Planting trees to eat fish

Field experiences in wetlands and poverty reduction

Wetlands International

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May 2009

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Cover picture: Bakary Koné

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Preface

This book presents and records the experiences of four demonstration projects of the Wetlands and Poverty Reduction Project of Wetlands International, part of the organisation's global programme on wetlands and livelihoods. These four demonstration projects were implemented in Kenya, Zambia/Malawi, Mali and Indonesia and were designed to develop and learn from on-the-ground experiences and to test the assumption that well-managed wetlands can reduce poverty while addressing at the same time policy, community engagement, water management and security, biodiversity and ecosystem services and project management issues. This book has been written by the managers of the demonstration projects and their implementing partner organizations. We hope it provides a valuable resource for future managers of similar initiatives and many other development and conservation workers who will be confronted with similar challenges and opportunities.

The book was written during the last of a series of annual workshops designed to exchange experiences and ideas regarding the development and implementation of the demonstration projects while enabling a visit to some of the project sites. Being the last workshop (held in Mali in November 2008) the aim was to capture common lessons and experiences in a systematic way. To this end a writeshop-approach as adopted, which created an intensive and highly participatory workshop that not only involved representatives of the demonstration projects, task group and Wetlands International staff but also a team of editors, logistic staff and a local artist. All their contributions are reflected in this book.

It is my pleasure to invite you to read this book and I hope that you'll find that the following pages provide useful insights in some of the innovative ways in which we, as partners in conservation and development, have tried to deal with the complex issue of sustaining livelihoods and wetlands values for future generations.

Jane Madgwick

Chief Executive Officer, Wetlands International

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Wetlands International wishes to thank all the Demonstration Project teams and their partners who have contributed to the development and implementation of the Wetlands and Poverty Reduction Project over the period 2005–2008. They have done some amazing work that has advanced our understanding of the livelihoods–wetlands nexus and how partnerships between conservation and development organizations can help us to tackle poverty and wetland degradation.

We are particularly grateful to the demonstration projects task group of the Wetlands and Livelihoods Working Group – led by Mike Ounsted – that provided technical backstopping to the project teams and guided the 3 years of project implementation. Their support and advice was very much appreciated by the local project teams and Wetlands International. Special thanks therefore to Violet Matiru, Rebecca D'Cruz, Hazell Shokellu Thompson and Mike for their support.

The writeshop, during which this book has been written, was hosted by Wetlands International Office in Mopti, Mali. We sincerely thank Bakary Koné (Director of Wetlands International's Mali programme) and his team for the warm welcome, hospitality and professional coordination of the writeshop and for an the very interesting field trip that enabled us to learn first-hand about the successes and challenges of the demonstration project implementation in the Inner Niger Delta.

Graphic artist Allasane Diallo captured the (often complex) issues discussed in graphic designs that populate this book and make everything more easy to understand. Paul Mundy, the writeshop's chief editor and facilitator did an extraordinary job during and after the writeshop in maintaining focus and ensure the avoidance of technical jargon. Finally, all authors, including also Paul Mundy and Alex Kaat provided useful and technical inputs after the writeshop that helped to improve and finalize the book.

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Multiple use of a wetland: fetching water and washing in the Inner Niger Delta, Mali
Photo: Sander Carpay

Summary

Conservationists often want to preserve wetlands for their unique biodiversity – birds, wildlife and plants. Many governments and development organisations, on the other hand, see them as under-exploited resources or a hindrance to development: water that can be extracted, land that can be converted to farming, timber to be felled, a source of mosquitoes and a barrier to transport.

As a result, wetlands areas in Africa, Asia and Latin America are being lost at an alarming rate. The few well-protected wetlands are often designated for nature conservation only, not for sustainable use by people. All over the world, conflicts arise between groups of people over the use of the shrinking wetlands and their fertile lands, fish stocks or fresh water resources.

Wetlands should be protected and managed as a vital environmental sanctuary and a source of livelihood for the – often poor – people who live in and around them. They are also important as water reservoirs and purifiers for everyone. How to reduce poverty at the same time as conserving wetlands is the subject of this book.

This book draws on the experience of four Wetlands International-funded demonstration projects in Indonesia, Kenya, Malawi/Zambia and Mali that combined conservation and development goals. These projects were funded under the Wetlands and Poverty Reduction Project, which ran from January 2005 to December 2008. These were demonstration projects, designed to learn from on-the-ground experience and test the hypothesis that well-managed wetlands can reduce poverty.

The book discusses the projects' methods and achievements as well as the challenges they faced, and analyses them in terms of six cross-cutting themes: poverty and livelihoods, biodiversity and ecosystem services, water management, community engagement, policy, and project management.

Four demonstration projects

The four Wetlands International-supported projects were:

- A project implemented by the African Wildlife Foundation in the Kimana wetlands, a spring-fed lowland important for wildlife, farmers and Maasai pastoralists in a semi-arid area in southern **Kenya** (Chapter 2). This project helped local people create a water users association to plan and manage the limited water resources, reduce conflicts among competing groups of users, and conserve water for domestic use, farming, livestock and wildlife. The project was used as a pilot to develop and test national government policy on wetlands conservation and development.
- The Striking a Balance project, implemented by Wetland Action in three small-scale wetlands known as *dambos* in Mpika District, **Zambia**, and another three in Kasungu District, **Malawi** (Chapter 3). This project helped local people in this drought- and famine-stricken area grow crops in the wetlands in a way that preserved the wetland's other functions – as a home for wildlife and a store for water. It trained local people how to use the wetlands and the surrounding catchment in a sustainable way, for example by promoting tree planting and soil and water conservation in the uplands, and preventing drainage and gullying in the wetlands.
- The Berbak–Sembilang Poverty Alleviation and Wetlands Project, implemented by Wetlands International in the peatlands of southern Sumatra, **Indonesia** (Chapter 4). This project focused

on villages around two coastal national parks. It aimed to help local people find other sources of income (for example through microcredit using Wetland International's "Bio-rights" model, and produce marketing) so they would not have to log trees illegally. It involved them in protecting and restoring the wetland (for example through forming community fire brigades, joint patrols with national park staff, and tree planting), and raising awareness and influencing policy (for example, encouraging park officials to work with local people on wetland management).

- The Poverty Reduction Project in the Inner Niger Delta in **Mali**, implemented by Wetlands International in collaboration with CARE, in 22 villages in this seasonally flooded wetland (Chapter 5). This project used the Bio-rights approach to provide loans to groups of local women to establish small enterprises such as livestock, cereal banks, rice huskers, gardens and fishponds. In return, the women undertook wetland restoration activities, such as planting trees (used by fish as spawning grounds – hence the title of this book, "Planting trees to eat fish"), restoring pastures and digging channels to relink fishponds to the river. The project also trained local people on organisation skills, natural resource management and enterprise management. It worked with various levels of government to develop or change policies on wetlands.

The book also presents an analysis of seven other (non-Wetlands International) projects (in Brazil, China, India, Nigeria, South Africa, Sri Lanka and Vietnam) that involved major components in both conservation and development in wetlands.

Six cross-cutting themes

Poverty and livelihoods

Despite the biological wealth and surfeit of water in wetlands, the people who live in and around them remain poor. Which comes first: poverty reduction or wetland management? Three of the four projects (in Indonesia, Kenya and Mali) addressed poverty first – trying to improve livelihoods while raising local people's awareness of the need for conservation and giving them tools to do so. The Malawi/Zambia project did tackle the environment first, by promoting the sustainable management of water as a way to reduce poverty. All four projects made progress towards improving livelihoods, but were too short (3 years) to have a significant impact on the environment. Most are part of longer-term interventions, so stronger evidence should emerge over time. In all projects there were conflicts over the wetland resources, yet the way managers had to handle a common issue differed greatly. The conflict was particularly evident where water was scarce, as in the Kenya project, which brought competing interest groups together to agree on how to conserve and manage water.

Biodiversity and ecosystem services

Wetlands are vital reservoirs of both animal and plant biodiversity, including large mammals and numerous species of birds. They also provide numerous ecosystem services, ranging from regulating droughts and floods to providing food (especially fish) and materials for building and handicrafts. These resources are under threat in all four project sites: from deforestation, land conversion and fire (Indonesia), over-use of scarce water (Kenya), inappropriate cropping techniques (Malawi/Zambia), and upstream dams (Mali). Some threats had external causes, so the projects tackled them at a higher policy level. Other threats had local causes, so the projects addressed them through local measures such as controlling irrigation water extraction, preventing fires, planting trees, promoting alternative livelihoods, community engagement, and awareness raising.

Water management

Wetlands are an important store of water for local people, as well as regulating flows downstream. A natural, well-functioning wetland needs little management, and can withstand natural fluctuations in the quantity and timing of the water it receives. But problems arise when degradation affects the natural functioning of the system, for example through drainage, excessive water extraction, or diversion of water upstream. Water management is necessary to avoid or mitigate these problems. The projects did this in different ways: through a management plan (Kenya), by conserving uplands and appropriate cropping and herding in the wetlands (Malawi/Zambia), and by enabling local people to manage the river themselves (Indonesia).

Community engagement

With their focus on conservation, environmental organisations often see local people as the source of problems in a wetland, rather than as vital to resolving these problems. Efforts to combine conservation and development must involve local people in various ways, including enabling community groups to manage the wetland, building their capacity to understand and manage the resource, and strengthening links with local authorities and conservation officials. Conservation efforts can be successful only if local people see how they will benefit from them. When engaging with the local community, it is important to take into account factors such as existing organisations, the position of women and young people, local politics, and indigenous knowledge and beliefs.

Policy

Policy at local, national and international levels can have a major impact on wetlands. Many countries lack a coherent policy on wetlands; in Kenya, for example, relevant legislation is scattered among 77 sections of numerous laws. Projects must be aware of policies that affect the wetland, and must find ways to influence policy decisions. At the same time, they can provide valuable inputs into policymaking if they are documented and communicated appropriately. Government institutions frequently lack expertise in key areas relating to wetlands – for example, a ministry of forestry may have little expertise in community development. It was difficult for project managers to influence ministries of energy, water resources and agriculture, which have huge vested interests in wetlands and their water. Projects can provide such expertise and help guide the policy process to conserve wetlands at the same time as benefiting local people.

Project management

Projects in wetlands can pose particular challenges because they combine a wide range of issues: reconciling the different interests of conservation and development, dealing with conflicts over water and other resources, and major seasonal fluctuations in wetlands located in dry areas (with the associated problems of poor access and infrastructure, hard-to-reach populations of fishers and pastoralists, and so on). Problems tend to be long-term and heavily influenced by factors beyond local control. Projects may have multiple goals (conserving biodiversity and reducing poverty and managing water and overcoming conflict), and must monitor diverse indicators: for water availability, biodiversity, poverty and livelihoods. Managers and staff need a range of skills to handle all the aspects of the project. A partnership between a development and a conservation organisation may be the most appropriate way to gather the range of expertise required. Drawing on a panel of external advisers is one way to provide the project with the support it needs.

Gullying in a wetland in Malawi caused by poor land management
Photo: Adrian Wood

1 Wetlands and poverty?

Mike Ounsted and Maria Stolk

Many conservationists have a special sympathy for wetlands: unique watery habitats filled with birds, wild animals and plants, with an indefinable mystique. That magic calls for special protection – not only of wetland wildlife but because wetlands have their own intrinsic values. Yet this romantic picture is far removed from the reality faced by wetland communities: farmers and fishers who live with seasonal floods and drought, the constant threat of waterborne diseases, and an unremitting depletion of the wetland foods and products which are mainstay of their livelihoods and cultural traditions.

Current thinking has started to bring these two differing perspectives closer together. Governments are beginning to frame land-use planning within an "ecosystems approach" (Box 1) that recognises that the lives of all living things (and the resources upon which they depend) are interrelated, and that within this ecosystem framework the needs and the development of human beings should be the primary consideration.

In adopting this ecosystems approach, many wetland conservation organisations have redirected the way they seek to reach their goals. They have introduced strategies to safeguard the livelihoods and needs of people who live in and around wetlands, in an attempt to provide social benefits linked to the sustainable harvesting of wetland products, thus encouraging biodiversity conservation. But conservationists have often found it difficult to show whether, or how, improving biodiversity has actually bettered the lives of local communities. Conservation organisations are used to gathering quantitative data, and find it difficult to measure success in a development process that is not necessarily the kind of exact science with which they are familiar.

Conversely, development agencies that focus on poverty reduction often struggle to recognise the significance of biodiversity conservation. Often, they see wetlands as a barrier to development, a resource to be exploited (reclaimable land, unused water), or a source of problems such as diseases,

Box 1. The ecosystems approach

"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.

"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."

Source: Convention on Biological Diversity, www.cbd.int/ecosystem/description.shtml

pests or weeds. Many development circles, both government and NGO, still think that conserving biodiversity means preserving globally threatened or rare animals and plants in protected areas, and keeping people out of these areas. Indeed, in some instances this may be the only realistic way to conserve the most vulnerable, endangered species.

Wetlands are "water" habitats, and water is unique among the earth's resources. The volume of water on earth remains more or less constant. It is the way we use water as it passes through wetlands that affects the quality and quantity of the plants and animals, and the course of human development of the people who live there. It follows that good wetland management will maximise the amount and quality of water that is available for human consumption, and that ensuring adequate water in naturally functioning ecosystems will maintain or even increase wetland biodiversity.

Within the ecosystems approach, wetland biodiversity conservation is increasingly concerned not only with protecting rare species but also with maintaining a range of plants and animals that contribute in many different ways to people's livelihoods – not just for poorer farmers and fishers, but for everyone in the world.

However, many poorer communities rely wholly or partly on wetlands for subsistence – so they need direct access to the water and the plants and animals in the wetlands. For them, access to wetland products is a matter of life or death. The evidence is indisputable: wetland degradation through drainage, water diversion, pollution and the overexploitation of natural wetland resources, all exacerbated by climate change, is placing increasing and unacceptable pressure on millions of already impoverished people. Rising populations with growing demands for water, fertile lands or fish are confronted with a decrease in the decline in the ability of wetlands to provide these.

The demonstration projects

Managing wetlands wisely, for both wildlife and people, seems an obvious solution to the poverty of wetland dwellers. This was the challenge taken up by Wetlands International in its Wetlands and Poverty Reduction Project, which ran from January 2005 to December 2008. Within this project, four demonstration sites were selected to test the hypothesis that "well-managed wetlands can reduce poverty".

It is easy to be persuaded of the rightness of a particular solution, and then to spend time searching for supporting evidence. The demonstration project teams may have started by looking for the evidence to support this hypothesis, but quickly turned their attention to questioning some of the fundamental concepts that conservation and development organisations have come to take for granted. Why should wetland biodiversity be conserved? What does "sustainable development" mean in practice? And what is meant by the "wise use" of wetlands? This book, written by wetland managers for wetland managers, shows how the demonstration project teams addressed these questions and came up with their own answers.

This book is a record of the experiences of community groups, project teams, task group members and Wetlands International staff who worked together to address the proposition that good wetland management will reduce poverty.

The idea of testing this hypothesis had its genesis at the meeting of Contracting Parties to the Ramsar Convention in November 2002, when Wetlands International and the Department of International Development Cooperation (DGIS) of the Netherlands' Ministry of Foreign Affairs organised a conference side-event on wetlands and poverty alleviation. The outcome of this meeting

was the establishment of a working group on wetlands and livelihoods and the development of the Wetlands and Poverty Reduction Project, to be managed by Wetlands International.

The project aimed to contribute to the Millennium Development Goals by promoting the integration of sustainable wetland management into poverty reduction strategies and by influencing local, national and international policies and practices. The project's activities were organised into four thematic areas: (1) policy and partnership, (2) demonstration projects, (3) capacity building, and (4) awareness and outreach.

