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Using the Ecosystem Approach to Implement the Convention on Biological Diversity

Using the Ecosystem Approach to Implement the Convention on Biological Diversity

Key Issues and Case Studies

R.D. Smith and E. Maltby



Ecosystem Management Series No. 2



IUCN



Using the Ecosystem Approach to Implement the Convention on Biological Diversity

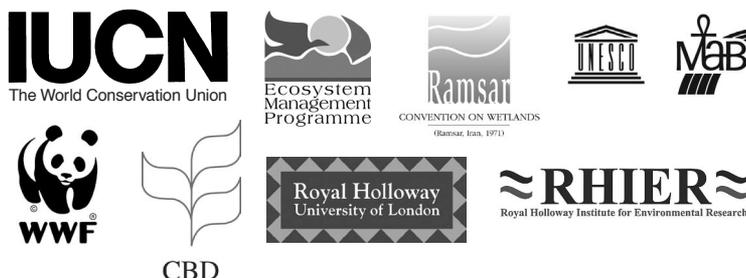
Key Issues and Case Studies

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R.D. Smith and E. Maltby

**IUCN – The World Conservation Union
2003**



Contents

Foreword	i
Acknowledgements	1
Preface	2
Executive summary	4
Awareness and understanding	4
Participation and societal choice	6
Scale	6
Benefit sharing and incentives	7
Science, information and decision-making	7
Structural and inter-sectoral issues	7
Other conservation strategies	8
Introduction	9
Regional workshops	10
Objectives of the regional workshops	11
Format of workshops and stakeholder participation	11
Case studies	12
Part 1: Lessons learned from the case studies	
Chapter One Awareness and understanding	15
Workshop awareness and understanding	16
Mainstreaming the CBD	18
Interpreting Decision V/6	23
Chapter Two Participation and societal choice	26
Increasing participation	28
Chapter Three Scale	30
Identifying the lowest appropriate level for management	30
Decentralising management	31
Implementing the Ecosystem Approach	32
Time scales	33

Chapter Four	Benefit sharing and incentives	35
Chapter Five	Science, information management and decision-making	39
	Adaptive management	40
	Accessibility and management of information	41
Chapter Six	Structural and inter-sectoral issues	43
	CBD Focal Points	44
Chapter Seven	Other conservation strategies	46
Chapter Eight	Conclusions and recommendations	49
	Conclusions	49
	Recommendations	53

Part 2: Case Studies

Case Study 1	The Zambezi Basin Wetlands conservation project	55
Case Study 2	The Campfire Programme in Zimbabwe	56
Case Study 3	The Biodiversity Foundation for Africa	58
Case Study 4	Sustainable Management of Indigenous Forests in Malawi	60
Case Study 5	East African Marine ecoregion project	62
Case Study 6	The Zimuto/Mshagashe catchment project, Zimbabwe	63
Case Study 7	The Pendjari Biosphere Reserve, Benin	64
Case Study 8	Choco Ecoregion project, Colombia	67
Case Study 9	Biodiversity conservation, Pampas Region, Argentina	69
Case Study 10	Ecological corridors in environmental management, Brazil	71
Case Study 11	The Marine Reserve of Galapagos, Ecuador	72
Case Study 12	Bañados del Este Biosphere Reserve, Uruguay	74
Case Study 13	La Segua Wetland management, Ecuador	76
Case Study 14	Integral use and management of Tumbes Mangroves, Peru	78
Case Study 15	Beni Biological Station Biosphere Reserve, Bolivia	79
Case Study 16	Vinalares sylvo-pastoral management, Formosa, Argentina	81
Case Study 17	Guacharo National Park, Venezuela	83
Case Study 18	Large-scale ecosystem health study, Langat Basin, Malaysia	84
Case Study 19	Community-based tiger conservation in Cambodia	86
Case Study 20	IPM in Indonesia and elsewhere in Asia	88
Case Study 21	Calculating TEV, Gio mangrove ecosystem, Viet Nam	90
Case Study 22	The role of <i>Melaleuca</i> wetlands, Mekong Delta, Viet Nam	92
Case Study 23	Non-timber forest products in Lao PDR	94
Case Study 24	Siberut Island National Park and Biosphere Reserve	96
Case Study 25	Chenderoh Reservoir, Perak, Malaysia	98
Case Study 26	Ecoregion conservation in Cambodia, Lao PDR and Viet Nam	100

Annex 1	CBD COP-5 Decision 6: The Ecosystem Approach	102
Annex 2	Guidelines for the preparation of case studies	110
Annex 3	Workshop participants	113
Acronyms		118

Boxes

Box 1.	Summary of CBD Decision V/6	10
Box 2.	Principles of the Ecosystem Approach	12
Box 3.	Points of Operational Guidance	14

Tables

Table 1.	The development of the Ecosystem Approach	9
Table 2.	Participation of national CBD Focal Points	11
Table 3.	Mainstreaming the approach: strategic steps	19
Table 4.	Mainstreaming the approach: on-the-ground actions	20
Table 5.	How the case studies relate to the Ecosystem Approach	21
Table 6.	How the case studies relate to the CBD	23
Table 7.	Capacity building: high-priority needs	29
Table 8.	Suggested responsibilities for a CBD Focal Point	45

Foreword

Before addressing who is supposed to use the Ecosystem Approach to implement the Convention on Biological Diversity, some explanation of the terms used in the title of this book may be helpful. The Ecosystem Approach is a strategy for the management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It was endorsed by the fifth Conference of the Parties to the Convention on Biological Diversity (CBD) in Nairobi, Kenya, in May 2000. The CBD was debated at the 1992 Earth Summit in Rio and has since been ratified by 157 countries.

In endorsing the Ecosystem Approach, the parties to the CBD called for, *inter alia*, "... practical expressions of the Approach in various contexts to be developed using case studies and workshops" and also "requested the CBD Secretariat to use lessons learned from workshops and case studies to prepare guidelines on implementation of the Approach before the 7th Conference of the Parties". These two components of Decision V/6 motivated CEM to work with the CBD Secretariat and other partners to organise three so-called Pathfinder Workshops, the results of which are summarised in this publication.

While this might not be immediately obvious from its name, the Ecosystem Approach puts people and their natural resource use practices squarely at the centre of the decision-making framework. Because of this, the Ecosystem Approach can be adopted by any entity, public or private, involved in the regulation or management of human uses of the environment. It is for this reason that many of the case studies contained in this volume are about the productive use of forests, wetlands, grasslands, marine and other ecosystems rather than just the management of areas that are strictly protected for biodiversity conservation.

Currently, a considerable share of activities ongoing in sectors such as agriculture, irrigation and other water development, health, defence and security, transport and communications and, increasingly, trade and commerce, have profound negative impacts on the world's ecosystems. It is IUCN's strong belief that adoption of the Ecosystem Approach will mitigate many of these negative impacts and in some cases even improve the environment. We hope that the practical examples of applying the Ecosystem Approach gathered here will convince government and private sector decision-makers to mainstream the Ecosystem Approach in the planning of their activities and provide practical guidance for their implementation.

This is not to say that adoption of the Ecosystem Approach by the environment sector — ministries and departments responsible for the environment, and environmental non-governmental organisations — is not useful; in fact, the practical guidance provided here may be very timely for them, e.g. in the management of conflicts between conservation and development objectives in or around a protected area.

The IUCN Commission on Ecosystem Management (CEM) was involved in the development of the Ecosystem Approach from the very start. In June 1996, it organized the Sibthorp seminar that came up with the first definition of the ecosystem approach and a set of ten principles of ecosystem management. The link with the Convention on Biological Diversity (CBD) was established in Malawi in January 1998 when the CBD sponsored a workshop that expanded the ten principles to the current twelve, often called “the Malawi Principles”. The principles gained more credence at the UN workshop organised as part of the Trondheim Workshop Series in September 1999, at which a CBD Liaison Group for the Ecosystem Approach was created. The final endorsement of the 12 Principles and 5 points of Operational Guidance of the Ecosystem Approach (see Annex 1) by the 5th Conference of Parties to the CBD in May 2000 was a milestone achievement for CEM, which had lobbied hard for its adoption.

CEM and its partners will continue to work to produce specific guidance on applying the Ecosystem Approach to a variety of human activities, including but not restricted to mining, agriculture and river basin management. We strongly believe such applications of the Ecosystem Approach will enable society to conserve biodiversity while sustaining or improving human livelihoods, thus realising IUCN’s vision of *“a just world that values and conserves nature.”*

A handwritten signature in black ink, appearing to read 'H.M.S.' with a stylized flourish.

Hillary M. Masundire
Chair, IUCN Commission on Ecosystem Management

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The workshops analysis and reporting were undertaken as a project entitled An Ecosystem Approach under the CBD, from concept to action. The contribution of the following host governments and project sponsors is gratefully acknowledged: Governments of Zimbabwe, Colombia, Malaysia, and the United Kingdom (DETR, now DEFRA), the European Commission (DG Environment), United Nations Education, Scientific and Cultural Organisation–Man and the Biosphere Programme (UNESCO-MAB), the Swiss Agency for Development and Cooperation, WWF-International, Bureau of the Convention on Wetlands (Ramsar, 1971) and Royal Holloway, University of London. The project also benefited significantly from ongoing technical guidance provided by the Secretariat of the Convention on Biological Diversity.

This report is a synthesis of the reports on three regional workshops. The three regional workshop reports are available from <http://www.biodiversity.org/programmes/cross-cutting/ecosystem/documents.asp>.

IUCN gratefully acknowledges the financial contributions of the Government of the Netherlands, the Secretariat of the Convention on Biological Diversity and the Bureau of the Convention on Wetlands (Ramsar, 1971) that made the publication of this report possible.

Preface

This report is a contribution to implementation of Decision V/6 on the Ecosystem Approach, taken in May 2000 by the Fifth Conference of the Parties (COP-5) of the Convention on Biological Diversity (CBD). In addition to the Parties at COP5, many other bodies endorsed Decision V/6 and a number of these organisations came together to co-convene the three regional workshops that are the main subject of this report. The workshops were held during 2000 in Southern Africa (July), South America (September) and in Southeast Asia (October). They brought together stakeholders to build awareness of the Ecosystem Approach, collect and examine practical examples of the Ecosystem Approach from different world regions and identify priority actions for implementing the Ecosystem Approach. This report summarises the discussions and conclusions and draws lessons from the three workshops. The report includes a number of recommendations for action that are widely relevant to Parties and other bodies. It is hoped that this report will encourage implementation of Decision V/6 while also stimulating further debate on aspects of the Decision.

In addition to this global synthesis report, reports on the three regional workshops are available on the CBD web site: <http://www.biodiversity.org/programmes/cross-cutting/ecosystem/documents.asp>. Readers with a particular interest in the target regions are encouraged also to examine the discussions and analysis of the relevant regional report.

Workshop participants included technical experts on the Ecosystem Approach from the field, together with CBD Focal Points from governments in the three regions. They were designed to examine the newly defined Ecosystem Approach in different regional contexts and to serve as guidance for the further steps that are required to make the Ecosystem Approach a practical reality for all Parties.

Overall coordination and planning of the workshops was undertaken in cooperation with the Secretariat of the CBD by the Royal Holloway Institute for Environmental Research (University of

Using the Ecosystem Approach

London, UK) on behalf of IUCN-CEM, UNESCO-MAB, The Convention on Wetlands (Ramsar, 1971) and WWF-International, along with the support of IUCN-BPCD and the IUCN Regional Offices for Southern Africa, South America and Asia.

Executive summary

During 2000 case studies were presented at workshops on the Ecosystem Approach that were held in Southern Africa, South America and Southeast Asia. This summary and analysis of workshop discussions and case studies is intended to be a resource to assist implementation of Decision V/6 by Parties, the CBD Secretariat and all relevant stakeholders.

Workshop participants broadly endorsed the definition and description of the Ecosystem Approach in Decision V/6 and generally agreed that it is a highly appropriate framework for delivering the objectives of the CBD. The Ecosystem Approach is defined as *a strategy for management of land, water and living resources that promotes conservation and sustainable use in an equitable way*. It was identified by workshop participants as being similar to a number of other holistic approaches to conservation, development and natural resource management. In many respects, therefore, the Ecosystem Approach is a codification of previous strategies, one that has the potential to provide momentum to efforts to integrate biodiversity management into development practice and decision-making.

These are some of the key distinguishing features of the Ecosystem Approach:

- it is designed to balance the three CBD objectives (conservation, sustainable use and equitable benefit sharing of genetic resources);
- it puts people at the centre of biodiversity management;
- it extends biodiversity management beyond protected areas while recognising that they are also vital for delivering CBD objectives; and
- it engages the widest range of sectoral interests.

Awareness and understanding

The workshops demonstrated that significant further efforts are needed to build awareness and understanding among

technical specialists and the wider community alike. A common misconception is that the Ecosystem Approach is an *ecosystems* approach, i.e. a set of guidelines for managing ecosystems. In fact, the Ecosystem Approach under the CBD is a framework for holistic decision-making and action.

The case studies presented at the workshops illustrated most aspects of Decision V/6 and a number of CBD thematic areas and cross-cutting issues. Various interpretations of ways to apply Decision V/6 are possible. It may not be necessary to apply each of the 12 principles of the Decision in each case, and it may not always be necessary to aim for a balance between the three CBD objectives. Problem-specific guidelines need to be developed to guide users.

The Ecosystem Approach can be used to help achieve the necessary mainstreaming of the CBD into policies and decision-making that affect the environment. Mainstreaming the Ecosystem Approach requires the engagement of diverse sectors of the economy and society, including those that are likely to be less aware of — or even hostile to — the Ecosystem Approach. Guidance on mainstreaming the Ecosystem Approach is needed.

Awareness is lacking of the significance of ecosystem functioning, along with inadequate recognition that ecosystem services are vital for human social and economic welfare as well as wildlife. Adoption of the Ecosystem Approach would benefit considerably from new mechanisms that would allow the economic and wider value of ecosystem functions to be realised.

Greater community-level understanding of the ecological thinking that underpins the approach is best achieved when empowered community members train one another. Regional centres may be appropriate for training, stakeholder empowerment and building awareness among professionals and non-specialists. Interested organisations and Parties can help build a common understanding of the Ecosystem

Approach by incorporating the description in Decision V/6 in their related work.

The workshop case studies illustrate that the Ecosystem Approach is highly flexible. It can be applied at a wide range of scales to address a diversity of problems in the management of biological diversity while also achieving CBD objectives. Pilot projects could encompass a greater diversity of Ecosystem Approach applications, and could demonstrate the advantages of adopting the Ecosystem Approach from the outset to achieve CBD objectives.

Participation and societal choice

Although achieving effective and sustained stakeholder participation is a significant challenge, successful use of the Ecosystem Approach depends on such participation. Active and sustained participation will typically require diverse communities to adopt a common vision and, for many countries, will entail capacity building, in areas such as taxonomy and in management techniques appropriate for holistic decision-making. The potential for using the Ecosystem Approach in conflict resolution needs to be tested.

Scale

The case studies demonstrate that the Ecosystem Approach can be applied from an individual farm to transnational regions. It can also be applied at the global scale; the Ecosystem Approach may be an appropriate framework for ensuring that international trade does not compromise the objectives of the CBD. The most appropriate scale for management, however, is probably best determined by the specific biodiversity problem being addressed. Although decentralised management is often needed, in practice, there are a number of significant obstacles to it. A combined bottom-up and top-down approach may be the best way to identify the most appropriate management scales and mechanisms.

The differences between the timelines of various stakeholders need to be managed. Some stakeholders — those whose livelihoods depend on biodiversity — have immediate needs and require immediate benefits in order to participate.

Adaptive management is new to many organisations and individuals and training is needed. Management should adapt to lessons learned in the field and be responsive to ongoing advances in scientific understanding. Monitoring of appropriate indicators is vital for adaptive management, but there are few guidelines or case studies on this subject.

Benefit sharing and incentives

There are many possible innovative approaches to benefit sharing under the Ecosystem Approach, although further guidance is needed. Management based on ecological principles often results in significant financial savings. However, it is unlikely that costs and benefits can always be internalised within ecosystems. For example, when ecosystems are managed to sequester carbon, benefits are global but costs are local.

Removing the distorting influence of perverse incentives is a priority if people's economic and other needs are to be balanced with their biodiversity concerns.

Science, information and decision-making

Decision support systems that integrate diverse types of scientific and local knowledge can greatly assist decision-making. Existing scientific and socio-economic knowledge, including that which has not been widely published, should be made easily available.

Structural and inter-sectoral issues

The sectoral structure of decision-making is a major constraint to adoption of the Ecosystem Approach. Harmonising policies, laws, fiscal measures, incentives and institutional mandates is a priority to facilitate use of the

approach. The Ecosystem Approach need not require legal enforcement: win-win situations can be voluntarily adopted. Existing or new inter-ministerial mechanisms may establish the necessary inter-sectoral linkages.

The Ecosystem Approach's compatibility with the objectives of other conventions can be used to promote collective implementation. In many countries, implementation of Decision V/6 would be enhanced if the capacity of the CBD National Focal Point or other coordinating authority were strengthened.

Other conservation strategies

Protected areas can be an integral part of the Ecosystem Approach. A notable feature of the Ecosystem Approach, however, is that it can also be applied outside the protected area context; for example, to conserve the many threatened charismatic and other species that occur beyond the boundaries of protected areas.

Introduction

The Ecosystem Approach, defined here as a strategy for management of land, water and living resources that promotes conservation and sustainable use in an equitable way, was adopted at the Second Conference of the Parties of the CBD as the primary framework for action under the Convention. Decision V/6, taken at the fifth Conference of the Parties in 2000 (COP-5), is the first agreed definition and elaboration of the Ecosystem Approach under the CBD and follows a long process of consultation and discussion (Table 1).

Table 1. The development of the Ecosystem Approach

1995	
June	Inter-Agency Task Force, USA: framework outline; barriers to use of the approach
1996	
June	IUCN-Sibthorp Seminar, UK: “traditional” approach questioned, 10 Principles formulated
September	Task Group and Global Biodiversity Forum, Canada: challenges identified; case studies
October	Keystone Policy Dialogue, USA: disparate values can be accommodated; recommendations for implementation
1997	
September	SBSTTA3 informal meeting, implications for CBD examined
1998	
January	Malawi workshop: 12 Principles
May	GBF 10, Bratislava: adaptive management
November	Vilm workshop: European case studies
1999	
April	Scottish Natural Heritage: integrated planning/different scales
May	IUCN-CEM technical meeting, Costa Rica: policy alignment needed
September	Trondheim-Norway/UN: improved understanding of 12 Malawi Principles CBD Liaison Group: synthesis of progress
2000	
February	SBSTTA5: recommends Malawi Principles and Operational Guidance
May	COP-5: Decision V/6 calls for case studies to help apply the approach
July- November	Three regional workshops: Southern Africa, South America, Southeast Asia

Regional workshops

In Decision V/6, Parties agreed to recommend application of the principles (Box 2) and use of the guidance (Box 3) on the Ecosystem Approach contained in the Decision, but made a request for workshops and case studies to build awareness and understanding of how to use the Ecosystem Approach to implement the CBD (Box 1). The Decision also called for further guidance on implementation of the Approach before the seventh Conference of the Parties in March 2004. The case studies and the associated analysis of discussions at three regional workshops, in Southern Africa, South America and Southeast Asia, are therefore intended as a timely resource to assist implementation of Decision V/6 by Parties, the CBD Secretariat and all relevant stakeholders. Importantly, the lessons learned from the cases studies were also a source of guidance to those partners working to realise the Plan of Implementation of the World Summit on Sustainable Development (2002). The various references to the Ecosystem Approach in the Plan of Implementation have further emphasised the relevance and increasing acceptance of the Ecosystem Approach as a strategic framework for achieving sustainable development objectives through an appropriate balance of conservation and sustainable use of biodiversity.

