



# The Ecosystem Approach

## Five Steps to Implementation

Gill Shepherd





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# The Ecosystem Approach

## **Five Steps to Implementation**

Gill Shepherd

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## Preface

The Ecosystem Approach puts people and their natural resource use practices squarely at the centre of decision-making. Because of this, the Ecosystem Approach can be used to seek an appropriate balance between the conservation and use of biological diversity in areas where there are both multiple resource users and important natural values. It is therefore of relevance to professionals and practitioners active in farming, forestry, fisheries, protected areas, urban planning and many other fields.

This publication by Gill Shepherd, Theme Leader for the Ecosystem Approach of the IUCN Commission on Ecosystem Management, takes us from the theory of the approach to practical steps towards implementing it. It demystifies the approach by providing real guidance on how to use the approach in planning field activities. Both the 9th meeting of the Subsidiary Body for Scientific, Technical and Technological Advice (SBSTTA) of the CBD and the 7th Conference of Parties to the CBD have welcomed the development of this practical guidance on the application of the ecosystem approach.

I would like to thank Gill Shepherd for her insight and the tremendous energy with which she is leading the IUCN CEM work on the Ecosystem Approach. I also thank the other CEM Steering Committee members who have provided various inputs, and Joachim Gratzfeld of the IUCN Ecosystem Management Programme for his meticulous editing skills.

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Dr. Hillary Masundire  
Chair, IUCN Commission on Ecosystem Management

*We welcome your views on the usefulness of this guide; please contact us at: [cem@iucn.org](mailto:cem@iucn.org)*

# Contents

Introduction	1
The 12 principles of the Ecosystem Approach	2
Organising the principles	3
Step A Determining the stakeholders and defining the ecosystem area	4
Case Study, determining stakeholders (Bocas del Toro, Panama)	5
Case Study, defining the ecosystem area (Niger-Nigeria border)	9
Step B Ecosystem structure, function and management	12
Case Study, ecosystem structure and function (Papua Province, Indonesia)	13
Case Study, devolving ecosystem management (Tanzania)	17
Step C Economic issues	18
Case Study, economic issues (Mekong River basin)	19
Step D Adaptive management over space	22
Case Study, scaling up (Tanzania)	23
Case study, scaling down (Niger-Nigeria border)	25
Step E Adaptive management over time	26
Case Study, Multi-stakeholder Forestry Programme (Papua Province, Indonesia)	27
Conclusions	30

## Photo captions and credits

page

1. *Dry acacia woodland, Zalingei, western Sudan*  
Jim Harvey
4. *Fishermen, Bocas del Toro archipelago, Panama*  
Nestor Windevoxhel
5. *Mangrove forest, Bocas del Toro archipelago, Panama*  
Marieke Wit
6. *Fishermen's houses, Bocas del Toro, Panama*  
Simon Rietbergen
7. *PRA exercise with community and government, Panama*  
Marieke Wit
8. *Farmed parkland, Sahel, northern Ghana*  
Gill Shepherd
9. *Transhumant pastoralists heading south, western Sudan*  
Jim Harvey
10. *Fulbe women watering animals, Niger-Nigeria border*  
Mike Mortimore
11. *Herding cattle under Acacia albida, western Sudan*  
Jim Harvey
12. *Looking down on the Baliem valley, Indonesian Papua*  
Adrian Wells
13. *Sweet potato beds, highlands, Indonesian Papua*  
Adrian Wells
14. *Women's transect walk, highlands, Indonesian Papua*  
Gill Shepherd
15. *Men's PRA exercise, highlands, Indonesian Papua*  
Gill Shepherd
16. *Selling fuelwood, Bermi village, Babati, Tanzania*  
Gill Shepherd
17. *The road into Bermi village, Babati, Tanzania*  
Gill Shepherd
18. *Beach seine-net fishing, Thailand-Lao PDR border*  
Peter-John Meynell
19. *Mekong delta, Tram Chim National Park, Vietnam*  
Peter-John Meynell
20. *Fish weir, Mekong delta, plain of reeds, Vietnam*  
Peter-John Meynell
21. *Riverbank gardens, Mekong River tributary, Lao PDR*  
Peter-John Meynell
22. *Acacia tortilis, Babati, Tanzania*  
Gill Shepherd
23. *The rift escarpment recovering, Babati, Tanzania*  
Gill Shepherd
24. *Fulbe woman hoeing weeds, Niger-Nigeria border*  
Mike Mortimore
25. *Ploughing in the early rainy season, Kitui, Kenya*  
Gill Shepherd
26. *Soil fertility indicator plant, lowlands, Indonesian Papua*  
Gill Shepherd
27. *Village leader and government officials, Indonesian Papua*  
Adrian Wells
28. *Wild pig hunter, lowlands, Indonesian Papua*  
Gill Shepherd
29. *Explaining land use, highlands, Indonesian Papua*  
Gill Shepherd
30. *Jetty among mangroves, Isla Bastimentos, Panama*  
Marieke Wit