On approval of the project proposal, Wetlands International put out a call for proposals from organisations who wished to implement site-based practical projects in wetland areas that had communities dependent on them. The strictly defined criteria for these project applications included the wish to see partnerships formed between development and conservation organisations in order to share expertise and to implement the projects from a holistic perspective. These were **demonstration projects**, so they had to be able to show the successes and failures of the approaches they took. From a final short list of 25 applications, four organisations were awarded grants:

- The **African Wildlife Foundation** in Kimana, Kenya (Chapter 2)
- **Wetland Action** in Malawi and Zambia (Chapter 3)
- **Wetlands International** in southern Sumatra, Indonesia (Chapter 4)
- **Wetlands International** in the Inner Niger Delta of Mali (Chapter 5).

A task group of six individuals experienced in wetlands and livelihoods acted as mentors to the project managers and helped Wetlands International review and report on project progress.

Each demonstration project had its unique characteristics, but they also had aspects in common, so had much to learn from one another. The opportunity to build on the experience of others was enhanced by an innovative approach: once a year, representatives of each of the demonstration projects met at a different project site in turn to look at on-the-ground experience and to discuss specific themes. These themes included learning about poverty indicators, livelihood frameworks and Bio-rights (Wetland International's approach to using microcredit as a way for paying for environmental services). So by the end of the Wetlands and Poverty Reduction Project, strong bonds had formed among the project teams, their task-group mentors and the Wetlands International management staff. This led to an openness and honesty in the project discussions, which is evident from the individual chapters of this book and its overall conclusions.

Why this book?

This book focuses on the demonstration projects of the Wetlands and Poverty Reduction Project, but should be seen in the context of the whole programme of Wetlands International on wetlands and livelihoods. It is written by the demonstration project managers and staff for the benefit of future managers and many other development and conservation workers who are confronted with similar opportunities and challenges.

Wetlands International is a conservation organisation that has realised that to achieve its conservation goals, it has to work not only with governments but also with people who live in and around the wetlands. That means finding ways to help them deal with the problems that they face: poverty, lack of employment, poor health, and so on.

Over the last few years, through its Wetlands and Poverty Reduction Project, Wetlands International has experimented with approaches in the challenging interface between conservation and development. This project has valuable experience to share. The purpose of this book is to document and share this experience, and to critically examine and compare aspects of the four projects, as well as to draw on experiences from other projects around the world that have dealt with wetlands and poverty reduction.

How this book was written

The book was developed through a "writeshop", an intensive, participatory workshop involving project managers and partner organisations, members of Wetland International headquarters staff and the task group, as well as a team of editors, logistics staff and an artist.

Before the writeshop, each of the four projects drafted a manuscript summarising its experiences, following guidelines from the coordinating committee. These manuscripts eventually became Chapters 2 to 5 in this book. Researchers from the International Water Management Institute (IWMI) summarised a literature review they had conducted of other projects worldwide addressing poverty and conservation in wetlands. This was the basis of Chapter 6. Members of the task group drafted manuscripts on six cross-cutting themes. These formed the basis of Chapters 7 to 12.

During the writeshop, each of the project managers and the IWMI researchers presented their manuscripts to the plenary. After each presentation, the other participants had the opportunity to comment and ask questions. After the presentation, the author and an editor revised the manuscript to produce a second draft. They also commissioned illustrations from an artist. The author then presented this second draft later in the writeshop, and again the participants made comments.

After all the first drafts had been presented, the participants split into three smaller groups to discuss the three of the six cross-cutting themes. A drafting team made notes of their discussions and revised the theme manuscripts. This process was then repeated with themes four to six.

After the writeshop, there remained the final editing and checking of the manuscripts in order to produce this book.

What is in this book

This book consists of two main parts.

Part 1 describes the four demonstration projects conducted under the Wetlands and Poverty Reduction Project, as well as IWMI's literature review of seven other projects on conservation and livelihoods in wetlands:

- Kenya (Chapter 2)
- Malawi and Zambia (Chapter 3)
- Indonesia (Chapter 4)
- Mali (Chapter 5)
- Other projects (Chapter 6).

Part 2 analyses these experiences along six cross-cutting themes:

- Poverty and livelihoods (Chapter 7)
- Biodiversity and ecosystem services (Chapter 8)
- Water management (Chapter 9)
- Engaging communities (Chapter 10)
- Making policy work (Chapter 11)
- Managing projects (Chapter 12).

The names and contact details of the writeshop participants can be found on page 139.

Village abandoned to seasonal flooding,
Inner Niger Delta, Mali
Photo: Paul Mundy

Part 1 Cases

This part describes the four demonstration projects supported by Wetlands International's Wetlands and Poverty Reduction Project, as well as an analysis of seven other projects on conservation and livelihoods in wetlands:

- Fighting over water: Kimana wetland, Kenya (Chapter 2)
- Striking a balance: Maintaining seasonal *dambo* wetlands in Malawi and Zambia (Chapter 3)
- Peatland and people in eastern Sumatra, Indonesia (Chapter 4)
- Planting trees to eat fish in Mali (Chapter 5)
- Lessons from elsewhere: Seven cases from around the world (Chapter 6).

Planting vegetables using irrigation water near the Kimana Sanctuary, Kenya.
Photo: Paul Mundy

2 Fighting over water: Kimana wetland, Kenya

Fiesta Warinwa, Nyokabi Gitahi, Peter Ngilisho Lengoiya and Leonard Korduni Nemushai

The crowd of angry young Maasai warriors marched along the river bank, waving spears and chanting war songs. They followed the course of the Kikarankot River for several kilometres upstream until they reached its source in the swampy Kimana wetland. There they found that local farmers had dug irrigation channels to lead water into their vegetable fields. The farmers hid: they did not want to confront 400 well-armed young men. When they returned, they found that the warriors had blocked the entrances to their channels, diverting the water back into the river.

Why were the Maasai so angry? For years, they had found that the river was drying up. There was no longer enough water for their cattle, sheep and goats that came each day to drink. The pastoralists, age-old inhabitants of the area who had used the water for generations, watched their animals

The farmers hid when the Maasai warriors arrived to block the irrigation channels

crowd around an ever-dwindling set of muddy pools. And the river no longer flowed from Kimana into the Olpusare swamp, where the Maasai graze their animals in the dry season. So the pastoralists were left with no water, and no way to feed their animals during the hardest part of the year.

The long drought in 2005–6 brought things to a head: the cattle were dying, and the pastoralists were faced with ruin. The river dried up completely when the company that ran a wildlife sanctuary and tourist lodge in the wetland built a dam on the river to make a waterhole for wildlife.

Conflict over the Kimana wetland

The Kimana wetland is a large swamp in Loitokitok district in southern Kenya. The swamp is fed by springs that are nourished by the snows on Mount Kilimanjaro, just across the border in Tanzania. Part of a large block of land owned by the Maasai community, the wetland is a vital source of water and dry season grazing for their animals. Together with the streams that flow into and out of it, the wetland forms the central water supply for an area of 12,000 km^2 and the 100,000 people who live there.

The wetland is important for wildlife too: it lies between the world-famous Amboseli and the nearby Chyulu Hills national parks. Without this stepping-stone that lets elephants and other wildlife move between the two parks, Amboseli and Chyulu would not be able to sustain their wildlife populations. Amboseli has about 1,800 elephants as well as giraffe, zebras and many other species. This wildlife is a major attraction for tourists and a big contributor to Kenya's economy.

The Maasai and the wildlife have lived in the area peaceably for centuries. But in the last few years various new factors have disturbed this harmony:

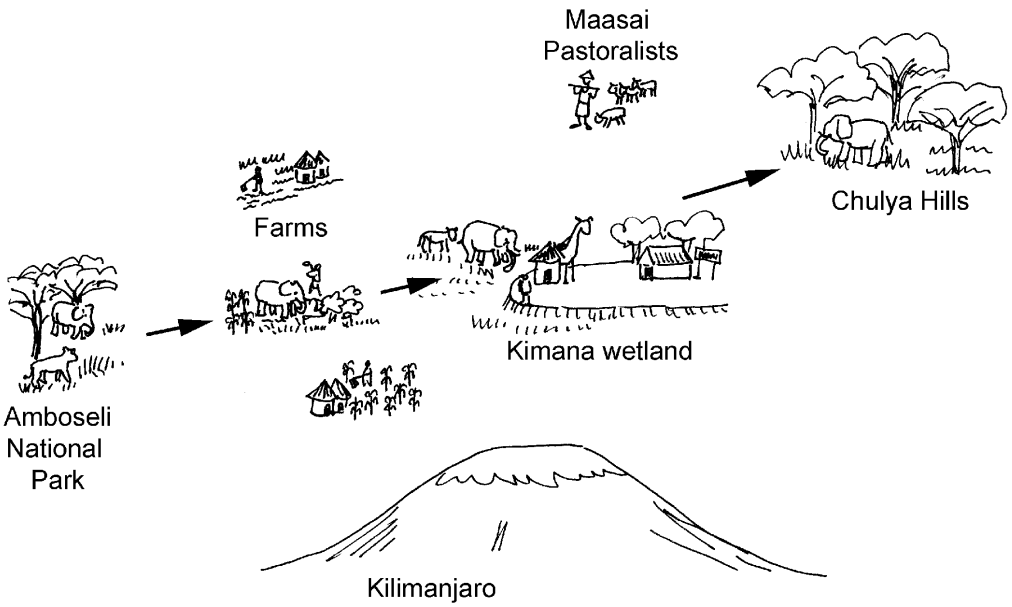
- **Tourism** In 1996, the Maasai community set aside part of the Kimana wetland as a wildlife sanctuary. They granted a long lease over this sanctuary to a private tour company. Nationwide, the rise in tourism has increased the value of the elephants and other wildlife for businesses such as tour operators and hotels, as well as for the national government.
- **Subdivision of land** The Maasai traditionally own land communally. But in 2003 they decided to divide the land into privately owned parcels and allocate it to individual community members. They felt this would benefit everyone more than the poorly governed and sometimes corrupt communal system. While much of the land remains unfenced, open to grazing by livestock and wildlife alike, increasing areas – especially of the more fertile and better-watered land – have been turned into fields and gardens.
- **Irrigated farming by in-migrants** Some of the owners have leased their land to non-Maasai people from outside the area. These farmers have dug irrigation channels – many illegal – to take water from the wetland into their fields, where they grow vegetables and other crops. These open canals are unlined and poorly maintained, allowing water to seep away or evaporate before it reaches the fields.
- **Poor farming practices** The soil in some of the older fields is becoming saline, and farmers there find their yields are declining.
- **Pollution and siltation** Agricultural chemicals, soap and other pollutants in the water harm the wildlife and animals, and make the water unfit for human consumption. Streams that used to be clear are now muddy, and the marshlands and irrigation canals are silting up.

- **Water for urban consumption** Kenya is a dry country with a growing population and thirsty cities. A government scheme now extracts water from the Noltrush spring, part of the Kimana wetland, and pipes it to distant Nairobi.
- **High cost of water** Local people felt the government was charging far too much for using water from the wetlands.

These pressures have resulted in a three-way conflict between wildlife, farmers and the Maasai pastoralists.

- **Wildlife officials** and the company that runs the wildlife sanctuary are concerned that as farmers erect fences to protect their crops, the migration corridor between Amboseli and Kimana is getting narrower and narrower. At one point, this corridor is now only 1.5 km wide – too narrow to allow elephants to pass unimpeded. Forced into ever-smaller areas, the elephants are beginning to damage the environment inside the parks.
- The **farmers** complain that hungry elephants invade their fields, damage the irrigation channels and devastate the maturing crops.
- The **Maasai**, meanwhile, see the water their livestock rely on dwindle to a trickle. They say the farmers have no right to take so much water that none is left for their livestock.

A committee manages the Maasai communal land, but there was no institution to bring together the various groups of water users to decide how to manage the water or the wetland. Instead, the District administration issued directives on such issues.



Wildlife come into conflict with farmers during their migration

Box 2. Project partners in Kimana

African Wildlife Foundation, an international non-profit conservation organisation, was the main implementer of the project.

Wetlands International raised funding from the Netherlands government and provided guidance, back-up and support.

Enterprise Works Vita, an American organisation, studied the water resources of the Kimana area and made technical recommendations on how to manage them.

Noomayianat, a community organisation in Kimana, mobilised local people and raised awareness among the different groups of water users. The project employed two community members.

The overuse of water and the lack of an overall management system meant that water users downstream lost out – they did not have enough water to survive. That forced them to move upstream into the wetland, damaging the delicate ecosystem there and triggering conflicts with other water users.

Can the water be shared?

The immediate conflict was resolved when the managers of the Maasai communal land and the sanctuary company agreed to hire a group of seven young pastoralists to manage the water. This group had the job of sharing the water among the key users: irrigation, livestock and wildlife. The farmers were allowed to irrigate their fields from 06:00 to 18:00 each day, after which the entrance to the canals would be closed, allowing the water to flow down the Kikarankot River so the livestock and wildlife downstream could drink.

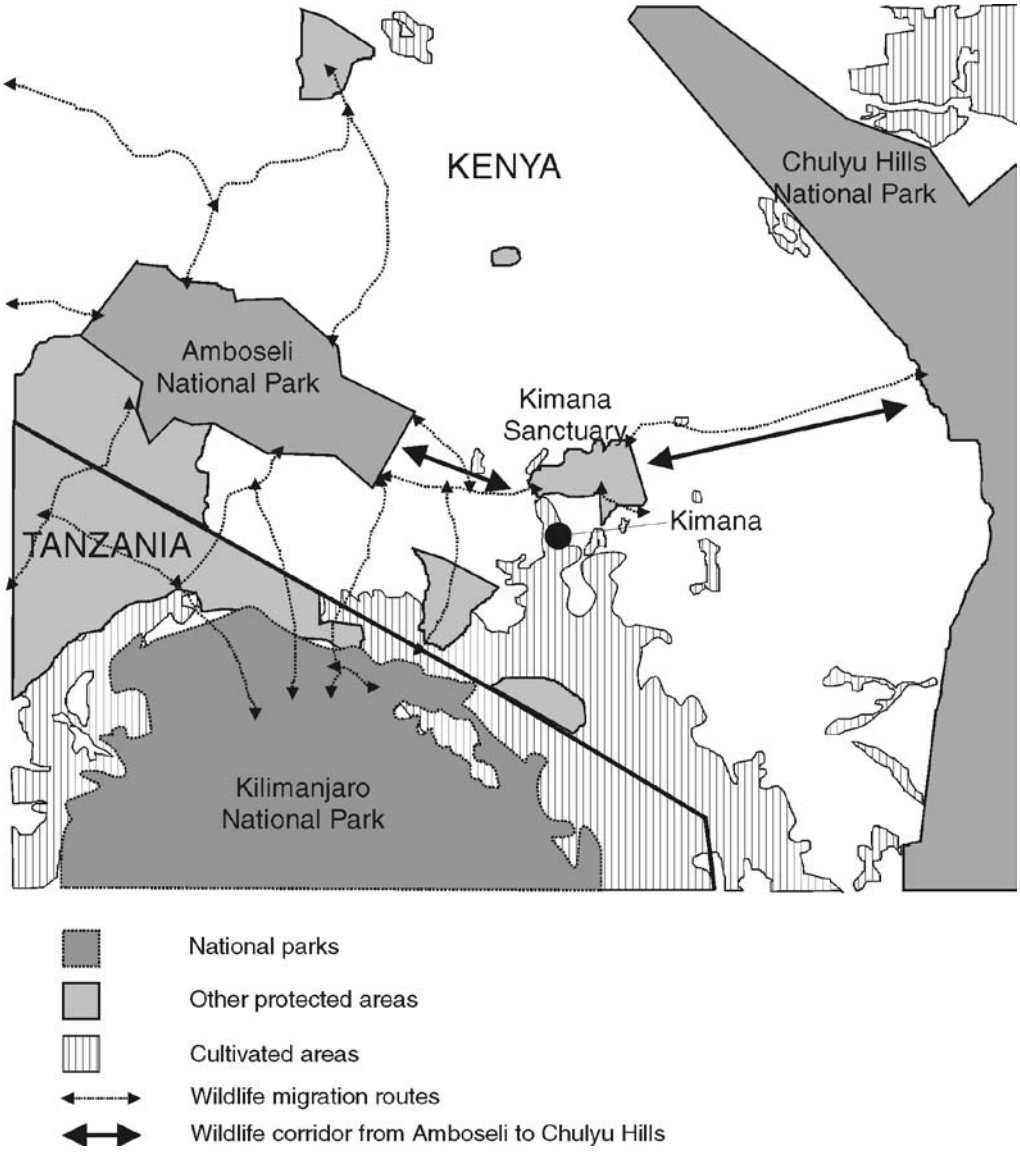
Nevertheless, the situation remained tense and threatened to spill over into violence. This was the situation when a project managed by the African Wildlife Foundation and supported by Wetlands International began work in the area. This project tested a cross-sectoral approach to managing and conserving the wetlands (Box 2).

