to fisheries.' (Rome, FAO. 2005. 76p) has also been produced.

15. The twenty-seventh session of the FAO Committee on Fisheries, held in Rome, Italy, from 5 to 9 March 2007, reaffirmed that EAF is the appropriate and necessary framework for fisheries management. It was noted by many developing countries at that meeting, that implementation of EAF required increased institutional capacity and they requested FAO to provide greater support for capacity building at the national level. The need to address the threats posed by climate change was also raised by some countries.

16. The FAO Guidelines define the EAF as: "An Ecosystem Approach to Fisheries strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic, and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries".

17. The EAF, and ecosystem approaches in general, are still poorly understood by many and a cause of uncertainty and concern. In particular, despite the clear elaboration of the human element in, for example, the FAO definition above, there is a perception by some that the approach is too focused on the biological and ecological considerations to the potential detriment of human issues. This mis-interpretation needs to be corrected urgently and, as a further contribution to the development and

[3] Food and Agriculture Organization of the United Nations. Biodiversity and the Ecosystem Approach in Agriculture, Forestry and Fisheries: Satellite Event on the occasion of the Ninth Regular Session of the

[4] FAO Fisheries Technical Guidelines No. 4, Suppl. 2, *Fisheries management. 2. The ecosystem approach to fisheries.*

understanding of the concept of EAF, an FAO expert consultation was held in 2006 to consider the economic, social and institutional considerations of applying the ecosystem approach to fisheries management[5]. The Expert Consultation elaborated a framework for technical guidelines on the economic, social and institutional considerations that needed to be taken into account in the application of the approach. The Expert Consultation also noted the need to clearly explain the current interpretation of the term EAF, expressing the ideas of a holistic, participatory and integrated approach to fisheries management. FAO also cooperated with the Nordic Council of Ministers in organization of the International Conference on Implementing an Ecosystem Approach to Fisheries that was held in Bergen from 26-28 September 2006. The proceedings of the Conference are being prepared for publication.

18. FAO has been active in encouraging and supporting EAF through a number of projects and field-based activities. The Organization has been coordinating a project to examine the feasibility of implementing EAF in the Benguela region in cooperation with the GEF-supported Benguela Current Large Marine Ecosystem programme (BCLME) and the fisheries agencies of Angola, Namibia and South Africa. This project pursued a structured and participatory approach, based on the FAO Guidelines, to identify and prioritise the gaps in the existing approaches and consider potential management actions to address them. Through another project, funded by the Government of Japan, technical assistance is being provided to fisheries institutions of some countries in the Lesser Antilles to develop the information tools, including ecosystem modelling, use of Geographic Information Systems (GIS) and collection of standard fisheries data, to improve management of their pelagic resources and fisheries in accordance with EAF.

19. Another important project is being implemented with core funding from the Government of Norway and in partnership with various GEF-LME regional projects, to strengthen the knowledge base for implementing EAF in developing countries. With an initial focus in the African region, this project will promote capacity building, standardized data collection and monitoring of marine fisheries and related ecosystems, while supporting policy development and management practices consistent with EAF principles.

20. FAO is engaged in a number of other projects contributing to implementation of EAF. These include several co-operative sub-regional projects funded by the Governments of Greece, Italy and Spain and the European Commission that implicitly address the various biological and socio-economical aspects of EAF in the Mediterranean region. In addition, within a project on capacity building for EAF funded by the Government of Japan, a number of initiatives have been undertaken to facilitate capacity building in specific countries mainly through smaller-scale pilot studies and workshops examining the needs and priorities for EAF. Much remains to be done in order to realise the goal of full implementation of EAF across all marine ecosystems, but through the above and other initiatives, some progress is being made.

Aquaculture

21. In 1995, the Code of Conduct for Responsible Fisheries (CCRF) was adopted by the FAO Council. The CCRF also deals with aquaculture more specifically through Article 9 addressing many aspects relevant for its sustainable development. There is an agreed definition of the Ecosystem Approach to Fisheries (EAF)[6] and the ecosystem approach to aquaculture can be described in a similar framework which is being currently developed by the Aquaculture Management and Conservation Service (FIMA) of the Fisheries and Aquaculture Department of FAO.

22. "An ecosystem approach to aquaculture (EAA) strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems including their interactions, flows and processes and applying an integrated approach to

[5] FAO Expert Consultation on the economic, social and institutional considerations of applying the ecosystem approach to fisheries management. Rome, 6–9 June 2006. FAO Fisheries Report 799.

[6] The Ecosystem Approach to Fisheries (EAF). FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, FAO. 2003. 112 p

aquaculture within ecological and operational meaningful boundaries. The purpose of EAA should be to plan, develop and manage the sector in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by aquatic ecosystems". This definition implies the need to use proper instruments, processes and structures to deal effectively with issues of environmental, social, technical, economic and political nature. Following the EAF[7], the EAA should have three main objectives within a hierarchical tree framework: i) insuring human well being, ii) insuring ecological well being, and iii) facilitating the achievement of both, i.e. effective Governance.

23. The EAA framework can be applied and developed at least at the following scales/levels; a) at the farm level, b) at the aquaculture geographic zone, c) at the industry, commodity level and d) at the macro level (policy formulation). The issue of defining meaningful boundaries is relevant here. The EAA framework should also apply to all productive scales (from small farmers to intensive, large scale farming).

24. An EAA should provide more comprehensive tools particularly for the management of mariculture and large scale aquaculture in inland waters. This is specially relevant considering that coastal and large scale offshore mariculture are rapidly developing and large quantities of inputs (feeds) will be used, not only from fish meal but also from vegetable protein (with unknown consequences for the ecosystem as for the waste processing). Also, on site nutrient re-cycling and the management of potentially escapees become challenges at larger scales which must be faced with an ecosystem perspective. An EAA should improve the acceptance of aquaculture by avoiding impairing ecosystem resilience and by offering new societal opportunities with equity. Therefore it would be possible, for example to apply a comprehensive Sustainable-label (S-Label) to aquaculture products which have followed EAA guidelines.

25. Principles of the EAA are as follows[8]:

Normative

1-Aquaculture shall improve human well-being and equity

2- Aquaculture should be managed to limit its impact on the ecosystem (direct and indirect) to an acceptable level (maintaining ecosystem resilience re: functions and services).

3- Aquaculture shall produce net benefits (including environmental costs) and shall include the whole production chain

4- Aquaculture shall be developed in a holistic manner (in connection with other sectors, policies, developmental goals etc)

Operational

4- Shall promote sectoral integration

5- Broaden stakeholder participation

6- Use incentives

7- Implement enhancing production together with mitigation approaches

8-Apply the precautionary approach/adaptive management

[7] FAO, 2005. Putting into practice the ecosystem approach to Fisheries. Rome, FAO, 76 pp
[8] modified from those proposed for EAF

Cognitive[9]

9-Appropriate research

10-Use best knowledge

11-Consider people/societal values.