## Introduction

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. It is the primary framework for action under the Convention on Biological Diversity (CBD) and comprises 12 Principles (*page 2*). In considering how to best implement the Ecosystem Approach, several attempts have been made to rank the principles, either by order of importance or according to theme.

While these efforts are interesting conceptually, what has been lacking so far is practical assistance in applying the Ecosystem Approach in the field.

The IUCN Commission on Ecosystem Management (CEM) has produced this document as a move towards filling the gap.

We have clustered subsets of Ecosystem Approach Principles into a logical sequence which encourages discussion, planning and step-by-step action.

Of course, no one aspect of an ecosystem can be dealt with alone for long, and those aspects tackled early in the sequence described below will have to be revisited regularly. Nevertheless, the approach is empowering because it enables both researchers and field workers to concentrate on one set of problems at a time. In this way, the ecosystem, its inhabitants, and the challenges and the opportunities they present can be brought slowly and manageably into focus.



## The 12 principles of the Ecosystem Approach

1. The objectives of management of land, water and living resources are a matter of societal choice.
2. Management should be decentralized to the lowest appropriate level.
3. Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
4. Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:
  - (i) reduce those market distortions that adversely affect biological diversity;
  - (ii) align incentives to promote biodiversity conservation and sustainable use; and
  - (iii) internalize costs and benefits in the given ecosystem to the extent feasible.
5. Conservation of ecosystem structure and functioning, to maintain ecosystem services, should be a priority target of the ecosystem approach.
6. Ecosystems must be managed within the limits of their functioning.
7. The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
8. Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
9. Management must recognize that change is inevitable.
10. The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
11. The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
12. The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

## Organising the principles

The 12 principles have been organised into five steps, each step involving a range of actions.

The five steps to the implementation of the ecosystem approach are as follows:

- Step A** Determining the main stakeholders, defining the ecosystem area, and developing the relationship between them
- Step B** Characterizing the structure and function of the ecosystem, and setting in place mechanisms to manage and monitor it
- Step C** Identifying the important economic issues that will affect the ecosystem and its inhabitants
- Step D** Determining the likely impact of the ecosystem on adjacent ecosystems
- Step E** Deciding on long-term goals, and flexible ways of reaching them

## A

## Step A

### Determining the stakeholders and defining the ecosystem area



Step A involves the most difficult issues:

- determining the main stakeholders;
- defining the ecosystem area; and
- developing the relationship between them.

It is best to work simultaneously on defining the ecosystem area and determining the stakeholders who will support the selection and management of that area. Whether we start with area or with stakeholders, it will take time and effort to achieve a workable fit.

We start here with stakeholder issues. Too many previous attempts at the management of biodiversity have tried to fit stakeholders to a chosen area without considering the broader implications of the Ecosystem Approach, which stresses societal choice.

### Principles related to Step A

1. The objectives of management of land, water and living resources are a matter of societal choice.
7. The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
11. The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
12. The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

## **Step A: Case Study, determining the stakeholders**

A

### ***Bocas del Toro Archipelago, Panama***

*The main resource managed at this site is the marine ecosystem. The main stakeholders — fishermen, women and other local inhabitants — have been negotiating the right to manage coral reefs and associated fishing areas themselves, through the formation of local fisheries committees (COLOCOPES). With the assistance of two IUCN NGO members, Fundación Promar and The Nature Conservancy (TNC), the COLOCOPES groups have formulated proposals for rules for fisheries management throughout the Bocas del Toro Archipelago.*