The project team quickly realised that everyone in the area has one thing in common – they all depend on the Kimana wetland and its water. Not only that: the Maasai, the sanctuary company and the farmers also depend on each other. The land belongs to the Maasai: they have leased plots to the farmers, who grow vegetables to sell in Nairobi and Mombasa, as well as in the local market – including to the Maasai themselves. The Maasai also own the wildlife sanctuary, and lease it to the company to manage. They want the business to be a success, as they themselves earn money from it. These mutual relationships mean that everyone has an interest working together to overcome the conflict.

The Kimana Wetlands Association

It made sense to bring all these people together to discuss how to manage the wetland in a better way, so that all would benefit. That led to the formation of the Kimana Wetlands Association.

This Association offers a way for pastoralists, farmers and other local people to talk to each other about the wetlands, decide how to manage them, resolve conflicts, and present their views to the government and the outside world. It enables them to raise awareness among local people about



Kimana is a key stepping stone for wildlife between Amboseli and the Chulyu Hills

water and wetland issues, cooperate with one another and with outsiders, manage the balance between cropping and grazing in the area, and control the supply of water for people, livestock, crops and wildlife.

Forming the Association was not easy. The project team first needed to discover who depended on the wetland, and what their interests were. There were several important groups of stakeholders to include: community leaders, women's groups, livestock keepers, irrigation committees and

other groups of resource users, government departments and administration officers, and business owners. The team invited representatives of each of these groups to an initial meeting to discuss their concerns.

The representatives first identified the various problems facing the wetland: the reduced access to land as more and more areas were converted into farms; the water shortage and the conflicts that resulted, the pipeline to Nairobi, and the high water charges levied by the government.

They then discussed what they could do. They agreed that forming an association would let them discuss issues and take collective action to resolve them. The project helped mobilise stakeholders, arranged meetings with various groups in different locations, and provided technical support. That was followed by two big meetings where representatives of each group discussed their concerns. After two days of deliberation, the representatives adopted a model for the new Association. This had four key points:

- **Membership** Who should be members of the Association? How should the various interests be represented? It would not be practical to have individuals as members: meetings would be too large and hard to arrange. Community organisations – irrigation associations, pastoralists' groups and traders associations, and so on – already existed in the area, and after much discussion, it was agreed to invite them and key businesses (such as the sanctuary tour operator) to join the Association and nominate representatives as members. These community organisations represent the interests of their individual members and communicate the Association's discussions and decisions to them. The annual general meeting of the Association provides an opportunity for individuals to review progress and plan activities for the next year. Government departments, the African Wildlife Foundation and the School for Field Studies (a US-based environmental education programme with a field station in Kimana) were included as ex-officio members of the association.
- **Secretariat** The Association elected a secretariat, mainly of volunteers, to manage day-to-day activities. Nine members formed an executive committee to manage the Association, oversee activities, call meetings, raise funds and promote the Association among local people. National and local politics interfered somewhat with the appointment of officials: the highly charged political atmosphere around the 2007 general elections influenced the choice of the chairperson and other officials.
- **Constitution** To open a bank account and be formally recognised, it was necessary to register the Association with the government. A committee consisting of government representatives, the African Wildlife Foundation, members of the policy linkage group and members of the steering committee drew up a formal constitution for the Association. This set out the Association's objectives, the roles and responsibilities of the members and secretariat, and other issues. A stakeholder meeting discussed and adopted the constitution and confirmed the steering committee as the first officials of the Association. The Association was formally established in November 2007 and registered with the government in April 2008.
- **Funding** The association does not yet have funding, but the African Wildlife Foundation will continue supporting it and will build the capacity of the Association's officials to raise its own funds.

Conserving water

Enterprise Works Vita, one of the project partners, undertook a comprehensive assessment of the water resources in the Kimana area (available at www.wetlands.org/wprp). This included an inventory of the 20+ springs in the area, a listing of the activities (such as irrigation and livestock watering) depending on each spring, and a census of the related infrastructure (such as irrigation structures and watering points). As a result of this analysis, Enterprise Works identified and prioritised the key issues and recommendations related to water management and infrastructure.

Since there are so many competing uses for water in the Kimana area, it is necessary to conserve every drop. In collaboration with the Association, the project undertook various activities to do so.

- **Protecting springs** Water gushes out of the rocks in several places around Kimana, forming pools and streams that feed the wetland. But these springs were becoming degraded: livestock and wildlife would wade into the pools and muddy the water, erode the banks, trample the nearby vegetation and expose the roots of trees. The project built stone walls around two of the springs, Tikondo and Isinet, to keep the animals out and prevent this type of damage. It plans to plant trees inside the walled areas to restore the original vegetation and control erosion.
- **Watering points for livestock and domestic use** Walling off the springs meant it was necessary to provide alternative sources of water for people and animals. The project recommended piping water from the springs to strategic locations outside the walls: standpipes for household use, livestock drinking troughs and concrete laundry facilities.
- **Improving canals** Many of the irrigation channels are unlined and poorly maintained. They are communally owned by the farmers, but no one feels responsible for maintaining them. Over time, they have become silted up, clogged with vegetation or eroded where farmers have cultivated too close to the banks. A lot of water evaporates or percolates away, and it takes a long time for the water to reach the fields. That in turn means crops go without water for long periods, reducing yields. Lining the canals or replacing them with pipes would reduce the loss of water for farmers, meaning they had to take less out of the streams. The project trained farmers how to clean the canals and measure water flows.

Training and awareness raising

Training and awareness raising was another vital component of the project. Noomayianat and Enterprise Works trained farmers and their leaders on how to manage the water more effectively – for example, how to reduce leakage from canals, how to improve their irrigation methods to conserve water, and how to work out the amount of water various crops need. The area has four main soil types – sandy, clayey, and so on – and different types need different amounts of water. This training enabled farmers to judge better how much water to use on each of their fields, and when best to irrigate their crops.

The farmers found some of these concepts difficult to understand at first. But the training included practical exercises that helped them grasp the new ideas and put them into practice. The project also arranged tours for the farmers, livestock keepers, game scouts, hoteliers and domestic users to Kibwezi and Naivasha in Rift Valley province, where communities have put these water management techniques into effect.

The wall (in the background) is allowing the vegetation around this spring to regenerate

Grazing animals consume most of the vegetation outside the wall. Photos: Paul Mundy

Working with women

Local culture and tradition mean that men tend to dominate decisions and activities in Kimana. But the project recognised that women have a vital role to play in managing water and the wetland resource. It targeted women especially: for example, by constructing water points for domestic users and facilities to do laundry. Women's groups were contracted to supply materials to build the walls around the springs – a type of work normally done only by men. Women are well represented in the Association: they make up 38% of the officials.

Despite this, the project still tends to communicate mainly with men. Other methods are needed to ensure that more women and young people are involved in activities and decision making.

Working with government

The participants of the original meeting of the Association realised they needed to work with the government to solve the problems they all faced. So they invited officials in charge of livestock, group ranches, water, wildlife, agriculture, fisheries, and so on, to come to Kimana to meet local people and explain how they could help them. This meeting took place two weeks later: the officials explained their roles, and local people also defined what they would do to conserve the wetland.

At a follow-up meeting, staff of the national Water Resources Management Authority from Nairobi spent two days in Kimana to discuss the issue of the high water charges. The staff discovered that the local people had been right to complain: they had been overcharged for their water.

As the project progressed, partnerships developed with various government ministries and the district council. The line ministries provided technical advice and knowledge on how to manage water from the springs and wells. The Water Resources Management Authority helped the Association better understand the government's new water management policies. At first the farmers were unwilling to pay for water permits; they did so after Authority officials had explained the permits' importance. The Authority also provides training to the Association on water management.

Developing an integrated management plan

An integrated management plan was necessary to ensure the wetlands and the surrounding area could be managed in a sustainable way. This plan was developed through the project; it identifies key issues, problems, threats and adverse impacts of existing activities that affect the wetlands. A situational analysis, done as part of the planning, came up with some good news: the ecosystem situation is not yet alarming, and existing trends can easily be reversed if the plan's recommendations are put into practice.

The planning process included five main steps:

- **Review of secondary literature** The team consulted documents, maps and government statistics to gather information about the Kimana area and the threats it faces.
- **Dialogue and consultation** with stakeholders: the pastoralists, farmers, concessions (such as the tour company managing the Kimana sanctuary), hotels, government, non-government organisations, and opinion leaders. The team conducted participatory rural appraisals with these various groups to gather information and discover their opinions.

Melons are one of the crops grown with water from the springs. Photo: Paul Mundy

- **Ground truthing** The team cross-checked the information from the various sources to make sure it was accurate. In many instances it was necessary to update the secondary data with information from the field and from local people. Where no secondary data existed, the team undertook baseline studies to collect the information they needed.
- **Data analysis** Once the data had been collected, the team analysed four areas: pastoralism, farming, wildlife husbandry, and business.
- **Recommendations** The analysis led to a series of recommendations that aimed to ensure that the land users realise the value of natural resources as a sustainable source of income. These included improving pasture and water management to keep the land productive; improving water storage through harvesting rainwater and constructing water pans and rock catchments; and improving water availability by drilling boreholes, digging shallow wells, and protecting springs. Other recommendations include training scouts to monitor water levels in irrigation furrows, constructing toilets to reduce pollution, and building the capacity of local people to monitor water resources and control pollution.

The planning process took one year. The team encountered some difficulties at first, such as getting all the data required. But all the stakeholders accepted the plan document. The next step is to present it to the district environmental committee.

Producing a plan that involved inputs from so many stakeholders was a significant achievement for the African Wildlife Foundation. The only other major example in Kenya of an NGO successfully spearheading such a wetland planning process was by WWF and the local council for Lake Bogoria, to the north of Nairobi.

Involving the government from the beginning was crucial. Without the participation of the various government units responsible for management and enforcement, it is unlikely that the plan would have been accepted.

Involving local people was vital too. They not only gave valuable inputs into the process; they were able to contribute effectively at stakeholder forums, became conversant with the planning process for wetland management, and came to understand the various issues and competing interests involved. The study tours to Lake Naivasha and Kibwezi gave Association members an opportunity to exchange information with other people facing similar problems and raised their awareness of wetland conservation methods used elsewhere.

Influencing national policy

Kenya still has no national policy or legislative framework that provides specifically for the special needs of wetland management and conservation. Wetland management is dictated by related policies and legislation laid out in some 77 sections of various Acts. That causes duplication, contradiction and a lack of unified direction, resulting in the continued degradation of wetlands. The evolving policy and legislation on the one hand seems disconnected from on-the-ground management on the other.

The conflicts over the Kimana wetland peaked at a time when the Kenyan government was developing a unified policy to manage and conserve wetlands. Wetlands International had previously supported the Kenya Wetlands Forum (a group of non-government organisations) to advocate and lobby during the drafting of this policy. This effort was successful: the resulting draft policy was based largely on inputs from the Forum.

The Kimana project provided an ideal opportunity to test this draft policy, as it provided for community organisations to manage wetlands and be involved in decisions on their management and use. At the African Wildlife Foundation's request, the Ministry of the Environment granted the Kimana project official status as a demonstration project to test the draft policy. The National Environment Authority, the Kenya Wildlife Service and the Ministry of Water and Irrigation appointed officials as members of a policy linkage group, together with the African Wildlife Foundation and the Kenya Wetlands Forum. This linkage group guided the project team on policy-related matters and identified lessons on community involvement to feed back into the final version of the national wetland management policy.

Partnerships

Consultancies can be an effective way of implementing projects such as developing the Kimana wetland management plan. But such projects cannot be left to consultants alone: they can be successful only if all the key stakeholders participate fully in the process.

The close relationship between the various project partners has been important to the project implementation. The four project partners (Wetlands International, African Wildlife Foundation, Enterprise Works Vita and Noomayianat) were each responsible to certain aspects of the management and implementation. Wetlands International and the African Wildlife Foundation are both conservation organisations. The partnership with Enterprise Works (which specialises in technical aspects of water management) and Noomayianat (a community-based organisation) was vital to ensure that both conservation and development issues were adequately addressed in the project.

The four partners, along with the Kimana Wetland Association, coordinated their activities through regular meetings and communications. Staff collaborated on activities such as community mobilisation, workshops and transport, and gave valuable comments on activities managed by other partners. Staff from Noomayianat and other community organisations attended many of the training sessions offered by Enterprise Works on water management and other topics.

Various other organisations also contributed to the project in various ways. Staff from several government ministries and local government units have provided inputs, training and guidance, as well as learning from the project's activities. Local organisations, including women's groups, livestock keepers' associations, academic organisations, game scouts, hotel operators, religious organisations and business people are members of the Association and have attended training and other activities.

Impacts

Impact on livelihoods What impact did the project have on local people? Although the time frame of the project was too short to produce a measurable impact on things like income, a socio-economic survey found that some people had seen their income increase through an improved supply of food or water.

Impact on capacity The project seemed to have a bigger impact on harder-to-measure variables such as capacity and skills. In these areas, more community members now know more about wetlands, while others improved their skills: they are now able to manage the wetland resources better. It was unclear, though, whether this had led to a change in their attitudes towards the wetland, or changes in the way the used it.

Why these results?

- **Difficulty of changing behaviour** Experience throughout the world shows that is relatively easy to change knowledge, but harder to get people to change their attitudes or behaviour. People in the Kimana area are preoccupied with their short-term concerns (where is the next meal going to come from?) rather than long-term goals (such as conserving the ecosystem for the future).
- **Erosion of collective responsibility** As in many areas, the decline of collective action and responsibility means that people do not feel responsible for maintaining a resource even if it is their own interests to do so.

Impact on institutions The project had a bigger impact on institutions. It helped established the Kimana Wetland Association, develop a constitution, elect leaders, and register it with the authorities. The Association is still new, though, and it needs to build its capacity in terms of governance, operations, external relations, financial management and conflict resolution.

Many local people feel they were inadequately involved in project activities. This may be the result of the representative structure of the Association, whose members are community organisations rather than individuals. Many activities were implemented at the same time. And the project could have done more to make local people aware of the reasons for certain activities and the benefits they stood to gain.

The impact on the local project partner, the Noomayianat community organisation, was bigger. Its governance, external relations and operations management have improved as a result of the project.

Impact on policy In terms of policy, the project has also had a big impact. It has been a useful testing-ground for the draft national policy. Lessons from Kimana will inform the government on wetland management, and particularly on the role that local communities can play, and how to get the communities to work together with government. Community management of wetlands was provided for in the draft wetlands policy, but there was no provision of how it would be implemented, for instance, what an organisation constitution might look like, what the role of women should be, or how a management plan should be developed.

The Kimana integrated management plan is a well-thought-out document that draws on a wealth of information and is based on local ideas on how to manage the wetland. Since its development was a participatory process that involved different stakeholders, most stakeholders have committed to undertake activities assigned to them during the planning phase. These included government departments, communities, NGOs and community organisations.

Impact on the wetland Due to the short timeframe of the project, it is difficult to measure its impact on biodiversity.