26. Among the FAO (past and planned) activities on the EAA, it is important to mention:

(a) Production of a general "issue" for The 2006 State of World Fisheries and Aquaculture 2006 (SOFIA-2006) on "Sustainable growth and expansion of aquaculture: an ecosystem approach" (ftp://ftp.fao.org/docrep/fao/009/a0699e/a0699e02.pdf);

(b) A joint Fisheries seminar was held on October 9 2006 with a presentation on EAF. (Ecosystem Approach to Fisheries) and EAA (Ecosystem Approach to Aquaculture). This seminar was well attended and allowed to start the discussion and internal FI interactions regarding EAA to understand similarities (eg. principles) and differences with EAF (context);

(c) Some organizational and brainstorming meetings have taken place with scientists and other institutions which could be partners in this initiative;

(d) A Workshop on *"Building an Ecosystem Approach to Aquaculture: initial steps for guidelines"* will take place in Palma de Mallorca Spain from 7 to 11 May (http://www.uibcongres.org/congresos/ficha.en.html?cc=128). This activity will bring together an international group of 25 experts to: (i) agree on concepts, principles and scale approaches, (ii) analyze present evidence, availability of knowledge and tools and (iii) further requirements in order to elaboration of guidelines for EAA .In this workshop there will be several concept papers, one of them based on the SOFIA issue and other elements shown here, essentially presenting the interplay between the Principles and Scales for implementation and using some examples for key issues where an EAA would render a different outcome. This paper will benefit from discussions within FIRI, FI and external. Such concept paper will be a base to start the first discussion on "what do we understand for an EAA". Papers and reviews (technical writing)/presentations are being prepared to address (and challenge) some of the proposed main principles across the scales considering global information and case studies, all of these will be presented shortly for discussion. There will be two technical reviews; on marine and coastal aquaculture and another on freshwater aquaculture. Other three papers will address the economic, socio-economic and legal implications of the proposed EAA scales and principles. One of the topics has already been defined; "Integrated aquaculture" (under one of the operational principles) as a tool for enhancing production and for mitigation within an ecosystem framework. Through FIRI regular program three reviews have been started, one covering temperate zones, another covering tropical systems and a third in a mediterranean ecosystem; the Mediterranean Sea. There will be short presentations on these. Proceedings of the Workshop will be reviewed and edited by a team and will be published as a FAO Technical Paper. A consultant will be hired to prepare a draft of general guidelines for EAA based on the technical paper mentioned above, other outputs and ideas from the workshop and also broadening these to all forms of aquaculture; and

(e) An Expert Workshop to review and advance such guidelines will be held in 2008: the Guidelines shall mainly target policy and decision makers unless a different decision is made in the brain-storming workshop in May.

Forestry

27. In the forestry sector, the sustainability issues for the management of forests and woodlands dominate. The role of biodiversity is seen from the perspective of forest genetic resources, but increasingly the benefits of biodiversity conservation for poverty reduction are coming into focus. FAO

[9] The Cognitive principles could be seen as transversal to the others

has also conducted extensive work in the forestry sector. One example is the paper "Sustainable Forest Management and the Ecosystem Approach: Two Concepts, One Goal," which outlines parallelisms between the two concepts with the aims of fully integrating them and improving policy and field management practices[10]. The paper, prepared as a response to 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.

28. In this context, it also important to recall that the CBD Expert Meeting on the Ecosystem Approach held in July 2003 discussed the two concepts of sustainable forest management and the ecosystem approach and reached the following conclusions:

(a) 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;

(b) 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;

(c) 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; and

(d) 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.

29. At its 18th Session, in March 2007, the Committee on Forestry (COFO) "requested FAO, in collaboration with Members and partner organizations, to develop, promote and implement management tools to bridge the gap between policy and actions at all levels with emphasis on inter-sectoral and landscape approaches." The implementation of ecosystem approach is promoted by sustainable forest management guidelines recently developed such as the "Responsible management of planted forests Voluntary guidelines", which include: Principle 12 - Management of landscapes for social, economic and environmental benefits. As planted forests interact with and impact local land uses, livelihoods and the environment, integrated planning and management approaches should be adopted within a landscape or watershed to ensure that upstream and downstream impacts are planned, managed and monitored within acceptable social, economic and environmental standards.

30. The guidelines include but are not limited to:

(a) Recognizing the continuum and the respective roles of naturally regenerating forests and planted forests having protective and productive functions and of trees outside forests – to varying degrees, they all provide economic, environmental, social and cultural services within a landscape or watershed, both spatially and temporally;

[10] Food and Agriculture Organization of the United Nations. Forestry Department. Forest Management Working Paper FM 25: Sustainable Forest Management and the Ecosystem Approach: Two Concepts, One Goal. Rome: FAO, 2003.

(b) Educating local communities and the public through outreach programmes, so that they better understand the interrelationships in the management of planted forests, naturally regenerating forests, lands destined for conservation, grasslands, croplands and other land uses;

(c) Retaining naturally regenerating riparian reserves or buffers of varying widths on permanent and, where appropriate, non-permanent water courses, depending upon their size and their conservation importance;

(d) Designing planted forests to provide corridors, where appropriate and practicable, between naturally regenerating forest areas with high environmental conservation value;

(e) Reducing the negative soil- and water-conservation and visual impacts of harvesting and other forest operations;

(f) Designating and managing reserves having significant scientific and cultural value, within which planted forest management will be restricted;

(g) Designating and managing buffer zones adjoining local communities and land uses, where appropriate, to reduce adverse impacts resulting from the management of planted forests;

(h) Locating roads and stream crossings and selecting maintenance programmes appropriate to the landscape (social, cultural, environmental and economic); and

(i) Monitoring upstream and downstream water quality and quantity as appropriate.

Agriculture

31. With respect to the agriculture sector, FAO uses the ecosystem approach as illustrated in a number of examples, such as through its work on crop-associated biodiversity, projects such as the "Conservation and Management of Pollinators for Sustainable Agriculture, Through an Ecosystem Approach" and "Globally Important Agricultural Heritage Systems", FAO's Integrated Pest Management (IPM) programme and the "Global Plan of Action".

32. Within the framework of the International Initiative for the Conservation and Sustainable Use of Pollinators within the CBD programme of work on agricultural biodiversity, FAO, as coordinator of that initiative, has been working towards a UNEP/GEF project aimed at filling very large gaps in the knowledge base on pollination services, and pioneering good agricultural practices for pollinator conservation in a wide range of ecological zones and farming systems. The project "Conservation and Management of Pollinators for Sustainable Agriculture, Through an Ecosystem Approach" plans to fill many of those gaps through activities in seven developing countries across the globe. A major objective will be to identify, test and document good agricultural practices for pollinator conservation and management, through an "ecosystem approach". For example, farmers might be encouraged to protect "corridors" that connect natural habitats, or uncultivated areas within and around cultivated ones. The project also underlines the importance of linkages between conservation of ecosystem functions, sustainable production systems, and poverty reduction.

33. The "Globally Important Agricultural Heritage Systems" (GIAHS) programme[11], launched in August 2002, is based on the profound inter-linkages of biodiversity, agriculture, ecology, culture and social organization and institutions, ethics, local livelihoods and food security. During the preparatory phase (2002-2006), the GIAHS initiative has identified pilot sites in Peru, Chile, China, the Philippines, Tunisia, Morocco and Algeria, taking into account biophysical, socio-cultural, economic, and programme criteria. These complex agroecosystems and their associated landscapes can, therefore, only be protected efficiently with a holistic approach, involving all stakeholders and building on local people's knowledge and experience. For the next seven years (2007-2014), the pilot systems will implement dynamic conservation management approaches aimed at helping the national and local stakeholders to protect and sustainably conserve the systems and their components.

[11] GIAHS Website: http://www.fao.org/sd/giahs/index.asp?lang=en

34. Since the mid 1960s, FAO has advocated Integrated Pest Management, as the preferred pest control strategy. IPM means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. IPM increases the sustainability of farming systems, because it improves ecological sustainability, by relying primarily on understanding and enhancing ecosystem services such as pest population regulation, through strategies that include the use of pest-resistant varieties, the conservation and augmentation of natural enemies and cultural controls. It improves social sustainability because it is institutionalized at the level of the farming community and local government. Finally, IPM programmes are economically sustainable, as they reduce farmers' dependence on procured inputs. FAO's IPM programme, including the Global IPM Facility based at FAO Headquarters in Rome since 1997:

(a) Raises questions about unsustainable pest management practices and helps increase awareness of IPM alternatives to strengthen the ecological and policy foundations of national IPM programmes;

(b) Facilitates collaboration and exchange of information among IPM programmes;

(c) Stimulates dialogue to encourage policy reform; and

(d) Advises governments, international organizations, NGOs and donors on pest management programmes and policies.