*The COLOCOPES groups have identified seven community fisheries reserves, which include both exclusion zones (to be regenerated) and high-quality fisheries resources (where exploitation is to be better regulated). The COLOCOPES groups have also now created a regional, archipelago-wide fisheries association (ADEPESCO) to enhance their negotiation position with other, more powerful institutions.*

*Local branches of the government agencies in charge of controlling marine resources and protected areas are increasingly supportive of the idea of community fisheries management reserves. Meetings now regularly take place between ADEPESCO and these government agencies to monitor progress and deal with problems.*



A

## STEP A (cont'd)



### Identifying stakeholders

Both **Principle 1** and **Principle 12** stress societal involvement in the choice of ecosystem and management objectives, and in the range of skills which will be needed.

The principles do not outline any criteria for selecting any one part of society, and its knowledge, over any other, though in practice that will be necessary. That requires a stakeholder analysis.

### Stakeholder analysis

Identify all the key stakeholders with interests in the proposed ecosystem.

Weight them as primary, secondary or tertiary stakeholders, and assess their views in that light.

#### Primary stakeholders

Those who are most dependent upon the resource, and most likely to take an active part in managing it, must usually be strongly weighted as primary.

#### Secondary and tertiary stakeholders

Over-powerful voices which may need to be weighted as only secondary or tertiary may include local government officials and those who live near the

**Step A: Case Study, determining the stakeholders (cont'd)**

*The protected areas agency welcomes ADEPESCO as an important complement to the Marine National Park Isla Bastimentos, while the marine resources agency is concerned about increasing pressures on local fisheries and is willing to consider constructive proposals to address them. Fundación Promar and TNC, along with the national agency in charge of marine resources, are exploring whether a clause in the new law of the seas provides suitable openings for community fisheries reserves. The national agency in charge of protected areas is interested in this approach, but is concerned that rapid tourism development in the Bocas del Toro Archipelago may need more stringent protection than can be provided by the community fisheries reserves. Ideally, their plans will both support and protect local stakeholder groups and their fisheries. All these ecosystem managers — partly complementary and partly competing, operating at different levels — are learning how to work together to address increasing pressures on the ecosystem.*

*In the medium term, adaptive management issues may encourage a stepping up to involve the impact of adjacent upland areas on marine resources, as fishermen become more aware of the impact of silt flow from the mainland and the islands into the marine ecosystem.*



## A

## STEP A (cont'd)



resource but do not greatly depend on it (secondary); and national level government officials and international conservation organisations (tertiary).

Assess relative stakeholder management capacity and commitment, in regard to the ecosystem.

Set up a stakeholder forum that will meet regularly. Primary stakeholders may not be experienced in speaking at such events, and may need help in discussing issues and preparing presentations for the main forum.

### Area analysis

What size of ecosystem management area is going to be chosen, using what criteria?

An appropriate size and scale (**Principle 7**) is one which does the following:

- meets scientific criteria (**Principle 11** and **Principle 12**);
- is appropriate to existing management capacity, knowledge and experience (**Principle 11**);
- takes account of administrative, legal and cultural boundaries where possible, to simplify liaison with existing institutions (**Principle 11**);
- understands that a long-term ideal area may be constrained by what is likely to be an effective management unit in the short term; and

## STEP A: Case Study, defining the ecosystem area

A

### *Drylands in Niger-Nigeria*

*The Sahel lies at the southern edge of the Sahara where, as one moves south, first herding and then farming become possible. It offers an excellent example of the way in which ecosystem areas are defined to a considerable extent by their most frequent and committed users.*

*Such drylands are typically extensive and heterogeneous, and multiple scales are needed to understand them. Drylands require that their inhabitants be flexible, adaptable and innovative, since rainfall is variable seasonally and over longer cycles. In the Niger-Nigeria border region, transhumant livestock herders move several hundred km north and then south again each year, following the rains and the grazing. Sedentary farmers grow crops on a south-north gradient along which rainfall becomes increasingly sparse and erratic. Drylands also exist in symbiosis with distant higher-rainfall areas, which export their excess farmers into dryer areas but also offer labour migration opportunities and markets to dryland inhabitants.*

*People — and their use of landscapes and biodiversity — are at the centre of ecosystem management. Conservation, productivity and sustainability all depend on decisions made by local managers, the vast majority of whom are small-scale farmers or livestock producers. These decisions are amenable to new*



## A

## STEP A (cont'd)



- accepts that if substantial parts of the originally selected ecosystem area will not be the responsibility of a specific individual or group, then the boundaries may need to be rethought.