Project management

The project may have tried to do too much in too short a time: lining irrigation channels, water assessment studies, forming an association, developing a management plan, and so on. Ideally, some of these activities should have happened before others: the plan should have been developed, for example, before some of the activities that it specified. But a more logical, phased sequence was not possible given the short timeframe.

A side-effect of this was the number of community meetings that were needed to discuss various aspects of the project. Often these meetings involved the same group of local people. Some said they were confused at times about the purpose of each meeting. It would have been better to begin by forming the Wetland Association and rallying the membership to support it, before building its capacity, and then introducing other initiatives one by one. As it happened, the Association was somewhat overwhelmed by the wide range of activities it took on. And an over-ambitious project timetable inevitably meant that some did not get implemented.

More information

Wetlands International: www.wetlands.org/wprp (including a short film about the project)

African Wildlife Foundation, www.awf.org

School for Field Studies http://tinyurl.com/amtkb6

With the right management, *dambo* wetlands can be very productive
Photo: Adrian Wood

3 Striking a balance: Maintaining seasonal *dambo* wetlands in Malawi and Zambia

Mukelabai Ndiyoi, Jonas Bupe Sampa, Patrick Thawe and Adrian Wood

The dambo *is like a dairy cow*
Good care of a diary cow means more milk
Look after the dambo *and it will look after you*
Good care of the wetland leads to a happy life
No hunger, no thirst, at any time of the year.

—Chancy Mhone

The *dambos* in Chancy Mhone's poem are wet, grassy valleys or depressions, or gentle slopes where water seeps to the surface. They are a common feature of the landscape in Zambia and Malawi. In Zambia, a huge area – some 35,000 km^2, or nearly 5% of the country – is covered with *dambos*. They may be permanently or seasonally waterlogged; the water table may be 20 cm below the surface in the dry season; and in the rainy season they may flood to a depth of 50 cm or more.

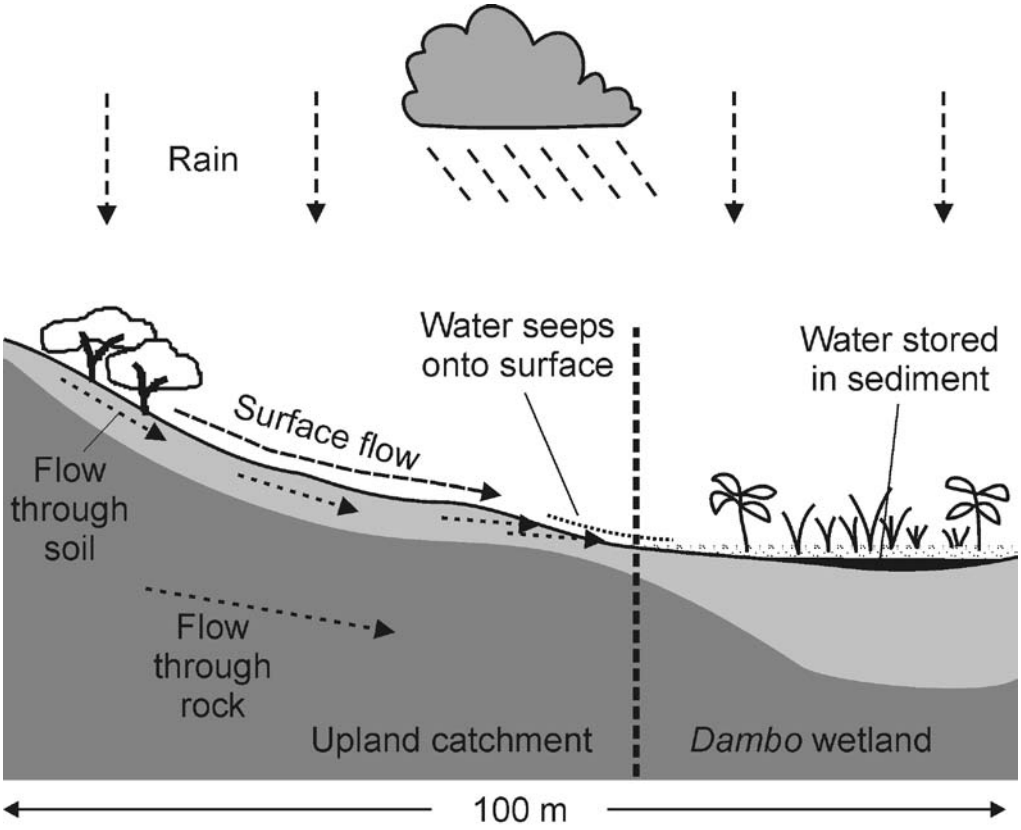
These are ecologically important areas. Always wet for a considerable part of the year, they are home to a wide range of plants and wildlife: vital reservoirs of biodiversity in a region subject to increasing levels of environmental stress. They hold water in the soil, often preventing flooding downstream and releasing the water slowly throughout the dry season.

They are important to people too. Zambia and Malawi both suffer periodic droughts, and the *dambos* are a vital source of water and food during this difficult time. But not only during droughts: they are also places where local people grow crops or graze their animals, catch fish, gather medicinal plants, and quarry clay and sand for building in normal years. And of course they supply water for domestic use, farming and urban uses.

Dambos are very rich and relatively stable ecological units. But they can easily become threatened habitats if they are mismanaged. Dangers include over-cultivation or overgrazing, in some cases excessive drainage to allow some types of farming, cutting of vegetation along the streams, gulley formation and quarrying, and overuse of chemical fertilisers and pesticides. These things can lead to the *dambos* drying out and becoming unproductive, as well as encouraging a cycle of floods and low river flows downstream, or causing pollution.

Degradation of the *dambos*

Dambos are very rich and relatively stable ecological units. But they can easily become threatened if they are mismanaged. There are two main dangers: misuse of the dambo itself, and degradation of the surrounding uplands.



The surrounding catchments feed water into the low-lying dambo wetlands

Misuse of the dambo itself Dangers include over-cultivation or overgrazing, in some cases excessive drainage to allow some types of farming, cutting of vegetation along the streams, gulley formation and quarrying, and overuse of chemical fertilisers and pesticides.

It is possible to drain the dambo temporarily during the wettest time of the year to prevent water-logging and allow crops to grow. This causes no permanent harm. But if the drains are too deep they may lower the water table too much – perhaps permanently – making the dambo too dry for cropping in the dry season. And the drains may lead to the formation of gullies, which can lower the water table permanently. The dambos become too dry for cultivation, they stop moderating floods downstream, and they fail to recharge the groundwater, causing wells to dry up.

Upland degradation If the natural forest is healthy and the farmland well-managed in the uplands, a lot of water sinks into the soil during the rainy season. This water slowly trickles down to the dambo during the dry season. The dambo has enough moisture throughout the year to allow grazing and cultivation and to maintain springs and wells.

But cutting trees and inappropriate farming methods in upland areas increases runoff and lets less water sink into the soil, so there is not enough to replenish the dambo in the dry season. Dambos that used to be permanently wet may dry out completely in the dry season.

Instead of sinking into the soil, the water runs off instead, causing erosion. Coarse sediments from the uplands may be washed into the dambo, covering the good soil and filling wells.

Growing crops in *dambos*

Zambia The soils in sparsely populated northern Zambia are acidic, and shifting cultivation is common in the uplands. Farmers have traditionally used *dambos* for crop production after poor rainy seasons when upland crops have failed. An improved way to cultivate *dambos* has led to increased use of these areas. A typical pattern goes like this: every two years farmers clear the grass from a new piece of the wetland. They turn the turf over to allow it to dry, then pile it into ridges and burn it. The resulting ash acts as lime, drawing water up from the soil into the ridges. The farmers plant beans, tomatoes, potatoes, cabbages, onions and pumpkins on the ridges. They can grow four crops (two a year) before leaving the land fallow for 2–3 years. That allows the grass to regrow, after which the cycle can be repeated.

But the intensity and level of use has increased in the last 15–20 years due to a combination of rising population, drought and people's need to earn cash. Zambia has been particularly hard-hit by the HIV/AIDS epidemic, and people weakened by the disease need to find ways to support themselves and their families. They have started planting gardens in *dambos* that people previously cultivated only occasionally, if the rains failed. In terms of immediate livelihood benefits for a large proportion of the population, this gardening is far more important and attractive to communities than other uses.

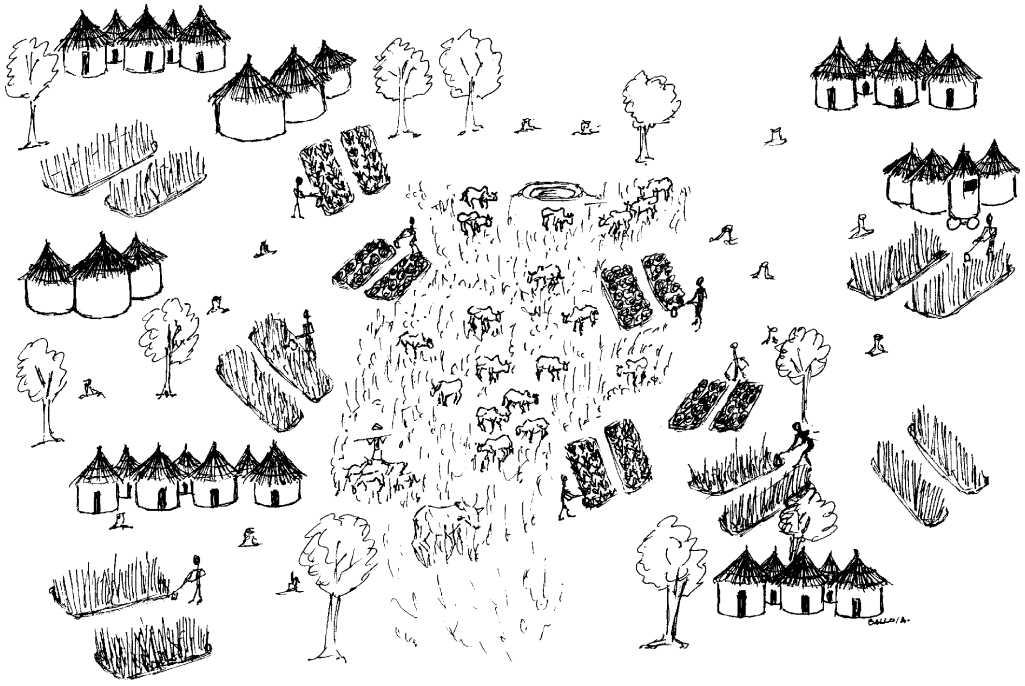
Malawi In densely populated Malawi, by contrast, people have long used the *dambos* more intensively. Farmers grow various crops there during the dry season. They take advantage of the moisture that is left over after the flood season as the *dambos* gradually dry out. They make small raised beds for crops in the early dry season to avoid waterlogging, and sunken beds later in the season to conserve water. They draw water from shallow wells to irrigate their crops using watering cans and treadle pumps. The very existence of many *dambos* is under threat as the natural vegetation gives way to ever more cultivation and other uses in the *dambos.*

There are many other factors encouraging people to use the *dambos*. Better-off families invest in irrigated vegetable farming in the *dambos* to supply local markets. Governments encourage local people to use the *dambos* to grow food, so improving national food security and reducing food imports. Development agencies supply treadle pumps, seed and fertiliser packages to help them do this.

The "Striking a Balance" demonstration project

Striking a Balance was a Wetlands International-funded project in Malawi and Zambia, developed by the European NGOs Wetland Action and Self Help Africa. As its name implies, it aimed to reduce poverty in villages dependent on the *dambos* by striking a balance between using *dambos* to earn a living while also maintaining their ecological functions so they can continue to provide benefits into the future. The project had six sites in all: three in each country to enable it to find ways to deal with various situations and share its findings in both countries. A multinational approach is important in south-central Africa as agricultural policies and practices tend to be heavily influenced by regional bodies as well as by national governments.

The project was implemented between July 2006 and December 2008 by two local NGO partners of Self Help Africa and linked with existing projects there:



A poorly managed dambo*: uncontrolled grazing and cultivation in the* dambo *itself, especially in its centre, and deforestation in much of the surrounding catchment*

- At Mwansabamba, Mushishe and Chikalaka, in Mpika District in Northern Province, Zambia, the local partner was the North Luangwa Wildlife Conservation and Community Development Programme. The project linked with the Chikwanda–Mukungule Area Initiative for Poverty Reduction, which focused on improving livelihoods in the district.
- At Katema, Malawila and Chiotha, in the Simlemba area of Kasungu District, in Central Province, Malawi, the partner was the Malawi Enterprise Zones Association. The project linked with the Simlemba Community Initiative for Sustainable Rural Livelihoods, which was already operating in the area with Wetland Action technical support.

Striking a Balance used the staff of these two projects and worked with the same beneficiaries. It added value to the existing project activities in its emphasis on the contribution of wetland management to achieve food and nutrition security. The local NGOs were supported by the country offices of Self Help Africa, with backstopping from Wetland Action.

Building on local knowledge

The project built on farmers' knowledge of the environmental processes in the *dambo* wetlands and the surrounding, higher-elevation catchments that feed them with water. It began with extensive field visits and discussions with farmers, exploring their local knowledge about how wetlands work and the key challenges in managing them. The project staff found that the farmers had a deep understanding of the seasonal variations in wetlands and were concerned about sustaining their use

for themselves and their children. They were clearly aware of the links between the catchments and wetlands.

Farmers identified several causes of problems faced in managing the wetlands sustainably:

- Cutting trees in the catchments to clear new fields or to collect fuelwood (for curing tobacco or cooking)
- Farming the uplands without taking care to conserve soil and water
- Cultivating in the centre of *the dambo*, where fast-moving flood water can form gullies
- Growing water-hungry crops such as sugarcane and eucalyptus
- Poor management of water from treadle pumps.

Functional landscapes

Like all wetlands, the *dambos* are dependent on the surrounding higher areas. Misuse of the nearby uplands will harm the low-lying wetlands. Erosion will clog the wetlands with silt. Over-use of pesticides and fertiliser will pollute them. Farming practices that reduce the soil's ability to absorb water will mean less water to feed the wetland during dry periods, but catastrophic floods during heavy rains.

This interrelationship means that wetlands cannot be managed in isolation. Management should start from the uplands that feed the *dambos*. Conserving soil and water in the catchments will help rainwater seep into the soil and trickle down to the wetlands. Reducing erosion not only keeps valuable topsoil on the upland fields, but also prevents the *dambos* from clogging with silt. Preventing the misuse of farm chemicals keeps drinking water safe for livestock.

Natural wetlands control floods, store water and recharge groundwater. They need to be managed carefully so they can continue to do this. That means not cultivating the central areas, not extracting too much water, and maintaining lots of natural vegetation in the wetlands.

Community organising

Since the *dambo* wetland is part of a larger landscape, it is necessary to work with local communities and organisations to manage the landscape sustainably. So Striking a Balance emphasised a participatory, community-driven, farmer-led approach.

The project sees the development of community institutions and capacity building of local people as keys to success. A first step was participatory rural appraisals and natural resource assessments. Following these, the project helped local people to establish village committees to manage natural resources, made up of representatives of each user group (e.g., charcoal burners, vegetable growers). The committee members were elected at a gathering of all the villagers. These committees' role is to oversee the management of the wetlands and other natural resources in the village. This is in line with the National Forest Act (in Malawi) and the Fifth National Development Plan in Zambia, both of which empower communities to manage their natural resources.

Each village committee developed a constitution and a set of by-laws. The by-laws cover the management and use of natural and planted forests as well as the *dambos*. The by-laws are different from village to village, and are registered with the local government so they can be legally enforced.

Lowered beds being used for cropping in a wetland toward the end of the dry season

Multiple use of wetland in Simlemba, Malawi. Photos: Adrian Wood

The local government passes the by-laws on to the responsible minister to be considered for gazetting. Once the by-laws are gazetted, the village committee is issued with a licence that enables it to supervise the use of the resources.

Villagers who break these rules, for example by cutting forest trees without permission from the village committee, must pay a fine – a chicken, a goat, or the equivalent in cash. The fines vary from one village to another.

