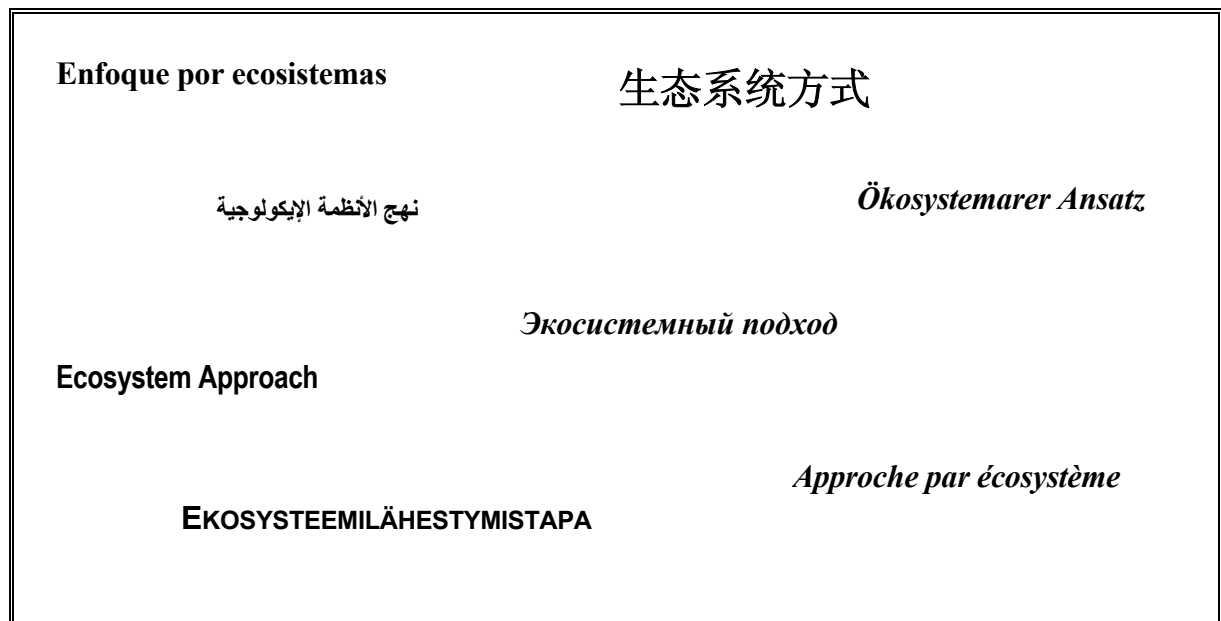


Volkmar Hartje, Axel Klaphake & Rainer Schliep

**The International Debate on the
Ecosystem Approach
Critical Review
International Actors
Obstacles and Challenges**



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List of Abbreviations

ADB	Asian Development Bank
CBD	Convention on Biological Diversity
CCD	United Nations' Convention to Combat Desertification
CEM	Commission on Ecosystem Management
CGRFA	Commission on Genetic Resources for Food and Agriculture
CITES	Convention on the International Trade with Endangered Species
COP	Conference of Parties
CSD	Commission on Sustainable Development of the United Nations
DFID	Department for International Development (UK)
DIVERSITAS	International Program of Biodiversity Science
EC	European Community
ECOSOC	Economic and Social Council of the United Nations
EsA	Ecosystem Approach
ESM	Ecosystem Management Approach
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environmental Facility
GTZ	Deutsche Gesellschaft fuer Technische Zusammenarbeit
IADB	Inter-American Development Bank
ICAM	Integrated Coastal Area Management
ICZM	Integrated Coastal Zone Management
IBRD	International Bank for Reconstruction and Development
IDS	Institute for Development Studies (UK)
IFF	Intergovernmental Forum on Forests
IGBP	International Geosphere-Biosphere Program
IHDP	International Human Dimensions Program on Global Change
IHP	International Hydrological Program
IIED	International Institute for Environment and Development (UK)
IMCAM	Integrated Marine and Coastal Area Management
IPF	Intergovernmental Panel on Forests
IUCN	World Conservation Union
IWRM	Integrated Water Resources Management
MA	Millennium Ecosystem Assessment
MAB	Man and the Biosphere Program
MEA	Multi-lateral Environmental Agreement
NGO	Non-governmental organization
ODI	Overseas Development Institute (UK)
OP	Operational Program
PAGE	Pilot Analysis of Global Ecosystems
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice

TNC	The Nature Conservancy
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Convention to Combat Climate Change
UNFF	United Nations Forum on Forests
UNGASS	United Nations General Assembly Special Session
WCRP	World Climate Research Program
WRI	World Resources Institute
WSSD	World Summit on Sustainable Development
WWAP	World Water Assessment Program

1 Introduction

The Ecosystem Approach (EsA) of the Convention on Biological Diversity (CBD) is an effort to codify basic elements of holistic natural resources management with special emphasis on biodiversity. In 1995 during the CBD's second Conference of Parties (COP), the EsA was introduced as a general principle for the first time and in 2000, the CBD's fifth COP specified the approach by adopting twelve principles and five operational guidelines in order to clarify the conceptual basis of the EsA and to provide a guide for implementation. In line with the overall objectives of the CBD, the EsA demands an integrated strategy for the management of land, water and living resources that promotes conservation and sustainable use in an equitable way.

The subject of our study is to summarize the international debate that has taken place as a consequence of these decisions in order to draw conclusions regarding the suitability of the EsA and its potential to foster an international spread of ecosystem management strategies which can be only - in face of the short period of experience - preliminary. To structure the debate, we consider the EsA as a policy innovation whose potential to have an impact on natural resources management will depend on its international diffusion. Whether countries will be prepared to implement management approaches that are in line with the principles and guidelines of the EsA will depend on three important prerequisites.

First, effective diffusion of the concept depends on the quality of the EsA in terms of its theoretical justification, its internal consistency, its ability to guide and its general connection to the existing natural resource management approaches currently pursued in most CBD member countries. Whether these qualities are achieved by the principles and guidelines is being debated internationally on a conceptual level by scientists and policy analysts and tested empirically in frontrunner countries that might serve as policy models (for best practice).

Second, international diffusion of such a demanding concept requires flexibility in the international system beyond the organs of the CBD in the form of international organizations and networks that might serve as adaptors and facilitators for implementation. They have performed this role in the past with other innovative concepts in environmental and development policy. One has to understand the functioning of these institutions to be able to answer the question whether they will act as adaptors and facilitators or whether they will promote other competing or complementary approaches.

Third, implementation "on the ground" will take place on the national and the subnational level. The degree to which the member countries adopt the concept of the EsA will depend on national and subnational institutional, social and economic capacities as well as political support.

Here, a summary of the international conceptual debate is presented and a survey of the adoption of the EsA among international actors, e.g. UN agencies and international development funding organizations. The third step in analyzing such a diffusion process is not, however, undertaken in this paper. First, the resources were not available to develop a representative survey. Secondly, the analytical approach for a profound analysis of the worldwide national implementation capacities must still be developed and is, therefore, outside the terms of this study.

Against this background, we start our discussion with a brief description of the innovation side (chapter 2). Usually, environmental policy innovation was originally debated in only one or a few innovative frontrunner countries and practiced, often as a result of special political and institutional circumstances,

with national environmental groups blocking traditional solutions. International non-governmental organizations (NGOs) often pushed their consideration of these innovations onto the international agenda, if international environmental agreements proved successful. As outlined below, the story of EsA's origins corresponds well with this rough picture.

Next we sketch some critical reviews that particularly relate to the quality of the EsA in terms of theoretical aspects, its logical consistency and its practical value as a guide for implementation (chapter 3). Here, we give an overview of recent academic debates and political experience that relate to the paradigm shift represented by the EsA. However, due to the complex character of the EsA this discussion cannot exhaust all related issues but only a selection of important open questions.

Hereupon, we discuss whether on the international level there are already institutions existent that perform coordinative functions with the CBD and support policy transfers. Just such a role might be played by the United Nations, bilateral and national donors, as well as actors and agreements concerning specific ecosystems. The objective of this discussion is to roughly assess the 'transmission power' of key actors and organizations on the international level. In particular, the current state of adoption of the EsA by the agencies of the United Nations, the World Bank and other international and national donors will be summarized. Further, we will present adopters and precursors that relate to specific ecosystems (mountains, freshwater, oceans, coastal zones etc.).

Finally, we draw a general conclusion and stress some key challenges for an enforced extension and acceleration of EsA's diffusion process.

2 Origins of the Ecosystem Approach

The CBD aims for the integration of its three main objectives: conservation, sustainable use and benefit sharing on the level of ecosystems, species and genes. In the delivery of these objectives there is a general agreement that the EsA of the CBD is of fundamental importance: the changing quality of environmental problems and the manifold user interests in land use demand a more integrated approach to ecosystem management, thus moving away from species and area protection towards ecosystem protection and integrated land use planning. Regarding the origins of CBD's EsA there are three (somewhat interrelated) roots: the development in frontrunner countries, the support of the paradigm shift by international NGOs, and the early entry of the concept into CBD's decision-making process.

Frontrunner Countries

On the national level there have been some important attempts to clarify the term ecosystem management for political and administrative purposes, in particular in the US and Canada, that had a major impact on the development of CBD's EsA. By the late 1980s, the focus of resource management in the US had begun to shift from traditional approaches to concepts that make resource conditions the goal and a precondition for meeting human needs over time. Leading resource management professionals and the scientific community began to favor an integrated management with a preference for landscape-scale and decentralized management, as well as effective public participation. By the early 1990s, these debates had melded into the concept of ecosystem management. At that time, one of the main focuses of the public debate was on biodiversity issues in forest management. Subsequently, by 1994 already eighteen federal agencies had adopted some form of ecosystem management as a guiding concept. The INTER AGENCY ECOSYSTEM MANAGEMENT TASK FORCE (1995) summarized the agency-specific development of definitions, outlined a common framework for ecosystem management and identified barriers to implementation. The work of this task force received considerable national and international attention and was followed by a *Keystone Policy Dialogue* in 1996. Equally, the concept of ecosystem management entered the political and academic debate in Canada, where a task group debated challenges and lessons learned in 1996.

The Role of NGOs

Parallel to the development on the national level, the evolution of thinking in international NGOs has led to more holistic management approaches that were pushed onto the international political agenda, in particular in the context of the CBD where the World Conservation Union (IUCN) and the WWF were important actors. The IUCN places high priority on the development and clarification of ecosystem management in the context of the CBD, not only because of the special importance attached to the work of the CBD, but also because of the mission of the IUCN itself. The Union is dedicated to the conservation of the integrity and diversity of nature ensuring an equitable and ecologically sustainable use of natural resources. Its Commission on Ecosystem Management (CEM) is one of six Commissions established within the IUCN providing technical networks for the generation of up-to-date concepts on key conservation and environmental management issues for the membership. A meeting convened by the Royal Holloway Institute for Environmental Research (RHIER) and IUCN-CEM, funded by the Sibthorp Trust and held at Royal Holloway, University of London questioned conventional and traditional approaches to conservation and sustainable development. One of the key outcomes was the development of ten principles for ecosystem management (MALTBY et al. 1999). In the following meetings individual members of the CEM provided substantial input to the debate on the EsA moderating the discussion and initiating analytic steps

for a better understanding of the concept (MALTBY 1999, IUCN 2000a/b, SMITH/MALTBY 2001). Equally, the rethinking of traditional conservation approaches and the development of an ecosystem management framework by the WWF was an important step in the history of EsA's development. The WWF had originally focused on single species and protection areas. However, in the 1990s more integrated management approaches were developed that culminated in the WWF's ecoregional policy that promotes a holistic, multi-stakeholder and broad scale approach in natural resource management.

Entry into CBD and Concretion of the Ecosystem Approach

Already at the first meeting of the CBD's Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) the term Ecosystem Approach was introduced as a primary framework for action, however, without concrete specifications (UNEP/CBD/COP/2/5 Annex). The CBD's second COP, building the basis for all further discussion and elaboration, reaffirmed this recommendation. The rather general introduction of the approach into the CBD process created a need for clearer direction, which was formulated by SBSTTA 3 in 1997. Therefore, COP 4 requested the SBSTTA to develop principles and other guidance on the ecosystem approach.

Although a clear direction of the approach was initially lacking, the COP introduced the concept in its preliminary form to the different crosscutting and thematic working programs, e.g. on inland waters, marine and coastal biodiversity, agricultural and forest biodiversity. While the member states formulated a strong demand for a workable description of the approach, a series of workshops and meetings was initiated by the CBD, strongly supported by NGOs, to elaborate on this. In 1997, a workshop on the EsA at Lilongwe/Malawi expanded on the Sibthorp Principles and developed the 'Malawi-Principles' as a first attempt to formulate a consistent concept. In the following year, a scientific workshop hosted by the German Federal Agency for Nature Conservation at the Isle of Vilm focused on the relevance of the Malawi Principles and their possible implementation in a European context (KORN et al. 1999). Two more meetings advanced the concept substantially: the Conference on the EsA at Trondheim/Norway in 1999, which focused on research and development that contributes to an improved understanding of the Malawi-Principles (SCHEI et al. 1999), and the CBD Liaison Group meeting at Paris/France in the same year, which elaborated proposals for actions aiming at the implementation of the proposed principles of the EsA.

After being requested by COP 4 to develop principles and other guidance on the EsA, SBSTTA submitted recommendation V/10 to the COP, which contained the results of the various meetings (Lilongwe, Isle of Vilm, Trondheim, Paris). Interestingly, the original draft of Lilongwe was only slightly changed when it became COP decision V/6 (Ecosystem Approach) in 2000 that concretizes the EsA in the form of twelve principles and five operational guidelines. Decision V/6 requests the SBSTTA to compile case studies and lessons learned as a basis for the further elaboration of the EsA. While ascertaining the demand for a further elaboration of the EsA, COP 6 (2002) requested CBD's Executive Secretary to convene a meeting of experts to compare the EsA with sustainable forest management approaches and to develop proposals for their integration.

Summing up

The introduction of the EsA into the CBD was supported by frontrunner countries and pushed by international NGOs. By recognizing early the importance of the EsA by the SBSTTA, the COPs made successful efforts to implement the EsA into the different working programs of the CBD rather than to develop and

refine the EsA itself. This task is delegated to the SBSTTA and external expert meetings. The SBSTTA especially utilized the input from organizations such as the IUCN or the WWF, as well as scientific advice by national experts to improve the theoretical basis and the implementation of the EsA. International NGOs promoted the EsA via technical input and recommendation papers timely scheduled with respect to the meetings of the SBSTTA and the COP. The EsA-related decision-making process was initiated at the first SBSTTA meeting in 1995, resulting in COP's decision V/6 (Ecosystem Approach) in 2000. However, decision V/6 did not finalize the EsA because there is a persistent demand for further elaboration of some inaccuracies in the usage of terms and several inherent conflicts of the approach. The approach was originally introduced into the follow-up process of the CBD without previous independent scientific debate and without thorough preparation by the SBSTTA. This led to some irritation of national actors in the process. Therefore, an improved scientific funding of the EsA seemed to be necessary (WBGU, 1999). As there is up to now no explicit systematic analysis of the theoretical background of the EsA, criticism of the EsA can be traced back to the questions that arose in the recent discussion of ecosystem management in the USA. In fact, the new terminology is sometimes used interchangeably and is somewhat unclear (e.g. the term 'management'), and conceptual categories used in the frame of ecosystem management are criticized because they lack an agreed-upon consensus among researchers.