### Building a logical relationship between stakeholders and area

Once it is clear who the main stakeholders are, and who has the strongest interest in managing which areas within the ecosystem, then it becomes possible to identify both ecosystem boundaries and the corresponding individuals, groups or institutions that are likely to be able to protect, manage and take decisions within those boundaries, over the medium to long term.

The result will be a mosaic of areas, managed by different stakeholders, at different intensities, within the overall ecosystem.

While conservation specialists will maintain a long-term vision, the practicalities of coordination and management will need to be built up from below, through the stakeholder forum, not commanded from above.

**STEP A: Case Study, defining the ecosystem area (cont'd)**

A

*technical knowledge or management modes, economic incentives, the negotiation of competition or conflict, and the strength of collective responsibility.*

*Ecosystems have no objective, territorial expression in this region, where integrated surface drainage is often absent and even a catchment is a concept of little value. Rather, user groups (stakeholders) define their own ecosystems as they relate to their livelihoods and economic interests. These are understood at one scale by farmers, woodcutters, local herders and medicine makers, at another by transhumant graziers or inter-regional migrants, and at still another by central government and international organisations.*

*Thus ecosystems are defined by the economic interests of their users, as is the value of biodiversity. Ecosystems vary in size, and those of different user groups overlay one another. This results in intense competition for certain resources in certain areas and at certain seasons, but a useful complementarity at other times and in other places. The institutional frameworks governing access to, and benefits from natural resources are inseparable from the ecosystem itself.*



*These ecosystems have been modified over millennia through exploitation, and they continue to be shaped, not only by use and season, but also by longer-term trends which include agricultural expansion and land-use intensification.*

## B

## Step B Ecosystem structure, function and management



Step B involves characterizing the structure and function of the ecosystem, and setting in place mechanisms to manage and monitor it.

### Ecosystem structure and function

How can we identify the characteristics of ecosystem structure and function that are needed to deliver key ecosystem goods and services? How can we tell when an ecosystem is under threat because it is being used beyond its capacity (**Principle 5** and **Principle 6**)?

The most productive way forward involves scientists and local inhabitants working together, in the office as well as in the ecosystem. Each group's knowledge is likely to be different and complementary.

### Principles related to Step B

2. Management should be decentralized to the lowest appropriate level.
5. Conservation of ecosystem structure and functioning, to maintain ecosystem services, should be a priority target of the ecosystem approach.
6. Ecosystems must be managed within the limits of their functioning.
10. The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.

## **Step B: Case Study, ecosystem structure and function**

B

### ***Papua Province, Indonesia***

*Papua is Indonesia's last great reserve of untouched forest. Its forests account for approximately 24 percent of Indonesia's total forested area, and are rich in biodiversity.*

*Recently, traditional forest-dwelling communities and government forestry officials have been finding ways of looking at their common interests — environmental protection, sustainable forest management and sustainable livelihoods — from the perspective of the ecosystem approach. They have been supported in this by local NGOs and by a Multistakeholder Forestry Programme funded by the British government. The programme works in both lowland and highland forests.*

*Negotiation of jointly agreed, environmentally benign land-use began with the decision by local people to map both their clan boundaries and the varieties of natural resources and use areas within them. These clan maps, when compared with the Forest Department's land classification maps, immediately revealed anomalies that required urgent resolution.*

*In lowland areas, where a great deal of forest is designated for production and conversion, it was clear that clan land-use valued ecosystem structure and function more highly than did government. In highland areas, clans had, in addition to their agricultural lands, a seven-*



## B

## STEP B (cont'd)



Tools such as joint mapping, ground-truthing, transect walks, and natural-resource-oriented Participatory Resource Assessment (PRA), along with monitoring exercises that measure change against base-line activities, build a two-way flow of knowledge and trust at the same time.

The balance between conservation and use of biodiversity will be achieved through joint decision-making and through agreements on who should manage what parts of the ecosystem (**Principle 10**) for which purposes.