Environmental awareness

Underlying much of what the project did was an attempt to increase local people's awareness of the importance of the *dambo* to their lives and livelihoods. The project helped people understand the interrelationships in the landscape – for example, if they manage the uplands wrongly, they reduce the *dambo's* ability to support them in hard times.

An example of such an interrelationship occurs in Mpika District in Zambia (Box 3).

Box 3. Harvesting caterpillars

In the first week of September each year, local people burn the grass in the uplands in Mpika District. The heat from the flames dries leaves on the trees; the leaves drop off, inducing the trees to produce new leaves. These new leaves are the food for caterpillars that hatch in early November. These caterpillars are a delicacy and important source of protein for local people. Harvesting caterpillars for sale is a big business in the area: people can make a total of ZK 600,000 (€100) in a season.

But in September the grass is very dry, so it burns intensely, and fires can spread out of control, damaging large areas, removing the vegetation cover, and destroying wildlife. Some people even cut down trees to harvest caterpillars.

In the past, the harvesting was by tradition restricted to 3 weeks only. This made harvesting more sustainable and allowed enough caterpillars to survive to produce the next generation. But this taboo has fallen into disuse, threatening the entire production.

Several approaches are used or are being considered to overcome this problem.

- Encouraging people to burn earlier, in June or July, when less damage is done to the vegetation around the wetlands. The trees still produce the same young leaves – and the same crop of caterpillars – at about the same time as with later burning.
- Discouraging the cutting trees to harvest the caterpillars, and urging pickers to climb the trees or bend the branches so they can reach the caterpillars.
- Regulating the harvesting period so that some caterpillars remain to produce the next year's harvest.
- Imposing penalties for early or late harvesting: arresting people who harvest too early, and confiscating the caterpillars of those who harvest late.
- Protecting some breeding grounds by prohibiting harvesting there.

Increasing the value of wetlands

Awareness is not enough: people need clear incentives to preserve a wetland, as well as the tools and technical skills to enable them to do so. For Striking a Balance, that meant enabling them to grow more, and higher-value, crops on part of the wetlands, as well as conserving vegetation, soil and water in the surrounding catchment areas.

Much of this aspect of the project involved technical training for members of the village committees. This covered how to use the *dambos* in a sustainable way, how to use the uplands more effectively, and how to invest earnings from the *dambos* in other enterprises, so reducing pressure on the *dambos*.

The training covered the following topics:

- Principles and practices of community forest management, including establishing and managing nurseries and woodlots
- Irrigation technologies: using treadle pumps, planting seedbeds, irrigating fields and managing crops
- Soil and water conservation: making or realigning contour ridges, making box ridges, and planting vetiver hedgerows
- Soil fertility improvement: composting and agroforestry
- Wetland utilisation and management, protecting the core of the wetland
- Sustainable livestock production
- Upland crop diversification
- Entrepreneurship, marketing and market research, and small-scale business development.

Each course lasted 7 days and was attended by an average of 30 committee members. These participants were in turn responsible for training other people in the community. They did so by organising village meetings to explain and demonstrate what they had learned. Some committees conducted campaigns to raise the villagers' awareness of these technologies.

In the past by September there was no water in the wells
We used to spend all night waiting for water to fill our wells
But now this is history.

—Chancy Mhone

Input provision and marketing

When the project began, both Malawi and northern Zambia were recovering from a devastating drought that reduced many people to absolute poverty. To help people recover, the project bought and distributed starter packs for growing food crops in the first year. The crops included tomato, onion, cabbage, potato, other vegetables and maize. In addition, the project provided treadle pumps and watering cans for irrigation. It could not afford to give every farmer one of these, so the farmers divided themselves into groups to share this equipment.

A well-managed dambo*: trees planted around the wetlands, and areas reserved for a sustainable amount of cultivation and for wildlife*

Most farmers applied compost or manure to these crops. Few could afford artificial fertiliser. Organic fertilisers are better for both the *dambos* and uplands anyway, as they help retain water and let it sink into the soil. After selling their crops, most of the farmers were able to buy their own seeds and equipment in the second year. The project trained the farmers on marketing and linked them to markets so they could sell their produce at the time of year when they could get the best prices.

Growing trees

The project promoted tree planting in the uplands to control runoff and soil erosion. It gave the village committees seeds of different tree species, which they raised in communal nurseries. The community could choose which types of trees to plant, subject to the project's approval – in line with the project's emphasis on local varieties and avoiding species (such as eucalyptus) that are detrimental to the *dambo* environment.

Groups of villagers planted these seedlings to establish village forests in areas without trees, while individual farmers planted them around their own homesteads. The tree species included *Senna siamena*, *Faidherbia albida*, *Tephrosia vogeli* and *Sesbania sesban.* These are leguminous species that fix nitrogen in the soil and can be used as fodder. A non-leguminous tree used was *Alfezelia quazensis*. The project had also introduced agroforestry to improve soil conditions in the uplands.

Box 4. A *dambo* launches a broiler business

With four children to support, Cecilia Pensulo could not make ends meet from irregular work on other people's land. She wanted to start her own farm. There was plenty of land in the dambo near her village, but she did not know how to grow crops there. Then she attended a course run by the North Luangwa Wildlife Conservation and Community Development Programme, where she learned how to grow pumpkins, squash and tomatoes in the dambo. In the first year she managed to plant only a small area, but the crops were good and she got good prices for her produce, so she was able to earn enough to send her children back to school. In the second year, she managed to cultivate a 50 x 50 m plot, and made over ZK 750,000 (€130), a small fortune by local standards.

Since then she has invested some of her dambo profits in raising chickens, and is now on her seventh batch of broilers. Every 3–4 months she sells the chickens and makes a profit of some ZK1.5m (€260). She says that she will not give up her dambo garden as it produces money and food during the hungry period. She now is able to hire workers to help her, so creating jobs for other people in the community.

Microfinance

The project provided capital for a revolving fund of MK 1 million (€10,000) for Malawi and ZK 17 million (€2,500) for Zambia. The farmers could borrow from this fund and invest the money in business enterprises – some of which use the *dambo*, and some which do not. The project decided not handle the money directly; instead, it subcontracted this aspect to specialist microcredit organisations in the two countries. The farmers who borrowed money had to pay it back with a lower rate of interest than normal commercial rates. To qualify for a loan, the borrowers had to be members of the project group. In Malawi the repayment rate is 70%, while in Zambia it is still only 50% because the funds were released late.

Land husbandry and diversification

The project encouraged the farmers to practise good land husbandry in their upland fields. It promoted soil and water conservation practices such as contour ridging and realigning ridges more exactly along the contour. Instead of running off and causing erosion, rainwater collects behind the ridges and sinks into the soil, so building up the soil moisture and recharging the wetland. Protection zones, 50 m wide with no cultivation, around all wetlands encourage water infiltration.

Project staff advised farmers to make compost and apply it to their upland fields. The compost contains valuable nutrients and organic matter, and improves the soil structure by making the soils loose and spongy. That raises crop yields and helps water seep into the ground. The staff also encouraged farmers to diversify the crops they grow on the uplands.

Beekeeping was another source of income that the project encouraged. Bees depend on the *dambo* wetlands as they gather pollen and nectar from the trees and plants that grow there. That gives the farmers an incentive to plant trees and protect the wetlands. The project organised the farmers into groups and trained them in beekeeping and honey production and marketing.

Policy

Not all the project's work was in the villages. It also engaged with government and non-government organisations in Malawi and Zambia to influence wetland policies and policies which indirectly affect wetlands – such as food security. Workshops in each country enabled stakeholders to review lessons in wetland conservation and use. Follow-up meetings were held with the authorities responsible for natural resources management and wildlife, as well as with other policymakers and donors. In Zambia the meetings contributed to the on-going discussion of the national policy on wetlands, while in Malawi they sought to re-invigorate a national task force on wetlands by contributing NGO experience to the discussion. In the two districts where the project operated, the district development committees (joint government–civil society bodies) both recognised the role of wetlands for livelihoods and included sustainable wetland management as a goal in their food security and poverty reduction policies.

Results

What were the results of all this effort? Did it lead to a more sustainable wetland use?

The answer is "Yes". This success was primarily because these projects operated with the communities and built on existing work on wetland issues in the area.

I**ncome** Improved wetland management increased the income for most households in the villages served by the project. Because the people are now able to produce and sell crops, they can eat three meals a day, send their children to school and buy items such as bicycles and household goods. It used to be difficult for people to buy such things unless they went to town in search of work. Some farmers have built better houses from the sale of products such as cabbages, tomatoes, pumpkins and squash, which fetch very good prices if grown in the *dambo* for harvest in the hungry season.

Resource management The communities have formed village committees to manage the natural resources in the area, and these committees have passed by-laws to control what people may, or may not, do. Local people now appreciate the value of the *dambo* and its surrounding catchment. By using the *dambo* and catchment sustainably, villagers have enough water to irrigate the crop during the dry months of September to December. That gives them enough to eat during the hungry season from December to February.

Poaching During this hungry season, villagers in parts of northern Zambia used to go out poaching to put food on the table. Poaching is now reduced as the farmers are growing enough food in the *dambo* to eat, and generate a surplus for sale.

Migration has also fallen. Young men used to travel during the hungry season to earn money. This nomadic lifestyle meant they neglected their own crops and families. Now they can use the *dambos* in a sustainable way, the young men can stay at home because there is enough food throughout the year. Food production is now more stable – and families are too.

Diversification Some 40% of the 260 households involved in the project in Mpika have invested income from their wetland enterprises or the project's microfinance fund in other income-generating activities – such as small businesses, poultry raising, hiring labour and beekeeping. Others have bought fertilisers for their upland crops, built houses or bought items such as radios and bicycles.

Box 5. "It seemed the project people were wasting their time"

That was what Samuel Mtika thought when staff from the Striking a Balance project gave him some seed to plant in the *dambo* near his house. How could crops like tomatoes, potatoes and onions grow there? The soil would be too wet – and the dambo dried out anyway in September.

Samuel thought he knew how to grow crops in the *dambo*. He had been planting maize and beans there since 2001, when hunger forced him to clear a quarter-acre (0.1 ha) plot in the wetland. But yields were low – just two pails of maize and one of beans from the plot. Such miserable yields could feed his family for only a month.

The Striking a Balance staff came to Katema, Samuel's village, in 2006. They trained local people on how to use the wetland, as well as topics like irrigation, water management and wetland protection.

"We learned how we can conserve water in our wetland and how we can stop it from going dry. And for the first time we learned how to construct beds in the wetland and how to plant and manage crops. We were given seed like maize, onions, tomato, rape, mustard and Irish potatoes to start with," says Samuel.

He was sceptical, but decided to try out the new methods. He was interested only in growing his usual maize and beans. He found that his yields increased tremendously – from 2 pails to three 50-kg bags of maize, and from 1 pail to a 50-kg bag of beans.

Recognising that the Katema wetland could provide a steady supply of water, Samuel increased the area which he cultivated and added new crops: rape, tomato, onion and cabbage.

"My best crop is tomato," he says. "I am able to make about MK 50,000 (€500) a year from selling tomatoes only. I bought a pig from the money I earned, as well as a radio and a mobile phone. Food is no longer short in our house. I did not know that there was such an easy way out of poverty. I am planning to buy cattle, build a nice house, boost my wife's bakery business and open a grocery shop."

Samuel is eager to protect the wetland. "It is this moisture that is important," he says. "As you can see my plot is not close to the middle of the wetland because when you cultivate close to the middle the water is exposed to direct sunlight and evaporates. I conserve natural vegetation around my plot because it keeps the moisture. I have started planting *katope* (a type of tree) because they are very important to conserve water in the wetland. Water is indeed life and there is life in the wetland."

Tree planting and soil conservation In the three sites in Malawi, the project resulted in the planting of nearly 8,000 trees. Other landscape-restoration interventions such as use of organic manure, contour ridges, and vetiver grass hedgerows were applied at varying rates. Planting vetiver grass was limited because of a shortage of the planting materials.

Scaling up A lot of people now want to know how to cultivate the *dambos*, especially after Ministry of Agriculture staff visited the area and interviewed the project staff. The techniques were discussed on national radio, resulting in many requests for information.

We have been trained and we manage our dambos properly
We conserve soil and water
We plant trees in the catchment
We have reduced the sugarcane in the dambo
So we now have more water in the dambo.

—Chancy Mhone

Challenges

Nevertheless, many challenges remain.

- **Increased pressure on dambos** Increased market demand for *dambo* produce has raised pressures to use more and more of the wetlands. Many people use the *dambos* without knowing how to manage them sustainably.
- **Policy issues** Both Malawi and Zambia lack policies on *dambo* use. Farmers do not have security of tenure because there is no policy that allows them to use these areas. At any time, somebody may say that they should not be using the *dambos*. Previously, no one owned the *dambos* – in fact, they were seen as boundaries. But now that more people are using these wetlands, issues of ownership and conflict are likely to arise.
- **Degradation of the catchment** In Malawi, many catchments are already deforested, and the *dambos* they feed are drying out. In addition, tobacco curing requires a lot of fuelwood, so people continue to cut trees. In northern Zambia this problem is less severe: there are only small areas of *chitemene* (slash-and-burn) gardens, but if they are near the edge of the *dambo* they can locally reduce the availability of water.
- **Enforcement** Enforcing the by-laws is difficult, especially for people in the community who do not use the *dambos*. Such people do not see how they benefit from the *dambos*, or why they should help protect them and their catchments.
- **Slash-and-burn** Many farmers burn vegetation in the *dambos* to clear plots during the dry season. These fires can get out of control and destroy the natural vegetation around the *dambos*.
- **The return of wildlife** Conserving wetland areas allows the vegetation to regenerate. That attracts wildlife, which may invade farmers' fields and attack the crops.

More information

Wetlands International www.wetlands.org/wprp (including a short film about the project)

Wetland Action www.wetlandaction.org

Self Help Africa www.selfhelpafrica.com

Fish are an important source of income and protein in the Berbak-Sembilang area
Photo: Yus Rusila Noor

4 Peatland and people in eastern Sumatra, Indonesia

Yus Rusila Noor, Maslian, Deddy Permana, Husni Thamrin, Iwan Tri Cahyo Wibisono and Irwansyah Reza Lubis

Edi Candra saw the fire while he was returning home from his fields. It was spreading quickly, and the wind was blowing towards his village, Desa Sungai Rambut. He tried to beat out the flames with a branch, but the peat underneath the dry vegetation was burning too. Bare-footed, he could not stand on the smoking ground, and he coughed as his lungs filled with smoke. The fire was impossible to put out alone.

Edi ran back to the village to fetch help. But he could not get a group together. Some villagers were worried that the fire would spread into their fields. Others said fires were nothing unusual: they just had to live with them. Others said they could not do anything: they had no equipment to put out a blaze. Calling the fire brigade was pointless: it might take days to get to the village from the distant town.

This particular fire caused a lot of damage before it was put out by heavy rain. But it had a longer term effect: the villagers decided to form the first community fire brigade in Indonesia. Edi Candra and his neighbours asked a project run by Wetlands International in the area for help. The project agreed: it organised three brigades of young men in Desa Sungai Rambut and nearby villages, trained them in fire fighting and first aid, and provided them with simple equipment such as fire beaters, pumps, hoses and backpack sprayers.

Box 6. The value of peat

Peatland acts like a giant natural sponge. It regulates water, reduces the risk of drought and floods, releases water gradually during the dry season, and supplies water for people and animals. The forest is a source of timber and other products, and acts as a sink that absorbs carbon dioxide – important to prevent global climate change. There are 21 million ha of peatland in Indonesia which store a total of 33.7 billion tons of carbon. Burning the peat releases large amounts of CO_2 into the atmosphere: currently about 600 million tons a year through decomposition of the peat, and around 1,400 million tons a year more due to irregular wild fires. In total, this amounts to 8% of global emissions from burning fossil fuels. Some 60% of the global emissions from peatlands come from Indonesia.