3 Critical Reviews of the Ecosystem Approach

Along with the general consensus and efforts to implement the EsA have come some questions of its feasibility and criticism from those who find it too vague and undetermined. The following summary of recent academic and political debates on some aspects of the EsA show that there is no general agreement on what the concept means exactly in terms of management approaches and management outcomes.

The EsA as a Paradigm Shift

In the international debate on holistic ecosystem management concepts the principles and guidelines of the EsA are strongly agreed in general terms. The concept can be interpreted as an attempt to codify basic elements of a new paradigm in resource management. Traditional resource management is pragmatic, seeing in nature a collection of resources that deliver economic goods and services that can be manipulated and harvested with humans in control (CORTNER/MOOTE 1999). In contrast, the EsA represents the new paradigm that acknowledges the dynamics of ecosystems and their complexity with which its components are interwoven. Therefore, nature cannot be controlled by humans and the protection of ecosystem attributes and biological diversity are critical. Maintaining biological diversity is perceived as a natural insurance for securing the generation of ecosystems functions and services at present and in the future (BARBIER et al. 1994). Implementation of the EsA means that more integrated or holistic concepts are needed in order to move away from protection on the species level to the conservation of habitats or ecosystem networks, as well as from area protection to integrated land use planning.

However, an academic agreement on the definition of the ecosystem approach has not been reached, although the general idea of “principles” to solidify the EsA is widely supported. As YAFFEE (1999) has pointed out, the lack of a scientific consensus is probably due to the fact that the ecosystem approach leaves room for quite different interpretations, ranging from an anthropocentric perspective to an ecoregional or ecocentric perspective.

Generally, the EsA is the primary framework for delivering the three objectives of the CBD: conservation, sustainable use and benefit sharing. This is a remarkable shift because the EsA seeks to combine the conservation of the structure and functioning of ecosystems with efforts to meet social needs and the sustainable use of ecosystem services for human purposes. However, unlike traditional resource management, implementing the EsA does not mean to begin by enumerating and maximizing outputs. Rather, the first priority is conserving the long-term ecological sustainability that allows the use of ecosystem services in a sustainable manner. Therefore, the view of humans as exploiters of substitutable resources is changing to see humans as stewards, using practices in synergy with ecosystem processes and functions.

It remains rather unclear, however, how all three objectives of the CBD can be focused simultaneously or with equal priority in concrete cases. In practice this will heavily depend on the relevant institutions and their general policy objectives. Different institutions may be primarily concerned with using resources to benefit people (e.g. water services), conserving species or maintaining ecological processes and functioning (e.g. hydrological flow). Progress in meeting the three CBD objectives would require the relevant actors to widen their perspective in resource management and include other perspectives, which were originally not part of the institutional perspective. However, for practical purposes it might be necessary to prioritize one or two of the objectives, although the EsA does not provide for practical guidelines on how to handle this problem. Generally, delivering the CBD objectives through the implementation of the

EsA may, in some circumstances, require socio-economic priorities to be addressed first (SMITH/MALTBY 2001)

Uncertainty

The EsA emphasizes the role of complex, dynamic ecosystems as critical natural capital assets whose functioning must be conserved. But what is the ‘criticality’ of ecosystems? This can be discussed in two ways. First, there is critical natural capital in terms of essential environmental functions for human well-being, functions regularly referred to as ecosystem services (EHRlich/MOONEY 1983) or source and sink functions (PEARCE/TURNER 1990). But there is also critical natural capital in terms of environmental functions of ecosystems - or life-support functions - that reflect ecosystem performance. The term ecosystem performance means the dynamic often non-linear interrelations between populations and communities of plants, animals and microorganisms and their energetic, hydrological and biogeochemical environment. The life-support performance of ecosystems generates and sustains the flow of source and sink functions for our well-being and existence.

Against this background, the emphasis on unpredictability and uncertainty is crucial for the understanding of the EsA. Management approaches that are based on a static understanding of ecosystems has led to fundamental problems and a loss of resilience of ecosystems (HOLLING 1996). Part of the problem is that traditional approaches appear unprepared to tackle gradual declines of ecosystems, as well as radical shifts in ecosystems’ performance. However, science no longer provides “the answer”. Rather, there is great uncertainty about even fundamental ecological questions (CORTNER/MOOTE 1999). For example, the carrying capacity of many ecosystems is not easy to determine and often controversial. This is an uncertainty with important consequences for management seeking to manage ecosystems within their long-term functional limits (WRI 2000). Considering this, the necessity for open decision-making with strong links between managers, stakeholders and the latest scientific knowledge appears crucial. In general, it is recognized that criteria for ecosystems’ health are essentially value judgments. Therefore, the intended ecological sustainability and the desired ecosystem outputs are, at last, socially defined concepts. An important consequence is that the implementation of the EsA is not only confronted with complex environmental problems but also with different values and expectations of stakeholders (SÖDERBAUM 1999). However, achieving the balance between the values of expertise and scientific knowledge on the one hand, with social consensus and civic discourse might on the other, is a very demanding task whose practical implications are rather unclear.

Preparedness in Science

The importance of scientific knowledge regarding ecosystem functions and conditions, as well as the socio-economic aspects of sustainable use of biodiversity is obvious. Without a stronger base of scientific knowledge and manageable indicators, implementation of the EsA will fall short, largely because decision-makers will not be able to judge possible losses of ecosystems’ functions and services and long-term consequences of management decisions (WRI 2000). However, the complexity of ecosystems’ structure and functioning is far from being fully explored. Not much is known about the changes in ecosystems’ functions and services that have taken or will take place on different scales due to human interference. Lack of reliable data is one reason for this. Another is the difficulty of distinguishing between natural variations (e.g., climate change or biodiversity change) and trends, which can be traced back to human threats. Further, the interdependencies of the different global stresses to the environment are not fully

understood. Generally, though numerous case studies illustrate the importance of science as a driving force for the implementation of the EsA, there is no general consensus on how research projects should be carried out in order to provide an adequate knowledge base for management.

Against this background, some authors stress the need for a more radical paradigm shift in science (KAY et al. 1999, FOLKE et al. 2002). According to them, the EsA demands a complex and transdisciplinary systems thinking that acknowledges inherent uncertainties, limited predictability of complex ecological-economic systems and multi-stable systems. But international experience suggests that existing theory and scientific practice for linked systems of nature, economies and societies are still too partial and fragmented, leading to inadequate policy recommendations (HOLLING/MEFFE 1996). A highly relevant topic is the development of meaningful indicators that, on the one hand, capture the dynamic performance of ecosystems and are nevertheless manageable on the other (CHRISTENSEN et al. 1996, HOLLING 1996, 2001). Such indicators should be systemic and reflect performance of not only a particular source or sink function, but of the dynamic processes of ecosystem change in relation to human uses. However, the development of such “adaptive critical natural capital indicators” (DEUTSCH/FOLKE/STANBERG 2002) still faces important restrictions.

We currently experience both a lack of deeper scientific knowledge and true integrated approaches in ecosystem science, as well as an enormous growth of scientific activities that have resulted in numerous data sets and publications. In many countries, political discussions on biodiversity have led to a shift in research policy and, particularly in developed countries, there are many support programs for interdisciplinary biodiversity research, even if truly integrated and transdisciplinary research is rare. On the international level, there are also important scientific and ecosystem assessment activities that show the potential to enhance the knowledge base for the implementation of the EsA. Examples are the World Climate Research Program (WCRP), the International Geosphere-Biosphere Program (IGBP), the International Human Dimensions Program on Global Change (IHDP) and the International Program of Biodiversity Science (DIVERSITAS). Furthermore, World Resources Institute (WRI) and its partners United Nations Environmental Program (UNEP), United Nations Development Program (UNDP) and the World Bank have launched an international ecosystem assessment process. For the conservation of the world's biodiversity, the WRI promotes bioregional management with an ecosystem approach aimed at a broad evaluation of how people's use of an ecosystem affects its functioning and productivity (ROSEN 2000). The WRI initiated a Pilot Analysis of Global Ecosystems (PAGE), which resulted in five separate studies on agro-ecosystems, forests, and grasslands, freshwater and coastal ecosystems published in the year 2000. Parallel to the PAGE work, a consultative process was established under the auspices of an Exploratory Steering Committee to create the full international science assessment called Millennium Assessment (MA). The MA was finally launched at the beginning of 2001 for a period of four years (2000-2004). It is designed to provide 'state of the art' scientific information for policy makers on how changes in global ecosystems will affect their ability to meet human demands for food, clean water, health, biodiversity and other ecosystem goods and services (UNEP 2001). The MA is a 'multi-scale' assessment and will include a global ecosystem assessment as well as a number of focal region assessments and sub-global assessments from Southeast Asia, Southern Africa and other regions.

Against this background, a particular issue is the management of the flow of environmental data, the communication of scientific results, and their transferability in management decisions (KARGER 2000).

The continuing reluctance of scientists to integrate local knowledge and institutional provisions with scientific and technical information is an obstacle to effective implementation of the EsA.

Adaptive Management

Adaptive management has been proposed to deal with the uncertainties surrounding the complexities of ecosystem management and social processes. The basic elements of adaptive management processes are (SALAFSKY et al. 2002, HANEY/POWER 1996): collection of ecological, socio-economic and institutional information, definition of goals and priorities, formulation of assumptions and working hypotheses, testing assumptions via ecological and socio-economic monitoring, reassessment of assumptions and adoption and learning and integrating lessons into decision making.

However, traditional resource and environmental management doesn't provide a reward for the necessary flexibility, openness, experimentation and monitoring. In particular, bureaucracies - by definition less adaptive to change - are structured not to be responsive to new learning, but to maintain control over resources and information. As a result, various authors have called for organizational change and institutional innovations (BUCK et al. 2001, WUICHET 1995, WESTLEY 1995). A basic argument is that in terms of ecosystems and social systems, which themselves are truly dynamic and adaptive, effective ecosystem management must be similarly so. Accordingly, management, which is static and fixed, will fail to be effective over the long haul. Generally, the majority of current management approaches reflects "equilibrium centered, command-and-control strategies" (GUNDERSON et al. 1995) and is institutionally based on the dominance of expert thinking. Therefore, current practice appears ill equipped to handle the characteristics of complex social and natural systems (ANDERSON 2001). Recent scientific contributions point out that analogical natural systems, diversity and an apparent redundancy of institutions (in the sense of overlapping functions) play a central role in absorbing disturbances, spreading risks and creating novelty (LOW et al. 2002).

A problem with much of the literature on adaptive management and the general demand for corresponding organizational reforms is that while learning and communication are rightly emphasized there is a general failure to describe necessary institutional incentives and motivation. A deeper examination of the literature and the examples shows that in much of the publications it is rather the need for collaborative and decentralized decision-making that is emphasized. Many authors discuss how implementation should work, but very little of the documents available present truly successful examples. Generally, there is a lot of enthusiasm but very few examples that go beyond token attempts to "consult" with local people.

Briefly, the why and how people and organizations should undertake adaptive management in the existing rigid decision-structures is superficially treated. Continued learning with limited reliance on fixed frames of reference and openness to new scientific insights is not self-evident but involves high transaction costs (ANDERSON 2001). According to modern organizational theories, formal planning processes are able to incorporate stimuli from the environment, in the form of scientific information, as long as that information does not challenge the paradigms upon which the organization and the planning processes are based (WESTLEY 1995). Furthermore, recent findings suggest that at a lower or "local" decision-making level individuals are more likely to respond to changes in their environments and that these responses represent important sources of innovation and learning for whole organizations. Informal face-to-face conversations in combination with the creation of platforms and forums appear to constitute the best way to transmit learning (WONDOLLECK/YAFFEE 2000, DANIELS/WALKER 1996).

Thus, the importance of decentralization, site-specific policy approaches, coalition networks, multistage processes, as well as the encouragement of the participation of a broad range of stakeholders are emphasized. Interestingly, ANDERSON (2001) has pointed out that the concept of consensus that is frequently the basis of participatory methods appears to be less able to provide for effective adoption in decision-making processes. Rather, the recognition of differences between stakeholder, science and policy tend to be better suited for self-correction and mutual learning. However, the need for capacity building to foster the implementation of adaptive management is obvious.

Valuation of Ecosystem Services

The EsA stresses the importance of valuation of ecosystem services and the design of economic instruments and benefit sharing mechanisms in order to create economic incentives for ecosystem conservation and sustainable use. Several cases have demonstrated that economic valuation is not just a place of scientific interest but that the identification of economic benefits of ecosystem preservation is particularly important in societies where economic and social objectives are at the top of the political agenda (PEARCE/MORAN 1996, PEARCE et al. 1998, EMERTON 2000b). Since in many cases degradation occurs due to the conversion of natural ecosystems to economic utilization (agriculture, settlements etc.), ecosystem managers regularly need economic arguments and concepts to overcome social and economic obstacles to determine which protective measures are necessary.

On the whole, economic research has made progress in the valuation of ecosystem services. However, scientific knowledge is still not fully developed. Generally, existing empirical literature fails to apply economic valuation to the full range of ecosystem services and the benefits of biodiversity preservation (NUNES/VAN DEN BERGH 2001, OECD 2002). Further, the dynamic view of nature and society has major implications for economic valuation (FOLKE et al. 2002). Therefore, the determination of an exact monetary value of dynamic ecosystems is not easy and sometimes impossible to calculate (DAILY et al. 1998). Lack of full economic valuation of ecosystems entails that in many cases management must deal with limited economic knowledge. This is especially true for the global respectively international economic benefits of biodiversity conservation as there are only rough and contentious valuation studies available (COSTANZA et al. 1997). Furthermore, economists have done much of the development of economic valuation to date from developed countries and most of the applications have been in developed temperate climate settings. Although several studies have shown the potential of valuation methods for improving ecosystem management in developing countries (KRAMER et al. 1995, OECD 2002, SWANSON et al. 1999, EATON/SARCH 1997), the empirical basis is still rather weak.