It is important to understand that knowledge will inevitably be incomplete at the beginning, but that it will grow over time if harmonious working methods are set in place from the start. The Ecosystem Approach demands realism: often we must settle for what is possible, not what is theoretically ideal.

### Ecosystem management

Applying **Principle 2** involves working as far as possible with local stakeholders. *It is necessary to accept that even if local concepts of ownership and responsibility differ from “official” views, they will need to be respected — and accommodated — if primary stakeholders are to make a commitment to long-term cooperative management.*

**Step B: Case Study, ecosystem structure and function (cont'd)**

B

zone classification of forest, with different kinds of use, management and protection attached to each zone. The Forest Department classified the entire area, thousands of square km, as a national park.

Four ecosystem areas were selected in 2004, with the help of forestry and clan maps. Forestry officials stayed for a week with villagers in each area, and took part, with them, in a specially-designed forest-focused exercise in Participatory Rural Appraisal (PRA). Villagers had the chance to explain ecosystem structure and function to government from their point of view and to analyse problems. They described the evolution of the ecosystem over about 40 years, and took officials on transect walks across both forest and agricultural land, explaining management rules and techniques. In subgroups that gave women and younger less important men a voice, they analysed livelihood sources (both cash and subsistence) drawn from the ecosystem, and identified key landscape and social trends. They also identified problems and possible solutions, indicating which problems they felt they could handle themselves, and which required outside help.



The PRAs revealed the strength of local people's land-management skills and decision-making institutions, and created opportunities for renegotiating land-use. Although each side had been fearful of working together, the joint exercises opened lines of communication and built new trust, respect and insight. Plans for jointly designed sustainable forest management, and for a more fine-grained patch-by-patch approach to conservation, are now underway.

## B

## STEP B (cont'd)



It will also be necessary to accept that some, possibly much, of the ecosystem may effectively be private land.

Accepting these realities will make the following more clear:

- which areas or aspects of the ecosystem local people want to manage;
- the areas or aspects for which they want help and support; and
- which areas or aspects they want others to manage.

Management at the “lowest appropriate level” (**Principle 2**) is likely to mean management at different levels (individual farmers, community groups, district, national, even international) in various parts of the ecosystem. A management mosaic will evolve. This management mosaic will need to be monitored from time to time, given the evolving understanding of issues concerning ecosystem structure, function and health.

Using the stakeholder forum developed in **Step A** (page 8), and the experience of its members, will raise topics for discussion and field verification. These might include the identification of areas in the ecosystem where management is weak but the need for ecosystem protection is strong; or areas of poor connectivity. The forum can also identify and deal with any management coordination problems that emerge.

## Step B: Case Study, ecosystem management

B

### *Managing at the lowest appropriate level in Tanzania*

*In many ecosystems, there is a conflict between common-property resource management regimes (which are unrecognised by government) and state management (which overrides the conservation activities undertaken by local people). Tanzania solved this problem by fusing the two; its experience offers an important model for the decentralisation of management. Since 1974 it has given ownership and control over farmland and nearby common land to individual villages; since 1996, village-level forest reserves have also been managed at the village level. Within the village boundary, decisions about land use are made by the village assembly, with representatives from every village household. The village land-use committee oversees the village land-use plan, and appoints patrols to check regularly on implementation. Each village must conform to district-level bylaws on such matters as the conservation of sloping land. Inter-village land-management issues are dealt with at the district level.*

*Some land areas have been retained as national-level property or as regional and district-level forest reserves. Nevertheless, the basic relationship between village and district combines the best of common-property resource and government land-management. Each village takes responsibility for its own immediate area, and can act if problems begin to emerge. At the same time, the institutional potential for wider action is there (see Step D).*



## C

## Step C Economic issues



It is important to identify important economic issues that will affect the ecosystem and its inhabitants. Which economic issues will drive management choices in the ecosystem?

### Incentives and disincentives

Points i and ii of **Principle 4** concentrate on reducing market distortions that have a negative effect on biodiversity, and the creation or strengthening of incentives for the protection and wise use of biodiversity. Both these tasks demand thorough analysis in the early stages of ecosystem management.

For instance, what negative incentives, or subsidies, are causing people to work natural resources unsustainably?