Box 1. Summary of CBD Decision V/6

Parties:

- endorsed the description and operational guidance of the Approach contained in decision V/6
- recommended that Parties apply twelve Ecosystem Approach Principles using the five points of Operational Guidance
- called for efforts to build awareness of the Ecosystem Approach
- requested practical expressions of the Approach in various contexts to be developed using case studies

and workshops

- requested the Executive Secretary of the CBD Secretariat to use lessons learned from workshops and case studies to prepare guidelines on implementation of the Approach before the seventh COP

For full text, see Annex 1

Objectives of the regional workshops

The workshops were an opportunity for the presentation of case studies to key stakeholders in each region, and for discussion of the practical implementation of the Ecosystem Approach. Specifically, the workshops aimed to:

- build awareness in each region by using case studies to illustrate aspects of the Ecosystem Approach under the CBD;
- examine perceived constraints in using the approach with a variety of relevant stakeholders;
- share experiences from each region of opportunities for taking action under the Ecosystem Approach;
- identify some key priority measures that need to be implemented to facilitate implementation of the Ecosystem Approach in each region;
- identify capacity building priorities (both human and technical); and
- suggest when other approaches may be more appropriate.

Format of workshops and stakeholder participation

Each workshop followed a similar programme. An introduction was given to the process leading to Decision V/6 and the workshop objectives were agreed. National CBD Focal Points were invited to participate from each country in the target regions (Table 2). The workshop objectives were addressed by a series of case study presentations and facilitated discussions in working groups and plenary.

Table 2. Participation of national CBD Focal Points

Region	Number of CBD Focal Points participating	Number of countries in region
Southern Africa	6	11
South America	10	13
Southeast Asia	7	7

Case studies

Practitioners of conservation and sustainable development presented a number of case studies, primarily from regionally-based field-level projects. A group of regional experts selected 29 case studies for presentation. Their aim was to identify a set of activities from the regions that were both representative and suitable for illustrating a number of key aspects of Decision V/6. The selected case studies varied in scale, thematic area and the cross-cutting issues addressed. The majority of them are summarised in Part II and analysed against Decision V/6 in Tables 5 and 6. Case study authors were given guidelines developed by the CBD Secretariat (Annex 2) on how to analyse their material so as to meet the objectives of the workshop.

Box 2. Principles of the Ecosystem Approach

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

Principle 2. Management should be decentralised to the lowest appropriate level.

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

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

Reduce those market distortions that adversely affect biological diversity;

Align incentives to promote biodiversity conservation and sustainable use; and internalise costs and benefits in the given ecosystem to the extent feasible.

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

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

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

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

Principle 9. Management must recognise that change is inevitable.

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

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

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

For full text, see Annex 1

Box 3. Points of Operational Guidance

When applying the 12 Principles of the ecosystem approach, the following five points are proposed as operational guidance.

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

For full text, see Annex 1

Chapter One

Awareness and understanding

Workshop case studies and discussions addressed a number of issues as part of their consideration of Decision V/6. The most prominent issues are reported and examined below. Where there is direct relevance to either the Principles or Operational Guidance in Decision V/6, this is indicated in **bold**.

One of the key aims of the workshops was to use case studies to build awareness of Decision V/6. It was not expected that all the Principles and Operational Guidance points of the Ecosystem Approach agreed in Decision V/6 would be illustrated by each case study because they reported on experiences that occurred prior to the adoption of Decision V/6. Each case study was therefore selected to illustrate certain aspects of the decision. The extent to which the case studies illustrated the Principles, Operational Guidance points, CBD thematic areas, and CBD cross-cutting issues is summarised in Table 5 and Table 6. Table 5 identifies the Principles and Operational Guidance that each case study illustrates most clearly. Table 6 identifies those case studies that best illustrate the various thematic areas and cross-cutting issues under the CBD.

Collectively, the case studies illustrate various aspects of Decision V/6 and a wide, but not comprehensive, range of thematic areas and cross-cutting issues. In particular, the case studies demonstrate:

- the great range of scales at which it is possible to apply the Ecosystem Approach, from the single fields of farmers practising Integrated Pest Management in Asia to the East Africa Marine Ecoregion;
- the diversity of problems in the management of biological diversity that can be tackled using the Ecosystem Approach; and

Part 1: Lessons learned from the case studies

A range of problems, at a range of scales, can be addressed through the Ecosystem Approach

- that additional cases and pilot projects are likely to illustrate the applicability of the Ecosystem Approach to an even wider range of problems and scales.

There are some notable variations in the perceived relevance of the Principles (Table 5). **Principles 1, 2 and 12** had the greatest overall relevance to the case studies. **Principles 3, 6, 7 and 9** were considered to have the least relevance to the case studies overall.

Workshop awareness and understanding

Workshop participants generally thought that the Ecosystem Approach was not entirely new, as it has many similarities to other conservation and development strategies such as Biosphere Reserves, Ecoregions and Integrated Catchment Management. The adoption of another new term was initially a cause of confusion for many participants. Following the workshop discussions and presentation of case studies, however, the similarity of the Ecosystem Approach to other approaches was not seen as an obstacle to its acceptance. Rather, the description and elaboration of the Ecosystem Approach in Decision V/6 was welcomed as an appropriate codification of actions and strategies that have been practised to a significant extent under different names. This codification has the potential to provide momentum to efforts to integrate biodiversity management into development practice and decision-making. Ultimately, the workshop participants characterised the Ecosystem Approach as holistic, flexible, socially oriented, scientifically based, and respectful of cultural preferences, use and traditions. They welcomed the Ecosystem Approach as a unifying tool, one that should be used to further CBD implementation by mainstreaming biodiversity into local, national and international decision-making.

The similarity of the Ecosystem Approach to other approaches should perhaps be seen as one of its strengths. For example, related approaches can be described to non-specialists (including policy-makers) by comparing

Decision V/6 is a codification of many existing conservation and development strategies

them to the Ecosystem Approach. Communication with non-specialists could be enhanced by the adoption of a common language based on Decision V/6. It might help build understanding and avoid confusion, for example, if Biosphere Reserves were routinely referred to as an example of the Ecosystem Approach under the CBD. For a common language to be used, however, all interested organisations and Parties need to use the Ecosystem Approach in their work. To date, this has not happened. The World Resources Institute, for example refer to Decision V/6, but has adopted its own definition of *ecosystem approach* (including a set of principles) in a recent publication.¹

A common confusion among workshop participants was that the Ecosystem Approach is an ecosystems approach. Closer examination of Decision V/6 reveals, however, that the Ecosystem Approach under the CBD is not a set of guidelines for the management of various ecosystems but a framework for thinking ecologically that results in action based on holistic decision-making. This framework for action links biological, social and economic information and aims to achieve a socially acceptable balance between nature conservation priorities, resource use and the sharing of benefits. In particular, it is a framework for planning and decision-making that bridges the barriers between economic, social, and environmental considerations. By doing so it places people firmly within the context of ecosystem management. Workshop participants thought that the case studies usefully demonstrated a number of the potential ways in which the Ecosystem Approach can be applied to achieve a balanced implementation of CBD objectives through actions based on holistic decision-making.

1. WRI/UNDP/UNEP/World Bank. 2000. Adopting an Ecosystem Approach. In *World Resources 2000-2001: — People and Ecosystems: the Fraying Web of Life*. World Resources Institute, Washington D.C: pp.225-239.

Stakeholders need to make greater efforts to use the terminology of the Ecosystem Approach

The Ecosystem Approach is a framework for holistic decision-making

An easily understood definition of the Ecosystem Approach needs to be developed and widely communicated

The Ecosystem Approach is a tool for mainstreaming the CBD into decision-making

Mainstreaming the CBD

In general, workshop participants thought the Ecosystem Approach needed to be much more widely communicated if it is to have a significant on-the-ground impact. Indeed, all relevant sectors need to be involved in using the Ecosystem Approach (**Principle 12**). Efforts to widen awareness of the approach need to include development practitioners, planners, economists, industrialists, legislators and sociologists. The inclusion of such sectors is necessary if the Ecosystem Approach, and hence the CBD, is to become mainstreamed into decision-making. Many participants also thought that a significant effort was needed to raise awareness of the Ecosystem Approach on the part of the general public. There was, however, some concern that the Ecosystem Approach as currently described is too complex to be widely disseminated and that a shorter, more easily remembered summary description would greatly help its wider communication, even among conservation and natural resource specialists.

Workshop participants agreed that integration of the Ecosystem Approach into natural resource sectors such as water resources, agriculture and fisheries was an appropriate way to further implementation of the CBD. The need was also recognised for higher-level integration of CBD objectives into policy-making, legislative processes and economic sectors, as called for by the COP (for example, CBD Decision III/9 para 2). The Ecosystem Approach could help this wider mainstreaming of CBD Articles and Decisions by engaging other sectors of the economy and society (including industry, agriculture and finance). People in these sectors are likely to be unaware of or even hostile to the CBD. However, participants were concerned that Decision V/6 alone is not a sufficient basis for mainstreaming the CBD through the Ecosystem Approach. The Operational Guidance set out in the Decision, while welcome, offers insufficient direction to Parties and others who wish to adopt the approach as a framework for decision-making beyond the nature and natural resource sectors.

Thematic workshops may be the most appropriate way for Parties and others to develop specific, practical guidelines aimed at increasing awareness and use of the Ecosystem Approach. Targeted training and education efforts are also needed. Southeast Asian workshop participants expressed a strong interest in creating a regional training centre for the Ecosystem Approach. In Southern Africa, participants identified the need for a range of training, including full-length university courses and workshops for professionals in diverse sectors. In South America, participants identified National Workshops as a key next step in building awareness, both within and beyond the conservation sector. Other strategic steps (Table 3) and on-the-ground actions (Table 4) for mainstreaming the Ecosystem Approach were also identified.

Targeted training and education efforts are needed

Table 3. Mainstreaming the approach: strategic steps

- enhance understanding and awareness of the Approach among policy-makers, planners, politicians and local authorities, for example by holding workshops designed specifically for employees of various sectors
- Conduct a review of existing sectoral and cross-sectoral policies, plans and programmes (including, but not limited to, those of Departments of Wildlife, Forest, Fisheries, Agriculture, etc.) and their relation to Decision V/6 to identify where reforms and changes are needed
- Undertake stakeholder consultations to reach a consensus on how to apply the approach to address different problems
- Use or establish an inter-Ministerial committee to oversee implementation of Decision V/6
- Integrate the Ecosystem Approach into NBSAPs
- Establish taskforces to take forward specific areas of proposed reforms

Key to the effective implementation of the Ecosystem Approach is its adoption in the management of productive systems such as farms, fisheries and forests. When these are viewed and understood ecologically their management is likely to bring greater benefits, both in terms of ecological functioning and the socio-economic well-being of those

CASE STUDIES
4, 20,
21

Using the Ecosystem Approach typically brings both socio-economic and ecological benefits

for whom they provide a livelihood. Adopting an ecological perspective typically results in lower costs due to reductions in the input of fertilisers, herbicides and pesticides.

Reducing such inputs has been shown in many systems to increase biological diversity, have a positive impact on sustainability and, in some circumstances, improve productivity and even human health. For example, when pesticide use is reduced in rice systems, spider populations increase and mosquito numbers (and hence malaria and other diseases) decrease. Improved farmer understanding of ecological thinking is best achieved through community efforts in which farmers learn from the practices of others.

Table 4. Mainstreaming the approach: on-the-ground actions

- perform an assessment of on-going projects, programmes and other field level activities to identify compliance with the Ecosystem Approach
- identify priority locations and issues for action by undertaking baseline biodiversity surveys that include measures of ecosystem integrity, diversity and an evaluation of goods and services
- knowledge bases should be constructed that integrate and synthesise the scientific and indigenous knowledge that is relevant to the conservation, use and assessment of biodiversity
- develop and implement awareness-building measures tailored for field practitioners and local communities
- identify existing local-level institutions, stakeholders and management systems that are suitable for applying the Ecosystem Approach
- identify institutional and socio-economic obstacles to meeting the CBD objectives
- encourage NGOs and other appropriate bodies to promote and facilitate implementation of the Ecosystem Approach at the local level
- integrate the Ecosystem Approach into project and programme design

Table 5. How the case studies relate to the Ecosystem Approach

Case study	Principles												Operational Guidance				
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
Southern Africa																	
1 The Zambezi Basin Wetlands Conservation and Resource Utilisation Project. <i>Excellent Hachileka, IUCN-ROSA</i>		•		•	•		•					•	•		•		•
2 The Campfire Programme: Community-based Resource Management, Zimbabwe. <i>Lynda Mujakachi, Africa Resources Trust</i>	•	•		•								•	•		•		•
3 The Biodiversity Foundation For Africa and the Zambezi Society. <i>Jonathan Timberlake, Biodiversity Foundation for Africa</i>				•		•	•	•		•	•	•		•			•
4 Sustainable Management of Indigenous forests in Mwanza East, Kamwamba, Malawi. <i>Estere Tsoka, SADC</i>	•	•		•					•	•	•	•			•	•	•
5 East African Marine Ecoregion project. <i>Irene Kamau, WWF-Tanzania</i>	•	•	•	•	•		•	•	•	•	•	•		•			•
6 Catchment Rehabilitation, Zimuto-Mshagashe, Zimbabwe. <i>Tabeth Matiza-Chiuta, IUCN-ROSA</i>		•		•			•		•		•	•		•	•	•	•
7 The Pendjari Biosphere Reserve, Benin. <i>Comlan Hessou, Agence Béninoise pour l'Environnement/UNESCO-MAB</i>	•		•	•	•	•	•	•	•	•	•	•		•	•	•	•
South America																	
8 Chocó Ecoregional Project, Colombia. <i>Ximena Barrera Rey, WWF-Colombia</i>	•	•	•	•	•	•	•	•	•	•	•	•			•		•
9 Biodiversity Conservation Initiative, Pampas Region, Argentina. <i>Néstor Maceira, Grupo Nacional de biodiversidad/IUCN</i>	•	•		•	•	•	•	•		•	•	•		•	•	•	•
10 Ecological Corridors, Brazil. <i>Moacir Bueno Arruda and Dione Angélica de Araújo Côte, IBAMA-Brazil</i>	•	•	•	•	•	•	•	•	•	•	•	•		•	•		•
11 The Marine Reserve of the Galapagos, Ecuador. <i>Eliecer Cruz Bedón and Mario Piu Guime</i>	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
12 Bañados del Este Biosphere Reserve, Uruguay. <i>Francisco Rilla, PROBIDES</i>	•	•				•					•			•	•	•	•

	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
13 La Segua Wetland Management, Ecuador. <i>Manfred Altamirano, Graciela Trelles and Segundo Coello</i>	•	•	•	•				•	•	•			•	•	•	•	•
14 Integral Use and Management of the Tumbes Mangroves, Peru. <i>Gustavo Suarez de Freitas, Pro Naturaleza</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
15 Beni Biological Station, Bolivia. <i>Carmen Miranda, María Marconi and Igor Patzi, Academia Nacional de Ciencias – ICIB</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
16 Vinalares Sylvo-Pastoral Management, Argentina. <i>Jorge Adámoli; Astrada, E.; Blasco, C.; Meli, P.; Florio y A.; Cirelli, V, GESER</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
17 Guácharo National Park, Venezuela. <i>Marisela Rabascall and María Henrika Caraballo</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Southeast Asia																	
18 Ecosystem health, Langat Basin, Malaysia. <i>Prof. Dr. Mohd. Nordin Hj. Hasan., LESTARI</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
19 Community-based tiger conservation, Cambodia. <i>Sun Hean, Dept. of Forestry and Wildlife</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
20 Rice IPM in Indonesia and elsewhere in Asia. <i>Dr Peter A. C. Ooi, FAO</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
21 TEV, Can Gio mangrove ecosystem, Vietnam. <i>Le Duc Tuan, Vietnam</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
22 Melaleuca wetlands Mekong Delta, Vietnam. <i>Duong Van Ni</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
23 Non-Timber Forest Products in Lao PDR <i>Joost Foppes and Rachel Dechaineux, IUCN-Lao</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
24 ICDP for Siberut Biosphere Reserve, Indonesia. <i>Ir. Zuwendra, Siberut National Park</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
25 Chenderoh Reservoir, Perak, Malaysia. <i>Prof. Dr. Ahyudin B. Ali, Universiti Sains Malaysia</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
26 Ecoregion conservation in Cambodia, Lao PDR and Vietnam. <i>Ben Hodgdon, WWF Vietnam</i>	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Note: Three case studies were omitted as they did not sufficiently relate their analysis to Decision V/6.

Table 6. How the case studies relate to the CBD

	Southern Africa	South America	Southeast Asia
CBD thematic area			
Forest biodiversity	4, 7	8, 10, 14, 15, 16, 17	18, 19, 21, 23, 24
Marine and coastal biodiversity	5	8, 11, 12, 14	18, 21
Inland waters biodiversity	1, 3, 6, 7	9, 12, 13, 14, 16	18, 22, 23, 25
Dry and sub-humid lands biodiversity	2, 3, 6, 7	9, 15, 16	19, 23
Mountain area biodiversity	8, 9, 17	18, 19, 23	
Agricultural biodiversity	7	8, 9, 12, 15, 17	18, 20, 22, 23, 24
CBD cross-cutting issue			
Invasive alien species	9, 16	18, 24	
Indicators of biodiversity	8, 9, 14, 16	18, 20, 23, 25	
Incentives	1, 2, 5, 7	20, 21, 22, 23, 24	
Impact assessments	3	8, 9, 15, 16	18, 20, 21, 22, 23, 25
Benefit sharing	2, 4, 7	11, 15, 16, 17	21, 22, 23, 24, 25
Indigenous and local communities	4, 7	8, 10, 11, 13, 15, 16	19, 20, 21, 22, 23, 24, 25
Sustainable use	1, 2, 3, 4, 5, 6, 7	8, 9, 10, 12, 13, 14, 15, 16, 17	18, 19, 20, 21, 22, 23, 24, 25
National Biodiversity Strategy and Action Plans	1, 2, 5	8, 9, 14, 16	24

Interpreting Decision V/6

Experience from the workshops demonstrates that even conservation and biodiversity professionals find it challenging to interpret Decision V/6. While the Principles and Operational Guidance were accepted as being widely relevant, they were also found to be very general, without clarity about how the approach can be applied to address specific problem scenarios. In particular, tools and guidance need to be developed that do the following:

- 1) address the variety of typical problems; and
- 2) are relevant at the policy, field and other levels.

Problem-specific guidance is needed

All principles and guidelines do not always need to be applied

Such guidance would be most effective when illustrated by problem-specific case studies. Without such detailed information, interpretation and hence implementation of the Ecosystem Approach is likely to be hampered.