Creation of Incentives

Albeit the advantages of economic incentives are theoretically and politically uncontested in broader terms (see CBD's COP decision VI/15, 2002) and some valuable handbooks and guidelines (OECD 1999, GEF/UNDP/UNEP/WORLD BANK/IUCN 2001, EMERTON 2000a) have been published, progress in implementation appears rather slow in both developing and developed countries. For many of the economic incentive measures there is not much experience available yet and this experience has tended to be relatively isolated since economic instruments have rarely been developed as part of a coordinated strategy. Examples for conservation finance through payments for environmental services come from a handful of countries. Costa Rica is a frequently cited example because the established National Fund for Forest Financing, which is primarily financed through a sales tax on fossil fuels, pays forest owners not only for

the mitigation of greenhouse gas emissions but also for the protection of watersheds, biodiversity and scenic beauty. There are rather few examples of interregional compensation schemes in developing countries (Colombia, Ecuador, Philippines) (KOCH-WESER/KAHLENBORN 2002). User fees (e.g. entrance fees for national parks, hunting fees) appear more widespread but knowledge on the effectiveness of this instrument is rather limited and there is much room for improvement. Certification schemes that are currently being promoted in many countries, particularly in the forestry sector, are only in an experimental and developmental phase. For the implementation of other economic incentives, such as tradable water or development rights, many countries fail to meet the necessary institutional and organizational conditions (LEE/JOURAVLEV 1998). However, in some industrial countries (e.g., USA, Australia) tradable water rights are already approved economic instruments, and in recent years - in particular via the integration of in stream uses in the schemes - there have been positive impacts on freshwater biodiversity (LANDRY 1998).

In theory, the removal of perverse incentives is one of the most cost-effective instruments for promoting conservation or sustainable use of biodiversity. Yet, perverse incentives are sometimes hard to identify without precise knowledge of the linkages between governmental activities, economic activities and ecological impact. Further, countries with lower subsidy levels, for example in agricultural policy, are not able to implement a similar policy switch. In addition, in many developing countries, the elimination of perverse incentives might be impeded because they are rooted in informal or ad hoc arrangements by the government and not institutionalized as procedures. Finally, people affected by the removal of incentives regularly demand compensation for income losses. Therefore, even the removal of subsidies might be an expensive tool. Despite these drawbacks, there are some encouraging recent examples for improvements. For example, some African countries have introduced the removal of perverse subsidies as a key part of their National Biodiversity Strategies and Actions Plans (NBSAPs) (EMERTON 2000b).

The establishment and protection of property rights and their allocation to users and beneficiaries should not be underestimated as it is an important prerequisite for the creation of dynamic incentives for biodiversity conservation and sustainable use (EMERTON 2000a). Generally, property rights deal with the fact that the widespread absence of markets for biodiversity goods and services is (partly) due to the absence of well-defined, secure and transferable property rights over land and biological resources. However, the EsA of the CBD does not directly mention the importance of property rights, although many other economic incentives (e.g., tradable rights for pollution and emission, quotas in resource use, partnerships between government and private sectors) are also based on the allocation of some form of property rights to private individuals or community groups.

Frequently, costs of the preservation of ecosystem functions accrue locally, whereas the benefits are predominantly national or international. Therefore, new ways are required to help increase the amounts that individuals or countries are willing to pay for protection of various national or global benefits. Possible ways are the payment for environmental services via national programs for land users for the services they generate, the mobilization of international financial aid (Global Environmental Facility; multilateral and bilateral donors, international conservation NGOs, international private sector investment etc.) or the promotion of tourism/ecotourism to generate increased local economic benefits. However and as a general rule, existing financial mechanisms are not sufficient to capture the full range of ecosystem services

and there is a need for an improved integration of biodiversity aspects in sector policies that dispose of important and generous financial means.

Institutional Mismatch

Many of the obvious restrictions for the implementation of the EsA can be traced back to the fact that necessary institutional provisions are not in place. The EsA (principle 4 c) refers to this problem because an internalization of all costs and benefits in the given ecosystem is demanded. Accordingly, CORTNER and MOOTE (1999, p. 42) stated, "In ecosystem management, there are no externalities". Such internalization involves structuring institutions in ways that maximize compatibility between institutional attributes and bio-geophysical properties (YOUNG et al. 1999). The general idea is that the effectiveness of an institution (e.g. a fishery conservation regime or water management institution) is diminished where its characteristics do not match the characteristics of the biophysical system it addresses. The most obvious dimension of this problem concerns the spatial fit. That is the degree to which a resource regime covers the whole geographical area of the natural resource it is designed to manage.

This problem of institutional fit is familiar to social scientists interested in determining optimal units of governance for various policy fields. One of the key results of the economic debates on environmental federalism is that there should be a link between the spatial spread of an environmental problem and the spatial extent of the political decision-making bodies. The main argument is that lack of spatial match causes spatial externalities, benefiting free-riders and harming others beyond the spatial reach of the responsible institution. In other words: the demand for a full internalization of costs and benefits in the respective ecosystem can only take place if appropriate institutional arrangements are in place.

However, both academic debates and practical experience in various countries show that the redesign of institutions in such a way that spatial externalities can be avoided is not self-evident. Many EsA-like strategies favor - in accordance with the most scientific recommendations - a landscape scale or river basin scale. This spatial approach appears adequate in ecological and economic terms. However, a landscape or river basin scale might be too large because motivation of people to participate in large-scale management activities is often small. Further, transaction costs stemming from the necessary integration of various interests and organizations in decision-making processes are obvious. Therefore, strategies to develop institutional arrangements that correspond to ecosystem characteristics have to take into account the possibilities to activate people.

Against this background, the EsA rightly emphasizes the necessity for decentralization because in the past natural resource management was over-centralized in many countries. However, devolution is not a self-evident process as there are many political obstacles and diverging interests. Further, the demand for decentralization tends to oversimplify the problem. For example, if decentralization of natural resource management has occurred, there is regularly a need for the development of appropriate mechanisms for the resolution of interregional conflicts and for the consideration of national or international interests in the conservation of ecosystems in site-specific management approaches. While in some cases more or less effective institutions to overcome these obstacles have been created, the majority of countries still lack appropriate arrangements.

Therefore, the EsA clearly needs a multi-level perspective. For example, granting that implementation of the EsA should occur on the landscape, ecoregional or river basin scale, effective ecosystem management

also depends on (legal and economic) decisions that must be taken at the central governmental level. Equally, devolution and participation of local communities that complement larger-scale activities and support the implementation are needed. Therefore, there is a kind of a “centralization/decentralization dilemma” in ecosystem management, which can only be tackled by sufficiently flexible institutions. However, practical experience is limited and the principles of the EsA that relate to these issues appear rather indeterminate.

4 International Actors as Potential Adaptors

The international dimension of the Ecosystem Management Approach (ESM) is influenced to a large extent by the reaction of international actors with relevance in the management of biodiversity towards the approach. The success of the approach as a conceptual innovation will depend to a large extent on the adoption of the ESM by these actors. Here, the current situation by three group of actors is summarized and briefly discussed. First, these are the organizations and specialized agencies of the UN system with a role in biodiversity management, particularly UNEP, UNDP, the Food and Agriculture Organization of the United Nations (FAO) and UNESCO. As a second group, there are international funding agencies, multilateral agencies such as the Global Environmental Facility (GEF), the World Bank, regional Banks and bilateral agencies.

4.1 Agencies of the United Nations

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 ESM 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. There is a consensus that UNEP could not fulfill its role as a coordinating organization, a role that has been replaced by a case by case approach. The agencies with an environmental mandate with activities in biodiversity management and their adoption of the ESM are summarized in table 1.

Table 1: UN agencies with biodiversity activities and their adoption of the ESM

UN organization	Areas of activity in biodiversity management	On a policy, planning & program 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	Supported 87 projects for 86.5 Mio US\$ 1995-2002	Applies ESM principles in biodiversity related GEF Operational Programs 1,2,3,4,and 12
	Biodiversity Planning Support Program	Information, Guidelines, best practices	Prepares for funding proposal	Emphasizes multi-sectoral approach for planning
	Administrator of specific species conventions	Coordinating function	Minor importance	Species and habitat focus

UNDP	GEF implementing agency	Scientific, technical analysis guidance	Supported 257 projects for 78 Mio. US\$ 1995-2002	Applies ESM principles in Operational Programs 1,2,3,4, 12
	Biodiversity Planning Support Program (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 programs Small volume	Emphasis on sustainable living connection to World Social Summit 1995
FAO	Biodiversity activities within the Priority Areas for Integrated Action (PAIA)	Case studies; guidelines	limited project activities	ESM as an PAIA Major emphasis on genetic resources for food and agriculture
	Agriculture related biodiversity actions	Policy Advice, Technical Guidelines, Codes of Conduct	Limited technical cooperation activities	Little impact, ecosystem view, but ESM perspective not central; biodiversity debate dominated by access to genetic resources for agriculture issues
	Forestry related biodiversity actions	Policy Advice, Technical Guidelines, Codes of Conduct	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	ESM perspective central; change in fisheries management views: cp. Reykjavik Declaration 2001

UNESCO	MAB Program Secretariat	Action Plan 1984 Seville Strategy 1995	Certifies Biosphere Reserves	Biosphere Reserves emphasized as prototypes for ESM
	World Water Assessment Program	World Water Development Report International Hydrological Program	Case studies for report	No explicit reference

United Nations Environment Program (UNEP)

UNEP’s central role was intended to be the coordinating organization within the UN systems, but instead a topic specific network with changing lead agencies developed. 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 ESM approach located within UNEP, the support for the ESM 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 Programs include references to the EsA, but they were developed before the fifth COP in Nairobi in 2000 and the references are rather general. A sizeable portion of those projects supported by UNEP (a total of 87 Mio. US\$ in 7 years) is used for capacity development and the development of national strategies and action plans, but the impetus from the portfolio to deal with the EsA seemed to have been rather small. This might change with the introduction of the Operational Program (OP) no. 12 “Integrated Ecosystem Management” when these projects enter UNEP’s portfolio.

The Biodiversity Planning Support Program 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 EsA 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 (PRESCOTT et al. 2000).

United Nations Development Program (UNDP)

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 Program and Energy Sector Management Assistance Program (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 Program. The size of the biodiversity portfolio of UNDP as a GEF implementing agency amounted to 417.5 Mio. US\$ between 1995 and 2002, with a higher share of full size projects. In addition, it developed activities in the water area, so-called water governance with

an emphasis on integrated water resource management on a regional level with transboundary waters, as well as ocean and coastal management.

Food and Agriculture Organization of the United Nations (FAO)

The FAO has a sectoral *raison d'être* covering agriculture, forestry and fisheries for which it provides policy advice, develops technical guidelines and disseminates best practice experience. Funding for technical cooperation in the above sectors has largely been reduced. In the more than 50 years of its existence, the organization has acquired know-how in the related ecosystems, agro-ecosystems, forestry ecosystems, oceanic ecosystems and mountain ecosystems and has become an organization with the corresponding specialized knowledge and view of problems and solutions. The above sectoral division of FAO has led to problems in intersectoral communications, resulting in the Strategic Framework of FAO, in which 16 Priority Areas for Interdisciplinary Actions (PAIA) were identified, ranging from sustainable livelihoods to biotechnology questions. One of them is "Strengthening Capacity for Integrated Ecosystem Management", but the relation to biodiversity is limited as the focus is on mountain and dryland ecosystems and the emphasis is on degradations risks involved.

In the agricultural division, the perspective on ecosystems is rather limited as well and biodiversity issues are seen from the perspective of genetic resources for agriculture. 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 gene resources, but increasingly the benefits of biodiversity conservation for poverty reduction are coming into focus. The FAO report on the "State of the World's Forests 2001" provides an explicit discussion for the applicability of the EsA to the management of protected forests, without explicitly endorsing it.

The Fisheries Department, however, has gone considerably further by embracing the concept wholeheartedly. It 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 last year which concluded with the "Reykjavik Declaration on responsible fisheries in the Marine Ecosystem", endorsing an ecosystem approach to fisheries management.

United Nations Educational, Scientific and Cultural Organization (UNESCO)

UNESCO has two major links to biodiversity questions: One is the Man and the Biosphere (MAB) Program and the other is water-related activities, such as the International Hydrological Program and World Water Assessment Program, resulting from its role as an international scientific organization.

The MAB Program 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. This network currently (November 2002) comprises 425 Biosphere Reserves worldwide. 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 Program 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" of UNESCO (1984), the "Statutory Framework of the World Network of Biosphere Reserves" (UNESCO 1995a), and especially on the "Seville Strategy" (UNESCO 1995b). There is an obvious and strong relation of the MAB concept and the EsA (UNESCO 2000). Biosphere reserves may thus be seen as a model and additional tool to implement the CBD (GÜNDLING 2001).

The International Hydrological Program (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 program of a single discipline, but developed into a multidisciplinary program 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 Program (WWAP) of the UN system, launched in 2000. The WWAP is a multi-agency effort, which will produce the World Water Development Report, to be published in 2003, 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".

Summing up

The adoption of the ESM as a guiding principle has progressed the furthest among those UN agencies closest to the Convention and its process: UNEP and UNDP as implementing agencies of the GEF adhere in principle to the biodiversity related Operational Programs and will probably be applied on a project level for the OP 12 Integrated Ecosystem Management. This adoption is basically the result of COP decisions. UNESCO's role in the MAB program as a prototype for the ESM precedes the introduction of EsA in the CBD process in the 1990s.

Additionally, UNDP, FAO and UNESCO are involved in biodiversity related activities that are sector or ecosystem specific. UNDP and UNESCO are involved in conceptual work, capacity development, networking in the water sector: UNDP with an emphasis on water governance and UNESCO as a lead agency of the World Water Assessment Program. In both areas, the integration covers a broader set of questions, but the integration of ecosystem views with a focus on freshwater ecosystems is included as well. Here, the "integration" in Integrated Water Resource Management has a similar procedural meaning as in EsA, such as participation and stakeholder involvement. As a tri-sectoral organization, FAO has different approaches to ESM according to its sectoral divisions. The importance of agricultural ecosystems for the productivity of agriculture and for wider ecosystem services is a central focus in the agricultural division, with a clear dominance on those aspects that are central to the productivity dimensions (genetic resources, pollination, pest management). A broader view, on the other hand, is taken in the context of rural development. The forestry division subsumes the biodiversity aspects under the view of the sustainability of forest use while biodiversity in forested areas is subsumed under protected areas. The EsA was introduced as a new approach, which is more complicated to implement than the traditional approach. The fisheries division moved towards a full adoption of ESM by calling for an "ecosystem-based fisheries management" and co-organized the Reykjavik conference where the principle was widely en-

dorsed. Here, the concept has progressed considerably as questions of scale, objectives, decision-making, management measures and flexibility of management are addressed more specifically.