### Principle related to Step C

4. Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should:
  - i) reduce those market distortions that adversely affect biological diversity;
  - ii) align incentives to promote biodiversity conservation and sustainable use; and
  - iii) internalize costs and benefits in the given ecosystem to the extent feasible.

## **Step C: Case Study, economic issues**



### ***The Mekong River basin***

*The Lower Mekong countries, Cambodia, Lao PDR, Thailand and Vietnam, created the Mekong River Commission (MRC) to protect the biodiversity of the Mekong River in order to secure the natural resource base for local livelihoods and the poor. IUCN's Mekong Wetlands and Biodiversity Project (MWBP) works with the MRC, and makes use of the concept of "environmental flow" — the water regime needed to maintain ecosystems and their benefits where there are competing water uses and where flows are regulated. The MRC negotiates these uses, and is currently developing the basin plan and working out the environmental flow required.*



*The main market distortion that affects biodiversity is the overvaluing of dams and irrigation schemes, and undervaluing of other economic uses of river water. The poor mainly need the river for its plant and animal aquatic resources; for these to flourish, a good proportion of water must flow freely and naturally into swamps and side courses, and be available as ground water. In fact, the needs of the poor fit very well with a water allocation regime that respects environmental flow concepts and benefits biodiversity.*

*Reducing market distortions and aligning incentives to promote biodiversity conservation and sustainable use involves improving both knowledge and political will. The MWBP, through its recent*

## C

## STEP C (cont'd)



Some may be local, such as bribes exacted by local officials or police for permits to extract products from the ecosystem. Some may be dictated by inappropriate or outdated national laws. In the Mekong case study, environmentally unsustainable water use is driven by favouring the needs of richer over poorer water users.

Positive incentives that lead to better use include better knowledge and understanding, and a stronger voice in local and national decision-making. It is also important to understand and try to quantify the economic benefits that will result from better management of the ecosystem.

Such economic analysis will be an ongoing activity. Many economic realities will only gradually become apparent. Markets — and market distortions — constantly change and evolve, generating an ever-shifting range of negative and positive incentives for the destruction or protection of biodiversity.

Internalising costs and benefits within the ecosystem (**Principle 4**: Point iii) is at the heart of what is innovative about the Ecosystem Approach. The challenge is to avoid concentrating the benefits inside one ecosystem or subsystem while exporting the costs into the next. It is also vital to work *with*, not *against*, key aspects of the local economy. Better, even if politically challenging, systems must be put into place, so that those who look after the resource control its benefits, and those who generate environmental costs have to pay for them.

**Step C: Case Study, economic issues (cont'd)**

*support of villager research (Thai Baan) in a Mekong tributary in Thailand, has shed light on the extent to which regional inland fisheries statistics underrate the economic importance of poor people's use of aquatic resources. Thailand's new Constitution gives local people more influence in development and natural resource management, and more power to overcome the conflicts that have characterised large-scale development. Investments in environmental flows can be justified by clear benefits for the poor.*

*In an ecosystem as large as the Mekong, internalising costs and benefits is very complex. The river basin has to be seen as a chain of subsystems, affected by both natural and political considerations. Excessive diversion of water into dams and irrigation schemes passes unwelcome externalities downstream, harming the diversity and vigour of resources there. Downstream demand must help to shape upstream use and management, and the water needs of the poor must be a high priority. "Environmental flow" has to be determined on the basis of the best knowledge available at the time, and regularly revised.*



*For the best economic outcomes, Thai Baan-type research should generate local-level stakeholder coalitions to communicate findings and flag unwelcome upstream changes. National governments should draw on the rich knowledge of local communities and officials, and develop more inclusive water management. Intergovernmental bodies should manage conflict boldly, drawing on international agreements that prioritise the Ecosystem Approach and taking advantages of opportunities for positive change as they occur.*

## D

## Step D Adaptive management over space



Adaptive management over space refers to the likely impact of an ecosystem on adjacent ecosystems. Changes in the management of one ecosystem may affect adjacent ecosystems, even though attempts have been made to internalize costs and benefits (**Principle 4**: Point iii).

Some unforeseen negative impacts will inevitably occur. For instance, if certain agricultural or livestock-raising practices are disallowed in one ecosystem, they might cluster in the next.

Inevitably, management will have to adapt. But better management in one ecosystem often induces better management in an adjacent one in due course.