One question that commonly arose in workshop discussions, to which there were a variety of responses, was: *Is it necessary, in every scenario, for all Principles and Operational Guidance to be applied for an activity to be described as the Ecosystem Approach?* Some people argued that all Principles must always be applied and that it is not possible to identify a sub-set of core Principles. There was more support for identifying a sub-set of core Principles for each type of problem scenario. This idea was also felt to be useful because it would simplify interpretation of the Approach. There was also support for making the Operational Guidance the core of the approach, while each Principle would be considered in each case *but not necessarily applied*. Following this interpretation of Decision V/6, when a Principle is not applied in a given problem scenario then the reason for its omission must be defended. Indeed, the majority of participants thought that, depending on the scenario or problem being addressed, one or more Principles could be omitted and the activity could still fairly be described as following the Ecosystem Approach. Although few, if any, case studies can be said to have applied all of the Principles, the consensus was that most of them were nonetheless effective at illustrating the Ecosystem Approach.

Equal emphasis on each CBD objective is not essential

The Ecosystem Approach is the primary framework for delivering the three objectives of the CBD: conservation, sustainable use, and equitable sharing of benefits from genetic resources. Therefore, when implementing the Ecosystem Approach, all three objectives need to be considered. But does each CBD objective need to be given equal priority in each use of the Ecosystem Approach? Typically, the case studies addressed benefit-sharing through efforts to address social concerns while achieving conservation or sustainable use. Analysis of the case studies

indicates, however, that they generally gave priority to only one or two of the CBD objectives. Workshop participants considered that so long as each CBD objective was considered it was not essential to strive for each objective simultaneously and with equal effort. This issue needs consideration in any further guidelines for implementation of the Ecosystem Approach.

The 12 Principles need to be considered but not necessarily applied

Chapter Two

Participation and societal choice

Case studies emphasise participation, decentralisation and societal choice

In many case studies the most relevant aspects of Decision V/6 are **Principles 1** (societal choice), **2** (decentralised management) and **12** (the engagement of the widest possible range of stakeholders). In other words, those aspects of the Ecosystem Approach that relate to effective participation are the ones most commonly emphasised in the case studies. In summary, participants emphasised that stakeholder participation would be vital to achieve the following:

- identifying societal choice;
- the long-term success of activities;
- creating a sense of ownership and commitment to the Ecosystem Approach among communities;
- the inclusion of all types of knowledge (indigenous, local and scientific) in Ecosystem Approach strategies;
- identifying high-priority socio-economic needs; and
- identifying appropriate incentives to encourage long-term participation.

Long-term, sustained participation from all stakeholders is a priority

Workshop discussions emphasised that participation must be active and “real”, both in project conceptualisation and management. It should not merely involve representation at a planning workshop. Without appropriate training, awareness and facilitation, however, the active and sustained participation of all stakeholders cannot be assumed. The significance of achieving sustained and active participation was stressed during the South American workshop, as reflected in the workshop report:²

In many field projects people have a superficial participation, as participation is limited to attending a workshop where they are given some material and asked some questions

2. María Ripa de Marconi. 2000. *Memoria del Taller Sudamericano, El enfoque ecosistémico en la aplicación de la CBD: de la teoría a la acción*. Villa de Leyva, Colombia 18-20 de septiembre de 2000.

whose answers are recorded and used to prepare a document. Participation should consist of people feeling part of the project and this is a much more difficult challenge, requiring a much more open-handed approach to the work carried out, placing decisions in the hands of the people. It is a long process and they must feel that what they propose is really being carried out.

Participation of the widest possible range of relevant stakeholders and sectoral interests in planning and management was considered by workshop participants to be vital for the identification of societal choice (Principle 1), both at the planning stage and when making decisions based on adaptive management (Operational Guidance 3). Societal choice can only be reflected in planning and management decisions if all interested parties are fully engaged. Nonetheless, the difficulties of reconciling opposing views to achieve a single identifiable “societal choice” should not be underestimated. Realising societal choice often, and perhaps typically, requires that a balance be achieved between competing views that are not easily reconciled. Historical tensions between authorities and communities can be an obstacle to participation if they create an atmosphere of distrust. Conflicts over land rights, between local and global interests and between authorities representing different sectoral interests were commonly cited in discussions and case studies, but workshop participants noted that authorities commonly lack the mechanisms to resolve conflicts. While the Ecosystem Approach is a framework for implementing the CBD by achieving a balance between contrasting stakeholder objectives, its potential as a basis for conflict resolution needs to be tested.

Many case studies were examples of strategies like the Ecosystem Approach being used at the landscape scale. Participants noted that the motivation of stakeholders in small-scale activities that are directed towards meeting landscape-scale objectives cannot be assumed. Yet even

Societal choice requires broad, effective participation and conflict resolution

CASE STUDIES

2, 4, 7,
15, 18,
19, 23,
24, 25

1, 3,
5, 8, 9,
18, 24

CASE STUDIES

Training for biodiversity professionals will increase participation

Human and technical capacity must be significantly enhanced

when the wider landscape perspective is taken, the engagement of local communities is essential. For example, a multidisciplinary survey at the landscape scale may be used as the basis for designing and targeting small-scale, community-based activities. But activities must be identified and specified *with* stakeholder communities in order to build awareness, support and, vitally, a common vision for the management of the larger landscape.

Increasing participation

Motivating biodiversity professionals and the wider biodiversity community to participate in implementing the Ecosystem Approach may be challenging. Their commitment would be enhanced significantly, however, if awareness and understanding of the Ecosystem Approach were improved by carrying out the following:

- building capacity of national CBD Focal Points or alternative Ecosystem Approach coordinating offices;
- provision of on-the-job training by universities and other bodies to raise awareness and understanding in diverse disciplines;
- revision of university and other training course curricula to include the Ecosystem Approach; and
- establishing regional centres to provide training in the technical and management skills needed to implement the Ecosystem Approach.

Workshop participants acknowledged that participatory processes are time-consuming and can be costly. Even when communities are keen to participate they often lack the training and resources to contribute as effectively as the statutory authorities to the planning and management processes. Participants also recognised that effective implementation of the Ecosystem Approach will often depend on the development of new or enhanced human and technical capacity among government and other implementing agencies. Most participants in the workshops indicated that their country lacked sufficient expert

personnel to undertake actions under the Ecosystem Approach to implement the CBD. A number of specific human and technical needs were identified, ranging from taxonomy to management techniques appropriate for holistic decision-making (Table 7). The specific requirement for each technical area needs to be assessed at the provincial, national and regional levels.

Technical training needs must be assessed at the provincial, national and regional levels

Table 7. Capacity building: high-priority needs

- biological skills such as ecology and taxonomy
- accessible information
- environmental engineers
- financial resources
- resource inventories
- environmental economists
- functional analysis tools
- social scientists
- development planners
- training in indicators, monitoring and adaptive management
- managers who can coordinate multidisciplinary activities; achieve a collectively agreed vision; mobilise stakeholders, including communities; and manage finances

Chapter Three

Scale

Identifying the lowest appropriate level for management

The Ecosystem Approach can be applied at any scale, from a single farm to an ecologically defined, transnational region. As with the “ecosystem” concept, the area over which the Ecosystem Approach is applied can be defined according to the issue at hand. The flexibility of the Ecosystem Approach means it can even be applied at the scale of planet Earth. The “lowest appropriate level” (**Principle 2, Operational Guidance 4**) may differ widely depending on the problems that the Ecosystem Approach is being used to address. Despite this fact, however, the lack of relevance of **Principle 7** to the case studies (Table 5) suggests that relatively few case studies explicitly considered how to identify the most appropriate scale when tackling a particular problem.

At the local level, as in the example of Integrated Pest Management (Case Study 20), the Ecosystem Approach can be applied at the scale of individual farms or even fields in Asia.

A number of participants proposed that the Ecosystem Approach be applied to address identified problems and that the appropriate scale for management should therefore be defined in each case by the problem being addressed.

Another interpretation of the “lowest appropriate level” is this: the Ecosystem Approach is best understood as a vision for an area — a river basin, biosphere reserve or ecoregion — that is large enough to include the biophysical and human factors that determine the way the ecosystem functions, but where actions are primarily carried out at the local level, and where they deliver benefits to livelihoods and local environments. According to this interpretation, while management of activities is primarily at the local/

1, 3,
5, 8, 9,
18, 24

CASE STUDIES

Local-level actions can contribute to landscape-level implementation of the approach

village/community/farmer level, local-level actions need not meet all the specifications of the Ecosystem Approach so long as at the larger scale they contribute to delivering the balance that the Ecosystem Approach vision and hence all three CBD objectives requires.

Decentralising management

Workshop discussions and case studies emphasised that decentralised management is typically vital to achieving the stakeholder participation needed to implement the Ecosystem Approach. When applying the Ecosystem Approach at the landscape scale, however, management cannot be fully decentralised to the local-level, making it problematic to engage local-level participants. Workshop participants identified a number of specific obstacles to decentralised management when applying the Ecosystem Approach at the landscape scale:

- lack of local capacity, including skilled labour, as well as institutional weakness;
- inexperience of local level managers in negotiations, discussions and in relation to authorities and donors.
- the centralised decision-making that is the norm in most countries;
- the application of decentralising measures runs the risk of alienating political support from the centre.
- centralised decision-making is perceived to be beneficial as it can lead to faster results; and
- the potential loss of the larger-scale vision necessary to tackle the overall problem. This may, for example, be the case where benefits are enjoyed non-locally (as in improvements to downstream water quality) and where incentives to the local community undertaking ecosystem approach management actions are not clear or immediate.

A combined bottom-up and top-down approach will often be the best way to identify the most appropriate mechanism for engaging people at the local level when applying the

Obstacles to decentralised management need to be overcome

Both top-down and bottom-up approaches need to be integrated

5, 8, 26

CASE STUDIES

Ecosystem Approach at the landscape scale. In ecoregions, for example, high-priority regions are identified according to their global biodiversity significance but actions within ecoregions are locally driven to address local priorities. In other words, ecoregion management seeks to link “top down” with “bottom up” approaches. Some workshop participants were divided over the feasibility of any top-down approach unless it addressed important needs. Many participants, however, were in favour of combining top-down and bottom-up approaches, and noted that the value of existing structures (institutional and legal) should be recognised when identifying the appropriate scale and mechanisms of management.

24

CASE STUDY

Implementing the Ecosystem Approach

Parties to the CBD are responsible for implementing the CBD at the national scale, while also considering transboundary issues and wider regional and global priorities. At the national level, tension between local and central governments can hinder implementation of the Ecosystem Approach. As shown in Case Study 24 from Siberut, Indonesia, for example, the central government endorses the Ecosystem Approach, but the recently formed local government — which administers Siberut — does not.

The first planning and strategy step of most Parties in implementing the CBD has been the development of National Biodiversity Strategies and Action Plans (NBSAPs). Implementation of NBSAPs requires integration of biodiversity into diverse sectors of the economy and government. The workshops considered that the Ecosystem Approach provides an appropriate framework for balancing conservation and development needs at the national level. Often, however, there is a need for NBSAPs and other policy instruments to be revised following Decision V/6 so that they incorporate the Ecosystem Approach (**Operational Guidance 5**). Furthermore, and importantly, effective linkages need to be established between NBSAPs and frameworks for economic planning so that biodiversity,

NBSAPs need to incorporate the Ecosystem Approach

through the Ecosystem Approach, is mainstreamed into development practice. Workshops identified the need for NBSAP guidelines (produced by organisations such as IUCN and WRI) to be updated to provide guidance on how to integrate the Ecosystem Approach into NBSAPs. National workshops were identified as an appropriate action to engage a diversity of stakeholders in integrating the Ecosystem Approach into NBSAPs and wider policy areas.

At the global level, trade is likely to continue to rapidly increase, bringing more and more connections between consumers and producers in different parts of the world. Many internationally traded commodities have significant impacts on biological diversity and ecosystem functioning. Although local communities can benefit from such trade, gains are often minimal, as people have little if any influence over access to markets or the marketing of their produce. Participants identified the Ecosystem Approach as a potentially appropriate framework for trade regulations that would safeguard the sustainability of productive export systems, equitably distribute environmental costs and benefits and protect biological diversity. It was recognised that the Ecosystem Approach may be an appropriate framework for ensuring that international trade does not compromise the objectives of the CBD and that World Trade Organisation rules should be consistent with the Ecosystem Approach.

Time scales

Politicians, producers, communities, businesses, donors, national and local authorities, and others who determine the fate of biodiversity all operate according to different timelines. These different time scales probably cannot be changed, but they must be managed if the Ecosystem Approach is to be successfully implemented. Case studies demonstrated that projects need to meet the expectations and needs of various stakeholders by having medium- and long-term aims (**Principle 8**), but with concrete, short-term actions.

CASE STUDY

23

The Ecosystem Approach could be used to ensure that trade is in harmony with CBD objectives

CASE STUDIES

1, 2, 4, 6, 8, 9, 11, 13, 14, 16, 18, 20, 22, 23, 25

Immediate benefits are needed if long-term aims are to be delivered

Although participants agreed that long-term objectives were central to the Ecosystem Approach, there was concern that Decision V/6 does not sufficiently emphasise the need for immediate benefits for the communities involved in delivering the Ecosystem Approach. There was also concern that governments do not like to make long-term commitments and are not interested in activities that don't have at least medium-term political benefits.

Delivering the CBD objectives through the Ecosystem Approach may, in some circumstances, first require socio-economic priorities to be addressed. Those people in greatest need are often socially and economically marginalized, and have immediate survival needs that may be completely different from those of the technician delivering the Ecosystem Approach. Human needs are immediate: a sustainable future is irrelevant to people in need today. But the need to set short-term objectives and goals does not come only from the users and providers of natural resources; the conservation needs of ecosystems or species in a critical condition can be urgent as well.

The short-term nature of projects was of great concern to all participants. Too often projects fail to find long-term solutions to the problems they seek to address. In practice, however, the limitations of short-term projects can be at least partially overcome by:

- integrating pilot projects of short- and medium-term duration in long-term programmes.
- the acceptance and dissemination of ideas among local participants.
- a realistic project exit strategy that provides for continuity of activities initiated by the project and for its economic sustainability in the medium to long term following short-term start up funding.

Chapter Four

Benefit sharing and incentives

The term “benefit sharing” has broader significance under Decision V/6 than elsewhere in the CBD. Although one of the three CBD objectives is the “fair and equitable sharing of the benefits arising out of the utilization of genetic resources”, its definition in Decision V/6 includes “Benefits that flow from the array of functions provided by biological diversity at the ecosystem level” (Operational Guidance 2). The sharing of benefits — or services — from ecosystem functions has potentially far-reaching implications, a number of which were explored in the workshops.

For some participants, the idea of benefit sharing was not new; it was understood as another term for reforms to land ownership and land use. Discussions demonstrated that equitable sharing under the Ecosystem Approach could be achieved in a number of different ways. For example, benefit distribution could include a tourist operator paying compensation to fishers to stop dynamite fishing, thereby preserving a coral reef for enjoyment by tourists (and for the long-term benefit of the fishing community). Workshop participants expressed the need for guidelines on benefit sharing and incentives under the Ecosystem Approach and identified the need for joint implementation of Decision V/6 and Decision V/15 on incentive measures.

Sharing costs and benefits across scales is a distinct feature of the Ecosystem Approach. Benefit-sharing mechanisms also have the potential to involve disparate stakeholders who do not typically identify themselves as having common interests, as in the payment of benefits to those who ensure or enhance ecosystem services. This could be appropriate, for example, where downstream fishing communities benefit from upstream land management within a catchment. In this scenario, upstream land managers would be paid for the services they provide in the form of cleaner, more productive and more biologically diverse water.

Under Decision V/6 benefit-sharing includes ecosystem services

Benefits can be shared non-locally

Management based on ecological principles can be cost effective and also enhance biodiversity

Benefit-sharing under the Ecosystem Approach may not always require a financial incentive or regulations. Indeed, statutes and regulatory or prescriptive approaches are often difficult to enforce. Non-prescriptive solutions, based on the active support of stakeholders, may have the greatest chance of success. For example, it may not be necessary to pay a landowner to undertake measures that improve water quality if those measures result in benefits to him or her. This is the case where fencing and careful use of fertiliser reduces costs for the landowner while also improving the biological diversity of catchment water and revenue from fishing.³

Costs and benefits cannot always be internalised within ecosystems

Principle 4 calls for costs and benefits to be internalised “in the given ecosystem to the extent feasible”. In some scenarios, however, costs and benefits must be considered from a global perspective. For example, land managers who reduce emissions of greenhouse gases could, under agreements designed following the Ecosystem Approach, receive payment from those who enjoy this enhancement to ecosystem services. As the benefits of a reduction in greenhouse gases are felt globally, it is reasonable to expect that the costs should also be applied globally. Ideally perhaps, a financial mechanism would not be necessary, as the land manager would see a direct economic benefit from improved management; for example, soil fertility improvements that result from low tillage management (and lower carbon dioxide emissions). Parties to the United Nations Framework Convention on Climate Change (UNFCCC) might usefully examine how the Ecosystem Approach could be a framework for sharing costs and benefits under the Kyoto Protocol.

Case study 1 reported the need for wider socio-economic priorities such as medical facilities, transport links and

3. See the Tamar 2000 case study in Maltby, E. 1999. Ecosystem approach from principles to practice. In: Schei, P. J., O. T. Sandlund and R. Strand (eds.) *Proceedings of the Norway/UN Conference on the Ecosystem Approach for Sustainable Use of Biological Diversity*, pp. 30-40, Norwegian Directorate for Nature Management (DN) and Norwegian Institute for Nature Research, Trondheim, Norway.

schools, to be addressed before communities would be willing to be actively involved in a project. This situation may be most likely where the Ecosystem Approach is applied to a wide area such as a river basin. It is not realistic to expect local communities or stakeholders to be willing participants in Ecosystem Approach activities unless they identify with and benefit from the larger-scale vision. In addition, when the Ecosystem Approach is applied at such a large scale, not all stakeholders benefit as immediately or significantly as others. The workshops highlighted the need for benefits to go directly to those involved in delivering the Ecosystem Approach.

The workshops recognised that **Operational Guidance 2** and **Principle 5** are important for the delivery of benefits under the Ecosystem Approach, but found that two factors hindered their application. First, there is a lack of scientific assessment and quantification of the services provided by most ecosystems. Valuing these services requires a greater degree of understanding of ecosystem functioning than is often possible. Complete understanding is unlikely in most instances, making it necessary to proceed on the basis of limited knowledge. Modelling of ecosystem functioning can predict the likely effects of management decisions and is a practical and viable solution where field data are lacking.

Second, even when the functional aspects of an ecosystem are well understood there is an absence of widely agreed procedures or guidelines for evaluating them. Having standardised procedures for evaluating ecosystem services under the CBD would significantly increase the potential impact of the Ecosystem Approach. Workshop participants agreed, however, that any mechanisms that are established need to deliver benefits directly to those responsible for the maintenance and management of ecosystem services.

Participants recognised that there is often a need to promote awareness and appreciation of biological diversity and its functions so that societal choices (Principle 1) balance the value of biological diversity with economic

Modelling of ecosystem function can help predict possible management impacts

Standardised methods for valuing ecosystem services need to be developed and applied

**Perverse
incentives
often distort
societal choice**

factors (Principle 4). Even when society puts a high value on biological diversity, however, perverse incentives often distort the true costs of economic exploitation of the environment and the conservation and sustainable use of biological diversity. Workshop participants suggested that there is great scope to redirect perverse incentives so that economic objectives are met while threats to biological diversity are reduced. For example, perverse incentives such as tax measures damage biological diversity by promoting recreational facilities (e.g. golf courses) in areas such as tropical forests that are rich in biological diversity and deliver important ecological services. For the same cost, and with the same or greater economic benefits, incentives could support alternative recreational facilities and businesses that do not have a negative impact on biological diversity or ecosystem functioning. The removal of perverse incentives can therefore be pivotal in achieving a balance between economic and biological diversity objectives that fairly reflects societal interests.