4.2 Funding agencies

Since shortly after the signing of the Convention, the multilateral and bilateral development cooperation agencies have been active in the implementation of the biodiversity convention by supporting their partner countries and organizations. A number have been active in funding nature protection activities, but the size of commitments became significant only after the UNCED summit in 1992. The main approach has been to integrate the conservation of biodiversity and its sustainable use as a topic into the range of their activities and to broaden the range of projects and programs by mainstreaming biodiversity in the language of the World Bank. They were integrated into the environmental portfolio, in most cases seen as an extension of existing nature protection, wildlife management and sustainable forestry funding. The agencies tend to cover the breadth of the CBD and its issues and select their own role according to their own regional and sectoral priorities and the instruments available for cooperation. Similar to the reaction of other new topics, the international agencies reacted in a multi-step manner to mainstream biodiversity. But because of differences in financing sources and the visibility and openness towards the environmental NGO community, the importance of biodiversity activities varies. Subsequently, the need for an integrated approach is dealt with differently and the adoption of the EsA varies as well. This situation will be summarized for five multilateral agencies and the bilateral programs of four countries.

The broad range of international development funding agencies in terms of size and range of activities allows for different approaches for integrating the objectives of the CBD and for adopting the ecosystem approach. A number of agencies make their approach open to the public and systematically review their experience in a documented fashion. These form the basis for the following review: among the multilateral agencies, the World Bank stands out in terms of size and degree of policy discussion for most development issues and this is valid for biodiversity conservation and use as well. The other multilateral lending agencies with visible efforts in this arena are the European Community, the Inter-American Development Bank (IADB) and the Asian Development Bank (ADB). Among the bilateral agencies with visible efforts are the British agencies (DFID), the US agency (US AID), the Japanese agencies (JICA and JBIC) and the German institutions (BMZE, GTZ).

The activities, the approach to biodiversity conservation and the adoption of the EsA are summarized in Table 2.

Table 2: Activities in biodiversity management and reference to EsA of International funding agencies

Agency	Activities in Biodiversity Management	Policy Programs	Project portfolio (% of ODA)	Reference to ESM
GEF	Funding of incremental costs of global benefits	Operational strategy 5 Operational Programs for Biodiversity	Total since 1991 1,300 Mio. US\$ 434.3 Mio. US\$ between 7/1999 - 6/2001 (44 % of funding)	ESM central to development of Operational Program no.12 “Integrated Ecosystem Management”

World Bank	GEF implementing agency (global costs) Support of CBD countries (local costs)	Mainstreaming biodiversity As part of WB Environmental. Strategy in 2001 Operational Policy for habitat protection	55 Mio. US\$ annually from GEF (90 Mio. US\$ annually from own sources)	Holistic natural resource management (Annex D) ESM as principle in Environmental Strategy (2001)
Asian Development Bank (ADB)	Stand alone biodiversity projects, sustainable use IWRM Integrated coastal zone management	Integration of biodiversity in new environmental strategy 2002	37 Mio. US\$ grants 315 Mio. US\$ in loans between 1995/99	No explicit reference found; Community based management
Inter-American Development Bank (IADB)	Selective funding in context of IWRM, forestry management and rural development	No explicit policy Exploratory workshop in 1996 New environmental policy in preparation	No portfolio identified	No explicit reference
European Community Cooperation Programs	Integration in whole range of activities Biodiversity strategies and action plans Support of sustainable use	European Commission Biodiversity Action Plan in Development Biodiversity in Development Project (EU, DFID, IUCN)→ Strategic approach	64 Mio. € for 1996-1998 (in addition 324 Mio. € for tropical forests) EU COM (2001)162	ESM as one of the Guiding principles
Germany (BMZE; GTZ, KfW)	Priorities for capacity building, national planning, management of protected areas, sustainable use of biological resources	Sector Concept 1997 CBD implementation program	275,6 Mio. US\$ per year (Average of 1998-2000) OECD (9.0%)	No explicit reference
Japan (JICA, JBIC)	Concentrated in technical cooperation	Part of sustainable development strategy	144,1 Mio. US\$ per year (1.4%)	No reference found
United Kingdom (DFID)	Support for biodiversity subordinated to poverty reduction goals Support for EU/IIED program	development of sustainable livelihoods as an alternative paradigm supported by research centers ODI, IDS, IIED	23,9 Mio. US\$ (0.7%)	Sustainable livelihoods entry point for integrated view

USA (US AID + other federal agencies)	Support for Biodiversity Conservation part of FAA Funding of Biodiversity Support Program (WWF, TNC, WRI)	Policy Paper "Environment and Natural Resources" 1988 Conceptual papers of BSP on ICDP Biodiversity Handbook for US AID staff	84,3 Mio. US\$ (1.0%)	ESM as part staff handbook
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FAA = Foreign Assistance Act; ICDP = Integrated Conservation and Development Project

Own calculations; Sources: OECD 2002, GEF 2002, World Bank 2000, ADB 2000, European Commission 2001

Global Environmental Facility (GEF)

The GEF is the largest international funding program for environmental programs and projects and the financial mechanism of the CBD. Since the establishment of GEF in 1991, over 1,300 Mio. US\$ has been provided for biodiversity activities on a grant basis to cover the incremental costs to achieve global benefits. The latest figures for a two year period 1999-2001 were 434.3 Mio. US\$ which leveraged an additional 1,232.5 Mio. US\$ from international funding agencies, the recipient countries and the private sector. It currently funds biodiversity activities based on five biodiversity-related OPs:

- No. 1 Arid and Semi-Arid Zone Ecosystems,
- No. 2 Coastal, Marine, and Freshwater Ecosystems,
- No. 3 Forest Ecosystems,
- No. 4 Mountain Ecosystems,
- No. 13 Biological Diversity Important to Agriculture.

The descriptions of these OPs on biodiversity contain references to the EsA in the general guidance section as formulated during the second COP in 1995, but they are not specified further in the sections on objectives, expected outcomes and GEF activities. Here, references are made to points relevant or part of the EsA.

An additional Program No. 12 "Integrated Ecosystem Management" is *based explicitly on the EsA* of the CBD, but it is a multi-focal area, i.e. it is intended to cover not only biodiversity, but also climate change and international waters simultaneously. This OP was established in 1999 at the request of the COP of the CBD and is a merger of a GEF proposal to establish an OP on "Carbon sequestration". Among the general activities is the rehabilitation of forested watersheds or floodplain wetlands with multiple benefits in terms of biodiversity conservation, improved storage of greenhouse gases and flood control of globally important water bodies. The report of the GEF to the COP-6 includes only four examples for the program, but no statistics (GEF 2002).

The World Bank

The World Bank is the development agency, which has been involved to an extent in all issues of implementing the CBD convention broader than the other agencies, and it sees itself as being in the leadership role. As the dominating implementing agency of the GEF in the initial trial phase since 1991, prior to the

signing of the CBD in 1992, and subsequently as the administrator of the GEF trust fund after the restructuring and replenishment after 1994, the World Bank has been involved early on in funding biodiversity projects on a broad scale with a global orientation and has subsequently gained considerable technical and management expertise. In addition, the World Bank has been funding biodiversity projects with its own funds (IDA grants, IBRD loans) since the early 1990s with average new investments of 90 Mio. US\$, more than the average of 55 Mio. US\$ of new investments from the GEF sources (World Bank 2000). Since 1995, the World Bank has been administering the multi-lateral Pilot Program to Conserve the Brazilian Rain Forest (RFTF), which provides for biodiversity benefits as well. The Bank is committed to continuing its support from these sources and remains the administrator of GEF.

The Bank's portfolio is dominated by investments in the protection of in situ conservation measures, which the Bank wants to change towards biodiversity protection outside protected areas where the relevant ecosystems are used. In the 1990s, after much debate, a Policy Paper from the Environment Department, "Mainstreaming Biodiversity in Development", was initiated, calling on the Assistance Strategy of the Bank to implement the CBD (1995). Here, the Department emphasized the need to integrate biodiversity aspects at the macro, sectoral and project level. The macro-level consists of country assistance strategies and National Environmental action plans, which need to be enriched by biodiversity aspects. Thus, the Bank is active by supporting partner countries in establishing national plans and programs required by the CBD.

The sectoral level concerns the policies relevant to specific sectors (pricing, institutional set-up, governmental sector wide policies asf.) and the position of the Bank on these policies. The relevant sectors subject to an explicit World Bank policy are natural habitat protection, rural development, forestry, fisheries and water resource management. While the policies of the Bank and the policy advice to partner countries, forming the basis for sectoral loan programs, are well established for rural development, forestry and water management, for the field of habitat protection, however, it is still in the process of being developed. There is an Operational Policy for habitat protection as part of the safeguard policies, but a biodiversity conservation policy paper does not exist yet, only the 1995 Environment Department paper on mainstreaming biodiversity. Some of the papers produced in the mid-1990s indicate that there was a habitat protection and ecosystem management handbook planned, but it has not materialized yet. The existing sectoral policies issued in the early 1990s have been critically reviewed together with the Bank's general environment performance. They resulted in a new Environment Strategy, new forestry and water policies of the Bank approved by the Board of Executive Directors in 2001 and 2002. In the new Environment Strategy, biodiversity is seen as an integral part of the natural resource management activities, as it is considered a key resource next to land, forests and water, which permeates all levels of natural resource management (WORLD BANK 2001).

On the project level, several reviews of the portfolio have taken place (WORLD BANK 1995, 1998, 2000) assessing its size and composition in terms of the support of natural habitat protection, general policies and institution building and the integration of biodiversity conservation components into projects with use perspectives in its goals. In the 1990s, the Bank experienced a considerable expansion of its natural habitats portfolio with stand alone projects while the share of integration with other projects outside protected areas in agriculture, forestry and water remained comparatively small. Here, the concerns are the methods of the impact assessment for biodiversity impacts and the need to establish compensation measures. The

narrow habitat protection projects are still classified as a first generation of this type of projects (WORLD BANK 1998).

The reference to the ecosystem approach in the context of the biodiversity policy of the Bank was initiated from the Environment Department. The main summary of the potential assistance strategy of the World Bank does not make reference to the ecosystem approach, but a number of papers produced by the Environment Department between 1996 and 2000 deal with it explicitly, some of them with sector specific aspects (freshwater 1998, drylands 1997, forests 2000). This conceptual work was an input to the 2000-2001 Report of the World Resources Institute "People and Ecosystems", which calls for the adoption of an Ecosystem Approach and is a joint effort of WRI, UNEP, UNDP and the World Bank. The second major output is the revised environmental strategy, called "Making sustainable commitments". Here, the need for an adoption of a holistic approach is emphasized to address the links between natural resource management and poverty reduction as the main developmental goal. An explicit reference is made to the Ecosystem Approach, however without exploring the theme further.

Asian Development Bank (ADB)

The ADB has included biodiversity related funding activities among its development activities since 1989 although on a relatively small basis. With the Medium Term Strategic Framework (1993-1996) support for standalone biodiversity projects and for the integration of biodiversity conservation components in traditional sectoral projects was formulated as a policy, further specified in its Environmental Action Plan for the 1990s and funding increased. Between 1995 and 1999, the Bank invested funds in technical assistance (37 Mio. US\$) and investment assistance (315 Mio. US\$) in biodiversity conservation projects or components (ADB 2000). But within the total allocation of funds for environmental purposes, biodiversity played a minor role while the support for urban and industrial pollution control activities clearly dominated.

With the Long Term Strategic Framework 2001-2015, the reduction of poverty became the central goal and environmental sustainability a "major crosscutting theme". Environmental protection became the theme of a separate policy paper in 2002, which covers biodiversity under the heading "protection, conservation, and sustainable use of natural resources", but a biodiversity policy was not established. However, the policy states that the approach of the 1990s with an emphasis on conservation of biodiversity (via protected areas) will be changed by combining it with the poverty reduction emphasis of the Millennium Development Goals (ADB 2002). Major selection criteria will be the contribution of biodiversity projects and/or related natural resources projects and the extent to which they have contributed to livelihood, particularly the rural poor. The need to deal with the protection of natural resources and their sustainable use in an integrated manner is emphasized in the Strategic Framework. The revised water, forestry and energy policies are used as references for the perspective of integration, but there the reference to the EsA does not appear.

Inter-American Development Bank (IADB)

The IADB has been supporting biodiversity related activities, particularly nature protection projects, since the mid-1980s, but there is no systematic assessment of biodiversity related components of projects in the productive landscape (DOUROJEANNI 2000). Compared to the other areas of environmental spending, the support for biodiversity related activities remained rather small, usually below 5% (BAYON et al. 2000). The lending for all environmental purposes reached almost 15% of total lending in the decade 1990-2000

and declined to 5,4% in 2001 (IADB 2002). The low level of biodiversity spending has been attributed to a lack of a clear mandate to support the sector and the small share of grant resources available for IADB for which there is considerable competition (BAYON et al. 2000). There were efforts by the Environment Division to analyze the potential of an increased role of IADB within the context of a workshop in 1996, but it has not led to an official policy or strategy so far.

There has been recognition within the Bank's management about the need for an integrated management approach to environmental resources, but they were only successful in two cases: Integrated Water Resources Management (IWRM) and for Coastal and Marine Resources Management, where strategies were developed by the staff and approved by the Bank's Board. The IWRM has elements of the EsA as the applied concept of integration is similar (with respect to participation, watershed orientation, consideration of the full range of services), but the input that the Environment Division provided in 1997 (BUCHER et al. 1997) - full use of the EsA for freshwater ecosystems - did not become part of the IWRM strategy. A later input directed the integration of freshwater ecosystems on a project level towards the assessment and mitigation of the planned project on ecosystems functions and services (BRAGA 1999).

European Community (EC)

The development cooperation programs of the European Community contributed a smaller share for environmental purposes in the 1990s, around 2% between 1990 and 1995. Of the total of 491 Mio. € for environmental purposes, 38.2 Mio. € was used for biodiversity, an additional 115.4 Mio. € for marine resources and tropical forests. For the period of 1996-1998, the amount committed for environment increased to 5.3% of EDF funds (EUROPEAN COMMISSION 2001).

The integration of environmental aspects has become a legal obligation for all DG of the Commission and the sectoral policies they are responsible for, including development cooperation, which is managed by four commissioners. The development cooperation of the EC has to follow the sectoral integration policies, which were instituted at the Cardiff council in 1999. In addition, in response to the CBD, the European Union (EU) decided in 1998 to devise a community wide Biodiversity Strategy, to implement it by Action Plans and to specify these in various policy areas, including development cooperation (EUROPEAN COMMISSION 1998). The Biodiversity Action Plan for Economic and Development Co-operation (EUROPEAN COMMISSION 2001) constitutes the central policy paper in the area. It refers to the international development targets to which the OECD/DAC countries agreed to in 1998. Among them are the reduction of poverty and the reversal of the current trends in degradation and loss of natural resources by 2015 in addition to the implementation of national strategies for sustainable development by 2005. It fully refers to the EsA as a guiding principle for the conservation and sustainable use of biodiversity (EUROPEAN COMMISSION 2001). The biodiversity Action plan for Development Cooperation builds to a large extent on a project called "Biodiversity in Development" that the DG Development initiated together with the Department for International Development (DFID) of the United Kingdom, and which was jointly implemented between 1998 and 2001 by DFID and the IUCN. The purpose was to develop a *Strategic Approach* to assist the EU and EC member states to support developing countries in implementing the CBD and related conventions. The main output was a document containing a Strategic Approach, which describes guiding principles to address the sustainability of biodiversity during programming and project development (IUCN 2001). It emphasizes the EsA as a landscape approach for a multi-sectoral, multiple-

use land management system. A second guiding principle is to deal with biodiversity as an asset benefiting the poor and to make the consideration of the protection of these assets a priority.