35. It is also important to recall that while, traditionally IPM has exclusively been applied to crops, the IPM approach to the use of veterinary drugs in livestock, and in particular in ruminants, is being developed to avoid their mis-use and reduce residues in meat and milk and environmental contamination, given the heavy use of anthelmintics, insecticides and acaricides in animal husbandry. This activity has been carried out since 1997 with the advice of the FAO-Working Group on Parasite Resistance (WGPR).

36. FAO produced an information paper for the Third Session of the Working Group on Plant Genetic Resources, highlighting areas in agriculture where the ecosystem approach can be used in achieving the goals of international instruments related to the conservation and sustainable utilization of agricultural biodiversity. The paper emphasizes specifically the synergies between the ecosystem approach of the Convention on Biological Diversity and the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture.

37. In conclusion, with respect to the agriculture sector, it is also important to emphasise that FAO's biodiversity programme applies ecosystem approaches in community level education and experiential learning by rural people as well as in educating national agricultural policy makers (FAO, 2003). In this context, it is important to recall the Farmers' Field School (FFS) approach.

Natural Resources Management

38. In addition to the above-mentioned projects, FAO has frequently applied the ecosystem approach for land use planning projects. For example, for Land Degradation Assessment of Drylands in Argentina as one of three pilot studies for this phase of the LADA.[12] The strengths of this report are its adaptation of a conceptual framework for the assessment of degradation in Argentina's drylands based on one of the earliest examples of the application of the conceptual framework of the Millennium Ecosystem Assessment. A methodology for applying the ecosystem approach was established specifically for a national-level assessment using features that easily could be transferred to a similar assessment in other countries. The report clearly identifies ecosystem services of Argentina's drylands, the benefits they

[12] Robin P. White, Janet Nackoney, Eriko Hoshino, Mindy Selman. 2004. LADA Pilot Study: Application of the Ecosystem Approach to Degradation Assessment of Drylands in Argentina. World Resources Institute.

afford to human populations, along with trends in the capacity of the services to be sustained over time. The report brings to the forefront and underlines the importance of examining degradation of drylands beyond the physical properties of the soil. The description and analysis of dryland ecosystem services makes it obvious that degradation affects the entire ecosystem including provisioning, regulating, cultural, and supporting services.

Cross-sectoral integration of the ecosystem approach

39. FAO also uses the ecosystem approach in a distinctly cross-sectoral manner, as illustrated in its activities on "traditional use and availability of aquatic biodiversity in rice-based ecosystems" and by initiatives focusing on nutrition. In this respect, it is important to highlight that FAO is currently organizing a technical workshop on biodiversity indicators for nutrition as an official satellite to the 7th International Food Data Conference[13], and the topic of the ecosystem approach in nutrition is on the agenda.

United Nations Educational, Scientific and Cultural Organization (UNESCO)

40. UNESCO has three major links to the ecosystem approach: (i) the Man and the Biosphere (MAB) Programme; (ii) water-related activities, such as the International Hydrological Programme and World Water Assessment Programme, resulting from its role as an international scientific organization; and (iii) the Landscape Level Planning Initiative.

The MAB

41. The MAB Programme was launched after the 1972 Stockholm World Conference on the Environment. It was established around four guiding principles focused on the need to establish a worldwide network of protected areas of outstanding national and regional cultural and biological value. The spatial structure of the reserves is separated into three zones: 1. Core areas - areas where human activities are limited to research and management; 2. Buffer zones - areas containing the infrastructure supporting research and monitoring, and limited economic activity such as non- timber forest product extraction; 3. Transition areas - areas where more intensive human economic activities are carried out, such as community forestry projects, which are compatible with the preservation of wildlife values. Thus the MAB Programme attempts to integrate human economic activity with park and wildlands protection. The criteria for the stipulation of biosphere reserves build on the "Action Plan for Biosphere Reserves"[14], the "Statutory Framework of the World Network of Biosphere Reserves"[15], and especially on the "Seville Strategy"[16].

42. The UNESCO MAB programme is cited as, in terms of its concepts, a predecessor of the ecosystem approach, and at the present time the biosphere reserves appear to be privileged sites where new ideas arising from that approach can be picked up. It was as early as 1995 at its Seville meeting that the UNESCO General Assembly underlined the fact that "the world network of biosphere reserves … could make a significant contribution to the implementation of the aims of Agenda 21 and … in particular the Convention on Biological Diversity". Biosphere reserves fostered the integrative approach of the Agreement and were, it was stated, particularly suited to ensure its implementation [17]. The same conclusion has also been reached that German biosphere reserves could serve as model areas for the

[13] 7th International Food Data Conference. Food Composition and Biodiversity Website: http://www.fcf.usp.br/7ifdc/

[14] UNESCO (United Nations Educational, Scientific and Cultural Organisation) (1984): Action Plan for Biosphere Reserves. - Paris (UNESCO).

[15] UNESCO (United Nations Educational, Scientific and Cultural Organisation) (1995): Statutory Framework of the World Network of Biosphere Reserves. - Paris (UNESCO)

[16] UNESCO (United Nations Educational, Scientific and Cultural Organization) (1995): Seville Strategy. Paris (UNESCO).

[17] UNESCO (United Nations Educational, Scientific and Cultural Organization) (1995a): Seville Strategy. Paris (UNESCO).

implementation of the CBD[18]. The ecosystem approach now also acts as a driving force in the implementation of the Agreement and so the Seville strategy, in other words the MAB programme, and the ecosystem approach are closely related[19].

43. A clear convergence has been found in the central tenets of the ecosystem approach. The aims listed as Principle 5 (Conservation of ecosystem structure and functioning) are followed up directly in the MAB criteria 25 – 27 "Natural ecosystem functioning and landscape management", even if at the Seville strategies these ideas were not expanded. It is above all the balance between, and integration of conservation and use from Principle 10 that is frequently mentioned as the common ground of the ecosystem approach and MAB programme that is reflected in the zoning of the MAB reserves. This concurrence is equally clear and evident in the *Governance Directive* section: The first principle of the ecosystem approach is to be found in the German MAB programme (Criterion 15) as well as in the Seville strategy (Sub-goal II.1). The Seville strategy puts particular emphasis on the institutional/legal support of management of biosphere reserves. This idea is also expressed in the MAB programme in the detailed appeals to the management of biosphere reserves and legal protection of the reserve area as well as the integration into already existing planning tools (Criterion 8-11 and 17-20). In addition, the decentralisation of management contained in Principle 2 is also taken up with reference to the mechanisms to be put at the management's disposal (Criterion 13 and 14 of the MAB programme, cf. also Seville strategy); also to be found is the integration of the relevant sectors of society (*Principle 12*) in different ways (e.g. "Balance of interests" in the MAB programme).