Subsidising the cost of fertilisers, pesticides and herbicides is another example of a perverse incentive. For example, field studies demonstrate that the use of fertiliser can be cut dramatically in many farming systems with benefits to the farmer (reduced costs) and to biological diversity (reduced eutrophication of catchment water). In Asia, reduction in pesticide use has resulted in increased rice yields. Results like these are most likely when incentive reduction or abolition is coupled with awareness building so that farmers choose to adopt an ecological perspective in their land management.

20

CASE STUDY

Chapter Five

Science, information management and decision-making

The lack of relevance of Principles 3, 6 and 9 in a number of case studies (Table 5) indicates a common disregard of applied ecosystem science. Principle 3 was found to be the least relevant of all the Principles, suggesting that many case studies did not consider the impact of activities in the project/target area on other ecosystems, or vice versa. The lack of importance attached to Principle 3 may reflect the general absence of appropriate (local, national, regional and international) institutional and financial structures and mechanisms. These are needed to value ecosystem services whose benefits extend beyond ecosystem boundaries. Ecosystems typically provide services (such as improvements to water quality that have little or no immediate financial value) or benefits that are received outside of the ecosystem. A number of other factors may also contribute to a neglect of inter-ecosystem relationships:

- the tendency for ecosystem managers (as with all people) to have a limited vision, to be interested only in the areas where they work, without being aware of interactions with neighbouring localities;
- the traditional focus of conservation efforts on target protected areas even though activities outside these sites may have a significant and damaging impact within them;
- the site-specific nature of most projects that seek to catalyse or demonstrate best practice in ecosystem management; and
- understanding inter-ecosystem effects requires long-term monitoring of biophysical processes, in some cases over very large areas. This presents significant practical difficulties.

One management system that implements Principle 3 through its implicit recognition that there are ecological

Ecosystem science is often neglected

Ecosystems often provide services that have little or no immediate financial value

7, 12,
15, 21,
24

CASE STUDIES

Adaptive management is necessary due to significant uncertainties in ecosystem science

Planning systems need to focus on objectives, not activities

connections between, for example, buffer and core zones is the UNESCO-MAB Biosphere Reserve system. Management that considers the ecological linkages across landscapes is commonly lacking, however, and needs promoting if there is to be wider implementation of Decision V/6.

Adaptive management

The reality of changing and dynamic ecosystems was recognised by many participants although was perhaps not widely examined in the case studies. In addition, the great uncertainty about even fundamental ecological questions was highlighted. For example, determining the carrying capacity of many ecosystems (e.g. marine, savanna and tropical forests) is problematic and controversial, making it difficult to manage ecosystems within their functional limits (**Principle 6**). This uncertainty demonstrates the need for adaptive management (**Operational Guidance 3**). Any adaptive management (or “learning-by-doing”) system needs to include strong links between managers and the latest scientific expertise on ecosystem functioning and processes. The effectiveness of this link is dependent in part on the ability of the latter to translate science into practical guidelines and tools.

It was recognised that the science of adaptive management was new to many stakeholders. People engaged in ecosystem management need to ensure they have sufficient training in this area so that they can respond to the inevitable changes that occur to both the physical and socio-economic environment (**Principle 9**). Management of projects needs to be able to adapt to political and financial uncertainties, as well as to, for example, climate variation. Organisations implementing the Ecosystem Approach need to adopt flexible planning systems that are centred on objectives, not activities.

Monitoring underpins adaptive management and it depends on adequate feedback mechanisms. Without such mechanisms managers cannot respond to change. Deciding which indicators to use for monitoring is crucial; faced with

the widespread situation of limited financial resources and personnel, monitoring multiple indicators is often a practical impossibility. It is therefore essential to select those key indicators that will allow the implementation of an adaptive management model. Workshop participants noted that indicators of ecosystem functioning and sustainable use should be developed with communities so that they incorporate any relevant indigenous knowledge and, importantly, so that the communities have a direct sense of responsibility over the quality and productivity of their environment. Overall, workshop participants were concerned that few case studies provided much guidance on how to successfully select indicators, undertake monitoring and revise activities as new information was received.

Accessibility and management of information

In many countries, scientific information exists that is relevant to the conservation objectives of the Ecosystem Approach but it is unavailable, or needs interpretation, synthesis and visualisation. Workshop participants reported problems both with the existence of information and its accessibility. Decision-relevant data, such as consultants' reports and information held in ministries, along with scientific and socio-economic materials, should be made widely available and shared among ministries and the wider public.

Information is not always available in an appropriate format. For example, a significant number of biological and ecological studies and records exist in libraries, ministries and herbaria, but in many cases this information is not readily accessible to those setting conservation priorities. Under the Ecosystem Approach it is vital that this existing information be made readily accessible, ideally in a collated and processed form that non-expert decision-makers and planners can easily understand.

Although the importance of incorporating local knowledge (**Principles 11 and 12**) was recognised by workshop

Guidelines and case studies on indicators are needed

Existing information needs to be synthesised and made widely available in appropriate formats

Some scientists are reluctant to integrate local knowledge with scientific information

participants, it was also acknowledged that little has been achieved in this area. Some scientists are reluctant to integrate local knowledge with scientific/technical information. But such knowledge integration can be used to create problem-specific knowledge bases and decision support tools that can help non-specialists visualise and interpret diverse data and can therefore help all stakeholders make appropriate management decisions under the Ecosystem Approach. It is important that those who contribute indigenous knowledge to Ecosystem Approach knowledge bases benefit appropriately.

Decision support tools can use all forms of local and scientific knowledge to guide decisions

Workshop participants recognised that decision-making under the Ecosystem Approach requires highly diverse information (e.g. biophysical, economic, sociological and political) to be evaluated by a wide range of stakeholders, each with distinct experiences and expertise. Few people have the multi-disciplinary expertise required to make informed decisions under the Ecosystem Approach. Decision support tools can help users by making information available graphically and, if the tools are linked to a suitable knowledge base, can guide the non-expert user through a series of choices to arrive at a decision informed by the best expert knowledge. Knowledge bases that incorporate both local and multi-disciplinary scientific knowledge therefore need to be constructed to address each identified problem. With a suitable knowledge base, decision support tools can assist all stakeholders in both day-to-day management and, through scenario visualisation, in predicting the likely outcome of different management decisions made under the Ecosystem Approach.

Chapter Six

Structural and inter-sectoral issues

Implementation of Decision V/6 will require unprecedented cooperation between government and other administrative sectors. Consequently, workshop participants identified the sectoral structure of government as a major obstacle to implementation of the Ecosystem Approach (**Operational Guidance 5**). Participants thought that the mandates of government and non-governmental institutions typically reflect a fragmentation of responsibilities, supporting legislation and resource allocations. This disjointed approach to decision-making can cause confusion; each institution or sector typically has its own priorities, message and associated jargon.

Changing the structures of government was thought to be impractical in most cases. Harmonisation of policies, institutional mandates and laws to remove inconsistencies and obstacles to the Ecosystem Approach is probably more feasible and therefore more likely to have an impact than far-reaching institutional changes. Such efforts are likely to be facilitated if, as in Colombia, there are environmentally trained staff members in a range of government ministries. In addition, participants considered that new or existing high-level inter-ministerial committees or working groups were appropriate for forming the shared vision needed to implement the Ecosystem Approach. Other possible structures, perhaps most relevant in countries that are reviewing or newly specifying the roles of government bodies, include an office responsible for the Ecosystem Approach that is answerable to the Head of State.

Whereas high-level institutions may be vital for harmonising policies, the value of inter-sectoral coordination may best be demonstrated at the local level using existing or newly created organisations dedicated to community empowerment. Working examples of successful cooperation can then be popularised more widely by central bodies.

Sectoral divisions within government are a major obstacle to use of the Ecosystem Approach

CASE STUDY

7, 10

CASE STUDIES

1, 4, 9,
13, 16,
18, 19,
23

Greater coordination of international environmental agreements can lead to wider use of the Ecosystem Approach

Implementation of the various international conventions on the environment is sometimes poorly coordinated, although many of them have objectives and strategies that are largely consistent with the Ecosystem Approach. Parties to the Convention on Wetlands (Ramsar, 1971), for example, are required to implement “wise use” principles (Article 3.1). In principle, synergies between conventions can be used to promote use of the Ecosystem Approach. In practice, however, workshop participants considered that the implementation of international conventions is often constrained by the failure of governments to allocate the necessary capacity and budget to promote and enable implementation. There is also the need in many countries for significantly greater cooperation between ministries charged with implementing the various conventions.

Wider ratification of conventions such as the Convention to Combat Desertification (CCD), the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Wetlands can help to harmonise policies across national boundaries in a manner consistent with the Ecosystem Approach. For example, a dispute over grazing lands between neighbouring countries may be more easily resolved if they have a common environmental commitment confirmed by ratification of the relevant international agreements.

CBD Focal Points

CBD Focal Points need to be able to effectively facilitate the adoption of the Ecosystem Approach

In many countries, the current status of CBD coordinating authorities, or Focal Points, was viewed to be insufficient to effectively facilitate the adoption of the Ecosystem Approach. Participants discussed how to strengthen the role of CBD Focal Points. One option proposed was for the office of the Focal Point to be supported by a technically proficient secretariat, so that it has the information and resources necessary to promote the delivery of the CBD objectives through integration of the Ecosystem Approach in decision-making in all relevant sectors. A number of suggested roles for Focal Points were identified (Table 8).

Table 8. Suggested responsibilities for a CBD Focal Point

1. Encourage action on the Ecosystem Approach among all sectors of government;
2. Catalyse the development of appropriate financial and institutional mechanisms to ensure that projects are sustainable once external funding ceases;
3. Secure the means of financing project activities in collaboration with the CBD Secretariat, GEF and other partners;
4. Advise on the priorities for harmonisation of legislation, laws and institutional mandates;
5. Advise government on the priorities for strengthening positive and reducing negative incentives;
6. Identify conservation priorities;
7. Coordinate and facilitate national dialogues to review biodiversity programmes, identify opportunities, and support projects and activities;
8. Develop a national database of experts who can support CBD implementation and liaise with collators of appropriate regional and international databases;
9. Make the case for government interventions to prevent activities that hinder a country's fulfilment of CBD objectives;
10. Recommend priorities for the development of local capacity for implementation of CBD/Ecosystem Approach.

Chapter Seven

Other conservation strategies

Workshop participants expressed the need for guidance on how the Ecosystem Approach relates in practice to other (more traditional) conservation strategies, especially species survival plans and protected areas. A number of questions were identified:

- when are other approaches more appropriate?
- is the Ecosystem Approach a strategy that complements or competes with other conservation approaches?
- when are protected areas appropriate within the Ecosystem Approach?
- can and should protected areas be planned as part of a spatially more extensive, Ecosystem Approach framework?
- under the Ecosystem Approach, should there be a balance between conservation, sustainable use and equitable sharing of benefits at one or more of the local/provincial/national/regional/global scales?
- should each protected area seek a balance between use, benefit sharing and conservation?
- can protection of one charismatic species (e.g. *Gorilla gorilla*) preserve an ecosystem and its vital services?

The relationship of the Ecosystem Approach to protected areas was of particular interest to participants. Protected areas have long been of central importance to conservation and a high proportion of workshop participants were conservation professionals. It was considered that protected areas should be part of the Ecosystem Approach framework, as called for by CBD Decision IV/7 on forest biological diversity. How this should be achieved depends on the scale at which the Ecosystem Approach is applied. At the landscape scale, a protected area may have the primary responsibility for delivering biodiversity benefits while other uses or production may be prioritised on the surrounding

Guidance is needed on how the Ecosystem Approach relates to other strategies

Protected areas have a number of possible functions within the Ecosystem Approach

land or water. Overall, within a landscape scale management unit that includes protected areas, the Ecosystem Approach can be applied and CBD objectives realised without it being necessary to achieve a balance between use, benefit sharing and conservation within the protected area itself.

Alternatively, the Ecosystem Approach could be applied at the scale of the protected area, i.e. without specific consideration of the surrounding landscape and its inhabitants. But application of the approach at this scale is unlikely to be successful, as it will inevitably be affected by the social and ecological systems beyond the boundaries of the protected area.

A number of case studies demonstrated that the Ecosystem Approach might be most effectively applied in the protected area context when benefits extend to the stakeholders both within and around the core area of high biodiversity. This reflects the reality that conservation often cannot be delivered without recognising and meeting human needs and rights. The Biosphere Reserve case studies of UNESCO demonstrate that Ecosystem Approach Principles and Operational Guidance can be highly relevant to the successful operation of protected areas when stakeholder needs are met.

While it is highly appropriate to apply the Ecosystem Approach to protected area management and this may be achieved in a number of ways, its implementation is not limited to protected areas. Indeed, its greatest potential contribution to CBD implementation may be its application in the approximately 90 percent of the planet that is outside protected areas. It is here that the challenge of conserving, sustainably using and equitably sharing benefits is most acute.

In situ conservation of charismatic species such as tigers, pandas and elephants typically requires that the habitat needs of the target species are balanced with the day-to-day needs of human populations. Traditional protected areas,

CASE STUDIES

7, 12,
15, 21,
24

The Ecosystem Approach may be most relevant when implementing the CBD outside protected areas

although essential, are often insufficient in themselves to conserve these species, as the vast areas often required to sustain viable populations typically include large human populations. The Ecosystem Approach is a particularly appropriate framework for achieving in situ conservation over wide areas, since it aims to find a balance between human needs and conservation. Guidelines are needed on how to use the Ecosystem Approach to achieve in situ conservation of charismatic and other species over wide areas. Such guidelines should draw on case studies that would include Biosphere Reserves and other protected areas with human populations (in some cases, with high population density).

Chapter Eight

Conclusions and recommendations

1. What is distinctive about the Ecosystem Approach?

- It provides a framework for planning and decision-making that balances the three objectives of the CBD.
- People are placed at the centre of biodiversity management.
- Capturing and optimising the functional benefits of ecosystems is emphasised.
- The importance of biodiversity management beyond the limits of protected areas is emphasised, while protected areas are recognised as being vitally important for conservation.
- The flexibility of the approach with respect to scale and purpose makes it a versatile framework for biodiversity management.

2. What has been learned from the three regional workshops?

(a) Overview

- There is still inconsistency in use of the term “ecosystem approach”.
- The Ecosystem Approach concept is already embraced to a significant extent by many practitioners and organisations and has been applied in various conservation, development and natural resource management contexts.
- Case studies presented at the workshops provide a range of valuable experience for others embarking on implementation of the Ecosystem Approach.
- It is essential to recognise the existence of differing societal priorities, economic needs and cultural perspectives when applying the Ecosystem Approach.
- Transboundary biodiversity problems can be addressed using the Ecosystem Approach and regional political structures.

(b) Gaps in knowledge and understanding

- There are many gaps in the technical understanding of ecosystem functioning.
- Guidelines are needed on how to use the Ecosystem Approach as a tool for mainstreaming the CBD into decision-making and planning.
- There are inadequate exchanges of relevant information between institutes and responsible agencies.
- Capacity in many areas of human resources is commonly insufficient to implement the Ecosystem Approach.
- There is limited understanding of the Ecosystem Approach.

(c) The main constraints to effective use of the approach

- Stakeholder participation in planning and management is ineffective.
- The use of terminology and definitions is inconsistent.
- Capacity for decentralised and integrated management is lacking.
- Institutional cooperation and capacity is insufficient.
- There is a lack of dedicated organisations able to support delivery of the Ecosystem Approach.
- Perverse incentives and conflicting political priorities are an overriding influence.

3. How can the Ecosystem Approach help implementation of the CBD?

- The Ecosystem Approach is a unifying tool that is appropriate for mainstreaming the CBD into decision-making, planning and the wider policy agenda.
- It codifies within the Convention what many Parties, institutions and agencies are already attempting to do with respect to project implementation and related policy obligations at local, national, regional and international levels.

- The Ecosystem Approach can be used to overcome sectoral divisions and thereby ensure that biodiversity conservation is well integrated with efforts to promote human welfare.
- The Ecosystem Approach can help policy-makers appreciate the importance of the vital ecosystem services that depend on biodiversity.
- Successful implementation of the Ecosystem Approach has the potential to assist the political process in realising the visions of civil society.
- Use of the Ecosystem Approach will implicitly emphasise benefit sharing and could provide a framework for resolving conflicts between sectors or stakeholders.
- The relevance of the approach to other conventions, such as the Convention on Wetlands and the CCD, can reinforce the delivery of all such treaties.
- The Ecosystem Approach underlines the importance of inter-sectoral cooperation, which is essential for better management of natural resources.
- Recognition of the need to combine both bottom-up and top-down mechanisms when applying the Ecosystem Approach can help facilitate achievement of the CBD objectives.
- Application of the Ecosystem Approach can help secure the future of protected areas while extending biodiversity management over the wider landscape.

4. What should be the next steps?

- Problem-specific guidance for the application of the Principles of the Ecosystem Approach should be developed.
- A concise definition of the Ecosystem Approach, and its relevance to implementation of wide-ranging environmental legislation and policy instruments in addition to the CBD, needs to be defined and promoted.
- Parties should be encouraged to develop new pilot projects and case studies that are based from the

outset on the Ecosystem Approach, and should make available the results of these practical experiences (both positive and negative) using, where possible, the Clearing House Mechanism (CHM) and other appropriate avenues.

- Ways in which the Ecosystem Approach can be more effectively integrated within conservation strategies and development plans at national and other scales (through, for example, NBSAPs) should be examined.
- Capacity building, to meet the specific human, technical and institutional needs required for use of the Ecosystem Approach, is a high priority.
- the non-conservation community, including industry, trade and finance sectors, must be engaged in the use of the Ecosystem Approach.