If these emissions were traded on the global carbon market, their monetary value would be enormous.

Managing the peatlands in a sustainable way not only means guaranteeing an important resource for local communities. It also means conserving a biodiversity resource of worldwide importance: Berbak-Sembilang is one of the few lowland and coastal tropical peatland forests left anywhere in the world, and its existence are vital to the global community.

There are now seven voluntary community brigades in the area, three of them supported by the project. The other four brigades have formed spontaneously without such support, as people copied the lead of Edi Candra and his neighbours. There is a strong tradition in Indonesia for voluntary community work, such as village security patrols and doing farm work together. These brigades draw on this tradition.

Dwindling peatswamp forests in eastern Sumatra

Swamplands cover about one-quarter of Sumatra, Indonesia's third-largest island. Much of them are covered by deep peat – a spongy organic layer that is mostly 1–8 m thick, but can be up to 24 m deep. In places the peat forms domes that act as natural reservoirs whose only source of water is rain. In its natural state, the peat is permanently wet. But when it dries out it becomes highly vulnerable to fire, which can burn both above and below ground.

The area of natural peatswamp forest is dwindling. Over the last 20 years, many of the swamplands have been converted to agriculture or plantations. Legal companies and illegal loggers have cleared vast areas of the natural forest, and oilpalm firms have established plantations. The government's transmigration programme has converted many areas for rice farming to be settled by people from other parts of Indonesia.

The government has created national parks in an attempt to conserve the remaining areas of natural forest. Two of these are Berbak National Park in the province of Jambi, which was the first site in Indonesia to fall under the Ramsar Convention on Wetlands, and the nearby Sembilang National Park in the neighbouring province of South Sumatra. The 167,000 ha Berbak park is mainly peatland, while the 202,000 ha Sembilang park encompasses a coastal area of mangroves, as well as freshwater and peat swamp forests. Between the two parks is the Merang Kepahyang peat swamp forest, which acts as a corridor for wildlife and supplies much of the freshwater in both parks.

In terms of biodiversity conservation, the Berbak–Sembilang wetlands are home to endangered and vulnerable species such as the Sumatran tiger (*Panthera tigris sumatrae*), Malayan tapir (*Tapirus indicus*), Sumatran elephant (*Elephas maximus*), false ghavial (*Tomistoma schlegelii*), the Chinese egret (*Egretta eulophotes*), the white-winged duck (*Cairina scutulata*), and the milky stork (*Mycteria cinerea*). There are 150 different tree species in the Berbak park. The coastal mudflats of the two

The peatland ecosystem is threatened by the expansion of farming and plantations

parks are also important sites for a large population of migratory waterbirds, including the world's largest wintering population of the rare Asian dowitcher (*Limnodromus semipalmatus*.

The Berbak–Sembilang area is surrounded by villages (one of which is Edi Candra's home of Desa Sungai Rambut), transmigration areas and logging concessions. Along the park boundaries, large parts of the peat-swamp forests have been drained and are the target of uncontrolled logging.

Threats to the swamplands

The peat and other swamplands are being threatened in various ways:

Illegal logging At the end of the 1990s, most legal logging concessions in the area stopped. They were replaced by a large number of people from nearby villages and outside who cut the remaining timber. These illegal loggers take the most valuable species first, then less valuable species, until there are no trees left. Logging means loss of biodiversity, as clear cutting destroys the habitat of many plant and animal species. Removing the vegetation cover also speeds evaporation and decomposition of the peat soils.

Drainage canals Loggers often dig canals to transport logs from the deep peat swamp forest to sawmills on the river. These canals drain the peat, allowing it to dry out.

Fire The Berbak park has been affected by fires since the early 1980s, first on the edges of the transmigration sites and land conversion areas. In 1992, a substantial area of virgin forest inside the park was destroyed for the first time. Many other fires have followed, both inside the Berbak and Sembilang parks and in the nearby logging concession areas. The fires are started by careless people entering the forest, fish-poachers, or by local farmers trying to clear their fields of weeds.

Fire in a peat-swamp forest may damage the ecosystem irreversibly: if the damage is severe enough, the natural forest will not regenerate. Such fires are a major contributor to the heavy smog that blankets much of Southeast Asia during most of the dry season. In 1997, peat fires in Sumatra and Kalimantan were headline news throughout the world. Malaysia and Singapore were seriously affected by the smoke which covered the region, as well as more than 20 million Indonesians. It is thought that more than 2 million hectares of Indonesia's peat swamp and mangrove burned during 1997/98.

Land conversion Once an area has been logged, the degraded forest is likely to be converted to other uses, such as farming, settlements or plantations of oilpalm, acacia or rubber. The rate of conversion on of the peatlands has been increasing over the past 20 years. In Jambi province, the rate is 1.7% of the area is converted each year; for South Sumatra the figure is 2.6%.

The Berbak–Sembilang Poverty Alleviation and Wetlands Project

A two-year project managed by Wetlands International's Indonesia office aimed to deal with these problems. It aimed to prevent further degradation of the forest through fires and illegal logging.

Wetlands International was responsible for guiding the project and providing technical expertise. Local partners included two local NGOs (Yayasan Pinang Sebatang and Wahana Bumi Hijau), whose staff lived and worked in the project villages; local authorities and government agricultural services; and Bina Swadaya, a national NGO which conducted the project's marketing study and trained the community facilitators and other project partners.

The project worked with:

- Three community groups in two villages in South Sumatra
- Six community groups in three villages in Tanjung Jabung Timur District, Jambi (in the buffer zone around the Berbak park)
- Fourteen community groups in six villages in Tanjung Jabung Barat District, Jambi.

Each community group had between and 28 members.

The communities living in and around the forest play a crucial role in protecting, monitoring and restoring it. Most of inhabitants are very poor and depend heavily on the forest. They are forced to cut trees illegally or work as poorly paid labourers in order to make ends meet. Finding ways they could improve their situation is key to conserving the forest.

Outsiders and conservation officials often see local people as causing environmental degradation, rather than being part of the solution. This project took the opposite view: it recognised that involving local people is critical to conserving the wetland, and worked with them to find ways to do so. That meant including the community in the project activities right from the beginning, helping the various stakeholders find common ground, and promoting awareness of the importance of conserving wetland and managing resources sustainably.

The project partners assessed the situation and consulted local people and the authorities. They decided to focus on three types of activities:

- **Diversifying income** Helping people find other sources of income to release pressure on the wetland. Project activities included market analysis, training, developing community plans and proposals, and microcredit and revolving fund schemes.
- **Protecting and restoring the peatswamps** Getting people involved in fire prevention, monitoring and restoration activities. That included community fire brigades, joint patrols, and tree planting.
- **Awareness and policy** Encouraging district authorities and park managers to work with local people on wetland management. This covered activities to raise awareness and lobbying for policy change.

Details of these activities follow.

Diversifying income

Market analysis The first step in helping local people improve their incomes was to analyse the markets for the crops and other products they could provide. Bina Swadaya assessed the existing market for agricultural produce and fish. The study identified various actors and their roles in the marketing chain, the market services used (or needed) by poor people, and constraints such as land tenure, gender issues, the availability of natural resources, and governance issues. It then identified ways to change the marketing system to increase the incomes of the poor.

The marketing study advised farmers to avoid working with travelling traders and instead to transport their produce directly to the market. It is also recommended increasing the quality of the product to build a reputation with buyers.

Community groups earn money through a variety of small enterprises. Photo: Yus Rusila Noor

Marketing chains for vegetables, chicken and some other products already existed in some of the villages. The project decided to focus on these products rather than try to create new marketing chains from scratch.

Training Bina Swadaya and the district agriculture office staff trained the villagers on various subjects: participatory community development (such as community dynamics and participatory planning), economic activities (establishing small enterprises, livelihood activities such as animal husbandry, crop management, making prawn crackers and managing a revolving fund), and ecosystem restoration (establishing nurseries and planting trees).

This training involved all members of the community, but the types of training and numbers of training varied between sites. It was arranged by the local project partners and the related government agency. The courses were held as required throughout the project life.

Community plans and proposals The next step was to develop community plans. These incorporated the findings from the market analysis and what people had learned in the training. The project team conducted rapid appraisals on the communities' socio-economic situation, which provided baseline information for monitoring the project results. They then held meetings with villagers and consultations with district officials, business people, and staff of other projects. On the basis of all this information, each community group developed a proposal to submit to the project manager.

The proposal contained a business plan for each community group, detailing the activities to be undertaken, the amount of funding required, the terms of disbursement and the conservation activities that the community agreed to take on. The communities submitted these proposals to local project partner, which then discussed them with Wetlands International before approving them.

The project offered additional training if needed. For example, a group in the village of Muara Merang did not have the skills and experience needed to keep chickens, so the project arranged for the district agriculture office staff to provide them with training and facilitation.

Microcredit and revolving funds Local people needed some incentive to protect the forests, so the project established a "Bio-rights" microcredit facility to do this (Box 7). Through their community groups, individuals could apply for loans to invest in a small business or other money-making activity. Instead of paying interest, the borrowers were required to work on environmental activities such as planting seedlings, taking care of replanted sites, joining community fire brigades and taking part in joint patrols.

Every borrower was obliged to plant and maintain a certain number of trees, depending on the size of the loan he or she received. For example, for every Rp 1 million (€100) loan, community groups had to plant 250–400 trees. They could choose which trees to plant from among a list approved by the project. The trees became the property of the people who planted them. Every group had to prove that it owned the land where the trees were planted (to avoid conflicts in the future).

At the request of the community groups, the original Bio-rights mechanism was modified to form a revolving fund. The obligation to plant trees was still in the contract, but the communities returned their loans instead to the revolving fund instead of having the loans converted to grants. This allowed other people in the same community or nearby villages to be supported, creating solidarity and reducing the potential for jealousy.

This revolving fund gave a strong incentive for villagers to participate in the project. Although they all had to return the loans, they did not see the obligation to plant trees as a burden. Instead, they

Box 7. The Bio-rights approach in Indonesia

The Bio-rights approach, developed by Wetlands International, is based on the principle of local people's user rights over natural resources. As poor communities often live in and depend on a particular ecosystem, they need to be actively involved in protecting and managing it. The Bio-rights approach was developed after 10 years of piloting in Indonesia and Africa.

Communities receive working capital, a loan or microcredit for a livelihood activity for which they do not need to pay interest. Instead, they "pay" by planting trees, joining a local fire brigade, preventing logging, and other sorts of environmental work.

The project sets conditions to encourage the community to keep this bargain. For example, at least three-quarters of the tree seedlings planted must survive for, say, 2–3 years. If fewer survive, the community must return all or part of the loan; if more than this number survives, they do not need to pay it back. The community signs a contract committing to this arrangement. That encourages the communities to check how the seedlings are growing and replace any dead ones.

For environmental protection work, the project keeps track on the number of forest fires in the area, and the number of illegal loggers who have switched to farming or fishing.

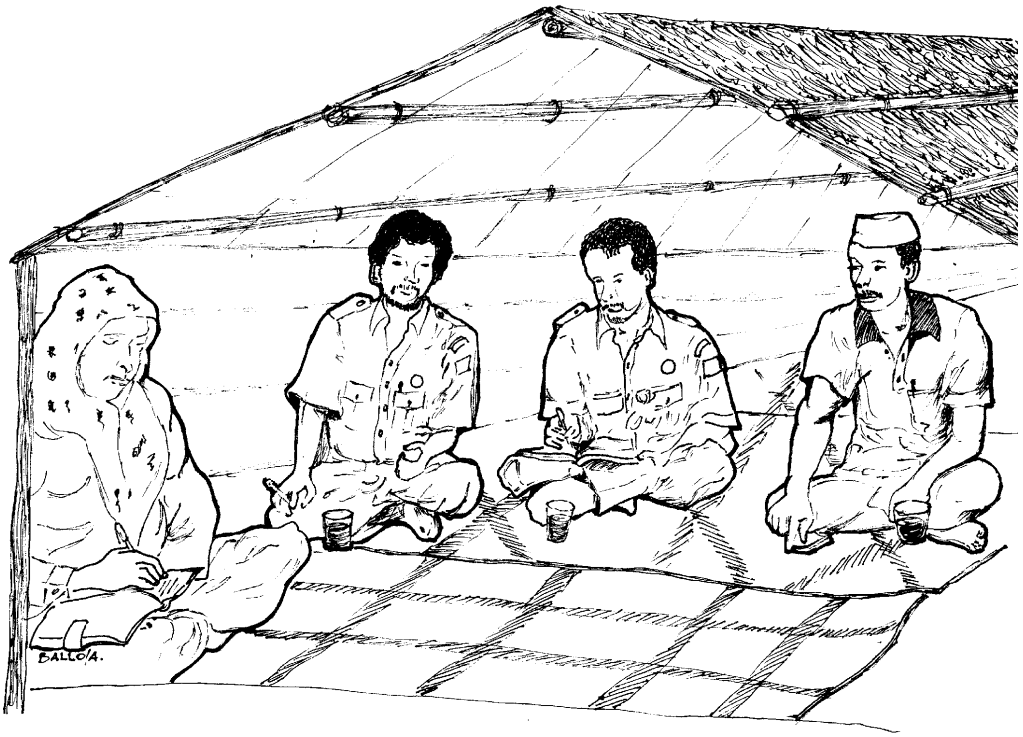
There are now seven community fire brigades in the Berbak–Sembilang area

thought of it as an opportunity to invest in the future as well as a chance to use the loan to boost their incomes in the short term.

This approach has developed a strong link between the livelihood activities and biodiversity conservation.

Protecting and restoring the wetland

Community fire brigades Edi Candra's story at the beginning of this chapter describes how the first community fire brigade was formed. The local government had already trained local people in firefighting, but the one-day course was too short and did not stimulate people to get organised as brigades.



The project worked closely with local government, community leaders and local people

The project helped form brigades in each village, gave them more training, and supplied them with simple firefighting and communication equipment. It provided refresher training and established links between the brigades and the national park authorities and the provincial government.

To ensure that the brigade members would be on call to fight fires, the project offered them small loans for livelihood activities. That gave them a source of income to cover the time they spent training and in fighting fires, and encouraged them to stay in the area rather than looking for work elsewhere.

Joint patrols The project helped establish joint patrols between community members, the Berbak National Park authority and local governments. The patrol teams were trained on law enforcement, forest fire prevention and suppression. They monitor illegal logging and fires in and around the park. The issue of illegal logging has to be handled delicately, as this is a sensitive issue and sometimes involves people from the same village, or even family. However, the project partner in Jambi (Pinang Sebatang Foundation) has good resources and experience in facilitating such patrols. The police, lawyers, the press, and local NGOs are also invited to participate in and observe the patrols.

Tree planting The project supported local people to start tree nurseries, plant trees and maintain replanted areas. These activities were linked closely with the revolving funds, described above. The project also trained and advised villagers how to grow seedlings, plant trees and ensure that as many as possible survived. Instead of planting trees, women's groups grew seedlings for other communities. Seeds are provided for free to other communities, but are sold to outsiders.

Awareness and policy

Awareness raising The project conducted various events to raise local people's awareness of the value of the wetlands. It also encouraged local people to recognise the importance of protecting wetlands and using them in a sustainable way, rather than seeing them as a limitless resource that would always recover from any amount of exploitation – or one that did not matter if it was depleted.

Awareness raising was also necessary for staff of the local authority and national park. The project helped them understand the importance of the wetlands to poor and vulnerable communities. It encouraged them to see the value of collaborating with local people rather than regarding them as enemies of the wetland – to see them as part of the solution rather than part of the problem.

It was not necessary to prepare new information materials for this: previous projects from Wetlands International in the area had developed an excellent set of materials that were very relevant to this project and the Berbak–Sembilang area.

Policy The Governor of South Sumatra became a champion of the community fire brigades. The brigades even met the President of Indonesia when he visited Palembang, the provincial capital. The success in initiating local fire brigades through involving local communities was one of the key factors in attracting the local provincial government, which led to further promotion up to the presidential level.