44. There is only a moderate degree of concurrence to be found, on the other hand, in the area of the Design Directive. Whilst there is a comprehensive treatment of zoning as a response to appropriate scales (Principle 7) in the MAB programme, at least indirectly, the critical loads (Principle 6) are only mentioned in passing in the Seville strategy. In particular, however, the question of external ecological effects (Principle 5) is not mentioned at all. Finally there is little congruence in the area of the Management Directive. Such congruence is limited to the significant role of knowledge management (Principle 11), also emphasised in the Seville strategy. By contrast, neither the long-term active management goals (Principle 8) nor the adaptive management approach (Principle 9) are dealt with explicitly to any depth in the MAB programme or in the Seville strategy.

45. Thus, the level of congruence between the two approaches seems prima facie to be quite substantial as long as one looks at the broad philosophy of the approach and concentrates solely on questions of governance. Less clear-cut, even open to question, is the congruence regarding the areas of the Design Directive and the Management Directive.

Water programmes

46. The International Hydrological Programme (IHP) was established in 1965 and operates in five/six-year phases and, currently, IHP VI is underway (2002-2007). It started as a pure scientific coordination programme of a single discipline, but developed into a multidisciplinary programme with a water management perspective. The current phase has a theme with water-land habitat interactions. Partially building on this experience, UNESCO became the secretariat of the World Water Assessment Programme (WWAP) of the UN system, launched in 2000. The WWAP is a multi-agency effort, which produces the World Water Development Report, published in 2003 and 2006, and use this effort to build an information network and support capacity building. The WWAP is organized around 11 challenge areas, two of which are called "protecting ecosystems" and "governing water wisely".

The Landscape Level Planning Initiative

[18] Gündling, L. (2001): Implementing the Convention on Biological Diversity on the ground: the example of biosphere reserves. - Bonn (Federal Agency for Nature Conservation). - BfN-Skripten 58.

[19] UNESCO (United Nations Educational, Scientific and Cultural Organisation) (2000): Solving the Puzzle: The Ecosystem Approach and Biosphere Reserves. - Paris (UNESCO).

47. The Landscape Level Planning Initiative (LLPI) has been established by UNESCO to support the uptake of effective Landscape Level Planning (LLP) in order to allow integrated thinking and decision making to reconcile the needs of conservation and development within the framework of sustainable development. Although the need for such integrated planning is well recognised, and even required under government commitments through conventions such as the Convention on Biological Diversity, there seems to be a consensus that global application of the theory is poor. The aim of the Landscape Level Planning Initiative is: *"to promote, by means of research, advocacy and the development of models, examples and tools, the wider application of effective LLP, in keeping with the principles of sustainable development"*. The Initiative is targeted at the full range of Ministries within national governments, private sector associations, business leaders and civil society organizations. The Initiative started with a consultation process to identify the expectations that stakeholders have for LLP, and will then move on to analyze the effectiveness of the range of approaches that have been taken to LLP, in delivering them. Any lessons that can be learnt, good practice and current gaps will be identified, together with ways to promote the results and support their uptake. The LLPI is a UNESCO Division of Ecological & Earth Sciences Initiative, managed by a Steering Group drawn from Intergovernmental Agencies, the Conservation Community and Industry Associations. The issue of integrated planning has also been recognized in the dialogue between the conservation community and the extractive industries, as a point of shared interest in the Mining, Minerals and Sustainable Development Initiative (MMSD). As a result of this the ICMM and IUCN have included it in their current dialogue, initially through the preparation of a discussion paper on mining and integrated land use planning. Despite this growing recognition of the need for LLP effective mechanisms are not universally in place. Centralized land use planning does exist in many countries, but where it does it is often seen as one directional and non-participatory, particularly at the decision making level, and frequently does not cover all sectors. The conservation community has also led a number of ecosystem based planning processes, but these have had relatively low participation from other sectors, including governments, and are seen by some as ways of promoting conservation sector agendas rather than reconciling differing perspectives.

48. Although the need for LLP is globally recognized there is little in the way of international frameworks, guidance or support. One of the few that does operate is the UNESCO Man & Biosphere Programme, but this has not yet been developed to its full potential in terms of integration with international conventions or national enabling legislation.

United Nations University International Network on Water, Environment and Health (UNU-INWEH)

49. The core concern of the United Nations University's International Network on Water, Environment and Health (UNU-INWEH) is the global water crisis. UNU-INWEH contributes to the resolution of this global challenge through a unique programme of applied research and education. It conceives, develops and manages water initiatives that help developing countries build their capacity for lasting improvements in human and ecosystem health, and overall reduction in poverty. Project teams are selected from a wide range of disciplines and countries, especially those countries in which projects are undertaken. The Network takes a multi-disciplinary, ecosystem approach to water and watershed management to more effectively achieve its mission. It's capacity development efforts help developing countries to implement Integrated Water Resources Management (IWRM) through:

(a) Cross-cutting, adult education programmes directed at water practitioners;

(b) Ecosystem-specific "networks of best practice" for knowledge sharing and comparative research; and

(c) Fostering of water-related "centers of excellence".

Coastal Zone Ecosystems

50. UNU-INWEH's coastal programme focuses on the improvement of scientific understanding to foster sound decision-making. This is directly linked to capacity development efforts to address critical

gaps, achieved through diffusion of scientific research and promotion of human and institutional capacity. These initiatives are all directed to the long-term goal of Integrated Coastal Zone Management (ICZM), linked to the integrated management of adjacent inland. Within its coastal projects, UNU-INWEH works closely and consistently with external partners, public and private, who share responsibility for ecosystem health and biological diversity. This holistic approach to coastal management will enable UNU-INWEH to more efficiently and effectively maintain healthy ecosystems on a long-term basis.

51. Coral Reefs are under threat worldwide, but improved management is hampered by critical gaps in scientific understanding of reefs. A major global programme, *Coral Reef Targeted Research and Capacity-Building for Management*, sponsored by the Global Environment Facility (GEF) and the World Bank, seeks to address these deficiencies. UNU-INWEH executes one of the six components of this programme, which addresses fundamental information gaps in our understanding of connectivity between coral reef ecosystems. Coral reefs are patchily distributed ecosystems potentially connected by ocean currents. 'Connectivity' is the flux of items between locations. It exists for nutrients, sediments, and pollutants, and for the transfer of individuals between local populations. Because of the complex nature of water movement in and around coral reef systems, connectivity is difficult to measure and predict. The inter-connection among local populations of reef species is very poorly understood, and is a critical parameter in models for optimising the size and spacing of Marine Protected Areas (MPAs). Isolated protected areas in this highly interdependent marine environment are not enough to sustain ecological processes, thus the need for a representative and functional MPA network, based on sound science, is needed.

52. The UNU-INWEH project is developing technologies and implementing demonstration projects that aim to obtain estimates of connectivity for specific species of fish, coral or lobster. It is also developing new tools for identifying sources of or tracking movement of larvae. The project strengthens management capacity and policy analysis, by directly engaging national management agencies and local NGO personnel from Belize, Guatemala, Honduras and Mexico in the research activities. The project is divided into components that: apply advanced genetic chemistry to understand connectivity among fish populations; explore different aspects of the recruitment process in corals; and build a database of recruitment patterns for species of fish, coral, and the Caribbean spiny lobster.

53. In December 2006, UNU-INWEH commenced a substantive research and capacity development project in Dubai in conjunction with some major off-shore land reclamation projects. This project is a partnership between UNU-INWEH and Nakheel (a subsidiary of the Dubai Port Authority) that will contribute to the strengthening of coastal management, particularly in the Gulf and other similar tropical ecosystems. These systems are facing increasing pressures from pollution and urban development. The key elements of this project include: monitoring and assessment of coastal land-reclamation development projects; facilitating coastal management practices that provide protection from pollution and habitat degradation; a large-scale demonstration project on habitat and fisheries enhancement; and organization of an international conference series on marine coastal zone management, organized by UNU-INWEH, to be held every three years in Dubai. This $4.3 million project will design and implement a long-term environmental monitoring programme for the Dubai coastal area. It will also enable capacity building on a regional scale to professionals engaged in monitoring and management of coastal ecosystems. It will also involve targeted research on specific components of the marine environments in order to develop advanced decision-support models for coastal managers.