Recommendations: From concept to action

a: Parties
 b: NGOs
 c: CBD Secretariat and SBSTTA
 d: Educational and research institutions
 e: International organisations
 f: Funding bodies

Recommended action	target organisations					
	a	b	c	d	e	f
Building awareness						
use the case studies presented at the workshops to illustrate the Ecosystem Approach	•	•			•	•
carry out pilot projects and additional case studies to further illustrate the flexibility of the approach and the diverse problems it can address	•	•		•	•	•
use the Ecosystem Approach as the basis for mainstreaming CBD objectives into policy-making	•					
support mainstreaming of the Ecosystem Approach/CBD into policy-making and integrating the approach into NBSAPs by: 1) raising awareness among the non-conservation-sector and 2) national workshops	•	•	•	•	•	
communicate the Ecosystem Approach in short, easy-to-grasp phrases to both non-specialist policy-makers and environmental specialists		•		•	•	
help raise awareness of Decision V/6 by referring to the decision and definition of Ecosystem Approach in related work		•		•	•	•
build awareness of the significance of ecosystem functioning to human social and economic welfare				•	•	
consider identifying/developing regional centres of expertise able to take the lead in building awareness and capacity for the approach	•		•	•		•
empower community members to raise awareness and understanding of the Ecosystem Approach within their community	•	•				
Overcoming constraints/seizing opportunities						
harmonise policies, laws and financial mechanisms to promote implementation of the Ecosystem Approach	•					
agree to procedures for evaluating ecosystem services	•			•		•
adopt responsibility for mainstreaming the Ecosystem Approach into cross-sectoral decision-making through inter-sectoral structures, such as inter-ministerial committees	•					
ensure that the Ecosystem Approach is consistent with the objectives of other international environmental agreements	•	•			•	•
use appropriate regional protocols and administrative structures to catalyse implementation of the approach, especially across borders	•				•	
rather than developing new institutions and legislation, revise existing legislation, laws, taxation and policies to ensure that they promote implementation of the Ecosystem Approach	•					

	a	b	c	d	e	f
strive to achieve a common vision among all stakeholders when using the Ecosystem Approach	•	•			•	
projects and other actions in support of the CBD should consider engaging communities by direct and visible coupling of projects with development efforts that deliver socio-economic improvements	•	•			•	•
use the Ecosystem Approach framework to ensure that international trade does not conflict with CBD objectives	•		•		•	
develop indicators of ecosystem functioning and sustainability with local communities		•		•		
Priority actions						
develop practical, problem-specific guidelines that are relevant at the field level to help Parties and others to use the approach			•	•	•	
use both bottom-up and top-down strategies to define the most appropriate scale for management for each particular problem	•	•	•	•	•	
remove perverse economic incentives	•					
make professionals from non-conservation sectors of the economy and society (e.g. industry, agriculture and finance) aware of the approach	•	•		•	•	•
develop and disseminate easy-to-use decision support tools that integrate multidisciplinary knowledge (including from indigenous peoples)				•	•	•
make existing information relevant to decision-making under the Ecosystem Approach available and accessible to non-specialists	•			•		•
develop and disseminate guidelines and case studies on benefit sharing			•		•	
research the physical and socio-economic aspects of ecosystem function				•		•
Capacity-building priorities						
significantly enhance the capacity of and support for national CBD Focal Points so that they can successfully promote and facilitate implementation of the Ecosystem Approach	•	•			•	•
develop training in training modules relevant to the technical and management skills required to implement the Ecosystem Approach					•	
ensure that capacity building is long-lasting and is not limited by project funding cycles				•	•	•
should provide education and in-job training in adaptive management				•		
address the chronic lack of skilled labour and resources by considering the specific capacity-building needs for the Ecosystem Approach identified in this publication	•			•	•	•
Coordination with other approaches						
produce clear guidelines on how the Ecosystem Approach relates to other conservation and natural resource management strategies			•	•	•	

The Zambezi Basin Wetlands Conservation and Resource Utilization Project

Case Study 1

Problem statement

The project aimed to conserve the Zambezi Basin wetland ecosystems while facilitating their sustainable use.

Description

An integrated, multi-national approach to management was promoted to address the ecological degradation resulting from the unsustainable use of wetland resources. There were two main types of activity: (1) wetland conservation and (2) community well-being. The achievements were: (1) Zambezi basin biodiversity assessment, which identified priorities and provided a baseline inventory; introduction of resource-based management regimes, which encouraged resource use to be more sustainable; economic evaluation of wetland resources, which has helped raise local awareness and develop regional policies. (2) Health, education, food security, income and cultural values were enhanced. It was necessary to first address community well-being and try to meet people's immediate needs before addressing the conservation goals of the project.

Highlighted aspects of the Ecosystem Approach

- It was necessary to first focus on enhancing socio-economic conditions and sustainable use before turning to conservation and use.
- Economic valuations of goods and services were undertaken at regional and local scales.
- The immediate delivery of benefits to the people responsible for conservation and sustainable use is vital.
- Maintaining ecosystem functioning across the basin (and the value of products locally) was a high-priority objective.
- A multi-scale approach was taken: the economic valuation of goods, services and biodiversity were undertaken at the local and basin levels, and activities were targeted at the local (village-level institutions

Case study 1
Principles: 1, 2,
4, 5, 7, 11 and 12

CBD Thematic
Area: Inland
Waters

CBD Cross-
cutting issues:
Incentives,
Sustainable Use
and NBSAPs

Case Study 2

established and local bylaws passed) and transboundary scales.

- Improvements to the conservation and ecosystem service status of site studies were not fully evident within the five-year project period.
- The project aimed to make use of multidisciplinary scientific and traditional knowledge.

Conclusions

- Conservation and sustainable use objectives cannot be achieved unless education, health, gender equity, transport and incomes and human well-being are first addressed.
- Local-level economic resource valuation helped build awareness of the need for measures to ensure the sustainable use of the resource base.
- Popular media (radio plays and songs) using local community artists were important for building awareness of wetland values and sustainable use.
- Regional economic valuation of resources assisted in integrated transboundary planning within the basin.
- To be more useful, the biodiversity study report needs to be packaged into appropriate formats for the different stakeholders such as planners, policy-makers and local communities.

Community-Based Natural Resource Management: The Campfire Programme in Zimbabwe

Problem statement

The Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) is a Community-Based Natural Resource Management (CBNRM) initiative that aims to promote the sustainable use of natural resources, especially wildlife, for socio-economic development.

Description

In the semi-arid and arid regions of Zimbabwe, home to most of the population, communities had no vested interest in conserving wildlife, as they had become increasingly

alienated from its management and use. CAMPFIRE seeks to overcome these obstacles by demonstrating the livelihood and conservation benefits that result when the management and use of natural resources are decentralised. The focus has been wildlife management in communal areas, particularly those adjacent to national parks, where people and animals are in conflict over resources. Wildlife management and use has the potential to bring rapid economic returns in agriculturally marginal areas.

Highlighted aspects of the Ecosystem Approach

- By recognising that local populations need to experience real benefits if protected areas are to succeed in their conservation goals, this case study illustrates efforts to simultaneously achieve all three of the CBD objectives. However, the focus is on sustainable use to support rural social and economic welfare.
- Design and expansion of CAMPFIRE has been in response to the expressed needs of the participating population.
- The project has identified a number of questions relating to defining the lowest appropriate level of management: How should the unit of management be defined? Is it feasible to have different levels of devolution in one country? Participants realised that government will need to retain the right to intervene in situations where actions by some communities can negatively affect others, e.g. strategic resources and threatened species. The feasibility of devolving the management of wildlife from the district level to the ward and/or village levels is being investigated.
- The institutional problems of two government agencies led to the neglect of key strategic and policy issues.
- The only evaluation of goods and services related to wildlife use. Nonetheless, economic evaluation has allowed the long-term value of wildlife to communities to be contrasted with agriculture, cultural and political values, the programmes of donors and the demands of safari activities.

Case study 2
Principles relating to ecosystem function and ecological science (3, 5 and 6) were not addressed

CBD Thematic Area: Dry and sub-humid lands

CBD Cross-cutting issues: Sustainable use, Incentives, Benefit sharing and NBSAPs

- Adaptive management is seen to be important but the necessary ecological, social and economic monitoring and indicators have yet to be systematically applied.

Conclusions

- Wildlife protection can best be ensured when producer communities are given an economic and management stake in the wildlife resource.
- Administrative and institutional structures are needed.
- Communities can benefit more from wildlife than from agriculture in arid and semi-arid lands.
- Collaboration with a diversity of institutions has been the key to success.

Case Study 3

The Biodiversity Foundation for Africa and the Zambezi Society

Problem statement

The project aimed at making available biodiversity information that is site specific and multidisciplinary. It is intended to cover the full range of biological groups useful for effective monitoring of the impacts of developments on biodiversity and development and implementation of biodiversity conservation measures for the Zambezi Basin wetlands.

Description

The project approach built on available biodiversity information through a literature review and used field biological surveys to gather new information. This was followed by analysis and synthesis of this information and identification of information gaps. The scientific information collected was then packaged into concise, focused and digestible formats for policy-makers, decision-makers, planners and local communities at all relevant levels. The availability of scientific biodiversity information in the appropriate formats is useful and forms an important database for improved biodiversity conservation in the wetlands of the Zambezi Basin. The project specifically provided recommendations on the important species and

priority areas for biodiversity conservation within the Zambezi Basin Wetlands, recommendations for development agencies to ensure conservation of biodiversity and wilderness values, increased knowledge on the biodiversity of the Zambezi Basin and facilitated its use in planning processes within the basin.

Highlighted aspects of the Ecosystem Approach

- It was necessary to review the existing information before undertaking field surveys to collect new biodiversity information.
- The project made use of all relevant fields of knowledge and expertise to collect, analyse, synthesis and package information appropriate for different users.
- The project recognised the need to operate according to available capacities at manageable, site-specific scales within a larger ecosystem.
- Ecosystem managers need appropriate and scientifically correct information to be able to make informed management decisions.
- Recommended conservation actions need to be based on the best possible multi-disciplinary understanding of the status of species and ecosystems.

Conclusions

- Effective conservation of ecosystems involves not just a single species but all species. It is important, however, that particular key species within an ecosystem be identified as the focus of conservation actions while recognising the functional relationships in the ecosystem.
- Conservation activities that involve communities need to follow the pace of those communities and not the pace of outsiders such as implementing institutions, donors or others with externally determined deadlines.
- It is important to have a reliable and functioning monitoring system capable of indicating when a state of balance is achieved between conservation and use of biodiversity resources.

Case study 3
Principles 3, 5, 6, 7, 9 and 10 were emphasized

CBD thematic areas: inland waters and dry and sub-humid lands

CBD cross-cutting issues: sustainable use, impact assessment

Case Study 4

Sustainable Management of Indigenous Forests in Mwanza East, Malawi*Problem statement*

The project addressed the problem of deforestation of *Miombo* woodland in a catchment of the Shire, one of Malawi's major rivers. The area has experienced a rapid conversion of forest to agricultural land following the construction of a main road. The remaining forest faces greater pressure from humans, livestock and wildlife.

Description

Five approaches were used to reduce deforestation: (1) Involving local communities in awareness campaigns and training in improved forest management. These campaigns have benefited from local knowledge of forest management and establishment techniques. (2) Integration of women and other marginalised groups in forest resource management. Women suffer most as a result of declining availability of firewood and the drying up of streams due to siltation. (3) Empowerment of communities through the formation of various clubs and committees. Committees were needed to administer the management of forest resources because awareness and training were found to be insufficient to address the problem of deforestation. (4) Control of illegal timber, charcoal and fuel wood use by bylaws. Since the licensing system designed to control the harvesting of trees has been ineffective, the project developed bylaws that limited the use of forest resources by communities. (5) Harvesting and marketing of non-timber forest products (NTFPs). The project encouraged the diversification of forest product use by supporting the formation of groups to carry out management, utilisation and marketing. As a result of these efforts, communities are managing greater areas of forest, illegal harvesting of wood is being reduced, income-generating activities have increased and diversified, and communities are actively involved in forest management.

Highlighted aspects of the Ecosystem Approach

- The project has had some success in simultaneously implementing each of the objectives of the CBD. For example, conservation and sustainable use were balanced and the distribution of forest benefits made more equitable by adding value to sustainably harvested forest products (e.g. fruit juices) and successfully marketing them in urban areas.
- Societal choice – the setting of priorities by local communities was vital for the success of the project; this identified the need and potential for income generation.
- Goods, both timber and non-timber, were identified. Sustainably harvested non-traditional forest products replaced timber and charcoal as the preferred products.
- The success of the project in changing peoples' attitudes towards natural resources results from the local involvement of diverse stakeholders including churches, research institutions, NGOs, businesses and government departments.
- The project did not: (1) use or enhance knowledge of ecosystem functional relationships and processes (although their importance were acknowledged); or (2) use or test adaptive management.

Conclusions

- The activities and structures developed by a project can only be judged as successful if they survive in the longer term. Continuity of project-inspired activities will require further empowerment and strengthening of institutions at the village level.
- Obstacles to the success of the project included: 1) insecurity of tenure over customary resources; (2) over-harvesting of NTFPs; (3) insufficient community empowerment to prevent illegal forest use.
- The project needs to be expanded more widely in the catchment if the improvements to forest condition are to have a positive impact on the river.

Case study 4
CBD thematic areas: forest biological diversity

CBD cross-cutting issues: benefit sharing, indigenous and local communities and sustainable use

Case Study 5

- A focus on the value of individual species (and neglect of their ecological function) has led to over-harvesting of some species and unknown ecological effects.

East African Marine ecoregion project

Problem statement

The overall goal of the project is to maintain a well functioning ecoregion where representative species and habitats are conserved and people use marine resources in a sustainable manner.

Description

The main focus of the project is to protect key sites, processes and wildlife populations in the marine and coastal habitats by promoting the implementation of policies and practices that support protection and wise use of marine resources. The other goal is to strengthen the capacities of local, national and regional institutions, enabling them to effectively participate in the conservation and wise use of the marine resources of the East African Marine ecoregion. An ecoregion-based conservation approach was used, encompassing multi-disciplinary approaches, stakeholder participation, partnership development and adaptive management. The implementation of the project specifically sought to identify the biological situation in the field and the threats affecting resources. The major steps taken were a reconnaissance, biological and socio-economic assessments, and development of a biological vision and ecoregion plan for the implementation of project activities.

Highlighted aspects of the Ecosystem Approach

- Both biophysical and socio-economic aspects need to be addressed in the conservation of marine and coastal ecosystems.
- The project approach is multi-disciplinary and encompasses stakeholder participation and adaptive management.

- The project addresses the conservation and sustainable use objectives of the CBD.

Conclusions

- It is difficult, in practice, to identify and fix the exact boundaries of ecoregions. They should be left flexible and adaptable depending on the nature of the ecoregion.
- In order to use an ecoregion approach, there is need to have reliable technical and scientific information.
- Although the mobilization of stakeholders across country boundaries may be difficult, it is an important aspect of the ecoregion approach.
- Ongoing activities and initiatives need to be recognised and utilized when using the ecoregion approach.

The Zimuto/Mshagashe integrated catchment rehabilitation and sustainable development project, Zimbabwe

Problem statement

The goal of the project was to develop and promote an integrated catchment rehabilitation of degraded lands. This was targeted at wetlands rehabilitation and conservation and enriching farming methods in order to avoid land degradation, both on farms and in the associated natural resources in the catchment area.

Description

These strategies have been used in catchment rehabilitation: (1) The use of community participation methods in the planning, implementation and evaluation of catchment rehabilitation actions. (2) Integration of conservation measures with livelihood activities such as the integration of agroforestry activities in farming systems for soil fertility and erosion control. (3) Employing catchment rehabilitation actions through a strategy that recognizes the inter-relationships of different natural resources. (4) Institutional coordination through joint multisectoral planning, implementation and evaluation of community-driven actions.

Case study 5

Principles 2, 3, 4, 9, 11 and 12 were emphasised

CBD thematic areas: marine and coastal biological diversity

CBD cross-cutting issues: sustainable use, incentives and NBSAPs

Case Study 6

Case study 6
Principles 2, 4, 7, 9, 11 and 12 were applied, along with Operational Guidance points 1, 2, 3, and 5

CBD cross-cutting issues: traditional knowledge and sustainable use

Case Study 7

Highlighted aspects of the Ecosystem Approach

- The project has had success in addressing the three objectives of the CBD. Conservation and sustainable use were addressed through the development of conservation farming regimes and benefit sharing through communal gardening models and household farmstead improvements.
- In line with Principle 2, an area larger than one village was used for field demonstration activities to avoid marginalizing some sectors of the community.
- The involvement of many relevant stakeholders was achieved through an emphasis on communities and multi-sectoral institutions operating in the catchment.
- The project focused on inland waters through the rehabilitation of *Dambo* wetlands and dry sub-humid lands rehabilitation.
- The design of the project involved communities in specifying the outputs.

Conclusions

- Participating institutions at the field level were used to conventional (instructive) approaches and lacked the capacity to facilitate a participatory approach.
- Community involvement and participation is a lengthy and complex process, for which adequate resources and time must be budgeted.
- The closer the management and decision making is to the community the greater its sense of ownership, accountability and participation in the catchment rehabilitation process.

The Pendjari Biosphere Reserve, Benin

Problem statement

The management of Pendjari was failing, as it formerly prioritised conservation for the benefit of tourism and neglected the need for grazing land and the economic needs of the local population. This led to significant poaching.

Description

Pendjari has been a protected area since 1954 and a Biosphere Reserve since 1986. Initially, management of the protected area was for conservation for the benefit of tourists. This system had limited success due to social and technical difficulties. For example, although every year thousands of domestic animals (particularly cattle) undertook seasonal migrations through the reserves this use conflicted with management objectives. Biosphere Reserve management has since implemented an integrated approach with some success. These are the key changes in management:

- Management that seeks to integrate the interests of all parties.
- Initiation of community participation in management.
- Grazing rights that have been formalised as part of a strategy to ensure that livestock rearing is sustainable and does not compromise the conservation objectives of the reserve.
- Allowing agriculture in designated areas within the reserve.
- Organisation of fruit picking and hunting so as to ensure its sustainability.
- Allowing ritual use by local communities.
- Transfer of some hunting revenues to the local community.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and the sustainable use of biological diversity are addressed.
- The importance of providing alternative livelihood strategies outside the reserve is emphasised. Tourist guides have been employed as a benefit sharing measure.
- The importance of inter-ecosystem linkages is recognised and the impact of agriculture in surrounding areas on the biosphere reserve is being examined. In particular, the impact on the river of pesticides used in cotton growing requires investigation.

Case study 7

All Principles and Operational Guidance were applied or considered

CBD thematic areas: forest, inland waters, dry and sub-humid lands and agricultural biological diversity

CBD cross-cutting issues: incentive measures; indigenous and local communities, benefit sharing and sustainable use

- Goods and services included grazing resource, hunting, fishing, firewood, fruit and cultural/religious value.
- Benefit sharing has been strengthened through granting of use, access and some hunting revenues to local communities.
- New legislation has been prepared and is being examined by the authorities with a view to legalising the participation of local communities in the management of the reserve.
- The Ecosystem Approach may provide a basis for negotiating an agreement with Burkina Faso for the harmonisation of certain practices, especially fishing. At present, Benin forbids all commercial fishing in the frontier stretch of the Pendjari River, which borders the national park, while Burkina Faso is intensifying its fisheries activities in the same waters on its side of the river.
- It is hoped that development agencies use the Ecosystem Approach to harmonise their assistance. For example, the European Union has funded the protection of the Pendjari National Park while simultaneously financing the development of fishing in the Pendjari River. Similarly, the World Bank supports the management programme for protected areas at the same time as it promotes the cultivation of cotton around, and in some cases within, these areas.
- Developing ecological monitoring is a priority and support is needed.

Conclusions

- The Ecosystem Approach can be used to support the Biosphere Reserve through promotion of transboundary cooperation and harmonisation of development assistance.
- Conservation goals are best achieved if local economic and cultural needs are also met.

Chocó ecoregion project, Colombia

Problem statement

Although the Chocó region in northwest Colombia is one of the most diverse and biologically rich regions in the world this biodiversity is increasingly threatened by socio-economic and development pressures. Efforts are being made to promote local conservation and sustainable development initiatives.

Description

Seven years ago WWF was using the Ecosystem Management framework in order to identify, conserve and manage natural areas. Under this approach, conservation was the main priority. However, it was recognised that there was a need to complement this strategy with an assessment of socio-economic variables in order to reduce the threats and pressures on the ecosystems and natural resources of the Chocó Region. As a result, a regional project is being implemented using the following strategies: (1) promoting conservation and protection of indigenous populations, Afro-American territories and ecological reserves; (2) promoting sustainable management of forestry resources and agricultural systems; (3) strengthening local and regional organisations and capacities; and (4) analysing and influencing policies that will define the development of the region.