Nevertheless, the project felt it was important that the fire brigades remain a community initiative. It lobbied for the provincial government to pass a regulation to enable this. The fire brigade training in Tanjung Jabung Timur, one of the districts where the project works, was adopted by the Jambi provincial government, which will repeat it each year for community brigades.

Achievements

Biodiversity conservation and maintenance of ecosystem services The project did not follow the usual approach to conserving wetland biodiversity (for example, it did not count wildlife or plant populations or restore habitat). Instead it focused on finding linkages between biodiversity and habitat conservation and the livelihoods of local people. In that sense, the conservation effort was rather hidden to the communities. That did not mean it was ineffective, though. The number of recorded fires fell considerably, and the patrols found a significant decline in illegal logging – in part because of stricter law enforcement initiated by the national government. Both of these trends significantly reduced threats to biodiversity. The threat to tigers, tapirs, elephants and other endangered animals was reduced.

In the village of Sungai Merang, a group of fishers joined the project to improve their livelihoods and maintain stocks of fish in the river. The local government granted this fishing group the rights to manage the river for one year through a system of river auction known as *lebak lebung*. The group have full control over who is allowed to extract what resources from the river in a sustainable way. To some extent, this scheme also helps reduce the number of logs floating down the river as a result of illegal logging upstream.

Increased incomes, diversified livelihoods The project enabled farmers to plant and harvest more crops (soybean, vegetables, fruit, rice) and raise chickens. Although no in-depth impact analysis on yield and incomes was done, it is apparent that local incomes rose. To illustrate: farmers living

As a result of the project, farmers and local officials now work closely together. Photo: Yus Rusila Noor

in the edges of the Berbak park reported that their daily income had risen from Rp 20,000 (€2) to Rp 40,000–50,000 (€4–5). Farmers have also expanded their farms: at the start of the project, most owned or rented only 0.5 ha of land, but by the end of the project, they were able to buy or rent more land, increasing their area farmed to 3–3.5 ha. Larger land areas meant more workers were needed, boosting local employment opportunities.

Some groups were able to diversify their livelihoods. For example, a group of chicken farmers went into raising cattle and growing rice seedlings. People outside the target villages also benefited from the project. They received loans through the revolving funds, which they have invested in their farms.

Improved market access The farmers gained access to new markets for their produce. For example, a nearby industrial estate in South Sumatra agreed to buy beef regularly from one community group. A company in Tanjung Jabung Barat buys *jelutung* (*Dyera costulata*) tree seedlings produced by several groups. In neighbouring Tanjung Jabung Barat, buyers purchase produce directly from the field at harvest time. The farmers get a slightly lower price than they would in the market, but they save on transport costs.

Local government involvement The project expanded its collaboration with various government units. Starting with the local forestry and agricultural services, it began working with the fisheries service, the transmigration department, and offices dealing with trade and public works. These

agencies provide new support to community groups. District agriculture office staff now help in the community livelihood programme, allowing smoother communication with local decision makers.

Scaling up The project arranged for members of community groups to visit other areas with interesting activities, and for people from outside (including foreigners) to visit the project sites. Some of these cross-visits stimulated collaboration among people interested in the same types of enterprises – chicken farming, *jelutung* seedling growers and cattle raisers.

Close coordination between the project and the local governments resulted in the district and provincial governments adopting various approaches pioneered by the project: its mechanism for distributing funds, as well as re-greening and fire prevention and control programmes. Such collaboration is long-term in nature: the project partners will continue to work in the area even after the end of this project, and can expect to enjoy similar close collaboration with various government units.

Challenges

Men's and women's involvement Although the project deliberately tried to provide fair opportunities for women, men made up 70% of the collaborators. Men tend to be dominant in the local culture, and women were sometimes reluctant to participate fully at each stage in the project, or to agree to the conditions that the project imposed. Even if women's groups decided to participate in the livelihood programme, their families often did not support them. For example, a flood destroyed an aloe vera crop that women's groups had planted in an area not thought to be prone to inundation. Replanting on higher ground ran the risk of the plants needing additional watering during drier periods. The women felt that their families were not concerned about this difficulty. The project tried to overcome this by involving the (male) household heads in the women's planning meetings. That gained their understanding and support, since they realised that the whole family would benefit from solving the problem.

Ecosystem or livelihood? How to introduce the idea of ecosystem services into practical livelihood activities is still a challenge. At first, project staff deliberately did not talk about ecosystem services; they focused instead on improving incomes. That was not because they thought the ecosystem was unimportant, but because they had found out through previous projects that villagers were more willing to pay attention to environmental issues once their day-to-day worries about income had been resolved. The idea of Bio-rights, for example, was introduced late in the process; instead, the word *kompensasi* (compensation) has become a popular word locally.

To overcome this imbalance, the project promoted awareness of ecological issues linked to the livelihood programme. It provided information materials to increase awareness on ecological issues linked to livelihoods. It also provided information materials to district agriculture office staff who are in day-to-day contact with farmers.

The project was right not to introduce the concept of Bio-rights at the start. Instead, it was best to wait until people had a chance to profit from their investments; then they were more receptive to the rather complex idea of payment for ecological services. Conversely, where groups of farmers were struggling with low yields and attacks on their crops by wild pigs and monkeys from the forest, it was difficult to convince them of the need to conserve the forest, or to spend time and energy to do so.

Coordination with local government Coordination with government is a problem in many projects, especially in their initial stages. Government and NGOs have different approaches, and it can be hard to understand each other. The project overcame this in various ways:

- Intensive communication with local government to introduce the project's approach and explore the possibility of incorporating it into government policy and activities
- Presenting successes in government meetings
- Maintaining close cooperation and finding ways to increase the government's involvement
- Jointly promoting collaborative activities to strengthen the government's sense of ownership and to encourage higher levels of government to adopt successful approaches.

Different levels of support resulted in the different project sites. Some of the local government units were fully supportive right from the beginning; others were less so. The provincial governments strongly supported the formation of the fire brigades, perhaps as they were coming under pressure from the national government to control widespread forest fires. There was less interest in the other ecosystem protection activities and the livelihood programme.

Local politics The project tried to be apolitical, but it was hard to ignore politics during election times, as loyalties in the target communities were divided, and the elections distracted attention from the livelihood work.

Linking with other projects The local project partners and other NGOs run several projects in the same area. This was useful in many ways: it meant that more resources could be devoted to support common initiatives. But coordination among initiatives was a problem, and the multiplicity of activities was sometimes confusing.

Short time and limited funding A lack of time and funds meant it was not possible to gather and analyse evidence on the project's ecological impacts. The project focused mainly on livelihoods in the hope that this would promote ecological concerns. But the project's achievements in this area were limited compared to the scale of the problem: it has worked in only a few villages in a relatively small area.

Learning from experience

Partnerships Clear, honest, concise and transparent communication, based on common concerns and responsibilities, are key to successful partnerships and problem solving. Open-minded (but strategic) relationships among project partners and with collaborating institutions reduce the project partners' administrative burdens and improve their effectiveness. For example, deriving additional funding from other sources increases the amount of intervention, but does not add much of an administrative or reporting burden, as a single report can be sent to both donors. Transparency is also important with local people, building their support for the project.

Villagers' backgrounds Whether farmers are full- or part-time affects how successful they are. Full-time farmers generally get higher yields than those who have jobs outside. This is important when advising farmers who apply for credit: the type of enterprise they should choose depends on how much time and effort they can devote to it.

Integrated approach Social cohesion is important, both between and within families. Husbands did not support their wives' activities until they realised that the whole family would benefit. That meant they did not help replant the aloe vera after the flood, for example.

Even successful community groups need intensive supervision. Indeed, they tend to get more attention from both the government and the private sector, but this attention is not necessarily relevant to their current activities and may be beyond their capacity to absorb it. Overburdening a group may even cause it to fail.

Interaction with outside communities A series of visits by outsiders, cross-visits and study tours enabled the villagers to communicate with, learn from and share their experience with many other people. Their achievements were exposed to a large number of people and various levels of government. Other communities asked the project partners for assistance in developing their own programmes. Serving them all may be a problem because of the limited funding available.

Government support and ownership Despite the project's best efforts, there was still a variation on support from the government among the sites. There often seemed to be a sharp distinction between "us" (the project implementers) and "them" (the government). The government supported the project, but did not feel ownership for it. Experience elsewhere shows that projects should instead be jointly owned so as to integrate approaches and activities into government policy and practice. The government should be able to claim successes as its own – as should the NGO partners.

More information

www.wetlands.org/wprp (including a short film about the project)

Life in the Inner Niger Delta revolves around the river
Photo: Sander Carpay

5 Planting trees to eat fish in Mali

Bakary Koné, Mori Diallo and Dramane Sidibe

Fatoumata Dienta looks proudly at the grove of acacia seedlings that she and her friends have just planted. Soon the flood will come, and all these trees will disappear under the water. That will be good: they will serve as a breeding ground for hundreds of fish. Some will swim all the way down the River Niger to its mouth in Nigeria. But many of them will end up in the nets of the Bozo fisherfolk – and on the dinner plates of families here in Akka village, in the Inner Niger Delta of Mali.

Over the years, Mrs Dienta's trees will grow tall, reviving a once-abundant flood forest. The roots of this forest, which are drowned soon after the rains begin, will turn into a natural hatchery for thousands of fish of many different species – some of which exist only in the Inner Niger Delta. Perhaps the fish the Bozo call *pindo* (*sounogo djeke* in Bambara, or *Parachama obscura* in scientific terminology) will lay its "caviar" on the roots, thinks Mrs Dienta.

The trees will not be home just for fish. Their branches will shelter birds migrating from wintry Europe. Mrs Dienta thinks of the beautiful cormorants and purple herons that will alight in her trees after a long flight over the Sahara.

And not just fish and birds. When fully grown, the trees will shelter Mrs Dienta's family from the wind, protect the village's boats during storms, and cut the risk of erosion. In a few more years, the trees will produce wood for building, gum and even medicine for people in Akka.

But the fish are most important of all. After all, the Bozo tribe are the traditional fisherfolk of the Delta, and the fish born in the flood forest are destined to land in their nets.

Yes, she decides, planting these acacia trees is a good investment. As the people of Akka say, "The trees are our bank". Now all she has to do is to wait for the moment to cash in.

The Inner Niger Delta

The Inner Niger Delta is a vast area that is inundated every year as floodwaters make their way down from the river's source in the Guinea Highlands of West Africa. The second-largest floodplain in Africa, it covers parts of the Ségou, Mopti and Tombouctou regions. The floods vary in size, from 9,500 km^2 in a dry year like 1984, to a massive 44,000 km^2 in a wet year like 1957. The Delta was included in the Ramsar Convention on Wetlands in 2004.

The Delta contains different types of wetland habitats: swamps, ponds, lakes, floodplains, rice fields, pastures of the *bourgou* grass (*Echinochloa stagnina*), and flooded forests. But the forests have been dwindling: there were some 38 in 1980, but now only 17 remain, and three-quarters of these have been heavily degraded. There are small numbers of hippos (*Hippopotamus amphibius*) and manatees (*Trichechus senegalensis*). Fish populations are shrinking: the fisherfolk say that 15 species have disappeared from their nets, and another 10 have become rare.

The Delta is temporary home to as many as 117 species of waterbirds. One to two million individuals are recorded here every year. They migrate from Europe and Asia and use the Delta as a winter

resting grounds or stop-over area before they go back to their summer nesting area. Local people hunt these birds for food or sell them to earn money. In 1999 about 62,500 waterbirds were sold in the market at Mopti, the largest town in the Delta.

With so much water in a dry area bordering the Sahara, the Delta also encompasses farmland and pastoral areas that, along with the abundant fish, support a million people. About 300,000 are rice farmers, from the Marka, Bambara and Rimaibe ethnic groups. They produce about 86,000 t of rice a year (though production varies considerably from year to year). The rice farmers eat most of what they grow themselves, but sell about 10% of their crop.

Another 300,000 people, mainly from the Bozo tribe, earn their living from fishing. The Delta produces 80% of Mali's fish, varying from 40,000 t during weak flood years to 100,000 t during high floods.

Many of the remaining people are Peul: pastoralists who keep 2 million cattle and 3 million sheep and goats. These animals come into the Delta during the dry season to graze on the stubble of crops and remains of the other vegetation that has thrived as the floodwaters subside.

The river that winds its way through the maze of marshes and lakes is the region's major transport artery. Tourism is important too: the Delta is in Mali's tourist triangle stretching from Djenne to the Dogon Mountains and Tombouctou. It attracts about 100,000 tourists a year, bringing in over €75 million.

A rich delta under pressure

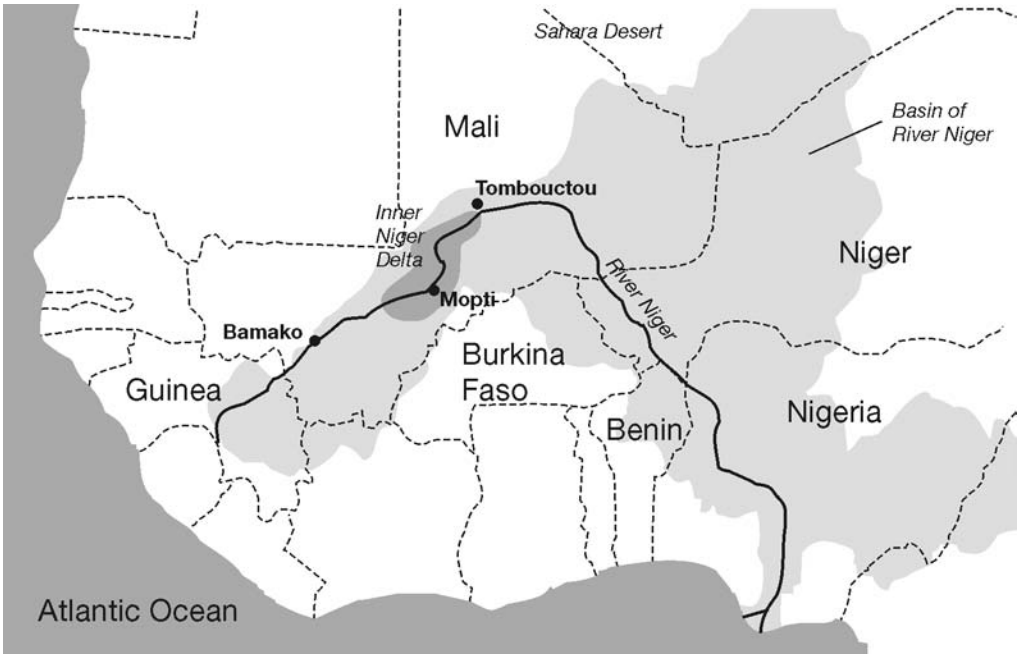
Despite this hugely rich natural resource, over 75% of the people in the Mopti region, in the heart of the Delta, are poor – the highest incidence of poverty in Mali. The social indicators are the worst in the country. Of Mopti's children only 22% go to school, compared to 37% for the country as a whole. Only one-third of households have access to tap water. The major diseases in the area are malaria, lung infections, diarrhoea and AIDS. Women are more likely to be poor than men.

Lack of infrastructure is one cause of these high levels of poverty. Another is the degradation of the Delta: erosion, poor soils, shrinking numbers of fish, and unpredictable water levels. This situation is worsened by increasing demands being put on the Delta by a rising human population and by new infrastructure upstream, such as irrigation schemes and hydropower dams. Less and less water reaches the Delta because of these developments. A shrinking Delta is less able to feed the increasing numbers of fishermen, farmers and herdsmen in the area.

The Wetlands International–CARE demonstration project

Wetlands International's demonstration project in the Inner Niger Delta works with local communities and authorities to improve management and restoration of the natural resources of the area.

As a conservation organisation, Wetlands International has long been active in the Delta, monitoring wildlife populations and promoting nature conservation. But it recognised that such conservation efforts were pointless unless they were accompanied by initiatives to improve local people's livelihoods so they would stop using the Delta's biodiversity in an unsustainable way, and start to protect and restore it.