Threatened River Basin Ecosystems

54. This programme contributes improved and integrated river basin management. It emphasises data-information-knowledge systems and policy support for integrated, holistic management of river basins.

55. The project "Twinning International Lake Management Commissions: Opportunities for Improved Management of Global Great Lake Resources through Collaboration and Mutual Action" deals with the North American Great Lakes that have a long history of amicable and successful co-management of water quantity, quality and biological resources through the bi-national International Joint Commission

(IJC) and the Great Lakes Fishery Commission (GLFC). This history of successful management has evolved over time, responding to the increasing complexity of issues in shared waters, and building on records of successful settlement of numerous trans-boundary disputes related to sharing water resources. Both commissions have achieved substantial successes through bi-national action such as equitable sharing of water and fisheries resources, reversal of eutrophication in the lakes, reducing loading and concentrations of toxic substances in the lakes, and control of the exotic sea lamprey. Both commissions through their experiences over time have recognized the need for an *ecosystem approach* to resource management and have made sustainable resource use and maintenance or restoration of *ecosystem health* the foundation of their missions. The longer history of the North American commissions gives them a reservoir of experience in managing shared resources that can be used to accelerate the capacity of the emerging African international organizations. There are lessons that can be transferred about effective organizational structures and management practices that may have value to the new African agencies.

56. The "Equatorial African Atmospheric Nutrient Deposition Network" is being planned as part of the TerrAfrica programme, to be executed in partnership with the Pan-African START Secretariat, University of Nairobi. Unique UNU-INWEH research has shown atmospheric deposition to be the dominant source of critical nutrients and major contaminants to the lake ecosystems. In this initiative, to be supported by the World Bank and GEF, UNU-INWEH would be responsible for network design, data management and quality assurance, identification of atmospheric fluxes of chemicals, and eco-toxicological risk assessment. In this 6-year project, a network in 10 participating countries across equatorial Africa would be established to better quantify the atmospheric deposition of macronutrients – nitrogen and phosphorus – onto the lake ecosystems in Africa. The primary goal of EADN is to provide regional input into government interventions targeting rural development, and particularly those targeting sustainable land use management, livestock and agricultural productivity and soil fertility that would allow the estimation of their "offsite" impacts from macronutrient deposition.

Threatened Dryland Ecosystems

57. This programme assists dryland communities in developing countries to manage their water, land and biodiversity resources sustainably. Projects currently under implementation within this programme build on the findings of the Millennium Ecosystem Assessment, in which UNU-INWEH took a leading role. Drylands are particularly vulnerable due to climatic and human pressures, yet they constitute some of the world's largest land reserves in terms of space and natural resources. Life expectancy, childhood malnutrition, and other development indicators demonstrate the comparative vulnerability of many marginal dryland populations in relation to less water-scarce regions. However, the increases in productivity, which are necessary to improve the well-being of dryland inhabitants, need to be embedded in wise practices that respect the conservation of the fragile ecosystems on which dryland communities will continue to depend. The Interlinkages between initiatives to address land, water and biodiversity through ecosystem approaches are emphasized at all levels of action, from the international policy level, to the local level. For example, programme activities to create fora for international desertification policy debates, extracting from them practical conclusions to improve dryland management. These conclusions have highlighted the Interlinkages between the three Rio Conventions, and their contributions to sustainable poverty reduction. The integrated ecosystem management approach is extended to the ground level, where the application and assessment of small-scale technologies for land, water and productivity management are developed through the international cooperative project on Sustainable Management of Marginal Drylands (SUMAMAD). This project is jointly managed by UNU-INWEH, UNESCO and ICARDA and implemented by dryland researchers and communities.

United Nations University – Institute of Advanced Studies (UNU-IAS)

58. The UNU-IAS recently produced a study on the implementation of the ecosystem approach in open ocean and deep sea environments[20]. Unlike IMCAM, the EAF is still a relatively new approach.

[20] Marjo Vierros, Fanny Douvere and Salvatore Arico 2006 Implementing the Ecosystem Approach in Open Ocean and Deep Sea Environments An Analysis of Stakeholders, their Interests and Existing Approaches. UNU-IAS.

Given this, it is not surprising that comprehensive information about its implementation is not yet available. Certainly the EAF has been applied in a number of countries, though its national application is far from being universal. The EAF has also been applied regionally, often within Large Marine Ecosystems. Within regional fisheries management organizations (RFMOs), the application of the ecosystem approach is still patchy. While the more recently concluded agreements, like those for highly migratory species of the western and central Pacific and for the South East Atlantic reflect the ecosystem and precautionary approaches of the UN Fish Stocks Agreement, other early agreements predate UNCLOS but do not disregard the ecosystem approach The Commission of the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), a component of the Antarctic Treaty System, was the first international body to adopt the ecosystem approach to management of living resources. The CCAMLR approach not only focuses on regulating fishing for certain species, it also aims to ensure that fishing does not impact adversely on other species that are related to, or dependent on, the target species. In practical terms, it may yet be too early to assess the overall effects of EAF, except in areas such as the Southern Ocean, where the ecosystem approach has been applied for a substantial amount of time under CCAMLR. However, even in the Southern Ocean, management efforts are threatened by illegal, unregulated and unreported (IUU) fishing, and according to all available data, the status of fisheries and associated habitats continue to decline worldwide. However, there is also reason for cautious optimism, as countries have taken action to protect fragile environments from the effects of fishing (for example, the closure of a large cold water coral reef to bottom trawling on the Sula ridge off the coast of Norway). Some regional fisheries organizations are slowly starting to undertake similar action, as demonstrated in 2004 by the North-east Atlantic Fisheries Commission (NEAFC), which closed seamounts in the high seas to fishing activities. A number of RFMOs are also addressing by-catch and have put in place regulations towards this end.

59. IMCAM projects have been implemented widely in response to international and regional commitments and programmes, such as those under the CBD, the 13 Regional Seas Programmes and Action Plans and the Global Plan of Action for the Protection on the Marine Environment from Land Based Activities. The Regional Seas Programmes have been particularly effective in fostering international cooperation for the management of joint resources. In addition, international financial institutions, such as the World Bank, the Inter-American Development Bank, and the GEF have supported implementation of IMCAM, either nationally or regionally. According to the national reports of the Convention on Biological Diversity, 35 percent of responding countries have IMCAM arrangements in place, 25 percent were in advanced stages of development of IMCAM, while 32% were in early stages of development as of May 2006. Only 9% of responding countries had not started implementing IMCAM. Similarly, 14% or responding countries have implemented ecosystem-based management of marine and coastal resources, for example through integration of coastal management and watershed management, or through integrated multidisciplinary coastal and ocean management. Twenty-five percent were in advanced stages of implementing such management programmes, while 52% were at early stages of implementation. Only 9% of responding countries had not started implementing the ecosystem approach in this manner. These results demonstrate that IMCAM is widely implemented, and will become more so in the future. However, there is, as of yet, no comprehensive information available on as of yet, no comprehensive information available on the degree to which IMCAM programmes are achieving their objectives and producing measurable accomplishments. Indicators for IMCAM, under development by the IOC of UNESCO and UNEP among others, and in use by the European Union, should result in better information in this regard. Given the complex nature of the pressures and the multiple users of the coastal zone, it is perhaps not surprising that the implementation of IMCAM continues to be faced with many constraints. Many IMCAM projects either have inadequate budgets, or have failed to become sustainable programmes once project funding has ended. Efforts to integrate all stakeholders, including sectors and levels of governments, as well as communities, into IMCAM planning and implementation have not always worked as well as they should have. However, there is much to be learned from both the successes and failures of IMCAM, given its long history of practice in all parts of the world and at different scales. Certainly any efforts to implement the ecosystem approach further offshore through oceans management can be guided by the experiences of IMCAM.