The main results of the project were: (1) establishment of public and private protected areas and indigenous and ethnic reserves; (2) formulation of a Forestry Management Plan; (3) implementation of sustainable forestry and agricultural productive systems; (4) formulation of actions to promote conservation of riverbanks; and (5) promotion of domestic animal rearing. Capacity building was also addressed.

Case Study 8

Case study 8
All Principles
were applied;
Operational
Guidance 2, 4, and
5 were also applied

CBD thematic
areas: forest,
mountain area,
marine and coastal
and agricultural
diversity

CBD cross-cutting
issues: criteria and
indicators, impact
assessment,
sustainable
use, indigenous
knowledge and
NBSAPs

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and sustainable use of resources were simultaneously addressed.
- The case study did not illustrate the need to understand the functional relationships of ecosystems.
- In the Chocó region the goods provided by the fauna and flora included: water resources, wood, secondary forest resources, CO₂ absorption, mineral soil storage, genetic information, landscape, genetic diversity, soil erosion control, fishery resources and tourism. Local communities as well as other components of external markets were recognised as the beneficiaries of these goods and services.
- Adaptive management was not illustrated or tested in this case study.
- The local level proved to be the appropriate scale for many reasons, although the regional and national scale also applied due to the national park system in the area. The project promotes institutional relationships between the parks and the local communities.
- Linkages between different local groups such as indigenous people, Afro-Americans, mestizos, farmer communities, local NGOs and governmental organisations were highlighted. These “inter-institutional alliances” aimed to build local capacity to influence the decision-making process and the region’s future development.

Conclusions

- Valuable indigenous information was gleaned from the auto-diagnosis strategy as well as the establishment of the collectively managed areas for the Afro-American communities.
- Success of territorial management relies on local community organisations and their internal regulations.
- Private reserves have been identified as suitable areas for conservation and environmental education.
- Inter-institutional alliances are an effective strategy for identifying solutions and for policy and decision-making.

Inter-institutional initiative for biodiversity conservation, Pampas Region, Argentina

Problem statement

The expansion and intensification of the agriculture and livestock industry have had destructive impacts in the pampas landscape and ecosystems. In order to minimise these environmental impacts, it was necessary to design environmentally sound agricultural and cattle-raising practices.

Description

The Inter-Institutional Initiative for Biodiversity Conservation of the Pampas Region (BIOPAMPA) is a joint effort coordinated by various private and governmental sectors. It is oriented to the conservation and sustainable use of this region, under the auspices of the Argentinean IUCN Committee and the Regional IUCN Office for South-America (IUCN-SUR). BIOPAMPA has the following objectives: (1) contribute to the effectiveness of action priorities identified in the National Biodiversity Strategy by means of the formulation of regional inter-sectoral programmes based on the Ecosystem Approach; (2) consolidate knowledge and improve communication and cooperation among institutions; (3) incorporate rural agricultural and cattle-raising producers into the Initiative; and (4) incorporate the different organisations and levels of political decision-making into the initiative.

An inter-institutional workshop was organised and a series of encounters among the different sectors directly involved with the agriculture and livestock industry were planned. Fieldwork guides on the sustainable use of resources are in preparation. Relevant sites have been identified and mapped to advance the bio-regional planning process.

Highlighted aspects of the Ecosystem Approach

- The case study simultaneously addressed conservation, sustainable use and equitable sharing of the benefits.

Case study 9
All Principles except 9 were applied or considered (Principle 3 was considered to be important but has yet to be actively applied) The five Operational Guidance points were applied

CBD thematic areas: biological diversity of inland waters, dry and sub-humid lands, agriculture and mountain areas

CBD cross-cutting issues: alien invasive species, indicators, impact assessment, sustainable use, and NBSAPs. The case study did not address the use of indigenous or local knowledge

- BIOPAMPA, through universities, NGOs and other organisations, carried out research activities that aimed to increase scientific knowledge about the taxonomy, phytogeography, populations and functioning of the ecosystem.
- The main goods and services provided by the ecosystem's biodiversity were identified as: soil protection; partial barrier for the invasion of alien species; natural mechanisms for the control of plague species; habitat for endangered species; habitat for the productive management of the wild fauna; management options for the improvement or domestication of new cultivable species; ecotourism and sports hunting; grazing lands; water retention; pharmacological substances and aesthetic and spiritual values. The beneficiaries of these goods and services were the cattle-raising and agricultural producers; the pharmacological and plant development companies; and researchers and society in general.
- BIOPAMPA expects to use an adaptive strategy, especially for the monitoring phase.
- The regional pampas ecosystem was chosen as the appropriate scale of management.
- The BIOPAMPA strategy included using inter-sectoral group linkages. Several biodiversity-related organisations were invited to formally join the initiative in order to strengthen its activities and help it to have an impact with decision makers. In total, 37 research and conservation projects have joined the Initiative, along with other important government and agricultural producer organisations.

Conclusions

- Early involvement of the various sectors, particularly at the local level, is essential for success.
- High-level political support is a key aspect of the success of the initiative.

- It is necessary to work with the media in order to publicise the initiative, mainly because politicians are very sensitive to the media and social demands.

Ecological corridors in environmental management, Brazil

Problem statement

In order to avoid the deleterious effects of species and ecosystems isolation, the concept of ecological corridors was introduced as an attempt to augment the connectivity between fragmented areas. The corridors were designed to enhance the conservation and sustainable use of ecosystems within the Itenez-Bolivia/Guaporé-Brasil area, while respecting the rights of the local populations.

Description

One of the most important causes of biodiversity loss is habitat fragmentation. In fragmented ecosystems the rate of extinction is higher compared with species within non-fragmented ecosystems. A large river basin region in Bolivia and Brazil, which contains indigenous reserves and large natural protected areas, is the testing ground for a project that will study, identify and implement connected areas. The corridors were located along the roads BR-421 and BR-429 and on the left bank of Guaporé-Itenez River in Brazil, and in the Baures-Itenez area in Bolivia.

Implementation of this project requires: (1) a full diagnosis of the status of the existing conservation units; (2) the design of connected areas or corridors; (3) the design of a programme on information-exchange between managers, directors and warden staff of protected areas; (4) identification of strategic points for conservation and management actions; (5) involvement of the local population through capacity building and environmental education; (6) harmonisation of public policies with the goals of sustainable development; (7) provision of technical, economic and scientific support to the local communities

Case Study 10

and other productive sectors; (8) the launch of pilot projects for natural resource management; and (9) identification of alternative tourism within the protected areas.

Highlighted aspects of the Ecosystem Approach

- The three objectives of the CBD are simultaneously addressed in this case study.
- The diagnosis phase of the project illustrated the need for a better understanding of ecosystem processes and functions.
- Goods and services were not identified in the project, but equitable sharing was addressed in relation to the benefits that should materialise when the project is implemented.
- Adaptive management is neither illustrated nor addressed in the case study.
- The most appropriate scale depended on the issue being addressed.
- Linkages between sectoral groups were established through the creation of various committees involving different governmental and non-governmental institutions.

Conclusions

- The Ecosystem Approach is an effective basis for planning ecological corridors.

The Marine Reserve of Galapagos, Ecuador

Problem statement

During the 1990s the Marine Reserve of Galapagos was the site of strong disagreements between the interests of the area's different users. The major conflict stemmed from the exploitation of marine resources (e.g. sea cucumbers), which resulted in confrontations between the local artisanal fishermen and the rest of the users of the reserve. A new participatory process aimed to protect and conserve coastal-marine ecosystems and biodiversity of the Galapagos Archipelago for the benefit of humankind, science and education.

Case study 10
All Principles were addressed. There was no mention of Operational Guidance
CBD thematic areas: forest biological diversity
CBD cross-cutting issues: sustainable use and indigenous and local knowledge

Case Study 11

Description

A number of issues contributed to the recent conflict in the Galapagos: the marine reserve unit was not recognised by the Ecuadorian National Protected Areas System; legal aspects of the reserve were weak in terms of conservation; the institutional capacity for the control of the reserve was insufficient; and the approved management plan for the reserve was rigid and non-adaptive and never implemented or even known of by local fishermen. To deal with this complex situation, a participatory process, involving all stakeholders, was designed and orientated towards the conservation of the marine area of the reserve.

A Core Group was established by local stakeholders including the local fishing community, the National Army, conservation and tourism sectors and the Galapagos National Park representatives. The main task of the Core Group was to elaborate a new management plan supported by the Special Regime Law for the Conservation and Sustainable Use of Galapagos' Province. This law established the reserve as part of the National Patrimony of Protected Areas and the Galapagos National Parks Directorate as the administrative body of the Marine Reserve. In addition, the area of the Marine Reserve was extended from 15 to 40 nautical miles (the total area is 133,000 square km) and industrial fishing activities were forbidden within the Marine Reserve limits. In 1999, the new management plan for the reserve, shaped by the Core Group, was approved.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and sustainable use of resources were simultaneously addressed.
- Research on ecosystem functioning was carried out, including a study of human-environment relationships in the archipelago.
- The goods and services identified were scientific research, fishing and tourism activities. Beneficiaries of these goods and services were identified as all those persons

Case study 11

All Principles were applied. Principle 9 was not explicitly identified in the case study. While the points of Operational Guidance were not explicitly addressed, all of them were indirectly considered.

CBD thematic areas: marine and coastal biodiversity

CBD cross-cutting issues: benefit-sharing, and local knowledge

directly or indirectly involved in tourism, fishery and research-conservation activities carried out in the reserve.

- Planning and management employs an adaptive strategy that is supported by the Special Regime Law.
- Through the learning-by-doing process an appropriate scale of management was employed according to the nature of the problem and the participants.
- The case study identifies and illustrates the linkages between the different sectoral groups as well as the need for and constraints on such linkages.
- Principle 9 is indirectly referred to in the Special Regime Law, which recognises that changes occur in systems and that these should be considered in decision-making.

Conclusions

- Problems associated with socio-economic pressures, conservation measures and unsustainable use of natural resources must be resolved through a management process that involves all local stakeholders.
- The economic appraisal of conservation and the sustainable use of resources generates interest from the political and economic sectors.
- Good communication and high-level political support is needed for the development of the overall management system.

Case Study 12**Guiding Plan Proposal, Bañados del Este Biosphere Reserve, Uruguay***Problem statement*

An interdisciplinary team was set up to initiate the redefinition and rezoning of the Bañados del Este Reserve in a manner that recognised both the socio-economic and biogeographic realities of sustainable development and conservation.

Description

Since 1997, the Biodiversity Conservation and Sustainable Development Programme in the Este Wetlands (PROBIDES)

has been developing a Guiding Plan for the management of the Bañados del Este Biosphere Reserve. The plan aimed to delimit the reserve area and propose new zoning. The Guiding Plan resulted in a planning instrument for the effective implementation of both conservation and sustainable development within the reserve. It contained a set of recommendations and actions that were orientated to better land-use management.

Public and private institutions collaborated to delimit zones within the reserve. The adopted methodology allowed the progressive development of an action plan designed to deliver conservation and sustainable development through: (1) identification of environmental units, (2) elaboration of a conceptual framework for the interpretation of the actual situation and the evaluation of the relationship between people and their environment, (3) study of the existing legal framework of the reserve, (4) identification of land-use patterns, (5) generation of a complete a data base for GIS, and (6) identification of the degree of conflicts between different sectors. A set of recommendations was proposed on the basis of these evaluations.

Highlighted aspects of the Ecosystem Approach

- Conservation and sustainable use of resources are addressed but equitable sharing was not.
- The need for greater understanding of the ecosystem and its processes was a key element for the Guiding Plan.
- Goods, services and benefit sharing were not identified in the case study.
- Adaptive management strategies were underlined as a component of the Guiding Plan.
- Both regional and local levels were recognised as the appropriate scales of management.
- The relevant sectoral groups were identified as NGOs, public bodies and private sectors that are directly connected to the reserve.

Case study 12

Principles 1, 2, 6, 10 and 12 were applied; Principle 4 was indirectly applied through an economic valuation of the reserve's natural resources; there is no explicit mention of Operational Guidance

CBD thematic areas: biological diversity of inland waters, agriculture and marine and coastal areas

CBD cross-cutting issues: sustainable use

Case Study 13

Conclusions

- A MAB-IUCN framework proved to be most appropriate for the zoning of the reserve's area, particularly for the management and protection of important natural habitats or vulnerable species.
- Area-specific management plans, based on the Guiding Plan template, will be needed in the future.

La Segua Wetland management, Ecuador*Problem statement*

A number of environmental problems threaten La Segua wetland ecosystem, including the use of toxic fertilisers, dam construction, bird hunting and dumping of solid waste. Since 1993 an integrative participatory management process has aimed to conserve the environmental integrity and functioning of La Segua wetland in order to maintain its production of goods and services.

Description

Active management of La Segua wetland has been in place for more than ten years; this has resulted in, among other things, its declaration as a Ramsar site. An initial attempt was made to identify conflicts in the area, as well as possible solutions. This resulted in the development of a conceptual framework for the management plan, its adoption and its implementation. In collaboration with the Ministry of Environment, IUCN and Fundacion Natura (a local NGO), the La Segua management Plan has developed different programmes to improve agricultural practices, develop ecotourism and initiate an environmental education program.

The process involved three phases: issues diagnosis, management plan development and local adoption. These steps have been successfully accomplished and a legal committee representing local users has been established.

Highlighted aspects of the Ecosystem Approach

- Conservation, sustainable use and benefit sharing were simultaneously addressed.
- Functional relationships and processes are fully understood. La Segua wetland is one of Ecuador's most well known ecosystems.
- Goods and services provided by La Segua were recognised as being fishery and food resources, ecotourism (bird watching), agricultural services, cattle forage, and honey production. Benefit sharing of these goods is addressed in the management plan. The beneficiaries of these goods and services are the local fishermen and farmers, as well as local communities.
- Adaptive management is one of the attributes of the La Segua management process.
- Management was most frequently applied at the local level. Regional- and/or national-level management was also applied in the decision-making process when appropriate.
- Full use was made of inter-sectoral linkages. The level of intervention, and the organisation involved, depended on the issue and its scale. For instance, some management plan policies need intervention at the central government level but also require the collaboration of local-level organisations and NGOs if they are to be successful.

Conclusions

- Participatory management was the basis of the project
- Low-level but ongoing economic investment is required during the entire planning process.
- Local users of natural resources are willing to collaborate in conserving their environment if economic benefits, property rights and access to land are not diminished.
- The La Segua Management Plan is a good strategy for local participation and coordination.

Case study 13
Principles 5, 6, 7, 9 and 11 were not addressed in the case study; Operational Guidance points were all undertaken

CBD thematic areas: inland water biological diversity

CBD cross-cutting issues: indigenous and local knowledge and sustainable use

Case Study 14

Integral use and management of Tumbes Mangroves, Peru*Problem statement*

The Tumbes Mangroves National Sanctuary in northern Peru had a number of environmental problems, such as changes to land property rights, the destruction of a large proportion of mangroves to install commercial shrimp ponds and the contamination of rivers and estuaries. An integrated management approach was adopted for the protected area to: (1) ensure the conservation of northern mangrove ecosystems, (2) improve the welfare of local people and (3) maintain biological diversity for the benefit of current and future generations.

Description

In 1988, the Peruvian government established the Tumbes Mangroves National Sanctuary as a protected area. The protected area did not address the pressure on local resources, however, and a strategy for their conservation was developed in collaboration with Pro-Naturaleza (a local NGO) and WWF. Since 1995, Pro-Naturaleza has adopted an integrated management approach in the Tumbes Sanctuary to ensure mangrove forest conservation.

The administration and management of the sanctuary was strengthened by the following: (1) site patrols; (2) elaboration of a master plan; (3) setting up a management committee; (4) description, monitoring and identification of sanctuary users; (5) evaluation of tourism possibilities; (6) identification and promotion of artisan micro-enterprises; (7) empowerment and environmental education of mangrove users, journalists, local authorities, teachers and children; (8) mangrove reforestation; (9) socio-economic examination including gender issues; (10) extractive activity identification; (11) environmental impact assessment of shrimp-farming; (12) publicising of project results; (13) elaborating agreements between NGOs, local government authorities, universities and aquaculture companies; and (14) workshops on participatory planning processes.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and sustainable use of the resources were simultaneously addressed.
- Research activities within the Sanctuary focused on understanding ecosystem functional relationships, including the human component.
- The main products or services provided by the Sanctuary area were fish, shrimp, molluscs, other animal-catch related to mangrove areas, wood, honey, water for shrimp cultivation, tourism areas and control of erosion. Beneficiaries of the area extend from the shrimp-cultivating companies to local fishing communities. Benefit sharing was poorly addressed.
- There is no explicit mention of adaptive management, although elements such as monitoring and evaluation were incorporated in the planning process.
- The appropriate scale was selected according to the issue.
- Inter-sectoral co-operation has been fundamental to the whole project process, including its design.

Conclusions

- Working at the ecosystem level and applying the Ecosystem Approach is a complex but productive process, although the level of complexity will depend on the size of the site.
- Extensive communication between the various area sectors was a key component of the approach.

South Buffer Zone of the Beni Biological Station Biosphere Reserve, Bolivia

Problem statement

At the beginning of the 1990s, an ongoing initiative was launched in the Beni Station Biosphere Reserve. Its aim was to achieve a balance between biodiversity conservation and autonomous sustainable development of the indigenous and local populations located in the vicinity of the biosphere

Case study 14
All Principles (except 9) and Operational Guidance were applied

CBD thematic areas: forest, inland waters and marine and coastal biological diversity

CBD cross-cutting issues: indicators, sustainable use and National Biodiversity Strategy and Action Plans

Case Study 15

reserve. Without this initiative both the biodiversity of the reserve and the well-being of local people were likely to deteriorate.

Description

To achieve the objective, four main actions were proposed: (1) updating the land tenure system and the official land register, (2) enhancing the economic and productive output of the region, (3) strengthening biodiversity conservation and (4) improving the living conditions of the local population. A joint planning initiative resulted in a zoning proposal for the buffer zone that was compatible with the needs of the local population and the conservation objectives of the reserve. A committee was established to oversee the implementation of a working plan.

The project's goal was to strengthen indigenous social organisations and their management capabilities. The recovery of traditional botanical knowledge, agricultural and forestry practices and the socio-economic diagnosis of local populations was the context for launching a management project of the reserve's buffer zones. These efforts led to the development of a strategic management plan for the south buffer zone.

Highlighted aspects of the Ecosystem Approach

- Conservation, sustainable use and equitable sharing of the benefits were addressed.
- Greater understanding of ecosystem functioning was not highlighted.
- Biodiversity components traditionally used for food and pharmaceutical purposes were recognised as goods and services, the recipients of which were the local indigenous peoples and farming communities.
- The case study illustrates adaptive management.
- The local-indigenous level was identified as the appropriate working scale for addressing the issues.
- Linkages and responsibilities of the various sectoral components were identified. Among the sectoral

groups identified were: the National Institute for the Agrarian Reform, the Forestry Superintendence, the General Biodiversity Directive, the National Protected Areas Service, the General Direction of Land Ordering, the San Borja and Santa Ana Municipalities, the Beni Departmental Authority and the South Buffer Zone Integral Development Local Committee.