German Programs: BMZE and GTZ

The organizations of the German program of Development Cooperation, particularly the ministry, BMZE, participated in the negotiations of the CBD and has been supporting an active role in implementing the CBD as it has done for the other conventions and processes in the Rio context. Five years after the signing of the convention, the Ministry issued a sector strategy paper, which defined the priorities of development cooperation (BMZE 1997):

- Support for national nature protection policies,
- Institution and capacity building, Support of national and local ownership,
- Support for the management of protected areas and
- Support for the sustainable use of biological resources (wildlife, ecotourism, non-timber forest products and agro-forestry).

It points to the synergistic effects of existing sectoral strategies on tropical forest management (1992), rural development (1989) and on the cooperation with indigenous populations (1996). It emphasizes the importance of the CBD objectives as being consistent with the general poverty reduction objective of the German cooperation program, particularly for groups in rural areas with a high dependency on productive and functioning ecosystems. Here, the importance of participatory approaches, which provide for an economic incentive for the local population in an equitable manner is highlighted. The role of the German program is seen on two levels, first by participating in the various bodies of the CBD and by refinancing the GEF, and second by funding bilateral projects in the above areas of priority and related projects in forestry, rural development and fisheries. The paper provides for a number of criteria for the planning and management of individual projects, central to which is the requirement for an integrated management concept. In conjunction with the emphasis on participatory approach, this can be seen as a precursor to the adoption of the principles of the EsA, but explicitly the EsA has not been taken up as a conceptual theme.

Most of the conceptual work in biodiversity policy is undertaken by the Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ) where the capacity is funded as an individual project "Implementing the Biodiversity Convention", which mainly supports partner countries in their own efforts (GTZ 1995). The conceptual work is concentrated on gender issues, agro-biodiversity and benefit sharing, eco-tourism and the conservation of tropical forests. To support these efforts, the GTZ has been operating a research program on tropical ecology and the sustainable management of tropical forestry and habitat protection since 1991.

The German program of development cooperation has developed a relatively large green portfolio over the last fifteen years, with between 20 and 100 Mio. € new commitments every year since 1990 and annual disbursement around 60 Mio. € since 1996. The technical cooperation agency GTZ assesses the portfolio development at a project level in a bi-annual period. (BMZE/GTZ 2002). The review reveals that the bilateral program covers the breadth of the themes of the CBD in a comprehensive manner, with in-situ conservation, sustainable use, research and training and public education as the themes with the highest number of projects, concentrated mainly in Africa and Latin America. The majority of the projects have a funding volume below 5 Mio. €. In addition, the funding support of the GEF from German sources for

biodiversity purposes should be included in the summary of the total spending. The allocation of the total German contribution to the GEF for biodiversity purposes amounts to 80 Mio. € during the pilot phase and 90 Mio. € each for phases 1 and 2.

Japan

The Japanese development cooperation supports biodiversity conservation in a number of areas, with an emphasis on forest areas and coastal zones of 144.1 Mio. US\$ per year based on the OECD statistics. This is a relatively low share of ODA as most of the environmental expenditures are allocated to brown issues including the investments in the environmental urban infrastructure. Their own sources list biodiversity conservation under “Other sectors” which includes environmental administration and global warming, but the share of this sector varies between 6 and 20% of the total environmental expenditures (JICA 2001).

This group of purposes was set up as an allocation target of the Japanese ODA within the action plan formulated during the UNGASS on Rio +5 in 1997 (JICA 2001).

United Kingdom

The support for biodiversity activities according to the OECD classification (which includes components in projects with other purposes) of the UK development assistance amounted to a relatively small 0,7% of ODA (an average of 24 Mio. US\$ of the years 1998-2000) (OECD 2002), while a higher percentage (3.4%) went to climate change protection. An internal reporting system of DFID shows an increase of DFID spending between 1992 and 1998 from 10.5 to 27.5 Mio. UK£ for biodiversity, although an internal study questions the validity of these statistics and the impression of increasing importance it conveys (FLINT et al. 2000).

This low OECD figure could potentially be the result of a change in the political valuation of the issue of biodiversity loss, which may be due to a competing conceptual framework. Based on the evaluation of mostly rural development projects, three of the development focused research institutes in the UK (ODI; IDS and IIED) developed the *sustainable livelihoods* approach which views the natural environment and its components and services as an asset of the poor, whereas the holistic view is centered around the problems of the poor in developing a livelihood. Combined with the poverty reduction focus of the UK development policy, environmental questions are dealt with in combination with the poverty reduction goal: this holds true for a separate Issue Paper “Poverty and the Environment” (DFID 2001), a Key Sheet “Poverty and the Environment” (DFID 2001) and the Policy Statement on the Environment (DFID 1998). A similar view can be seen for sustainable agriculture (DFID 2002), forestry (2002) and biodiversity (DFID 2001). The Issue paper on Biodiversity (KOZIELL 2001) focuses on the connection between biodiversity loss and its impact on the livelihood and the conservation of biodiversity conservation as well as its impact on the poor. They are based on two research efforts funded by DFID. The first is the joint project with the European Commission, “Biodiversity in Development”, implemented by the IUCN, and the second project “Linking Policy and Practice in Biodiversity”, funded solely by DFID but managed by IIED (KOZIELL 2001, KOZIELL et al. 2001). Here, the linkage between biodiversity conservation and sustainable use and its potential for the sustainable livelihood of the poor was explored in more detail. As a consequence the EsA is not employed as a prime conceptual foundation.

United States

The figures of the OECD for US support for biodiversity between 1998-2000 amounts to an average of 84.3 Mio. US\$, equivalent to 1% of ODA, ranking the US among the low priority bilateral donors (OECD 2002). The self perception is completely different as the US government sees itself as a bilateral donor, supporting one of the most comprehensive biodiversity conservation programs (US AID 2002a). The question is difficult to settle, but it is clear that given the size of the total cooperation budget the US activities are among the heavy weights. The support for biodiversity has a long tradition. The Foreign Assistance Act (FAA), authorizing the spending for development cooperation, already had in its 1983 version a specific requirement to support biodiversity and tropical forest conservation (US AID 1988). An additional characteristic of US funding is that a number of organizations are involved in biodiversity conservation along with the official development agency, i.e. the US-national nature protection agencies and a number of private organizations as well.

US AID has a long history of biodiversity support, based on the congressional amendments of the FAA and their reporting requirements which, in the 1980s, supported countries developing national conservation strategies under the IUCN's World Conservation Strategy (IUCN 1980). Currently, the US development cooperation program is based on a strategic plan, which puts environmental protection as one of six strategic goals and puts the conservation of biological diversity as one of the five environmental sub-objectives. It has to report to congress where these objectives and related performance criteria are assessed.

One of the major efforts of US AID in the area of biodiversity in the 1990s was the funding of the "Biodiversity Support Program", which operated between 1989 and 2001 as a joint effort of WWF, WRI and The Nature Conservancy (TNC). It provided analysis for a number of issues and capacity strengthening of partners and technical assistance to US AID regional offices through 4 regional programs. It laid the foundation for a staff handbook on "Biodiversity Conservation Program Design & Management (US AID 2002)" which deals explicitly with the ESM, but without a specific reference to the EsA of the CBD. Here, it is used to discuss the spatial scale of intervention in biodiversity conservation and it places ESM on a landscape level.

Summing up

The *size and quality of the biodiversity budget* varies considerably among the agencies covered. Because of its mandate, the GEF has the largest biodiversity budget of all agencies, with biodiversity ranking as the top theme in that it accounts for more than 40% of GEF spending. The funding is based on grants, making this funding source attractive for the recipient countries, but it covers only the incremental costs of global benefits: it requires additional funding for the local costs. The World Bank has a sizeable portfolio for local costs, but they are not all grants. The other multilateral programs are smaller for the regional development agencies, but here the loan components are higher (ADB, IADB). Only the EC programs consist fully of grants. The bilateral agencies increased their commitments in the 1990s with the German program reaching the relative and absolute top figures among the four programs. In relative terms, only Norway and Finland have invested more (OECD 2002).

The adoption of the EsA is highest or more pronounced among the multilateral agencies, the GEF, the World Bank, the European Community, and among the bilateral agencies, only US AID is explicitly committed to the concept and principles. The GEF position is basically the result of a COP decision on

Further Guidance to the financial mechanism (GEF 2002): within the World Bank, the Environment Department tried to establish ESM as a guiding principle in the 1990s, but only with the new Environmental Strategy did the concept become official policy (WORLD BANK 2001). The European Community used its own commitment as a party to the convention to develop a Biodiversity Strategy and included its development cooperation program. The inclusion of the EsA is to a large extent the result of a conceptual biodiversity project, which was operated by IUCN. The development in the United States looks similar: a long running conceptual project provided the input for the adoption of the EsA; this time the project has been implemented by Washington-based environmental NGOs, WWF, Nature Conservancy and WRI. In terms of the regional development banks, the development of biodiversity conceptual papers did not progress towards an integrated solution beyond the support for national strategies of their client countries.

The situation in the United Kingdom is completely different, however: here, the development agency and a number of UK research and consulting organizations are committed to the sustainable livelihood approach. This approach can be seen as a competing approach for integration, but with a poverty focus. The sustainable use of biodiversity is subordinated to the poverty reduction objective and biodiversity is seen as one of a number of resources used by the poor (CHAMBERS/CONWAY 1991). The redirection of a number of development cooperation programs towards the reduction of poverty increases the importance of the environment-poverty link.

Within the funding agencies, the perception of the ecosystem approach is limited, mostly to those units of the organizations involved in supporting habitat protection. It has broadened recently by the debates about the sectoral policies in water management, forestry and irrigation. It entered into policy documents of the funding agencies in cooperation with global environmental research/lobbying organizations (EC/DFID/IUCN 2001, ROSEN 2000) as part of a communication strategy with the stakeholders of the funding agencies. The environmental units of the agencies are involved in conceptual work of applying the concept to habitat conservation, most prominently at the World Bank (GRIMBLE 1996, HASSAN/DREGNE 1997, PUTZ et al. 2000, WORLD BANK 1998).

When sectoral strategy papers were reviewed in relevant sectors - forestry, rural development, and water management - the concept and importance of the EsA was then introduced (WORLD BANK 2001 in forestry, EU rural development; DFID 2002 agriculture). Particularly in forest policy, the longstanding debate of sustainable use led to policy changes that included elements of the EsA, such as participation, the integration of wood harvesting with other uses and the maintenance of ecosystem services.

With the increase of the habitat protection portfolio among all funding agencies, integration and participation issues have gained importance based on practical project implementation experience. Similar to the reaction on a national level, explicit references to the EsA are rarely made, but relevant principles are formulated as general development objectives and/or design concepts of projects or programs. The concepts of "Integrated-Conservation Development" (SANJAYAN/SHEN/JANSEN 1997) and "community based conservation" have to be mentioned.

The explicit consideration of the ecosystem approach within the international funding community has been limited first to general policy discussion papers, and as a sub-theme in thematic reviews of the importance of biodiversity and the need to integrate it into the funding program. Only in a second round was the EsA included in handbooks and official strategies. The World Bank, the EC and US AID have been

most active in pursuing the question of how to integrate the approach of conservation and sustainable use on a conceptual level. They have pursued it by co-operating with international nature protection organizations.

There is little evidence that the next steps of integrating the EsA into the existing set of operational policies have advanced considerably. There is a broad debate on the various approaches of integrating habitat protection and the experience resulting from the cooperation efforts of the past. Their relationship needs further elaboration. These changes at the conceptual and policy level still have to be translated to the operations of the agencies on a project and program lending level. At the World Bank, as within other lending agencies, this change will be cumbersome, as the previous reviews of the Bank in terms of integrating environmental objectives have shown (OED 2001, LELE 2000). The only existing portfolio reviews undertaken by the Environment Department of the World Bank do not cover the role the ecosystem approach already plays on the project level. The available material does not allow a second assessment regarding this question.

4.3 Further Refinement within Specific Ecosystems

The CBD launched different thematic working programs for the protection and restoration of biodiversity in specific ecosystems such as oceans, coastal zones, freshwater, mountains etc. The question dealt with here is, to what extent already existing or conceptualized international actions and programs for the protection of these specific ecosystems contribute to the policy of the CBD and the implementation of the EsA. Which institutions or agreements exist that performs coordinative functions with the CBD and support policy transfers? In the following the advances achieved concerning specified ecosystems and their related actors and precursors will be presented.

Marine Ecosystems

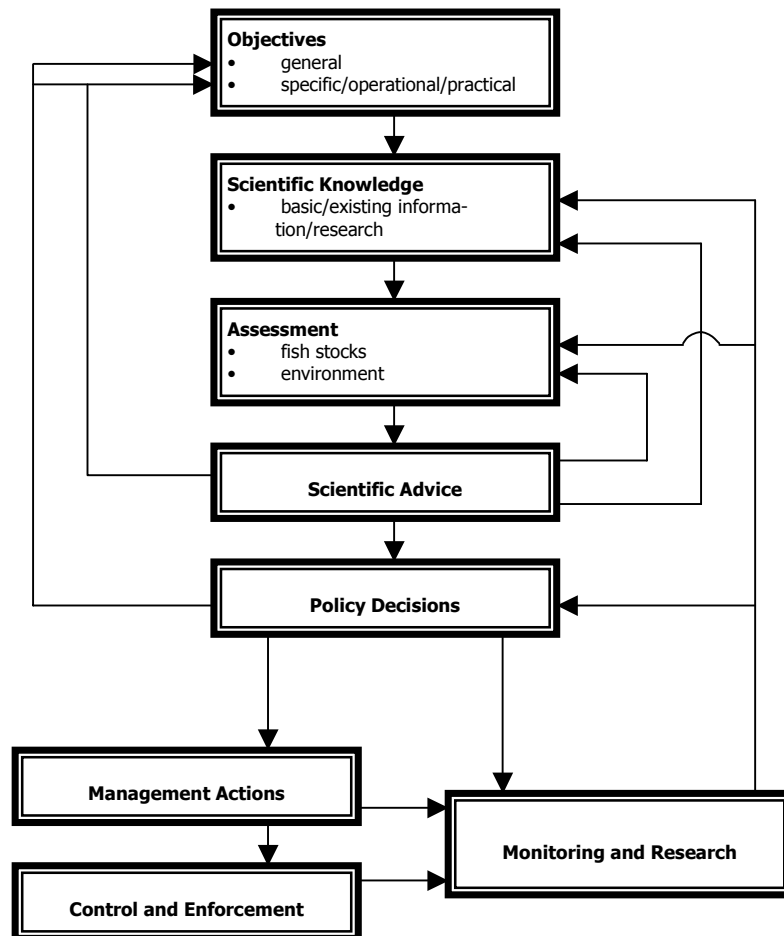
The 1982 Framework Law of the Sea (LOS) Convention establishes a comprehensive framework for use and development of the oceans. It specifies each nation's rights and responsibilities and the general objectives and principles that are to guide their ocean use. The LOS Convention was designed to serve as a unifying framework for the growing number of more detailed international agreements on marine environmental protection and the conservation and management of marine resources. The respective international conventions and regional agreements focus on two aspects of marine conservation policy: the protection of species and the protection of marine habitats and ecological functions.