60. The UNU-IAS is currently in the process of preparing a publication that will examine the relationship between customary marine resource management practices in the Pacific, legally established Marine Protected Areas (MPA) and national and international law and policy. The publication will draw lessons learned and good practices from the case studies in order to examine ways in which traditional resource management methods can contribute to reaching national and international MPA targets in the context of national law and the regional framework for MPAs, which is currently under development in the Pacific. The relationship between the ecosystem approach and traditional resource management practices will be examined.

The United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea

61. The seventh meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea, 12 – 16 June, 2006, organised its discussions, pursuant to resolution 60/30 of the General Assembly, on ecosystem approaches and oceans. The report of the meeting[21] agreed consensual elements to be suggested to the General Assembly for consideration under its agenda item entitled "Oceans and the law of the sea".

62. The meeting considered the aim of an ecosystem approach, human activities and pressures that affect marine ecosystems, legal and policy frameworks, and implementation of an ecosystem approach. Available panel presentations and abstracts thereof can be consulted on the DOALAS website at www.un.org/depts/los/consultative_process.htm.

63. The meeting proposed that the General Assembly: (a) Recall that States should be guided in the application of ecosystem approaches by a number of existing instruments, in particular the United Nations Convention on the Law of the Sea (UNCLOS), which sets out the legal framework for all activities in the oceans and seas, and its implementing agreements, as well as other commitments, such as those contained in the Convention on Biological Diversity and the World Summit on Sustainable Development call for the application of an ecosystem approach by 2010; and (b) Encourage States to cooperate and coordinate their efforts and take, individually or jointly, as appropriate, all measures, in conformity with international law, including UNCLOS and other applicable instruments, to address impacts on marine ecosystems in areas within and beyond national jurisdiction, taking into account the integrity of the ecosystems concerned. Further proposals to the General Assembly included considerations of what an ecosystem approach should entail, how implementation might be achieved, and responses from States required to achieve an improved application of an ecosystem approach.

III INTERNATIONAL ORGANISATIONS

The World Conservation Union (IUCN)

64. The IUCN continues to be at the forefront of the development, application and capacity building regarding the ecosystem approach – particularly through its Commission on Ecosystem Management (CEM) (http://www.iucn.org/themes/cem/). Recent activities have included the following:

(i) Using the Ecosystem Approach: learning from experience[22]

65. Over the last three years, IUCN's CEM has conducted a series of case studies, funded by the Government of the Netherlands, which have followed the application of the ecosystem approach in the context of projects or other land management initiatives. The studies took place in Panama, dryland West Africa, the Congo basin, the Mekong Delta and Indonesian Papua (former Irian Jaya).

[21] http://daccessdds.un.org/doc/UNDOC/GEN/N06/432/90/PDF/N0643290.pdf?OpenElement

[22] Shepherd, G. (ed) 2007 *Using the Ecosystem Approach: learning from experience* IUCN, Gland, Switzerland 120pp.

66. It has become clear that for the ecosystem approach to have a value, it must have a problem-solving capacity. A new way of looking at issues might come about as a result of a crisis, in which the old way of doing things is no longer seen to be adequate, and new knowledge, new institutions or a new appreciation of the ecosystem itself is called for. The starting points for the application of the ecosystem approach began in just such a way in several of the case studies analysed. The ecosystem approach was used to unpick the problems, and to provide not only some possible site-based solutions, but also to suggest national level policy blockages that needed to be addressed to make it possible to manage sites for their intended purpose. Several of the case studies show how, as issues are better understood and as institutional mechanisms allow, mosaics of different kinds of complementary land-use can be harmonized into larger and more coherently managed areas over time.

67. The case studies have all shed particular light on management and institutional challenges and solutions. All the case studies have plenty to report on adaptive management over time and make it directly or indirectly clear that the ability to integrate and act on different kinds of knowledge is a vital part of management. The case studies also illustrated the scale of the influence of markets on ecosystem management.

68. The ecosystem approach is reported as useful within the context of the project cycle for planning, for monitoring and for ex-post analysis to evaluate and draw out lessons from what went right and wrong. The ecosystem approach also provides a way of marking progress against a baseline and noting incremental change towards final goals. It does not offer a pass/fail judgement. However, for the ecosystem approach to go beyond analysis and investigation to application, certain preconditions may have to be in place. It can only be fully applied where people are ready to share power and knowledge. There has to be willingness to invest in the gathering of knowledge, and in the realigning of management goals and practicalities in the face of that knowledge. So, to be effective, the ecosystem approach must have the freedom to be a multilevel approach - national and sub national policy and legal frameworks may be just as important as what is going on within the ecosystem itself. It is often the case that, until ambiguities are resolved at top government levels, it is difficult to deal with the local stakeholder issues.

69. In the case of protected areas, it is important to understand that often the ecosystem manager is only an implementer, and that innovation must be agreed elsewhere. The ecosystem approach, applied in a landscape mosaic of different kinds of tenure and different kinds of land-use can become an analytical and integrative mechanism if stakeholders are prepared to make it so. However, several of the cases show that where goals are not clearly worked out with stakeholders at an early stage, where absent stakeholders hold all the power, or where there is an ambiguity about management goals, the ecosystem approach can only provide an analysis of problems, but cannot deliver solutions. New thinking about integrated ecosystem management now needs to be translated into effective, accountable and democratic planning, negotiating processes, and decision-making. In non-protected area landscapes people and their use of landscape and biodiversity are at the centre of ecosystem management. Conservation, productivity and sustainability outside protected areas all depend on decisions made by local managers, a majority of whom are poor and small-scale farmers or livestock producers. Such an agenda cannot be imposed from outside, and the challenge for any conservation or development agency lies in facilitation, empowerment and incentives. In other words, biodiversity conservation cannot be treated in a fragmented manner - we have to take account of its economic and governance dimensions. What distinguishes the ecosystem approach is that sustainable management of ecosystems can be given equal weight with development objectives. This reflects the realities of poor people, who understand ecosystem degradation and environmental risk as threats to their livelihood strategies. The ecosystem approach is better adjusted to these realities and easier for local people to relate to, than an exclusively sectoral or technical approach to development.

70. For poor rural people in many parts of the world, improving ecosystem management and enhancing livelihoods go hand in hand. The Ecosystem Approach provides a framework for addressing

the two and in so doing can make an important contribution to the achievement of the Millennium Development Goals in rural areas[23].

(ii) Streamlining the ecosystem approach

71. The 2004 publication by Gill Shepherd, Theme Leader for the Ecosystem Approach of the IUCN CEM, of a way of simplifying the application of the ecosystem approach by condensing it into 5 steps to implementation[24], has been widely used. This publication was welcomed by both the 9th meeting of the Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA) of the CBD and the 7th Conference of Parties to the CBD. It has been translated into Spanish (2005) and Vietnamese (2006), and used in training workshops in Latin America, Botswana, Viet Nam and Thailand.