Conclusions

- Ongoing long-term participatory processes have produced positive results through the development of strategic management plans.
- The participatory process must be flexible and dynamic.
- A range of participants and components of the process should be involved from the beginning, even during the planning and discussion stages.

Vinalares sylvo-pastoral management, Formosa, Argentina

Problem statement

Vinal (*Prosopis rusCIFolia*) is an aggressive and invasive shrub species that usually affects over-grazed savannas, transforming them into dense shrub land. Although numerous attempts were made to eradicate *vinal* during the 1970s in order to restore grazing and foraging areas, these efforts were only effective in the short term. In the long term they resulted in stronger recolonisation. In addition, the eradication of *vinal* was very expensive.

Description

Application of an alternative strategy, sylvo-pastoral management, has improved the foraging quality of lands invaded by *vinal* at no net cost to livestock producers. This strategy involves the pruning and thinning of trees, together with the management of grazing by cattle. Native flora species were incorporated into the system and monitored in the second phase of the project.

Case study 15

All Principles and Operational Guidance were applied and illustrated.

CBD thematic areas: dry and sub-humid lands, forest and agricultural biological diversity

CBD cross-cutting issues: impact assessment, sustainable use, benefit-sharing and local knowledge

Case Study 16

Case study 16
All Principles
except 3 and 11
and all Operational
Guidance points
were applied

CBD thematic
areas: biological
diversity of dry and
sub-humid lands,
forest, and inland
waters

CBD cross-cutting
issues: invasive
alien species,
indicators,
benefit-sharing,
indigenous and
local knowledge,
sustainable
use, NBSAPs,
and impact
assessments

Experimental sylvo-pastoral management plots were identified by local groups of small producers. Mature and diseased *vinal* trees were cut down in each plot. This phase of the project produced useful products: charcoal and timber for floorboards. A cost-benefit analysis was made for the production and yield of these products. Marketing the products was undertaken through local cooperatives.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and sustainable use of the resources were simultaneously addressed.
- An understanding of the functional relationships and processes in the vinal ecosystem, especially since 1993 through the work of the GESER Group (Group of Regional Ecological Studies) was important.
- Floorboards, charcoal production and the expansion of grazing lands were identified as the services produced by the sylvo-pastoral system. Benefit sharing was addressed by cooperatives, which distributed revenues from the sale of wood products.
- Adaptive management is not illustrated in the case study.
- The appropriate scale of management was identified to be the local level, where local producers, cooperatives, technicians and scientists were the main participants.
- Linkages between different sectoral groups were established through co-operation between the scientific sector, governmental and non-governmental organisations and small local producers.

Conclusions

- Marketing of products obtained from the natural system was vital to the success of the project.
- Cooperative and integrated work proved to be a good management strategy.
- Local-level initiatives that improve local environmental policies benefit from support at the regional and national levels.

Integral protective programme, Guacharo National Park, Venezuela

Case Study 17

Problem statement

Several studies in Monagas and Sucre states in the northeastern region of Venezuela showed that the Guacharo National Park area was inadequate to protect the Turimiquire River basin forest that guaranteed the survival of bird colonies of Guacharos (*Steatornis caripensis*). Conservation concerns have been addressed using a combination of restoration, reserve enlargement and protection and meeting socio-economic needs.

Description

In response to the growing recognition of the park's conservation value, including the discovery of new pristine forests, caves and sink-holes, the government approved the enlargement of the national park area from 15,000 to 62,700 ha. In addition, the overall protection of the Guacharo National Park was enhanced by the following:

Cerro Negro Project: Reforestation of the 2000-ha area affected by fire in 1987 through the planting of pioneer species and, with support from the national oil company, the spraying of pre-germinated seeds.

Middle Basin Project: Protection of the forest through the employment of park wardens and through research and environmental education. As a result of the research activities carried out by Audubon de Venezuela (an NGO), researchers from the Universidad de Oriente, and with financial support from the national oil company, new bird and endangered vertebrate species were reported. Ten flora species were found to be endemic to the Turimiquire River basin. In addition, local NGOs launched awareness campaigns in local schools.

South-Basin Programme: Agro-socio-economic features of the southeast basin population were studied. The quality of life, production systems and economic activities of the local

Case study 17
Only eight Principles were applied; 3,6,8 and 9 were not relevant. Operational Guidance points were neither directly mentioned nor taken into account, but were indirectly applied.

CBD thematic areas: forests, mountains and agricultural biodiversity

CBD cross-cutting issues: benefit sharing and sustainable use.

population were assessed. Based on this assessment, the project sought to involve the local farming community in the cultivation of coffee, a highly profitable crop.

Highlighted aspects of the Ecosystem Approach

- The case study highlights the conservation of the area. Sustainable use of resources and equitable benefit-sharing were also addressed through coffee cultivation by local farmers.
- Ongoing research programmes in Guacharo National Park include efforts to understand ecosystem processes.
- Goods and services were not clearly identified, however, economic benefit sharing and management practices in which local farmers take leadership are being considered.
- The case study did not address adaptive management guidelines or strategies.
- The appropriate level of management was selected according to the issue.
- The value of linkages between sectoral groups was clearly illustrated by the participation of local stakeholders, e.g. the national oil company gave logistical and financial support, while local NGOs (*Audubon*, *Fundación Caripe*) and farmers implemented the project.

Conclusions

- The success of the project was made possible by the collaboration between the private oil enterprises, local and national NGOs, the scientific sector, governmental support and local communities.

Case Study 18

Large-scale ecosystem health study of the Langat Basin, Malaysia

Problem statement

The project developed a basin-wide perspective of relationships between the environment and development. It used the ecosystem approach to determine the status of biological diversity and the threats to it from loss of forests and wildlife habitats and pollution of rivers in the Langat Basin.

Description

An integrated multi-disciplinary study of the Langat Basin was commissioned to facilitate and promote the ecosystem approach as a basis for environmental planning and management in the long term. The Langat Basin has been the focus of much rapid and large-scale physical and economic development. Since the early 1970s, large areas of land with natural cover have been lost to agricultural development, industrialisation and urbanisation. The resulting ecological and environmental degradation has had a considerable effect on the status and sustainability of biological diversity in many regions of the basin. The project successfully delineated and identified those areas of primary concern for biological diversity conservation. It also contributed to a thorough understanding of the driving forces behind biodiversity loss and how they relate to the trends in industrialisation and urbanisation that prevail in the basin. The relationships between loss of natural areas high in biological diversity and population growth, land-use change, mineral resource exploitation and river pollution have been described and modelled. A pilot version of an ecosystem scenario tool has been developed that allows potential ecosystem scenarios in the basin to be visualised for use by policy- and decision-makers.

Highlighted aspects of the Ecosystem Approach

- From the outset the project was planned and executed as a multi-disciplinary study using the ecosystem health framework for analyses. It involved the participation of specialists in aquatic and terrestrial species inventories, ecologists, botanists, zoologists, geologists and soil scientists, sociologists and economists.
- The study area was delineated into three ecological zones based on their physiognomy, geomorphology and edaphic characteristics.
- Maintaining ecosystem integrity across the basin was a high-priority objective of the management recommendations.

Case study 18
Principles 1, 2, 4,
5, 6, 7, 8, 9, 10,
11 and 12 were
emphasised

**CBD thematic
areas: inland
waters, forests,
coastal and
marine,
agricultural and
mountain areas**

**CBD cross-cutting
issues: invasive
alien species,
indicators, impact
assessment and
sustainable use**

- Conservation of ecosystem structure and function, and the contribution of biological diversity to them, were emphasised during the duration of the study.

Conclusions

- A broad unifying conceptual framework (e.g. ecosystem health) and multi-disciplinary involvement were crucial from the beginning of the initiative.
- Results of studies must be analysed within the context of relationships between the ecosystem and development and of the ecological processes within the ecosystem.
- Multiple stakeholder participation and acceptance are crucial for success of the ecosystem approach.
- The systems ecology approach can help integrate diverse findings.
- Modelling is essential when dealing with the multiple variables necessary for scenario development.
- The issues of scale, institutional fit, scale concordance and cross-scale dynamics need to be addressed.

Case Study 19

Community-based tiger conservation in Cambodia: using the tiger as an umbrella species

Problem statement

Urgent efforts are needed to address the threats to tigers from rapid loss of habitat and hunting pressure.

Description

The goal of the Community-based Tiger Conservation in Cambodia is: “to conserve biodiversity by promoting local education and participation in conservation of tigers as an umbrella species.” The project aims to achieve this goal by pursuing the following objectives:

1. Establish tiger conservation offices in the three largest Tiger Conservation Units.
2. Recruit wildlife technicians from the hunters interviewed in previous surveys.
3. Train provincial officers and newly recruited wildlife technicians to accomplish objectives 4-6.

4. Monitor wildlife and human activities through regular patrols of the Tiger Conservation Units.
5. Conduct village conservation education workshops.
6. Facilitate education, health care and alternative economies in Tiger Conservation Unit villages.

After decades of turmoil and war, the initiative faces significant challenges to engage local people. The initiative is promoting wider engagement from government and NGOs to meet human livelihood needs.

Highlighted aspects of the Ecosystem Approach

- This community-based initiative is primarily aimed at conservation, although the initiative recognises that a balance between use (i.e. hunting of non-endangered species) and conservation of the tigers' extensive habitat is essential for meeting conservation objectives in the long term.
- Functional relationships and processes of ecosystems will benefit indirectly from this initiative.
- Local people requested the project. It aims to promote societal choice by building bridges between the people and the government after two decades of poor relationships. Local people are involved in management and government officials have participated in seminars to set biodiversity priorities.
- Ecosystem functioning was not explicitly addressed.
- Benefit sharing is indirectly addressed through the salaries paid to locally hired wildlife technicians. The TCUs also facilitate the involvement of development NGOs, which are usually not present in these remote regions.
- The Tiger Conservation Units define the scale of management intervention. They typically cross provincial boundaries, and establishing them involved overcoming significant logistical and administrative hurdles.
- In the long term the initiative will encourage rural development and eco-tourism as strategies to meet human needs.

Case study 19
Principles 1, 2, 4, 5, 8, 10, 11, 12 and Operational Guidance points 2, 3, 4 and 5 were applied

CBD thematic areas: biological diversity of forests, mountain areas and dry and sub-humid lands

CBD cross-cutting issues: indigenous and local communities; sustainable use

- Local knowledge is key to the success of the Tiger Conservation Units. Hunters have been recruited as wildlife technicians and are motivated to learn new data-gathering skills.
- Monitoring of tiger and human activities is undertaken by personnel with local knowledge.
- The initiative strives for intersectoral cooperation by linking communities with central government.

Conclusions

- Broad scale management needs cooperation among institutions. While everyone accepts that large-scale management is needed, there has yet to be much action.
- Hiring local hunters provides the initiative with crucial local knowledge and helps in communication efforts.

Case Study 20

Rice integrated pest management in Indonesia and elsewhere in Asia

Problem statement

Intensification of rice production, particularly the inappropriate use of pesticides, is damaging to biodiversity and human health. In addition, government subsidies for pesticides often involve a significant cost to taxpayers.

Description

Rice Integrated Pest Management (IPM) was introduced first in Indonesia in 1989 in response to threats to rice production. The main tool of the IPM programme is the “farmer field school,” a form of informal community-based adult education. Farmers gain a firm understanding of ecological principles, monitor the progress of their crops, and examine the distribution of insect pests, their natural enemies and other components of biological diversity. The lessons from field schools are scaled up through farmer-to-farmer learning. To date over one million Indonesian rice farmers have graduated from farmer field schools, along with more than 400,000 in Viet Nam, and over 170,000 in the Philippines. The programme has been extended to Africa and

to other crops. In the case of rice, crop diversity is low but associated biodiversity is high and is critical to ecosystem functioning. Additionally, diversity at the landscape level is important in reducing the use of costly pesticides. The IPM approach has empowered farmers to become better managers of their crops, and to improve production while substantially reducing pesticide inputs.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and sustainable use of the resources are simultaneously addressed by the IPM approach.
- Understanding and conserving ecosystem functioning is essential for IPM. One of the key aspects of IPM is the conservation of natural enemies of crop pests; this in turn depends on high soil organic matter content and a well-functioning agro-ecosystem.
- Goods (crops) and services (natural enemies of crop pests) were identified. Watershed protection, clean water and a healthy environment were also identified as services provided by IPM.
- In addition to rice, fish, soybean, maize and other vegetables can be produced in rice fields where IPM is practised. The farmer also benefits from reduced costs and increased yields. Global benefits include crop diversity and culturally diverse landscapes.
- Ecosystems need to be managed at multiple scales. Both the individual farm and the wider community were appropriate scales for management, as both are relevant to dissemination of the IPM approach. The landscape scale is also important, as landscape scale heterogeneity in crop systems can result in significant reduction in crop losses to pests. Asynchronous planting of rice helps to support strong populations of natural enemies.
- Local actions benefit greatly from intersectoral policy measures such as: (a) promotion of IPM as a national policy, as in Indonesia; (b) changes in incentive measures, such as the removal of subsidies for pesticides,

Case study 20
All Principles and Operational Guidance were applied

CBD thematic areas: agricultural biological diversity

CBD cross-cutting issues: indicators, incentives, indigenous and local communities and sustainable use

Case Study 21

and/or the application of taxes on pesticides; and (c) regulatory measures, such as the banning of particularly harmful pesticides.

- Adaptive management is a core component of IPM; farmers are trained to regularly monitor the crop ecosystem and intervene only when necessary.

Conclusions

- The Ecosystem Approach has the potential to reconcile needs for increased food production and provision of goods and services, and to contribute to conservation.
- Agricultural biodiversity is of great importance, even for crops based on a single variety. The associated biodiversity is critical to ecosystem functioning. Landscape diversity is also important.
- The case study illustrates the usefulness of practical examples and an enabling policy environment.
- The “farmer field school” approach is highly effective in disseminating IPM.

Calculating Total Economic Value, Can Gio mangrove ecosystem, Viet Nam

Problem statement

Restoration of the mangrove forest ecosystem was necessary to recreate a green belt around Ho Chi Minh City. Nearly all the forest was destroyed by herbicide spraying by U.S. forces during the U.S.-Viet Nam war.

Description

The Can Gio ecosystem is the first Mangrove Biosphere Reserve in the world. For over 22 years forestry staff have worked with the people of Ho Chi Minh City to restore the mangrove forest. Total economic value was calculated to demonstrate the importance of the restored ecosystem. Biodiversity is increasing rapidly; both flora and fauna show yearly growth since restoration efforts began. Four factors were identified as being key to this ecosystem restoration:

1. the supportive policies of the city authorities,
2. the high level of commitment of the forestry organisation staff,
3. The contribution of local people to forest planting and protection, and
4. Financial support and extension work to assist forest residents in income generation.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and sustainable use of resources were simultaneously addressed.
- Goods and services were identified, including forest products; aquatic resources; salt production; carbon fixing; and a landscape that is attractive for recreation, relaxation, ecotourism, education and research.
- Local people have made a vital contribution to forest planting and protection. The government allocated forest to local people, and in return for protection of the forest, residents were allowed to harvest seafood. The benefits enjoyed by local people are increasing significantly, so they are motivated to work very hard in forest planting and protection.
- Two scales of management were identified: Ho Chi Minh City and the communities in the forest zone.
- The total number of species is monitored as one criterion for measuring the success of activities.
- The total economic value (TEV) of the ecosystem was the focus of this case study.

Conclusions

- Land gifts and promotion of sustainable harvesting are an effective way of ensuring the vital commitment of local residents.
- Total Economic Value is a powerful tool for demonstrating the cost effectiveness of meeting CBD objectives to policy makers.
- Long-term political support is necessary to provide the continuity that is essential for ecosystem restoration.

Case study 21
Principles 1, 2, 3, 4, 5, 6, 7, 8, 10 and 12, along with Operational Guidance points 2 and 4 were applied

CBD thematic areas: biological diversity of marine and coastal and forest ecosystems

CBD cross-cutting issues: incentives, impact assessment, benefit sharing, indigenous and local communities and sustainable use

Case Study 22

The role of *Melaleuca* wetlands in the Mekong Delta, Viet Nam*Problem statement*

An increasing proportion of the Mekong Delta has infertile, acid sulphate soil. This soil type is becoming more widespread in the Delta as a result of wetlands drainage, removal of *Melaleuca* (*Melaleuca cajuputi*) trees and other natural vegetation, agricultural production, poverty and the expansion of canals.

Description

About half of the Mekong Delta has acid sulphate soils. These soils severely limit productivity in an area that is otherwise highly suited for agriculture in terms of landscape, climate and proximity to population centres. Recent research on ecosystem functioning has helped further an understanding of how environmental and economic benefits can be simultaneously achieved. In particular, research has demonstrated the role of *Melaleuca* in improving water quality, thereby lowering the acidity of soil in surrounding fields. The relationship between depth of water in the *Melaleuca* wetland forest reservoir and number of days of irrigation needed for good soil quality has been established. This makes it clear that *Melaleuca* can be used to lessen the acidity of affected soils and increase agricultural production. The alternative is to restore wetlands on severely acidic soils that are no longer suitable for agriculture as a result of drainage. However, the pressures for agricultural expansion are great. This study advocates looking at the whole Mekong Delta, including issues such as urban migration and alternative livelihood strategies. The best solution is to have an educated community and an integrated farming system. This will improve both livelihoods and the environment. Management solutions need to balance the need for *Melaleuca* with the need for cropland. Agroforestry may also be a viable option.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and sustainable use of the resources are simultaneously addressed. The study advocates a balance between conserving wetlands that improve water quality and promotion of agriculture that benefits from the improved water (and hence soil) quality.
- Understanding and conserving ecosystem functioning is key to this case study. The impact on surrounding ecosystems is also considered; acid sulphate soils leach pollutants into aquatic ecosystems.
- Greater and sustainable production of crops was the main good identified, in addition to honey, essential oils, fish and timber from the *Melaleuca* forest. The improvement of water and soil quality by *Melaleuca* was the principal ecosystem service identified. Other services include wildlife habitat and wind break.
- Farmers and their communities were the main people to benefit from improved soil. The wider community also needs to see immediate benefits, as poverty is a major force driving overexploitation of *Melaleuca* wetlands.
- The case emphasised the need to work with individual farmers and to provide immediate benefits.
- Intersectoral cooperation is vital as the delta needs to be managed as a whole. In other words, agriculture, conservation, canals and development must follow coherent strategies. There is a need for policy leadership to reverse damage to wetland ecosystems.

Conclusions

- Integrated *Melaleuca* reforestation with agriculture is practicable, profitable and sustainable.
- Severely acidic soil should be managed as a natural wetland ecosystem to overcome problems of environmental degradation and economic loss.
- It is essential to work with individual farmers and address socio-economic priorities as the entry point for biodiversity recovery and environmental restoration.

Case study 22
All Principles and Operational Guidance were applied or considered

CBD thematic areas: agricultural and inland waters biological diversity

CBD cross-cutting issues: incentives, impact assessment, benefit sharing, indigenous and local communities and sustainable use

Case Study 23

Non-timber forest products in Lao PDR*Problem statement*

This initiative sought to overcome two problems:

1. The unsustainable and inefficient use of non-timber forest products (NTFPs); and
2. The lack of incentives for local people to protect biological diversity.