On the global level, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973) and the CMS (1979) identify species threatened with extinction, overexploitation or unfavorable conservation status among them also marine species. In the realm of area protection, the CBD and the World Heritage Convention (1972) serve as instruments to define geographic areas for special protection within the territorial sea (12-mile-zone) and to promote the establishment of protected area networks. In 1995, a Global Program of Action (GPA) for the Protection of the Marine Environment from Land-based Activities and the Jakarta Mandate on the Program of Action for Marine and Coastal Biodiversity within the CBD were adopted. A Coordination Office was established at The Hague in 1998 (UNEP/GPA 2002). In its COP 4 (Bratislava, 1998), the CBD adopted a program of work on the conservation and sustainable use of marine and coastal biological diversity and established an Adhoc Technical Expert Group on Marine and Coastal Protected Areas (AHTEG MCPA).

Several regional agreements complement the international approach to area and species protection in the marine environment. The existing regional seas conventions (e.g. Mediterranean, Black Sea, Caribbean, North-East Atlantic, South-East Pacific, North-East Pacific, South Pacific) and regional nature conservation agreements (Africa, ASEAN, Europe, South Pacific, Western Hemisphere) call on states to take measures to protect and conserve species and their habitat. However, in 2001 only nine of the respective 14 agreements were in force (KIMBALL 2001).

At the 5th International Conference on the Protection of the North Sea (Bergen) in March 2002, an ecosystem approach was adopted to manage all human activities that affect the North Sea in a way that conserves biological diversity and ensures sustainable development (NSC 2002). The Conference agreed that management will be guided by a conceptual framework, which emphasizes the development of general and operational environmental goals, the importance of scientific and technical knowledge and advice for integrated management, and the necessity for integrated expert assessment and monitoring. The framework also stresses the involvement of stakeholders and includes policy decisions as well as control and enforcement of management measures. Cornerstone of the concept is the development of a coherent and integrated set of Ecological Quality Objectives. The respective conceptual framework is shown in figure 1 and has been elaborated by the International Council for the Explorations of the Sea (ICES), which is based in Denmark.

Fig. 1: A conceptual framework for an Ecosystem Approach to the management, protection and restoration of the North Sea (NSC 2002)



Coastal Ecosystems

Integrated coastal zone management (ICZM) or integrated coastal area management (ICAM) was defined at an International Coastal Zone Workshop in 1989 as "a dynamic process in which a coordinated strategy is developed and implemented for the allocation of environmental, socio-cultural, and sustainable multiple uses of the coastal zone." (UNEP 1996) Integrated marine and coastal area management (IMCAM) is one of the elements of the CBD's marine and coastal program of work, however, further thorough guidance for the inclusion of the EsA into IMCAM is required (SADACHARAN et al. 2001).

During the last two decades, the different adopted regional seas programs were focused on environmentally sound integrated planning and management of coastal zones. Programs on several coastal zone management projects for particular sites were subsequently launched, e.g. in the Mediterranean, where in 1997 the Contracting Parties to the Barcelona Convention adopted the Strategic Action Program to address pollution from land-based activities. Another regional program that has taken great strides in defining their approach to coastal zone management is the Caribbean. The program's prescription for successful integrated management includes a strong legal and institutional framework, an established coordinating mechanism, strong cooperation within existing agencies and departments, universities to supply personnel and as a vehicle for research and training, active non-governmental organizations and community based management initiatives and long term budgetary support for local agencies (UNEP/CEP 2000).

Freshwater Ecosystems

The topic "biodiversity of freshwater ecosystems" is addressed in particular with the CBD, the Ramsar Convention, the United Nation's Convention to Combat Climate Change (UNFCCC) and the Convention on International Watercourses. There is an emerging global framework for action aiming to preserve the integrity of freshwater ecosystems. Guidelines and decisions recently adopted under the CBD and Ramsar Convention have set out a strategic approach to ensure the proper management and sustainability of ecosystems and associated biodiversity within river basins. However, practical experience of these relatively new concepts is scarce. Given the above, there is a demand for a mechanism to promote sharing of best practices and issues relating to integrated management of river basins based on an ecosystem approach. This is the basis for the development of the River Basin Initiative (RBI). The RBI intends to establish a global network to link and support activities and projects where the principles and practices of integrated management of wetlands, biodiversity and river basin management will be demonstrated. A recent questionnaire revealed the usefulness of this initiative (UNEP/CBD/COP/6/INF/13).

International cooperation on the regional level is of prime importance for the implementation of an ecosystem approach in river basin management. There are many examples of cooperation between riparian states in the allocation and control of freshwater resources. The United Nations has compiled a list of 3,707 agreements. Issues of quantity and quality of water resources have been resolved in some, but not all, cases. In general, cooperation is confined to a limited scope (e.g. electricity, fishery, quantity and quality of water) while the governments involved only rarely commit themselves to a holistic ecosystem approach. Therefore, and apart from some important examples in the developed world (e.g., Great Lakes, Rhine), implementation of an ecosystem approach in transboundary freshwater management is rather weak. Tensions over water exist in river basins and there are few water-sharing agreements that include all riparian or ensure full protection of the freshwater ecosystems. Thus, obstacles for the implementation of ecosystem management are obvious and stem from a lack of common understanding, adequate institu-

tions (international, national and sub-national) and mechanisms for conflict resolution and sharing of costs and benefits (KLAPHAKE et al. 2001). There are, however, preliminary hints that international river regimes that focus on a small number of core issues and detailed and operational regulations might tend to be more effective than approaches that aim to implement an integrated approach in transboundary cooperation (BERNAUER 2002). This finding, obviously vulnerable to criticism, suggests that integrated river basin management, though desirable in ecological terms, has been a recipe for failure, particularly in the developing world. However, it might be interesting to analyze whether and in which cases policy recommendations, such as the EsA, that favor an integrated approach might overstrain the capacity of actors in some cases.

Agricultural Land Use

Biodiversity in agricultural lands has earned increasing attention in recent years. At its COP 5 (Nairobi) in 2000, the CBD established a program of work on agro-biodiversity that includes elements such as assessment and adaptive management of agro-biodiversity. The program also emphasizes cross-cutting issues, which include use of plant and animal genetic resources for food and agriculture. The CBD has therefore intensified its collaboration with a number of relevant international institutions such as the FAO, which initiated an International Initiative for the Conservation and Sustainable Use of Pollinators. The aim of the Initiative is to promote coordinated action worldwide to monitor pollinator decline, its causes and its impact on pollination services. The COP also requested the Executive Secretary to evaluate the impact of trade liberalization on the conservation and sustainable use of agricultural biological diversity in consultation with relevant bodies, such as the World Trade Organization (WTO).

Other international Conventions and codes of conduct (soft law instruments) on biodiversity relevant to food and agriculture are the International Treaty on Plant Genetic Resources for Food and Agriculture, a legally binding instrument negotiated by the FAO and its Commission on Genetic Resources for Food and Agriculture (CGRFA), the International Plant Protection Convention, and the Code of Conduct for Plant Germplasm Collecting and Transfer. Additionally, since 1991 the CGRFA has been developing a draft Code of Conduct on Biotechnology, however, this work was put on hold pending the completion of the negotiations for the revision of the International Treaty. The CGRFA will consider how to proceed with the draft in late 2002 (FAO 2002).

On the national level the contracting parties of the CBD are obliged to submit a first national report on the status of biodiversity. However, of the 111 national reports submitted, some 58 provide sufficient coverage of agriculture and/or agricultural biodiversity. Furthermore, the reports are mostly heterogeneous in content, which aggravates comparison between countries. Few countries describe comprehensive policies, programs or strategies for agricultural biodiversity, though a number indicate that they plan to develop these. A common reporting format, in the second national reports, shall facilitate comparison between countries (CBD 2002).

Forest Ecosystems

The establishment of United Nations Forum on Forests (UNFF) in October 2000 by the Economic and Social Council of the United Nations (ECOSOC) as a subsidiary body to promote the implementation of proposals for action for the management, conservation and sustainable development of all types of forests originated in the year 1995: these proposals for action had been formulated under the auspices of the earlier Intergovernmental Panel on Forests (IPF) and its successor, the Intergovernmental Forum on Forests

(IFF) which had been established to bridge the gap between North and South on forest issues. The UNFF is supported by the Collaborative Partnership on Forests (CPF), which was established in April 2001. However, the UNFF is characterized by the same long-standing and deep divides on financial resources, trade and environment, technology transfer, and underlying causes, such as issues of governance and illegal trade that already labeled the IPF and IFF and which prevent the implementation of the process (SIZER 1994, IISD 2001). At the UNFF-2 in March 2002, it became increasingly clear that the UNFF's role is largely a forum for information exchange with little authority to push forests onto the international agenda (IISD 2002).

The Forest Stewardship Council (FSC), established in 1993, is the most significant non-governmental global process to establish elements of an international framework to support sustainable forest management. This certification system guarantees that wood coming from certain sources is being produced in ways that meet ecological and social criteria. In Europe, the Pan-European Forest Certification (PEFC) holds large shares of certified areas and originates in the EU Ministerial Conference for the Protection of Forests in Europe, held in 1993 in Helsinki (HÄUSLER/SCHERER-LORENZEN 2001). The market will remain a major source of finance for funding sustainable forest management, however, sharp downturns in timber markets like that in 1998 for tropical wood turn out to be a severe obstacle to the successful implementation of certification systems (ITTO 2001).

The non-governmental World Commission on Forests and Sustainable Development (WCFSD) completed its work in 1999 with a final report summarized into ten recommendations closely resembling the EsA principles, e.g. the involvement of people in decision-making on forest use, the cessation of harmful subsidies, the application of sustainable forest management approaches, the planning under consideration of whole landscapes instead of isolated forests and the expansion of information bases (WCFSD 1999). Its political mandate, however, seemed to be limited as it was not able to gain the support of the UN (WRI 2002).

Although there has been substantial progress in the sector of international forest policy, some extra-sectoral problems such as world trade rules cannot be handled by the forest sector alone. The relevant multi-lateral environmental agreements (MEA), such as the CBD and UNFCCC focusing on specific global forest services, need improved informing on good forestry (IIED 1999).

Mountain Ecosystems

There are only a few legally binding international agreements and soft laws exclusively concerned with mountain issues: the Alpine Convention (1991) and the Strasbourg Resolution (1990), both of which deal with the management of European mountain ecosystems. There are other multi-lateral environmental agreements (MEAs) like the CBD, the UNFCCC, CCD and the Convention on the International Trade with Endangered Species (CITES) aimed at the solution of the general global environment which provide programs or protocols relevant for the protection of mountain ecosystems. However, the coverage of mountain issues within these MEAs is perceived as inadequate and it is recommended to add protocols focusing on mountain-specific concerns relating to property rights, biodiversity, climate change and desertification (LYNCH/MAGGIO 2002). Although the logical culmination of Agenda 21's Chapter 13 on sustainable mountain development appears to be a future international instrument on mountain people and the conservation and sustainable development of mountain ecosystems, there is no international consensus on this point (LYNCH/MAGGIO 2002). In 2000, the FAO as Task Manager for Chapter 13 of Agenda

21, submitted a report to CSD-8 stating that the establishment of parks and protected areas without adequate attention to rural development concerns has too often led to a failed attempt at conservation. There are today an increasing number of innovative examples of more integrated approaches to biodiversity conservation combining both human development and natural resource conservation (ECOSOC/CSD 2000).

On the regional level, mountain ecosystems, cultures, and economies are usually not contiguous with international frontiers and domestic boundaries. Cooperation between neighboring states is necessary for promoting the well-being of mountain people and ecosystems. As a prime example of legally binding transboundary collaboration, the Alpine Convention is a comprehensive regional approach to the conservation and sustainable use of the alpine ecosystem. A similar agreement was adopted for the East Carpathian Region (international protocol, 1993). Further, resolutions and declarations aimed at the balance of land use, conservation and development in mountain regions were elaborated for African mountains and highlands (1997), the Pyrenees (1995), and the mountain areas of Asia (1994) (LYNCH/MAGGIO 2002).

Summing up

There have been various efforts to implement holistic approaches into the management of specific ecosystems. Most advanced is the implementation in the realm of marine ecosystems and forest ecosystems. For marine ecosystems, various regional agreements have produced transboundary management concepts and programs, however, focused mainly on the protection of species and their habitat. The far more ambitious project of the implementation of an ecosystem approach for the management of the North Sea is still in its infancy, yet an evaluation was not feasible. In the forest sector, an intensive international dialogue in the frame of UN negotiations and results from scientific efforts produced substantial progress concerning sustainable forest management approaches, however intersectoral cooperation with trade-related institutions needs to be intensified to link regional advances in sustainable forestry with economical incentives on the national and global scale.

Albeit in freshwater and coastal ecosystems integrated river basin management (IRBM) approaches and ICZM approaches with the respective initiatives on the international level (RBI) represent promising concepts, in practice implementation is weak due to national and transboundary institutional misfits and complex policy and management problems. While in developed countries existing sectoral institutions seem to represent an obstacle to the implementation of a comprehensive management approach, actors in developing countries might be overstrained by the complexity of management issues.

The protection of biodiversity in agricultural landscapes is dominated by questions concerning the genetic level of agro-biodiversity and the high dynamics in biotechnology. On the international level, the FAO provides regulations for the responsible handling of our food basis, however on the national level only few CBD member countries provide comprehensive policies, programs or strategies for the protection of agricultural biodiversity.

Concerning the protection of mountain ecosystems' biodiversity, only few international agreements exist. With respect to the coverage of this issue in MEAs, it is recommended to add specific protocols.

On the whole, there is no consistent picture concerning the implementation of EsA-like strategies in specific ecosystems. Some sectors like forestry gained increased attention and produced substantial progress due to their relevance for combating global climate change, while other sectors with promising ap-

proaches such as ICZM and IRBM only show slow advances due the complexity of institutional and management issues.