(iii) Ecosystem Approaches and Forest Landscapes[25]

72. Recent innovations in Sustainable Forest Management and Ecosystem Approaches are resulting in forests increasingly being managed as part of the broader social-ecological systems in which they exist. *'Forests in landscapes'* reviews changes in forest management that have taken place in forest management in recent decades. Case studies from Europe, Canada, the USA, Russia, Australia, the Congo and Central America provide a wealth of international examples of innovative practices. Cross-cutting chapters examine the political ecology and economics of forest management, and review the information needs, and the use and misuse of criteria and indicators to achieve broad societal goals for forests. The book concludes by drawing out the key lessons of changes in forest management in recent decades, and sets out some thoughts for the future.

(iv) The Ecosystem Approach and Drylands

73. In addition to the drylands ecosystem approach case study in the CEM book, *Using the Ecosystem Approach: learning from experience*, IUCN has initiated or contributed to two other key studies of relevance to the Ecosystem Approach and Drylands.

74. The first[26] contributes to the planning and management approaches that minimize land degradation and desertification in arid and semi-arid zones as a result of extractive industries operations. Both operational and policy guidance are included to help those government departments responsible for extractive industry activities to take account of environment and development issues in their decision-making. The second[27] is a study of the economics of pastoralism in dryland areas, published jointly by IUCN and UNDP. It shows how, in many countries, mobile pastoralism in the most economically viable land use system for the world's drylands, while contributing to biodiversity conservation, climate change mitigation and to production.

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[23] *Biodiversity & Livelihoods - Where the Ecosystem Approach can take us.* A report by the IUCN Commission on Ecosystem Management. September 2006

[24] Shepherd, Gill. (2004). The Ecosystem Approach: Five Steps to Implementation. IUCN, Gland, Switzerland and Cambridge, UK. vi + 30 pp.

[25] Sayer, J., Maginnis, S. and Laurie, M. (eds). (2005). *Forests in landscapes: ecosystem approaches to sustainability*. IUCN, Forest Conservation Programme London: Earthscan.

[26] Gratzfeld, J. (ed.). (2004). *Extractive Industries in Arid and Semi Arid Zones: Environmental Planning and Management*. IUCN, Gland, Switzerland and Cambridge, UK. viii + 112 pp. (also in Spanish, French and Arabic)

[27] Hatfield, R and Davies J. (2007) *Global Review Of The Economics Of Pastoralism* World Initiatkive for Sustainable Pastoralism. IUCN, Kenya.

(v) The Ecosystem Approach, Livelihoods and Disasters

75. Conceived after the Asian tsunami of December 2005, this publication[28], developed by IUCN with CARE and IWMI, proposes an approach that integrates ecosystem management, development planning and risk reduction strategies to reduce disaster impacts and improve both livelihoods and biodiversity outcomes. It provides examples of how conservation organizations can work together with the disaster community to help local communities to rebuild their livelihoods while minimizing their exposure to future disasters. The ecosystem approach is used for managing resource use more effectively and contributing to reducing the risk and impact of disasters.

(vi) The Application of the Ecosystem Approach in Latin America

76. IUCN's Latin-American members have been very active in their testing of the ecosystem approach, working over the period 2004-2006 to focus in turn on the ecosystem approach and the management of corridors; the ecosystem approach and links between people and nature; and most recently the ecosystem approach and the management of water resources[29]. A workshop gathering this experience and other Latin-American experience will be held in Bogota Colombia in June 2007, as part of the Commission for Ecosystem Management's annual meeting.

(vii) Integrating Biodiversity Conservation and Sustainable Use: Lessons Learned From Ecological Networks. [30]

77. This publication illustrates the development of several ecological networks around the world. It demonstrates the benefits of these networks, not only for conservation purposes, but also for sustainable development. Although the concept is relatively new and needs more time to fully crystallise, these examples indicate that investments in ecological networks yield benefits, not only because of the biodiversity they conserve but also because of the essential ecological services they provide to local communities, thereby contributing to poverty alleviation. This has been acknowledged by IUCN's World Commission on Protected Areas (WCPA) by integrating both sustainable use and conservation in IUCN's Protected Area classification system. Ecological networks provide an operational model for conserving biodiversity that is based on ecological principles and allow a degree of human use of the landscape. This combination makes the concept of ecological networks a useful instrument for the implementation of the Convention of Biological Diversity and contributes to the intention of the World Summit on Sustainable Development held in Johannesburg in 2002.

(viii) The rehabilitation of the Delta of the Senegal River in Mauritania[31]

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[28] Sudmeier-Rieux, K., H. Masundire, A. Rizvi and S. Rietbergen, eds. (2006). Ecosystems, Livelihoods and Disasters : An Integrated Approach to Disaster Risk Management. IUCN, Gland, Switzerland and Cambridge, UK. x + 58 pp.

[29] Guerrero, E., O. De Keizer, R. Córdoba (eds). (2006). *La Aplicación del Enfoque Ecosistémico en la Gestión de los Recursos Hídricos*. UICN, Quito, Ecuador. 78 pp.

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[30] Graham Bennett. (2004). *Integrating Biodiversity Conservation and Sustainable Use: Lessons Learned From Ecological Networks.* IUCN, Gland, Switzerland, and Cambridge, UK. vi + 55 pp.

[31] Hamerlynck, O. and Duvail, S. (2003). The rehabilitation of the Delta of the Senegal River in Mauritania. IUCN, Gland, Switzerland and Cambridge, UK. viii + 88 pp.

78. This book tells the story of an ecosystem approach to the rehabilitation of the lower delta of the Senegal River in Mauritania, in and around Diawling National Park. Its main objective is to provide practitioners with a "feel" for what the approach can entail in the real-life setting of a remote corner of the Sahel, where people's livelihoods are inextricably tied to the productivity of their delta. This productivity is in turn influenced by the mixing of fresh and saline waters during the floods, and by the surface area flooded. Restoring the floods, not as an exact replica of the pre-dam situation, but largely based on the water requirements of the natural resources as perceived by the local communities, has been a daunting task. Local knowledge of pre-dam functioning was combined with technical advice from a wide range of experts to arrive at a consensus flood scenario aimed at enhancing both biodiversity and productivity, and this was then laid down formally in a management plan. Rather than being a finished product, a management plan should be an ongoing process with constant adjustments in response to unforeseen alterations in the ecosystems, rapid changes in stakeholders' resource use strategies and unexpected institutional changes. The unquestionable success of the rehabilitation effort, both in improving local livelihoods and conserving and even enhancing biodiversity, has been achieved against a challenging environmental, social and institutional backdrop. The achievements and unresolved issues are presented and the project approach is compared to the principles for ecosystem management. Some lessons are extracted and proposals to address a number of challenges are made.

(ix) Using the Ecosystem Approach to Implement the Convention on biological Diversity: Key Issues and Case Studies [32]

79. This summary and analysis of workshop discussions and case studies is based on case studies that were presented at workshops on the ecosystem approach that were held in Southern Africa, South America and Southeast Asia in 2000. It is intended to be a resource to assist implementation of Decision V/6 by Parties, the CBD Secretariat and all relevant stakeholders. Workshop participants broadly endorsed the definition and description of the ecosystem approach in Decision V/6 and generally agreed that it is a highly appropriate framework for delivering the objectives of the CBD. The ecosystem approach is defined as *a strategy for management of land, water and living resources that promotes conservation and sustainable use in an equitable way.* It was identified by workshop participants as being similar to a number of other holistic approaches to conservation, development and natural resource management. A common misconception is that the Ecosystem Approach is an *ecosystems* approach, i.e. a set of guidelines for managing ecosystems. In fact, the ecosystem approach under the CBD is a framework for holistic decision-making and action. The case studies presented at the workshops illustrated most aspects of Decision V/6 and a number of CBD thematic areas and cross-cutting issues. Various interpretations of ways to apply Decision V/6 are possible. It may not be necessary to apply each of the 12 principles of the Decision in each case, and it may not always be necessary to aim for a balance between the three CBD objectives. Problem-specific guidelines need to be developed to guide users. The ecosystem approach can be used to help achieve the necessary mainstreaming of the CBD into policies and decision-making that affect the environment. Mainstreaming the ecosystem approach requires the engagement of diverse sectors of the economy and society, including those that are likely to be less aware of — or even hostile to — the ecosystem approach.