Description

The NTFP Project is an Integrated Conservation and Development Project (ICDP). The use of NTFPs has been promoted by the project with the aim of (1) alleviating poverty, food insecurity, and gender inequality; (2) conserving forests and landscapes/watersheds; and (3) developing sustainable forest-based commerce and industry. These objectives were pursued through action learning and participatory approaches. The project sought to increase stakeholder interest by promoting economic development and by involving local people in planning, management and benefit sharing. These were the key targets:

1. Demonstration of sustainable NTFP use systems that contribute to conservation;
2. Promotion of community-based organisations that manage NTFP/forest resources;
3. Improvement of the well-being of pilot villages through the promotion of alternative livelihoods to reduce pressure on forests and build capacity for conservation;
4. Better marketing of NTFPs to create incentives for sustainable use through improved income from forests;
5. Development of an expansion strategy to extend sustainable NTFP use models; and
6. Laying the groundwork for a national management strategy for NTFPs.

Achievements have been made in four main areas:

1. community NTFP harvesting rules;
2. NTFP marketing groups;

3. domestication of NTFPs; and
4. aquatic resource management.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and sustainable use of the resources were simultaneously addressed.
- Conservation of ecosystem functioning and processes was an important objective, as many NTFPs are dependent on specific ecosystem types. Measurement of off-take per unit of effort indicated whether the forests were being managed within appropriate limits.
- Goods were identified as food, medicines and foreign exchange from trade in NTFPs. Services identified were watershed protection and ecotourism potential.
- Promotion of trade in NTFPs benefits poorest people most, since they depend on this income to buy rice.
- A combination of scales were found to be appropriate: villages were the most appropriate level of forest management, but higher level networking approaches were necessary for issues concerning trade regulations and inter-village agreements at district level.
- Intersectoral linkages were promoted through strategic arrangements with local institutions.
- A number of adaptive management strategies were tested, including: in-situ sustainable harvesting of NTFPs, ex-situ domestication of NTFPs to reduce pressure on wild resources, participatory management of forests by local communities and activities aimed at improving the well-being of rural communities to reduce pressures on forests.

Conclusions

- The NTFP approach is a good example of a practical application of the Ecosystem Approach
- The NTFP approach could gain more rapid adoption beyond local levels by linking to regional and global approaches such as the Ecosystem Approach.

Case study 23
All Principles and Operational Guidance were applied

CBD thematic areas: biological diversity of forests, dry and sub-humid lands, inland waters, mountain areas and agriculture

CBD cross-cutting issues: indicators, incentives, impact assessment, benefit sharing, indigenous and local communities, sustainable use

Case Study 24

Siberut Island National Park and Biosphere Reserve*Problem statement*

Sustainable use, conservation and cultural diversity are all threatened by outside economic pressures and newly devolved government.

Description

Siberut Island, Indonesia, is a humid tropical island, the western half of which is a national park and the central portion of which is a Biosphere Reserve. Previous attempts to deliver sustainable development through an Integrated Conservation and Development Project (1992-1999) largely failed; they were top-down approaches that placed unrealistic demands on the limited local capacity. New activities identify communities as the main participants managing the national park and Biosphere Reserve and seek to build on the advances in local land tenure and resource rights made by the ICDP. Activities promoted by UNESCO-MAB, the national park and a local NGO in cooperation with the local government and *Adat* (customary law) councils are small scale and based in buffer zones. These activities, which have been welcomed by the communities involved, aim to do the following:

1. Support sustainable development
2. Increase the (locally defined) quality of life
3. Preserve the values of local societies
4. Avoid increasing conflicts between conservation and development.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and the sustainable use of biological diversity are all addressed.
- The importance of preserving ecosystem functioning and inter-ecosystem linkages is recognised.
- The lack of intersectoral cooperation is a major obstacle to delivering the Ecosystem Approach across the whole island of Siberut; the management of various zones is the responsibility of different government sectors.

Intersectoral cooperation is not emphasised in current actions, however, which identify communities as the main stakeholders and beneficiaries. Private-sector interests have not been directly considered. This lack of intersectoral cooperation also compromises management decisions that consider the effect of actions on adjacent ecosystems. Extending the reserve to the entire island and surrounding marine area is recommended as the best way of achieving integrated management.

- The participatory approach is key to achieving sustainable use, but the importance of local communities working with other agencies is also emphasised. This partnership gives local communities a wider perspective on the implications of their choices.
- Activities have been developed with and promoted by local community members. Management is therefore decentralised. The political changes in Indonesia have influenced decentralisation and the expression of societal choice. Although the creation and zoning of the national park partially reflect societal choice, for this to be fully realised the opinions of Mentawaians (90 percent of the population) should have priority. Outside economic influences, such as logging activities, increasingly influencing societal choice.
- Balancing long-term objectives and short-term economic gain is especially acute on Siberut. The devolution of administrative authority in the region has significantly increased demands for short-term revenue from logging.

Conclusions

- There is an urgent need to promote the Ecosystem Approach and Biosphere Reserve concepts at all levels and among all stakeholders.
- The lack of an integrated approach to biodiversity management that includes the entire island is an obstacle to resolving the significant and acute tensions between conservation, sustainable use and development.
- Decentralisation in Indonesia poses obstacles to implementation of the Ecosystem Approach.

Case study 24
All Principles and Operational Guidance were applied or considered

CBD thematic areas: forest and agricultural biological diversity

CBD cross-cutting issues: alien invasive species; incentive measures/perverse incentives; indigenous and local knowledge; NBSAP

Case Study 25

Aquatic resources, Chenderoh Reservoir, Perak, Malaysia*Problem statement*

Reservoir construction has significantly altered the biodiversity and productivity of the Perak River ecosystem, Malaysia.

Description

The Chenderoh Reservoir is the oldest and lowest of four cascading reservoirs. Initially, reservoir construction changed the assemblages of the reservoir fish from fluvial to lacustrine and affected the downstream biodiversity. Over time, however, the reservoir has become more shallow and productive, taking on some of the characteristics of a wetland, with changes in flora and fauna that reflect a shift to a mature reservoir ecosystem. Research was undertaken to determine the impact of reservoir construction on the biodiversity and productivity of the ecosystem. The biodiversity and productivity of the different subsystems were studied over a period of time. The impact of dam operation on biodiversity and productivity in terms of water management was also assessed. The help and cooperation of the local people were important, especially with regards to the study of the historical state of the environment, fisheries and fish biodiversity. The process of rapid rural appraisal (RRA) was used for this aspect of the study.

Highlighted aspects of the Ecosystem Approach

- Conservation, equitable sharing of benefits and sustainable use of the resources were simultaneously addressed.
- The study contributed to a greater ecological understanding of the reservoir and river ecosystems. It has shown the need to properly manage water-level fluctuations during power generation in order to control the impact on the biology and ecology of aquatic life and to support the breeding requirements of the fish community in and downstream of the reservoir.

- Goods and services for the local community were identified as: (1) electricity generation; and (2) fisheries. Wider society has an interest in the sustainable management of the river-reservoir system as it benefits from the water supply. Local people benefit directly from fishing rights.
- Management that effectively balances conservation, sustainable use and equitable sharing of benefits of genetic resources requires intersectoral and multi-stakeholder decision making that takes into consideration the views of the local communities. In this case, it also involves the power company, fisheries authorities and the drainage and irrigation departments.
- Since local communities are highly dependent economically on the fisheries resource they limit the catch to ensure that fishing is sustainable in the long term.
- Fish biodiversity is used as an indicator of ecosystem health; this data is the basis for adaptive management.
- The value of local knowledge and fish resource management practices, in the form of community-based aquatic resource management (CBARM), was recognised.
- The study contributes to the National Biodiversity Strategy and Action Plan in that it demonstrates how to promote the sustainable and wise use of biological resources by incorporating the active participation of the local community.

Conclusions

- Indigenous and local knowledge of fish resources can be key to successful biodiversity conservation and management.
- Adaptive management is vital if local-level observations are to result in appropriate changes in management practices.

Case study 25

Principles 2, 3, 5, 9, 10, 11 and 12 were emphasised, along with Operational Guidance points 1, 2, 3 and 5

CBD thematic areas: biological diversity of inland waters

CBD cross-cutting issues: indicators, benefit-sharing, indigenous and local communities and sustainable use

Case Study 26

Ecoregion conservation in Cambodia, Lao PDR and Viet Nam*Problem statement*

Conservation efforts continue to have limited effectiveness and hence many conservation organisations have begun to re-examine their current approaches and develop new strategies based on the identification of priority ecological regions. The ecoregion approach of WWF, for example, recognises the need to give detailed consideration to the social and economic factors that constrain or provide opportunities for biodiversity conservation.

Description

The aim of ecoregion conservation is to develop long-term conservation programmes that ensure the persistence of healthy ecosystems and species by mainstreaming conservation with natural resource management. Ecoregions are defined as areas with similar or interrelated ecological processes and characteristics. Ecoregion conservation can be useful as a planning tool because it provides a holistic view of major ecological processes and treats ecosystems as discrete management units. It differs from site-based Integrated Conservation and Development Projects (ICDPs) in that it allows for conservation planning and management at a broader scale. WWF and its conservation partners have defined 233 ecoregions (the Global 200) throughout the world. The ecoregion conservation programme in Cambodia, Lao PDR and Viet Nam is made up of a number of projects, which contribute directly to the overall programme goals:

- More effective conservation of the full range of biodiversity and promotion of its persistence within viable populations and of sufficient habitat;
- Mitigation of many significant threats to biodiversity through efforts at multiple sites;
- Facilitation of coordinated regional efforts to ensure more effective and strategic use of limited resources for conservation;

- More accurate identification of areas requiring specific habitat management interventions (e.g. forest restoration);
- Facilitation of more effective communication of ecoregion conservation goals and activities to policy-makers and the donor community.

Highlighted aspects of the Ecosystem Approach

- Although the main emphasis is conservation, the approach strives to simultaneously address conservation, equitable benefit sharing and sustainable resource use.
- Understanding and conserving ecosystem functioning is key to ecoregion conservation. This approach simultaneously considers entire ecological processes and root causes of biodiversity loss affecting many sites.
- Goods and services and benefit sharing were not addressed, although a situational analysis of key socio-economic trends and priorities was undertaken.
- ecoregion conservation seeks to recognise societal choice by involving the widest possible range of stakeholders in conservation planning and by involving local partners in conservation interventions.
- ecoregion conservation seeks intersectoral cooperation through the mainstreaming of conservation with natural resource management and development.
- ecoregion objectives are set for the long term.
- ecoregions are defined according to global conservation priorities, but on-the-ground actions must meet local needs; i.e., the scale of management is decided by a combined top-down and bottom-up approach. Interventions are made at various sub-regional scales while the ecoregion vision applies at the regional scale.

Conclusions

- The ecoregional approach to conservation is one example of the Ecosystem Approach.
- A key challenge to ecoregional conservation is linking the top-down vision to the bottom-up everyday needs of people within the region.

Case study 26
All Principles and Operational Guidance were applied or considered

CBD thematic areas were all relevant to the planned ecoregion.

CBD cross-cutting issues were all relevant to the plan

Decisions adopted
by The Conference
Of The Parties to
the Convention
On Biological
Diversity at its
Fifth Meeting,
Nairobi, 15-26
May 2000
Decision V/6

Annex 1. CBD COP-5 Decision 6

UNEP/CBD/COP/5/23

Ecosystem approach

The Conference of the Parties,

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

Governments and relevant organisations to provide technical and financial support for this purpose;

7. Encourages Parties and Governments to promote regional co-operation, for example through the establishment of joint declarations or memoranda of understanding in applying the ecosystem approach across national borders.

A. Description of the ecosystem approach

1. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.
2. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organisation, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognises that humans, with their cultural diversity, are an integral component of many ecosystems.
3. This focus on structure, processes, functions and interactions is consistent with the definition of “ecosystem” provided in Article 2 of the Convention on Biological Diversity: “Ecosystem’ means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.” This definition does not specify any particular spatial unit or scale, in contrast to the Convention definition of “habitat”. Thus, the term “ecosystem” does not, necessarily, correspond to the terms “biome” or “ecological zone”, but can refer to any functioning unit at any scale. Indeed, the scale of analysis and action should be determined by the problem being addressed. It could, for example, be a grain of soil, a pond, a forest, a biome or the entire biosphere.
4. The ecosystem approach requires adaptive management to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning. Ecosystem processes are often non-linear, and the outcome of such processes often shows time-lags. The result is discontinuities, leading to surprise and uncertainty. Management must be adaptive in order to be able to respond to such uncertainties and contain elements of “learning-by-

doing” or research feedback. Measures may need to be taken even when some cause-and-effect relationships are not yet fully established scientifically.

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

B. Principles of the ecosystem approach

6. The following 12 principles are complementary and interlinked:

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

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

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

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

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

Rationale: Management interventions in ecosystems often have unknown or unpredictable effects on other ecosystems; therefore,

possible impacts need careful consideration and analysis. This may require new arrangements or ways of organisation for institutions involved in decision-making to make, if necessary, appropriate compromises.

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

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

Rationale: The greatest threat to biological diversity lies in its replacement by alternative systems of land use. This often arises through market distortions, which undervalue natural systems and populations and provide perverse incentives and subsidies to favour the conversion of land to less diverse systems.

Often those who benefit from conservation do not pay the costs associated with conservation and, similarly, those who generate environmental costs (e.g. pollution) escape responsibility. Alignment of incentives allows those who control the resource to benefit and ensures that those who generate environmental costs will pay.

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

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

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

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

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

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

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

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

Principle 9: Management must recognise that change is inevitable.

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

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

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

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

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

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

Rationale: Most problems of biological-diversity management are complex, with many interactions, side-effects and implications, and therefore should involve the necessary expertise and stakeholders at the local, national, regional and international level, as appropriate.

C. Operational guidance for application of the ecosystem approach

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

1. Focus on the functional relationships and processes within ecosystems

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

2. Enhance benefit-sharing

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

3. Use adaptive management practices

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

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

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

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

5. Ensure intersectoral co-operation

12. As the primary framework of action to be taken under the Convention, the ecosystem approach should be fully taken into account in developing and reviewing national biodiversity strategies and action plans. There is also a need to integrate the ecosystem approach into agriculture, fisheries, forestry and other production systems that have an effect on biodiversity. Management of natural resources, according to the ecosystem approach, calls for increased intersectoral communication and co-operation at a range of levels (government ministries, management agencies, etc.). This might be promoted through, for example, the formation of inter-ministerial bodies within the government or the creation of networks for sharing information and experience.

Annex 2. Guidelines for the preparation of case studies

Preparation and analysis of case studies

All presenters of case studies are required to submit a written version of their case study at or before the workshop. This need not be long; indeed you encouraged to keep it as short as is practicable. These guidelines should help meet this objective.

All presenters are therefore requested to prepare their case studies using the following guidelines. The use of these guidelines will help ensure that the assessment of case studies will meet the workshop objectives. We thank you in advance for your cooperation.

These guidelines have been adapted from those produced by the Secretariat of the CBD for other case studies. The use of this common framework is welcomed by the Secretariat of the CBD, as it will facilitate the synthesis of lessons learnt from these and other case studies, a key objective of this workshop.

Indicative outline

Overview: In one page or less, please provide a summary of the case study using bullet points to highlight: the context/problem to be solved; the objectives; the approach; application of the Ecosystem Approach; and lessons learnt.

I. Background/Problem statement: Please describe the context or situation of the case study, and identify the problem that is addressed by the activities of the case. Consideration of threats to biological diversity, the goods and services derived from it, and the distribution of benefits among stakeholders may be included, and, if known, the underlying causes of such threats may be described.

II. Objectives/Purpose of the Activities: Please provide, in one or few sentences, the main objective(s) of the activities proposed and/or carried out.

III. Details of the case study and the approach taken: Please describe the activities, the approach taken, and the main actors involved.

IV. Analysis: Please analyse the case study in the framework of the Ecosystem Approach under the Convention and the various programmes of the Convention, using, as appropriate the following framework. (Note, this should be used as an aide memoir. It is not necessarily appropriate to address each and every part of the framework in each case). This section might be presented in tabular form, and should complement section III:

A. Application of the Ecosystem Approach.

1. Describe how the case study illustrates any of the **12 principles** of the Ecosystem Approach under the Convention (see Decision V/6, attached), and identify any constraints in applying these principles.
2. For the case study:
 - (a) Identify the **goods and services** provided by biodiversity in the area of case study (and additional ones that could be provided with improved management);
 - (b) Identify the **beneficiaries** of these goods and services, who should as well as additional groups be beneficiaries, their participation and barriers in the benefits;
 - (c) Describe approaches to **adaptive management**, noting what works and what does not;
 - (d) Describe scale(s) of management used, additional scale(s) of management needed to address the problem, and any barriers to exercising management at the appropriate scales.
 - (e) Identify sectors involved, and those that should be involved, and identify changes required to provide an enabling policy environment.

B. Relevance to the thematic work programmes of the Convention

Indicate whether or not the case study is relevant to the following thematic areas, and if possible how they are relevant:

- (a) Forest biological diversity
- (b) Marine and Coastal biological diversity
- (c) Biological diversity of inland waters
- (d) Biological diversity of dry and sub-humid lands (including Mediterranean, Savannah and Grasslands)
- (e) Biological diversity of mountain areas
- (f) Agricultural biological diversity

C. Relevance to the cross-cutting work programmes of the Convention

- (a) Indicate whether or not the case study is relevant to the identification, control or mitigation of the effects of invasive alien species.
- (b) Indicate whether or not the case study employs indicators of biological diversity, or of impacts on biological diversity.
- (c) Indicate whether the case study employs the use of incentive measures, or identifies perverse incentives.
- (d) Indicate whether the case study employs impact assessments (environmental, socio economic) or indicates the need for impact assessments.

- (e) Indicate whether the case study employs the use of **benefit-sharing** measures.
- (f) Indicate whether the case study draws upon the knowledge, innovations and practices of **indigenous and local communities** and whether it contributes to the protection and wider application of such knowledge, innovations and practices.
- (g) Indicate any other measures taken to promote the **sustainable use** of biological diversity.
- (h) Indicate if the case study is part of, or contributes to, a **National Biodiversity Strategy and Action Plan**.

V. Conclusions.

A. Outcome of the activities. Please provide a brief note of the results, or expected results, of the case study, and the extent to which the objectives were met.

Conclusions. Please highlight any critical factors that led to the success or failure of any of the activities carried out. It would be useful to note any practical conclusions that would assist others in carrying out similar activities, as well any policy-relevant lessons.

Annex 3. Workshop participants

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Acronyms

CBD	Convention on Biological Diversity
CCD	Convention to Combat Desertification
CHM	Clearing House Mechanism (of the CBD)
COP	Conference of Parties (of the CBD)
GEF	Global Environment Facility
IPM	Integrated Pest Management
IUCN	The World Conservation Union
IUCN-BPCD	IUCN Biodiversity Policy Coordination Division
IUCN-CEM	IUCN Commission on Ecosystem Management
IUCN-ROSA	IUCN Regional Office for Southern Africa
knowledge base	The data, knowledge and rules used to solve a problem
LEAP	Local Environment Action Plan
LIFE	Living in a Finite Environment Programme
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-governmental organisation
NTFP	Non-timber forest product
Ramsar	Convention on Wetlands (adopted in Ramsar, Iran, 1971)
SADC	Southern African Development Community
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
UNESCO-MAB	United Nations Educational, Scientific and Cultural Organisation — Man and the Biosphere Programme
UNFCCC	United Nations Framework Convention on Climate Change
WRI	World Resources Institute
WWF	World Wide Fund for Nature