5 Obstacles and Challenges

The international debate on the Ecosystem Approach shows considerable diffusion of a concept that originated within the context of a specific international environmental agreement. The approach of this paper has been to view the debate as an international diffusion on a codification effort of a holistic concept of environmental management. This has been fruitful as the following results can be summarized. They point to challenges in the need for a clarification of the codification of the EsA and in the needs of demonstrating the usefulness of the guidance it is supposed to provide:

- The concept of the EsA of the CBD is the center of a critical debate concerning its theoretical foundation, its logical consistency and its value as a practical guide.
- It is a demanding approach in terms of complexity and coordination requirements - the claims towards a paradigm shift make the adoption difficult. At the same time, there is not only in science a need for an integrative approach with an open decision-making process with a long term perspective.
- Internationally, there are a number of early adopters (World Bank, EC, US AID, UNEP, WRI) of the ESM, but with a slight degree of conceptual and definitorial variation (cp. Table 3).
- But there are competing approaches as well (sustainable livelihood) guiding international actors and there is an open relationship to the concept of sustainable development.
- The concept lacks guidance for the balancing between conservation and sustainable use, particularly in view of the renewed emphasis of poverty reduction.
- There are applications of the ESM on an ecosystem-specific level that have progressed further in their conceptual basis and are more specific (FAO fisheries: Ecosystem-based fisheries management; North Sea Conference: Ecosystem Approach to the management, protection and restoration of the North Sea).
- There seems to be progress towards integration among the international actors, but it can only be identified on a conceptual level, i.e. on paper, but not yet on the programmatic or project level.
- Within these international actors, the change towards integration comes from the conservation side to integrate sustainable use, although selectively, from the user side - forestry and fisheries and sometimes water management - to the conservation side.

Table 3: Characteristics of the Ecosystem Approach and related concepts

	Convention on Biological Diversity	World Resources Institute	WGBU (German Advisory Council on Global Change)	Commission of the European Community	World Bank	US AID
Concept name	Ecosystem Approach	Ecosystem Approach	Bioregional management	7 Guiding principles in Biodiversity Action Plan	Ecosystem Approach; Natural Resources Management (NRM)	Ecosystem Management
Status	COP decision	Recommendation of NGO	Recommendation of advisory Council	Guiding principles	Principle in sector strategies (Environment, Rural development) part of NRM strategy	Biodiversity Handbook Guide for Staff

Scale	Appropriate, otherwise not specific	Ecosystem +Landscape level	Region Bioregion	Landscape Programs/ projects	Lending activities; Productive landscape	Landscape (larger than protected area)
Goals	P5 Conservation of ecosystem structure and functioning has priority P10 Appropriate balance between conservation and use	Optimises the mix of benefits for a given ecosystem Maintains productive potential	Long term balance, not dominated by economic use concepts	Conservation and sustainable use in productive systems and protected areas Consistency with wider policy framework	Sustainable use of natural resources Integrate conservation and economic and social factors Link to poverty reduction	Integration of conservation and social issues Specific to biodiversity threat
Decision-making	P1 objectives of management are societal choice P2 Management should be decentralised P7 appropriate scale (Spatial and temporal) P 11 consider all forms of information P 12 involve all sectors and disciplines OG 4 decentralise decisions	Public dialogue on goals policies, trade-offs Includes people Stakeholder involvement	Decentralised Involvement of stakeholders Limits of discourse approach	Multi-sectoral Full stakeholder participation Accurate, appropriate multidisciplinary information Fair sharing of costs and benefits	Holistic Long-term perspective Community based natural resource management Consideration of offsite effects	Community based conservation
Instruments	P 4 Reduce market distortions; Align incentives; Internalise costs and benefits OG 2 benefit sharing	Integrated assessment	Zoning Negotiation Economic incentives		Economic incentives Generate multiple benefits	Management agreements Incentives, sanctions Equitable distribution of benefits
Management principles	P 3 Consider external effects P6 Consider limits of ecosystem functioning P 8 Recognise temporal scales and lags P 9 Recognise inevitability of change OG 1 manage under uncertainty OG 3 manage flexibly (adaptive management)		Adaptive management	Effective, accountable transparent institutional arrangements Framed in the context of national structures and processes		Adaptive management

6 References

- ADB (Asian Development Bank) (1994): Biodiversity Conservation in the Asian and Pacific Region: Constraints and Opportunities, Conference Papers and Proceedings. - Manila.
- ADB (Asian Development Bank) (1999): Mobilising Broader Support for Asia's Biodiversity. - Manila.
- ADB (Asian Development Bank) (2002): The Asian Development Bank Environment Policy. - Manila.
- ANDERSON, J. (2001): On the Edge of Chaos - Crafting Adaptive Collaborative Management for Biological Diversity in a Pluralistic World. - In: BUCK, L.E. et al. (Eds.): Biological Diversity: Balancing Interests through Adaptive Collaborative Management. - London: 171-186.
- BARBIER, E.B., BURGESS, J. & C. FOLKE (1994): Paradise Lost? The Ecological Economics of Biodiversity. - London.
- BAYON, R. LOVINK, J.S. & W.J. VEENING (2000): Financing Biodiversity Conservation, Inter-American Development Bank, Sustainable Development Department. - Washington. -Technical Papers Series, ENV 134.
- BERNAUER, T. (2002): Explaining Success and Failure in International River Management. - Basel (Springer). - Aquatic Sciences Vol. 64(1)
- BMZE (1997): Sektorkonzept Erhaltung biologischer Vielfalt durch Naturschutz. - In: Konzepte Nr. 087/Dezember 97. - Bonn.
- BMZE (2001): Elfter Bericht zur Entwicklungspolitik der Bundesregierung. - Bonn. - Materialien No.111.
- BMZE/GTZ (2002): BioDiversity in German Development Cooperation. - 4th ed. - Eschborn.
- BRAGA, M.I. (1999): Integrating Freshwater Ecosystem Function and Services with Water Development Projects. - Washington (Inter-American Development Bank, Sustainable Development Department)
- BUCHER, E.; CASTRO, G. & V. FLORES (1997): Freshwater Ecosystem Conservation: Towards a Comprehensive Water Resources Management Strategy, Washington (Inter-American Development Bank, Sustainable Development Department). - Technical Papers Series, ENV 114.
- BUCK, L.; GEISLER, C.C.; SCHELHAS, J. & E. WOLLENBERG (Eds.) (2001): Biological Diversity: Balancing Interests through Adaptive Collaborative Management. - Boca Raton (CRC Press)
- CBD (CONVENTION ON BIOLOGICAL DIVERSITY) (2002): Agricultural Biodiversity. Sections in National Reports on Agricultural Biodiversity. - www.biodiv.org/programmes/areas/agro/reports.asp, July 9, 2002
- CHAMBERS, R. & G.R. CONWAY (1991): Sustainable Rural Livelihoods: Practical Concepts for the 21st Century. - Brighton (Institute of Development Studies). - IDS Discussion Paper 296.
- CHRISTENSEN, N.L. et al. 1996: The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management. - Ecological Applications, Vol. 6: 665-691
- CORTNER, A. & M.A., MOOTE (1999): The Politics of Ecosystem Management. - Washington (Island Press)
- Costanza, R.; D'Arge, R.; de Groot, R.S.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K.; Naeem, S. & R. O'Neill (1997): The Total Value of the World's Ecosystem Services and Natural Capital. - Nature 387: 253-260.
- DAILY, G.C. et al. (1997): Ecosystem Services: Benefits Supplied to Human Societies by Natural Ecosystems. -Issues in Ecologic, Vol. 2: 1-16.
- DANIELS, S. & G. WALKER (1996): Rethinking Public Participation in Natural Resource Management: Concepts from Pluralism and Five Emerging Approaches. - In: FAO (Ed.): Pluralism and Sustainable Forestry and Rural Development. - Rome (FAO)

- DEUTSCH, L.; FOLKE, C. & K. SKANBERG (2002): The critical nature capital of ecosystem performance as insurance for human well-being. - The Beijer International Institute of Ecological Economics, Discussion Paper 156. - Stockholm.
- DFID (DEPARTMENT FOR INTERNATIONAL DEVELOPMENT) (2000): Poverty and Environment. - Issue Paper. - London.
- DFID (DEPARTMENT FOR INTERNATIONAL DEVELOPMENT) (2001): Biodiversity a crucial issue for the world's poorest. - Issue paper. - London.
- DOUROJEANNI, M. (2000): IDB Investments in Brazilian Protected Areas during the 1990s: Working Paper. - Washington (Inter-American Development Bank)
- EATON, D. & T.-M. SARCH (1997): The economic importance of wild resources in the Hadejia-Nguru wetlands: Collaborative Research in the Economics of environment and Development (CREED). - London (International Institute for Environment and Development). - Working Paper No. 13.
- EC/DFID/IUCN (2001): Biodiversity in Development Project: Strategic Approach for Integrating Biodiversity in Development Cooperation. - Brussels, Gland, Cambridge.
- ECOSOC (ECONOMIC AND SOCIAL COUNCIL)/CSD (2000): Integrated Planning and Management of Land Resources: Report of the Secretary-General. Addendum 3. Sustainable Mountain Development. - Commission on Sustainable Development. Eighth session. 24 April - 5 May 2000
- EHRlich, P.R. & H.A. MOONEY (1983): Extinction, substitution and ecosystem services. - In: *Bioscience*, Vol. 33: 248-254.
- EMERTON, L. (2000a): Using Economic Incentives for Biodiversity Conservation. - Gland (IUCN)
- EMERTON, L. (2000b): How Eastern African Countries are Using Economic Incentives to Make Biodiversity Attractive. - Gland (IUCN)
- EUROPEAN COMMISSION (1998): A European Community Biodiversity Strategy: Communication of the European Commission to the Council and the Parliament. - Brussels. -COM 42.
- EUROPEAN COMMISSION (2001): Biodiversity Action Plan for Economic and Development Co-operation: Communication from the Commission to the Council and the European Parliament. - Brussels. -COM 162.
- EUROPEAN COMMISSION (1999): Forests and Development: the EC approach, Communication from the Commission to the Council and the European Parliament. - Brussels. - COM 554.
- EUROPEAN COMMISSION (2000): Integrating Environment and Sustainable Development into Economic and Development Co-operation Policy: Elements of a comprehensive strategy, Communication from the Commission to the Council and the European Parliament. - Brussels. - COM 264.
- FAO (FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS) (2001a): Reykjavik Conference on Responsible Fisheries in the Marine Ecosystems, <http://www.fao.org/fi/documents/reykjavik/Default.htm>, 8/30/02
- FAO (Food and Agriculture Organization of the United Nations) (2001b): State of the World's Forests. - Rome.
- FAO (FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS) (2001c): Towards an Ecosystem-Based Fisheries Management: Background Paper prepared by the FAO for Reykjavik Conference on Responsible Fisheries in the Marine Ecosystems, 2001/4 <http://www.fao.org/fi/documents/reykjavik/Default.htm>, 8/30/02
- FAO (FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS) (2002a): Biological Diversity in Food and Agriculture. Commission on Genetic Resources for Food and Agriculture. http://www.fao.org/biodiversity/cgrfa_en.asp, July 9, 2002
- FAO (FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS) (2002b): Priority Areas for Interdisciplinary Action, <http://www.fao.org/paia/>

References

- FLINT, M. et al. (2000): Environmental Evaluation Synthesis Study Environment: Mainstreamed or Sidelined? - London (Department for International Development). - Main Report Vol. I.
- FOLKE, C. et al. (2002): Resilience and Sustainable Development: Building Adaptive Capacity in a World of Transformations, Scientific Background Paper on Resilience for the Process for the World Summit on Sustainable Development on behalf of The Environmental Advisory Council to the Swedish Government, April 16, 2002
- GARCIA FERNANDEZ, J.J. (1998): Guide for the Preparation of Action Plans within the Framework of the Convention on Biodiversity. - New York (Global Environmental Facility, UNDP)
- GEF (GLOBAL ENVIRONMENTAL FACILITY) (1999): Elements for a GEF Operational Program on Carbon Sequestration, GEF/C.13/14 April, 1999
- GEF (GLOBAL ENVIRONMENTAL FACILITY) (2000): Operational Program #12: Integrated Ecosystem Management. - Washington.
- GEF (GLOBAL ENVIRONMENTAL FACILITY) (2002a): Operational Programs http://www.gefweb.org/Operational_Policies/Operational_Strategy/operational_strategy.html 8/31/02
- GEF (GLOBAL ENVIRONMENTAL FACILITY) (2002b): Report of the Global Environmental Facility, CBD, Conference of the Parties VI, UNEP/CBD/COP/6/9
- GEF/UNDP/UNEP/WORLD BANK/IUCN (2001): The Use of Economic Measures in National Biodiversity Strategies and Action Plans. - London.
- GRIMBLE, R. (1996): Carrying Capacity, Sustainable Use and Demographic Determinants of Natural Habitats and Ecosystems Management. - Washington. - World Bank, Environment Departments Papers, No 35.
- GTZ (1995): Biologische Vielfalt erhalten! Eine Aufgabe der Entwicklungszusammenarbeit: Dokumentation zum Fachgespräch "Umsetzung der Biodiversitätskonvention". - Eschborn.
- GUNDERSON, L.H. & C.S. HOLLING (Eds.) (2002): Panarchy: Understanding Transformations in Human and Natural Systems. - Washington.
- GUNDERSON, L.H.; HOLLING, C.S. & S.S. LIGHT (Eds.) (1995): Barriers and Bridges to the Renewal of Ecosystems and Institutions. - New York.
- 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.
- HANEY, A. & R.L. POWER (1996): Adaptive Management for Sound Ecosystem Management. - Environmental Management, Vol. 20(6): 879-886.
- HASSAN, H. & H.E. DREGNE (1997): Natural Habitats and Ecosystem Management in Drylands: An Overview. - Washington. - World Bank, Environment Department Papers, No 51.
- HÄUSLER, A. & M. SCHERER-LORENZEN (2001): Sustainable Forest Management in Germany: The Ecosystem Approach of the Biodiversity Convention reconsidered. - Bonn (Federal Agency for Nature Conservation). - BfN-Skripten 51.
- HOLLING, C.S. (1996): Surprise for Science, Resilience for Ecosystems, and Incentives for People. - Ecological Applications, Vol. 6: 733-735.
- HOLLING, C.S. (2001): Understanding the complexity of economic, ecological and social systems. - Ecosystems, Vol. 4: 390-405.
- HOLLING, C.S. & G.K. MEFFE (1996): Command and control and the pathology of natural resource management. - Conservation Biology, Vol. 10: 328-337.
- IADB (INTER-AMERICAN DEVELOPMENT BANK) (2002): IDB and the Environment: 1990-2002: Briefing Report. - Washington.