(x) Capacity Building and Training for the Ecosystem Approach

80. Various training courses on the application of the Ecosystem Approach for practitioners were held. The most important were:

(a) Botswana 2005: Implementation of the Okavango Delta Management Plan;

(b) Bolivia 2005: Monitoring the implementation of the Ecosystem Approach in conservation and development projects in South America;

[32] R.D. Smith and E. Maltby. (2003). Using the Ecosystem Approach to Implement the Convention on biological Diversity: Key Issues and Case Studies. IUCN, Gland, Switzerland and Cambridge, UK. x + 118 pp.

(c) Viet Nam 2006 for Protected Area Managers in the Mekong Delta: challenges arising from attempts to apply the Ecosystem Approach to wetland protected area management. The report from this workshop can be read online[33];

(d) Policy Issues arising from the Mekong regional workshop are to be addressed at a High Level Policy Workshop in Hanoi in June 2007; and

(e) IUCN took on a supporting and training role at the CBD's 'Small Islands and the Ecosystem Approach' training workshop held in Bangkok, Thailand in December 2006.

The World Wide Fund for Nature (WWF)

81. The WWF Global Freshwater Programme has been instrumental in developing the *Mountains to the Sea Implementation Plan*[34] which consists of a methodological proposal for the ecosystem-based, cross-biome, inter-sectoral, cost-effective and integrated implementation of the CBD. This proposal takes fully into account the goals, objectives and activities under each of the thematic programmes of work and the cross-cutting issues of the CBD. Based on the ecosystem approach, the *Mountains to the Sea Implementation Plan* aims at addressing the following issues: streamlining the ecosystem approach and the programmes of work under the CBD; level of complexity of the current system; and, promoting uniformity among the different thematic areas. The *Mountains to the Sea Implementation Plan* presents an optional tool to simplify, to the benefit of the Parties to the CBD, the task of applying the Convention's agenda, while, at the same time, furthering the ecosystem approach. It is thus a proposal for cohesive, harmonized, and integrated biodiversity protection across interrelated biomes. The *Mountains to the Sea Implementation Plan* represents, in one single, standardised document the content of the six programmes of work in a more didactic, straight-forward, and comprehensible framework of cross-biome sub-programmes. It also puts in evidence the key management challenges and issues with implementing the CBD, irrespective of the biome, and accounts for eventual biome-specific management or priority issues contained in the original programmes. From an administrative perspective, this *Plan* condenses the text that Parties have to consult in the development of their own national approaches to implementing the CBD. Parties can now consult one cross-biome implementation plan for landscape, seascape, and river basin scale planning. If necessary, national agencies can always go back to the existing six thematic programmes for further clarifications in relation to a specific biome or issue. Nature designed ecosystems with connectivity and thus actions to protect biodiversity need to take these interrelations into account, through the effective application of an ecosystem approach. For this reason, the *Plan* assists the urgent need for the CBD to move to a cross-biome, integrated approach to biodiversity conservation and sustainable use. The *Mountains to the Sea Implementation Plan* proposes a methodology to guide and support the Parties in this direction.

82. In 2002, as part of a process to develop a workable approach to ecosystem-based management (EBM) in marine capture fisheries, WWF published its policy proposals and guidelines to encourage and inform the global debate about EBM, as well as offer an operational interpretation about how EBM might be applied in a fisheries management context. WWF USA and WWF International have recently undertaken an analysis of, and provided guidance for, ecosystem-based implementation of management in marine capture fisheries based on case studies from WWF's Marine Ecoregions[35]. The case study regions were: Yellow Sea Marine Ecoregion; Eastern African Marine Ecoregion Baltic Sea Marine Ecoregion; Fiji Islands Marine Ecoregion; North West Atlantic Marine Ecoregion – Grand Banks, Canada; Benguela Current Marine Ecoregion; Heard & McDonald Islands/Prince Edward Islands/Kerguelen and Crozet

[33] http://www.iucn.org/themes/cem/documents/ecosapproach/esatrain_mekong_june2006.pdf

[34] For further information on the *Mountains to the Sea Implementation Plan*, please refer to the link http://assets.panda.org/downloads/mountaintoseareportphase2.doc and/or contact Christopher E. Williams, Manager, River Basin Conservation, WWF Global Freshwater Programme, chris.williams@wwfus.org

[35] Chris Grieve and Katherine Short. 2007. Ecosystem-Based Implementation of Management in Marine Capture Fisheries: Case studies from WWF's Marine Ecoregions. WWF USA.

Islands initiatives; South West Atlantic/Patagonian Shelf Marine Ecoregion – San Matías Gulf, Argentina; Gulf of California Marine Ecoregion – Mexico; Bismarck Solomon Seas Marine Ecoregion - Bird's Head Peninsula Seascape, Indonesia; Southern Ocean – Antarctic Krill; Western African Marine Ecoregion & New Zealand Marine Ecoregion. Ecosystem Based Management (EBM) is evolving into modern management systems that deal with the environmental and ecosystem interactions that result from the effects of resource exploitation on the environment and the effects of the environment on the resources being exploited. The concept of EBM, as characterised by WWF's policy framework, explicitly recognises the human dimension, acknowledging that as managers we can only manage the activity of human beings within the system. To make EBM operational in a practical, real world sense, some constructive lessons for operational implementation are built into WWF's 12-step operational framework upon which the case studies of EBM-in-action were based. These lessons included the need to *develop outcome oriented objectives* for management activities; *delineate boundaries for the management system* including ecologically defined spatial boundaries and relevant ecological and socio-economic factors influencing the productivity of the resource and integrity of the ecosystem; and *involve stakeholders* in all aspects of management leading to shared understanding and agreed individual and collective aspirations for the resource and associated ecosystems. The concept of EBM is hierarchical, where the operational aspects should be guided by and nested within the terms of EBM principles. The linkages, however, do not have to be singular: a single operational activity can meet the needs of more than one principle. Nor do operational elements, as set out in the framework's 12 steps, need to be followed sequentially or rigidly. While a prototypical demonstration of EBM could involve working through the steps or components of EBM in a progressive, systematic way, each step building neatly upon the first until the ultimate outcome is achieved, in the real world, we rarely have the luxury of beginning with a blank canvas, nor working through such a tidy process. Moving towards EBM might be characterised in many parts of the world as more evolutionary than revolutionary, negotiated incrementally through existing political and economic realities, with the right elements already in place for some of the EBM steps and more work to be done on others. This approach makes sense and can be adapted uniquely for each region or local sub-division, determined entirely by the reality confronting people working on the issues. Indeed, during the research to develop these 12 case studies, this is what was encountered. WWF practitioners around the world are working carefully within pre-existing networks, developing new partnerships, or identifying gaps where there are opportunities for new or modified structures to deliver ecosystem-related outcomes more rapidly, transparently or efficiently. Other projects are incorporating broad conservation and biodiversity priorities as well as the socio-conomic interests and needs of people and communities, especially when it comes to fishing, and developing and using an extensive science-base. Similarly, there are systematic approaches being implemented to deal with issues confronting other areas.