### Principles related to Step D

3. Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
7. The ecosystem approach should be undertaken at the appropriate **spatial** and temporal scales.

## **Step D: Case Study, adaptive management over space**

D

### **Scaling up, Tanzania**

*In Babati district, the Rift Valley escarpment, once forested, slopes steeply down to the plains below. A Catholic mission and hospital, established in the 1920s, attracted farmers into the area, and in the 1970s compulsory villagisation grouped new populations along the base of the escarpment. The trees on the escarpment were cut for house-building and fuelwood, and eventually cattle were grazed there.*

*By the early 1990s, the escarpment was in poor condition. Streams no longer ran all year, stream water was siltier than before, and landslides were more frequent. Escarpment footpaths were gullied and dangerous.*

*The Chairman of Bermi village closed his village's section of the escarpment permanently to grazing animals in 1994, and instituted fines for any animals found there. He also banned fuelwood collection and proposed intensive tree-planting at the base of the slope instead.*

*Two adjacent villages then closed their sections of the escarpment.*

*Regeneration rapidly occurred, prompting more villages to establish protection arrangements. By 2001, streams were flowing all year, and landslides were less frequent. Wild animals were re-colonising the slope. Villages are now tackling even broader management issues. These include asking hilltop villages to stop grazing cattle on the escarpment, and asking the mission hospital to stop cutting two lorry-loads of fuel a week there, and to consider other forms of fuel, such as biogas.*



## D

## STEP D (cont'd)



Indeed, changes in one ecosystem often lead logically to step-by-step scaling up, as residents in adjacent ecosystems adapt to unforeseen impacts by making their own ecosystem management changes.

In the same way, circumstances sometimes force change in the opposite direction, and scaling down occurs. Changes in externalities (the extent to which certain activities receive funding, or are otherwise economic) may mean that only part of an originally larger ecosystem can now be successfully managed.

## **Step D: Case Study, adaptive management over space**

D

### **Scaling down, Niger-Nigeria border**

*Over the last 30 years, the inhabitants of the ecosystems of Maradi Department in Niger, near the Nigerian border, have adapted to erratic rainfall and a rising population. The proportion of village lands under cultivation rose at the expense of woodland and wooded grassland, and farmers have experienced growing shortages of the animal manure and the crop residues needed to maintain soil fertility. Some farmers have started cultivating north of the line intended to demarcate the exclusively pastoral zone.*

*The decreased availability of common-property resources has led to changes in ecosystem management. On the whole, the inhabitants of the area are now taking responsibility for smaller and smaller units of land, though managing these more and more intensively.*

*Farm households have adapted to change by maintaining production, by increasing on-farm tree densities — mainly by managing and protecting natural regrowth — by privatising fallowed land (once a communal resource) for animal feed and for fuelwood, and by increased labour migration. In the south of the district, they have introduced new crop varieties and a wide range of new soil fertility conservation measures. In the north, farmers are extending cropped areas, and bringing previously uncultivated low-lying land into use. They are also changing livestock-keeping methods: some animals are now kept permanently on farm while others are sent right out of the area for much of the year.*



## E

## Step E Adaptive management over time



Planning for adaptive management over time involves long-term goals, and flexible ways of reaching them.

The principles relating to this last step (**Principle 7, Principle 8, Principle 9**) all make the point that, while long-term goals must be spelled out, inevitably, unforeseen issues will modify those goals and/or show new ways to reach them.

In order to address this challenge, long-term goals — and the management tools used to achieve them — must be regularly revisited.

Good adaptive management requires excellent monitoring methods, so that indications of potential problems are spotted early.

### Principles related to Step E

7. The ecosystem approach should be undertaken at the appropriate spatial and **temporal** scales.
8. Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
9. Management must recognize that change is inevitable.