- IIED (INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT) (1999): Policy that works for forests and people: Overview Report. - London (International Institute for Environment and Development)
- IISD (INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT) (2001): Summary of the First Session of the United Nations Forum on Forests: 11-22 June 2001. - Earth Negotiations Bulletin 13(83). www.iisd.ca/linkages/forestry/unff/unff1/, July 8, 2002
- IISD (INTERNATIONAL INSTITUTE FOR SUSTAINABLE DEVELOPMENT) (2002): Summary of the Second Session of the United Nations Forum on Forests: 4-15 March 2002. - Earth Negotiations Bulletin 13(94). www.iisd.ca/linkages/forestry/unff/unff2/, July 8, 2002
- INTERAGENCY ECOSYSTEM MANAGEMENT TASK FORCE (1995): The Ecosystem Approach: Healthy Ecosystems and Sustainable Economies. Volume I-III. Report of the Interagency Ecosystem Management Task Force. June 1995. - Springfield (NTIS/ U.S. Department of Commerce)
- ITTO (INTERNATIONAL TROPICAL TIMBER ORGANIZATION) (2001): ITTO Yokohama Action Plan. - ITTO Policy Development Series No.11. www.itto.or.jp/policy/action_plan/, July 8, 2002
- IUCN (THE WORLD CONSERVATION UNION) (2000a): Carbon Sequestration, Biodiversity and Sustainable Livelihoods: The Role of an Ecosystem Approach in Balancing Climate Change, Biodiversity, and Social Objectives. Discussion paper. - Gland.
- IUCN (THE WORLD CONSERVATION UNION) (2000b): The Ecosystem Approach. Recommendations. Fifth Meeting of the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA) to the Convention on Biological Diversity (Montreal, Canada, 31 January - 4 February 2000). - Gland.
- IUCN (THE WORLD CONSERVATION UNION) (2001): Biodiversity in Development Strategic Approach for Integrating Biodiversity in Development Cooperation. - European Commission Brussels, IUCN Gland and Cambridge
- JICA (JAPAN INTERNATIONAL COOPERATION AGENCY) (2001): The Second Study on Development Assistance for the Environment (Summary). - Tokyo.
- JICA (JAPAN INTERNATIONAL COOPERATION AGENCY) (2002): Japan's Policies Toward Environmental Development Assistance. <http://www.jica.go.jp/english/global/env/policies.html> 9/3/02
- KARGER, C.R. (2000): Kommunikation - Perspektiven für den Naturschutz. - In: ERDMANN, K.-H. & T.J. MAGER (Hrsg.): Innovative Ansätze zum Schutz der Natur - Visionen für die Zukunft. - Berlin (Springer): 165-176.
- KAY, J.; REGIER, H.; BOYLE, M. & G. FRANCIS (1999): An Ecosystem Approach for Sustainability: Addressing the Challenge of Complexity. - Futures, Vol 31:721-742.
- KIMBALL, L.A. (2001): International ocean governance: using international law and organizations to manage marine resources sustainably. - Gland (IUCN)
- KLAPHAKE, A.; SCHEUMANN, W. & R. SCHLIEP (2001): Biodiversity and International Water Policy: International Agreements and Experiences Related to the Protection of Freshwater Ecosystems. Study. - Bonn (Federal Ministry of the Environment)
- KOCH-WESER, M. & W. KAHLENBORN (2002): Legal, economic, and compensation mechanisms in support of sustainable mountain development, Draft background paper B1, for review by the Mountain Forum. - Global Mountain Summit 2002, Bishkek.
- KORN, H. et al. (Eds.) (1999): Report of the scientific workshop "The Ecosystem Approach - What does it Mean for European Ecosystems?" at the International Academy for Nature Conservation Isle of Vilm, Germany, November 26/27, 1998. - Bonn (Federal Agency for Nature Conservation). - BfN-Skripten 9.
- KOZIELL, I. (2001): Diversity not Adversity: Sustaining Livelihoods with Biodiversity: Issue Paper. - London (International Institute for Environment and Development and Department for International Development)

References

- KOZIELL, I. & J. SAUNDERS (Eds.) (2001): *Living Off Biodiversity, Exploring Livelihoods and Biodiversity Issues in Natural Resources Management*, IIED, London
- KRAMER, R.A.; SHARMA, N. & M. MUNASINGHE (1995): *Valuing Tropical Forests. Methodology and Case Study Madagascar*. - Washington. - World Bank Environment Paper Number 13.
- LANDRY, C. J. (1998): *Saving our Streams through Water Markets: A Practical Guide*. - Bozeman (Political Economic Research Centre)
- LEE, T. R. & A.S. JOURAVLEV (1998): *Prices, Property and Markets in Water Allocation*. - Santiago (United Nations Commission For Latin America and the Caribbean). - Serie Medio Ambiente y Desarrollo.
- LELE, U. et al. (2000): *The World Bank Forest Strategy - Striking the Right Balance*. - Washington.
- LOW, B.; OSTROM, E.; SIMON, C. & J. WILSON (2002): *Redundancy and diversity in governing and managing natural resources*. - In: BERKES, F. et al. (Eds.): *Navigating the Dynamics of Social-Ecological Systems*. - Cambridge.
- LYNCH, O.J. & G.F. MAGGIO (2002): *Mountain Laws and Peoples: Moving Towards Sustainable Development and Recognition of Community-Based Property Rights. A General Overview of Mountain Laws and Policies with Insights from the Mountain Forum's Electronic Conference on Mountain Policy and Law*. Center for International Environmental Law. - Washington.
- MALTBY, E. (1999): *Ecosystem approach: from principles to action*. - In: SCHEI et al. (Eds.): *Proceedings of the Norway/UN Conference on the Ecosystem Approach for Sustainable Use of Biological Diversity, 6-10 September 1999*. - Trondheim.
- MALTBY, E. et al. (Eds.) (1999): *Ecosystem Management. Questions for Science and Society*. - Egham (Royal Holloway Institute for Environmental Research, Royal Holloway, University of London)
- NSC (NORTH SEA CONFERENCE) (2002): *Ministerial Declaration of the Fifth International Conference on the Protection of the North Sea*. - Bergen.
- NUNES, P.A.L.D. & J.C.J.M. VAN DEN BERGH (2001): *Economic Valuation of Biodiversity: Sense or Nonsense?* - In: *Ecological Economics*, Vol. 39: 203-222.
- OED (OPERATIONS EVALUATION DEPARTMENT) (2001): *Review of the Bank's Performance on the Environment*. - Washington (World Bank)
- OECD (1999): *Handbook of Incentive Measures for Biodiversity: Design and Implementation*. - Paris.
- OECD (Ed.) (2001): *Valuation of Biodiversity: Selected Studies*. - Paris.
- OECD (2002): *Aid Activities Targeting the Objectives of the Rio Conventions 1998-2000*. - Paris (Development Assistance Committee)
- PEARCE, D.; BARBIER, W. & E.B. MARKANDYA (1998): *Environmental economics and decision-making in Sub-Saharan Africa*. - IIED/UCL London Environmental Economics Centre, Paper 88-01.
- PEARCE, D. & D. MORAN (1996): *The economic value of biodiversity*. - London.
- PEARCE, D. & R.K. TURNER (1990): *Economics of Natural Resources and the Environment*. - Harvester Wheatsheaf, Hemel Hemstead.
- PRESCOTT, J.; GAUTHIER, B. & J. NAGAHUEDI MBONGU SODI. (2000): *Guide to Developing a Biodiversity Strategy from a Sustainable Development Perspective / Institut de l'énergie et de l'environnement de la Francophonie, Ministère de l'Environnement du Québec, UNDP, UNEP*. - Québec.
- PUTZ, F. et al. (2000): *Biodiversity Conservation in the Context of Tropical Forest Management*. - Washington. - World Bank, Environment Departments Papers, No 75.
- ROSEN, C. (2000): *World Resources 2000-2001. People and Ecosystems: The Fraying Web of Life*. - Washington (World Resources Institute)

- SADACHARAN, D.; VAN DER VALK, F. & I. HARKES (2001): IMCAM and the CBD: An analysis of Integrated Marine and Coastal Area Management in relation to CBD objectives. - Amsterdam (AIDEnvironment / RIKZ)
- SALAFSKY, N., MARGOLUIS, R. & K. REDFORD (2002): Adaptive Management: A Tool for Conservation Practitioners.
- SANJAYAN, M.A.; SHEN, S. & M. JANSEN (1997): Experiences with Integrated-Conservation Developments Projects in Asia. - Washington. - World Bank Technical Paper No. 388.
- SCHEI et al. (Eds.) (1999): Proceedings of the Norway/UN Conference on the Ecosystem Approach for Sustainable Use of Biological Diversity, 6-10 September 1999. - Trondheim.
- SIZER, N. (1994): Opportunities to Save and Sustainably Use the World's Forest Through International Cooperation. - London (World Resources Institute) <http://www.wri.org/biodiv/intl-toc.html>, 25/10/02
- SMITH, R. D. & E. MALTBY (2001): Using the Ecosystem Approach to implement the CBD: A global synthesis report drawing lessons from three regional pathfinder workshops. - Egham (Royal Holloway Institute for Environmental Research, Royal Holloway, University of London)
- SÖDERBAUM, P. (1999): Values, Ideology and Politics in Ecological Economics. - Ecological Economics, Vol. 28: 161-170.
- SWANSON, T., DAY, B. & S. MOURATO (1999): Valuing Water Quality in China: Purpose, Approach and Policy. - Journal of Environmental Sciences 11(3): 309-315.
- UNDP (UNITED NATIONS DEVELOPMENT PROGRAM) (2002): Biodiversity Planning Support Programme. - http://www.undp.org/bpsp/index_2.htm, 9/28/01
- UNDP (UNITED NATIONS DEVELOPMENT PROGRAM) (2002)a: Water Governance, <http://www.undp.org/seed/water/>, 9/8/02
- UNDP/UNEP/WORLD BANK/WRI (2000): World Resources 2000-2001: People and ecosystems: The fraying Web of Life. - Washington.
- UNEP (UNITED NATIONS ENVIRONMENT PROGRAMME) 1996: Guidelines for Integrated Planning and Management of Coastal and Marine Areas in the Wider Caribbean Region: UNEP Caribbean Environment Programme. - Kingston.
- UNEP (UNITED NATIONS ENVIRONMENT PROGRAMME) (2001): The MA Project Summary. - New York (UNEP/MA-Secretariat)
- UNEP (UNITED NATIONS ENVIRONMENT PROGRAMME) (2002a): UNEP Activities in Biodiversity. - <http://www.unep.org/themes/biodiversity>, 8/30/02
- UNEP (UNITED NATIONS ENVIRONMENT PROGRAMME) (2002b): UNEP's Role in the GEF, http://www.unep.org/gef/introduction/unep's_role.htm, 8/30/02
- UNEP (UNITED NATIONS ENVIRONMENT PROGRAMME)/CEP (2000): Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region. Protocol concerning pollution from land-based sources and activities. <http://www.cep.unep.org/pubs/legislation/cartxt.html>, 9 July, 2002
- UNEP (UNITED NATIONS ENVIRONMENT PROGRAMME)/GPA (2002): About the GPA. - www.gpa.unep.org/about/default.htm, 9 July, 2002
- UNESCO (UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION) (1984): Action Plan for Biosphere Reserves. - Paris (UNESCO)
- UNESCO (United Nations Educational, Scientific and Cultural Organization) (1995a): Seville Strategy. - Paris (UNESCO)
- UNESCO (UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION) (1995b): Statutory Framework of the World Network of Biosphere Reserves. - Paris (UNESCO)

References

- UNESCO (UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION) (2000): Solving the Puzzle: The Ecosystem Approach and Biosphere Reserves. - Paris (UNESCO)
- UNESCO (UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION) (2002a): The MAB Programme, http://www.unesco.org/mab/index_htm 8/30/02
- UNESCO (UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION) (2002b): World Water Assessment Programme. <http://www.unesco.org/water/wwap/index.shtml>, 8/30/02
- US AID (AGENCY FOR INTERNATIONAL DEVELOPMENT) (1988): Environment and Natural Resources. - Washington (Bureau for Program and Policy Coordination). - AID Policy Paper.
- US AID (AGENCY FOR INTERNATIONAL DEVELOPMENT) (2002a): Biodiversity Conservation Program Design & Management: A Guide for USAID Staff. - Washington.
- US AID (AGENCY FOR INTERNATIONAL DEVELOPMENT) (2002b): USAID & the Environment What we do, <http://www.usaid.gov/environment/whatwedo.html> 9/4/02
- WBGU (GERMAN ADVISORY COUNCIL ON GLOBAL CHANGE) (1999): Conservation and Sustainable Use of the Biosphere. - London (Earthscan)
- WCFS (WORLD COMMISSION ON FORESTS AND SUSTAINABLE DEVELOPMENT) (1999): Final Report of the World Commission on Forests and Sustainable Development. - Washington.
- WESTLEY, F. 1995: Governing Design: The Management of Social Systems and Ecosystems Management, in: Gunderson, L.H., Holling, C.S., Light, S.S. (eds.): Barriers and Bridges to the Renewal of Ecosystems and Institutions, New York, pp. 390-427
- WONDOLLECK, J.M. & S.L. YAFFEE (2000): Making Collaboration Work: Lessons from Innovation in Natural Resource Management. - Washington.
- WORLD BANK (1995): Environment Department, Mainstreaming Biodiversity in Development: A World Bank Assistance Strategy for Implementing the Convention on Biological Diversity. - Washington. - Environment Department Papers, No 29.
- WORLD BANK (1998a): Biodiversity in World Bank Projects: A Portfolio Review. - Washington. - Environment Department Papers, No 59.
- WORLD BANK (1998): Environment Department, Integrating Freshwater Biodiversity Conservation with Development: Some Emerging Lessons. - Washington. - Environment Department Papers No 61.
- WORLD BANK (2000a): Supporting the Web of Life: The World Bank and Biodiversity -A Portfolio Update (1988-1999). - Washington.
- WORLD BANK (2000b): Transboundary Reserves - World Bank Implementation of the Ecosystem Approach. - Washington.
- WORLD BANK (2001): Making Sustainable Commitments: An Environment Strategy for the World Bank. - Washington.
- WRI (WORLD RESOURCES INSTITUTE) (2002): New Initiatives on International Forest Policy. <http://www.wri.org/wri/biodiv/opp-bx2.html>, July 9, 2002
- WUICHET, J.W. (1995): Toward an Ecosystem Management Policy Grounded in Hierarchy Theory. - Ecosystem Health, Vol. 1(3): 161-169.
- YAFFEE, S.L. (1999): Three Faces of Ecosystem Management. - Conservation Biology, Vol. 13: 713-725.
- YOUNG, O.R. et al. (1999): Institutional Dimensions of global Environmental Change: Science Plan. - Bonn. -IHDP Report Series No. 9.