## **Step E: Case Study, adaptive management over time**

E

### ***Multi-stakeholder Forestry Programme, Papua Province, Indonesia***

*In Indonesian Papua, the State's goal has been to plan for both conservation and production in Papuan forests through a very broad and inflexible series of land classifications (see Step B Case Study). Local people also aim for both conservation and production, but in a far more nuanced, integrated and complementary way, within areas which they consider to be ecosystems they own.*

*The Multi-stakeholder Forestry Programme (MFP) initiative is providing good examples of adaptive management in action by helping generate concrete evidence of ways of improving ecosystem management, and by testing new approaches to conservation and sustainable forest management that combine the skills and views of a variety of stakeholders.*

*MFP is creating or strengthening community institutions for negotiation with the outside world. Clan institutions realised they needed to collaborate more effectively with one another, and formed clan federations. These were strengthened through the challenge of mapping multiple clan areas and the resolution of boundary disputes. Developing natural resource protection rules, and a system of fines to go with them, was then coordinated among*



Continued, page 29

## E

## STEP E (cont'd)



It also needs transparent and mutually trusting stakeholder relationships within which problems can be discussed.

Adaptive management over time requires the capacity to diagnose the reasons for problems, and solutions to them, drawing on all the other Ecosystem Approach principles (especially **Principle 4**, related to economic issues) to understand what is going wrong and how to design new responses to reach goals.

All these tasks demand an active and responsive stakeholder forum (*page 8*).

**Step E: Case Study, adaptive management over time (cont'd)**

E

*the clans. Both highland and lowland clan federations are now engaged in creating and empowering institutions that will represent their interests to local and provincial government.*

*The MFP is engaging civil society, local NGOs and local and provincial government in diagnosing new ecosystem problems and in finding their solutions. New institutional forms will no doubt emerge from these interactions, as they have among the clans, and will address longer-term adaptive management challenges as they arise. Adaptive management is at work in both the institutions, and in the ecosystem areas with which they are associated. Small clan territories are linked first with those of other clans, and common regulations are formulated in response to challenges from outside. Similarly, government concepts of land classification and institutional responsibility must be adapted over time to working at a lower and more intense level, where land-use compromise is essential.*

*Finally, the MFP is increasing the likelihood of policy change in support of better ecosystem management through encouraging better land-use policy, more understanding of livelihood needs, greater trust in local people's technical management capacity, and a more bottom-up approach.*



## Conclusions

The Conference of the Parties to the Convention on Biological Diversity supports the application and implementation of the Ecosystem Approach, and welcomes additional guidelines to this effect (Decision VII/11). This document suggests a practical way to implement the Ecosystem Approach, using the five-step method outlined. Using this method, IUCN's Commission on Ecosystem Management is undertaking a set of case studies in multiple-use landscapes, funded by the Government of the Netherlands. Some of the cases have been used here to illustrate the application of the Ecosystem Approach Principles.

Three issues are proving particularly important. First, since diverse tenure and institutional arrangements exist within ecosystems, we must learn how to manage when we do not have overall authority, but must negotiate land use with other actors.

Second, we need to learn how to scale up through adaptive management, working to strengthen the linkages from the smaller ecosystems often managed well by local people, to the much larger ones favoured by conservation organizations. Some of the case studies outlined suggest that scaling up is best fostered by first making sure that there is clarity about local-level rights to manage, take decisions and make choices. Only then can new institutions emerge (or existing ones be given a clearer mandate) so that local capacity can engage with other levels to address broader issues.

Third, our understanding of ecosystem structure, function and management, and of action needed, will grow most rapidly through the empowering multi-stakeholder relationships we help to build and support. Only by engaging the long-term commitment of ecosystem custodians themselves will we release the full potential of the 12 Ecosystem Principles to protect biological diversity more equitably, and more sustainably.



## **IUCN – The World Conservation Union**

Founded in 1948, The World Conservation Union brings together States, government agencies and a diverse range of non-governmental organizations in a unique world partnership: nearly 1000 members in all, spread across some 140 countries.

As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

The World Conservation Union builds on the strengths of its members, networks and partners to enhance their capacity and to support global alliances to safeguard natural resources at local, regional and global levels.

## **IUCN's Ecosystem Management Series**

The livelihoods of people all over the world depend on goods and services provided by ecosystems: clean water and air, food, fuel and construction materials. Ecosystems, however, are under increasing pressure from unsustainable use and outright conversion. To address this threat, IUCN promotes the Ecosystem Approach — a strategy for the integrated management of land, water and living resources that places human needs at its centre. The aim of the IUCN Ecosystem Management Series is to share the lessons learned from implementing the Ecosystem Approach, both at field and policy levels, to help realise IUCN's vision of a just world that values and conserves nature.

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