Just south of the Sahara, the Inner Niger Delta is the second largest wetland in Africa

Wetlands International knew that it did not have sufficient skills in economic and social development. So it entered into a partnership with CARE, an international development organisation experienced in these fields. CARE was also already active in the area, but the two organisations had not worked with each other before.

The partnership between CARE and Wetlands International was vital for the success of the project. Both organisations work on the global level, and previously focused on their own speciality of poverty reduction (CARE) or nature conservation (Wetlands International). The two organisations brought different skills to the project, but they had a common vision of reducing poverty, managing resources sustainably and conserving biodiversity. This project was the beginning of what both CARE and Wetlands International hope will be a long-term partnership. CARE hopes to apply the same approaches in two other areas of Mali: Ségou and Tombouctou.

The project team chose to work in nine rural districts in the Delta: Wetlands International would focus on four rural districts where it was already working, while CARE would be responsible for five districts where it also already managed activities. Within these districts, the team selected 22 villages to work in.

The Bio-rights approach

Bio-rights, Wetlands International's approach to using microcredit to pay for environmental services, forms the central part of the project. This approach aims to provide poor rural people with access to finance to improve their livelihoods and promote biodiversity conservation.

The idea of Bio-rights is to encourage individuals, village associations and groups of people who practise a common occupation to start micro-projects that not only generate income but also conserve biodiversity. It gives loans that may be converted into partial or complete grants, depending on how effective the conservation activities are. That gives people a strong incentive to manage and protect their environment in a sustainable way.

Local people find it increasingly difficult to get the money they need to invest in producing enough food to eat. Apart from a few schemes run by NGOs and development projects, the Delta has no major microfinance system. The project's loan programme was handled by three specialist microcredit institutions: Kondo-jigima, CAMEC and Amprode.

The project introduced and promoted the Bio-rights idea at meetings in the target villages and sought the support of local leaders, government officials and community organisations. It established a set of rules to govern the programme: the types of micro-projects that would qualify for loans, the criteria for determining how effective the conservation activities were, and a method of monitoring to make sure that borrowers were actually doing these activities.

Slightly different approaches were used in different districts. In seven districts (Diondiori, Borondougou, Konna, Toggore-Coumbe, Deboye, Dialloubé and Fakala), the focus was on communities: groups of local people made the decisions and local authorities merely provided support. In two other districts (Kewa and Dandougou Fakala), the local authorities were given responsibility for ensuring the activities were implemented. The local government contributed part of the funds for these activities, with Wetlands International providing the rest.

Micro-projects supported by loans

The project allocated 30 million FCFA (about €45,000) as loans to women's groups to support a range of income-generating micro-projects, including livestock fattening and marketing, cereal banks, rice huskers, gardens, and fishpond restoration. There were two reasons for choosing women as beneficiaries: they have a vulnerable position in both family and community life, and they bear the most responsibility. Providing loans to women proved successful. In the project sites of Wetlands International, 100% of the loans were repaid; in the area served by CARE the rate was 85%. The average loan provided was CFA 50,000, or €77.

The loans supported various types of activities. Below are some examples.

Grain banks Community members in Kakagna, a village in Dialloubé district, decided to establish a grain bank, "paying" for it under the Bio-rights scheme by digging a canal to connect a fishpond to the River Niger (see below). The grain bank's initial stock of 4 tons was sold to the villagers during the rainy season, which is when food is scarce. After the rice harvest, the grain bank was refilled. After paying all the costs, the group earned a profit of €305.

Rice huskers In the villages of Severy and Kamaka Sebe, the women said they spent a lot of time pounding rice. So they used their Bio-rights loan to buy rice huskers. The project trained them how to operate the machines and earn money by husking other villagers' rice. They invested their profits in other small enterprises.

Vegetable gardens In Akka village, three groups of women with 110 members own a 1-ha garden. In Guidio village, two groups with 150 members own a 2-ha garden. And in Kewa and Dandougou Fakala five groups of women with a total of 357 members each own similar gardens.

As the floods recede, they will reveal land for planting crops. Photo: Sander Carpay

Shallow basins in the soil capture moisture for trees and crops. Photo: Bakary Koné

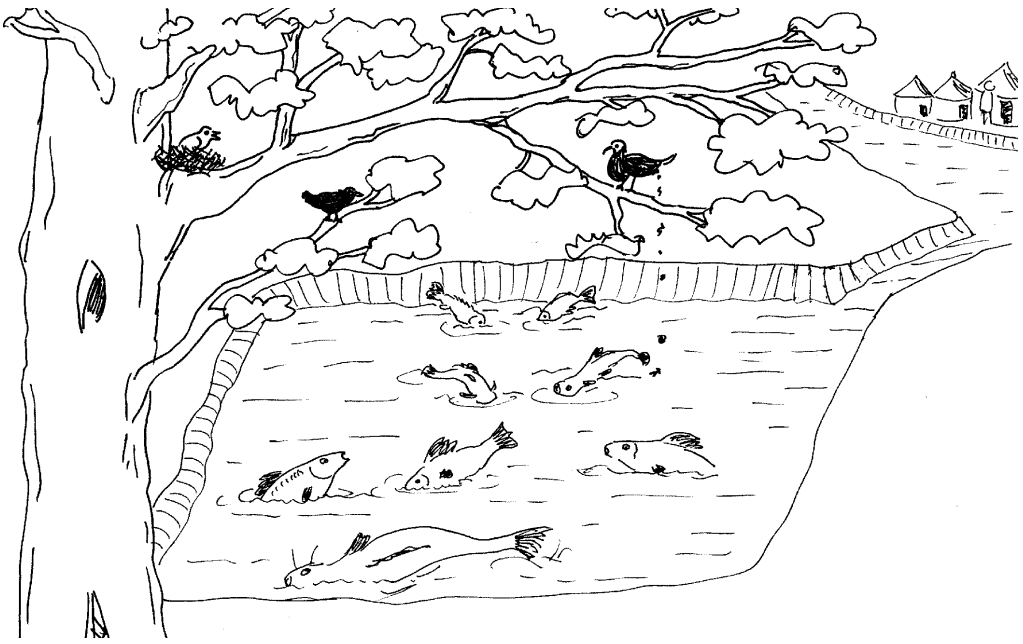
These groups have used their loans to plant a wide range of vegetables: carrots, lettuces, onions, cabbage, potatoes, maize, okra, aubergines, tomatoes, maize and peppers. Yields have been good: 5–6 t/ha of onions, for example.

The women say that they can now sell vegetables to earn enough to buy food during times of scarcity. Because the women can earn money in this way, they do not need to cut trees to sell as firewood. They have added vegetables to their families' diets, improving their children's nutrition – important in an area where many children die from malnutrition. During the dry season, wells paid for by the project in the gardens supply clean drinking water for the village. The gardens have also strengthened cohesion among the group members.

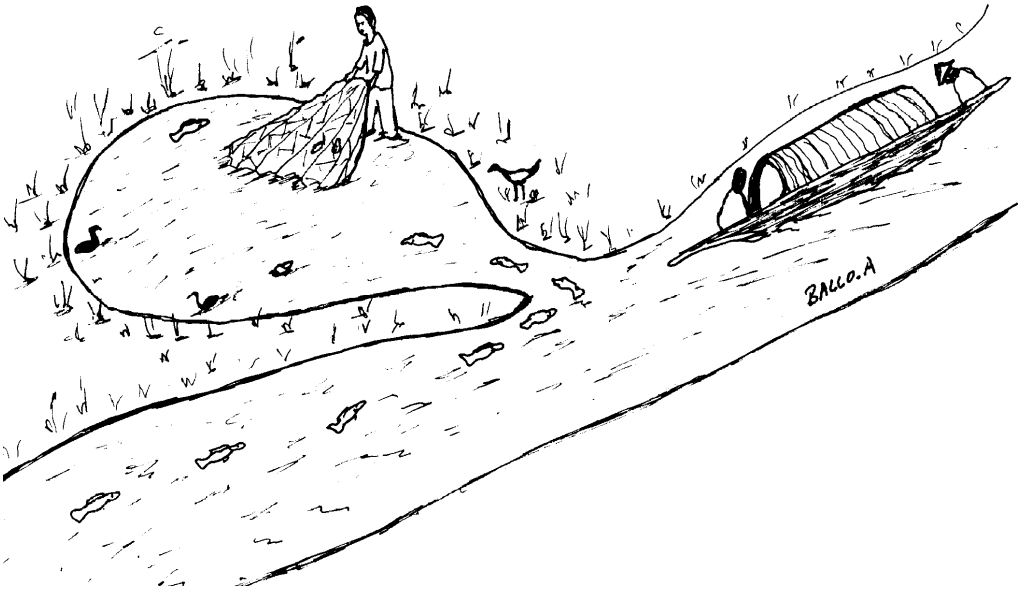
Profit from Bio-rights

The Bio-rights loans enabled borrowers to make a sizeable profit. In Toggore-Coumbe, for example, groups of borrowers earned between €11 and €31 a month extra. In Deboye, they earned €43–76 more, while in Dankdougou Fakala, Kewa and Borondougou, they earned as much as €56 a month. These amounts may seem small, but they are enough to get people out of poverty. From a survey done by Wetlands International in the Delta, the poverty limit was set as US$2 (€1.30) per day per person, as this amount satisfies the people's basic needs. Therefore, an extra €50 per month is enough to double a poor person's income and lift her or him out of poverty.

People do not seem to regard the scheme as a handout: at 85% in the CARE-managed villages (and 100% in those managed by Wetlands International), repayment rates were relatively good. People in non-target villages have expressed an interest in joining the scheme.



Planting trees can increase the fish population in the wetland



Fishponds can be an important breeding ground for fish if they have a permanent channel to the River Niger

"Bio-rights has been excellent thing for us because of this year has been tough after the bad cereal harvest last year. The income from activities funded by Bio-rights has been the only way out."

—Nana Sougoule, Konio village

Restoring and sustaining biodiversity

In order to qualify for the Bio-rights loans, the groups of women were required to undertake various activities to conserve and restore biodiversity. These included planting trees to create new flooded forests, protecting existing forests, restoring *bourgou* pastures (used as backup food source during droughts, and as livestock feed), and digging channels to link fishponds to the river. All of these activities were in line with the local authorities' environmental action plans.

Planting trees Groups of villagers have planted a total of nearly 20,000 trees of various species: fruit trees like guava, mango, lemon and tamarind, shea (*Butyrospermum paradoxa*, used to make a kind of butter), locust bean (*Parkia biglobosa*, used to make a fermented food), *Acacia kirkii* and *Acacia nilotica* (which produce gum), and African mahogany (*Khaya sengalensis*). All these are local species, chosen because of their products or because they act as a breeding ground for fish or as habitat for waterbirds.

In five villages (Severy, Kakagna, Toggore-Coumbe, Akka and Guidio), over 80% of the seedlings survived after one year. In three villages (Kamaka Sebe, Kouboulou and Sofara) half of the trees survived, while in two villages (Dialloube and Tomona) fewer than half survived.

Why did some groups fail? Some of the groups were poorly chosen and their members were unwilling to put in the work needed. In other cases, the trees were destroyed by grazing cattle.

Protecting forests The project has resulted in the protection of 22 ha of flooded forests. These forests have been under severe threat because people cut down trees to use as firewood. The forests are managed by village committees under the coordination of the local authorities. These committees decide on rules to manage them in a sustainable way.

Restoring *bourgou* *Bourgou* (*Echinochoa stagnina*) is a floating grass which forms huge areas of floating vegetation that provides important habitat for a number of waterbirds, especially herons and egrets. This grass is also an excellent fodder for approximately 5 million cattle, sheep and goats that throng into the Delta as the waters recede at the end of the flood season. *Bourgou* feeds them for 8 months of the year. It feeds people too: the seeds are an important source of food if the rice harvest fails, and *bourgou* juice produces sugar and is used to make a traditional wine.

Groups of villagers have regenerated 10 ha of *bourgou* in Akka and 20 ha in Guidio villages. These areas yield an average of 15–20 t/ha, worth about over 90,000 FCFA (€143) per ton.

Fishponds In Kakagna, local people dug a 300-m-long channel to link a village fishpond with the River Niger. This channel keeps the pond filled with water during the dry season and lets fish migrate into it throughout the year and use it as a breeding ground. When the Delta floods each year, the fishpond is also flooded, allowing the fish to swim free and be caught by fisherfolk in nearby areas.

Since the channel was dug, two valuable fish species that had disappeared from the pond have reappeared in local fisherfolks' nets. Apart from its value for fish, the pond is home to 11 species of waterbirds.

Such channels could have a major impact on both biodiversity and livelihoods in the Delta. Simply by digging channels to link the thousands of ponds scattered throughout the Delta with the river, it may be possible to significantly increase the number of fish in the river – and the amount of food on people's plates. Government support would be vital to ensure that this is possible.

Building skills, creating capacity

The project provided local people with the skills they would need to plan, organise and implement their Bio-rights livelihood and conservation activities. It helped local people organise into groups to propose and implement activities that would qualify for support under the Bio-rights programme. It gave them training on organisation and negotiation skills, managing natural resources, and implementing economic activities. Information and communication activities informed them about the project goals and approach, sensitised them to the linkages between biodiversity and livelihoods, and spread news about the project to other villages. As a result, other villages started to plant trees, hoping for a Bio-rights scheme.

The project also worked with local elected officials, local government units and service providers. It introduced them to the project goals, sought their help in implementing it, and advised them on sustainable approaches to development and conservation.

To catalyse the micro-project initiatives, the project held meetings with local government officials and community groups to ensure that the activities proposed by the communities were in line with government priorities. It helped local groups, project partners and local authorities negotiate finance and contracts, and facilitated the establishment of procedures to manage the process.

Changing policy

The project aimed to change policy at various levels – local, regional, national and international.

At the local level, the council in Fakala reached an agreement on how to manage a pond in Niamoro. This agreement was part of a broader vision for development and conservation that also covered the neighbouring Timissa district. In Kewa district, another agreement was reached on how to manage a flooded forest.

The project contributed to an action plan on conserving the black crowned crane, a spectacular but rare waterbird that is iconic for the Delta. Local people associate these cranes with prosperity. The action plan called for activities to raise local people's awareness of about the national and international values of such waterbirds and how to harvest them on a sustainable way.

At the national level, the project contributed to implementing Mali's national wetlands policy. It also provided inputs into the environmental component of the national Strategic Poverty Reduction Document for 2007–11. In this influential document, developing a sustainable management plan for the Delta had the highest priority.

At the international level, the project pushed for the Niger Basin Authority to consider the restoration of fishponds in its sustainable development action plan.

Challenges

The Bio-rights approach successfully promoted environmental conservation at the same time as livelihoods improvement. Although the Bio-rights idea has been included in the national microcredit programme, the challenge remains: how to sustain funding so it can continue and be extended to other villages, some of which have already taken up conservation activities in anticipation that they will benefit from such a scheme.

Siltation The channels that link the major ponds to the main river channel are becoming silted up. This makes them dry out sooner in the dry season than before. Deepening these channels and digging new channels to link the ponds to the main river is a major undertaking that must be tackled by government policy.

Women's rights to land Traditionally, women in Mali cannot own land. A woman who wants to use a piece of land has to ask men for permission. Different people may have rights to land, the water and the vegetation growing on it. This makes things more complicated for women, as all three owners have to agree to let her use it. If a family moves from one piece of land to another, the women have to go through the same process of getting permission all over again.

More information

www.wetlands.org/wprp (including a short film about the project)

The Negombo lagoon in Sri Lanka:
a source of fish and livelihood for thousands
Photo: Nidhi Nagabhatla

6 Lessons from elsewhere: Seven cases from around the world

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Part of Wetlands International's Wetlands and Poverty Reduction Project was a desk-based study of other experiences that addressed the interface between wetlands conservation and poverty reduction. The International Water Management Institute (IWMI) conducted this study. For analysis the researchers selected seven wetland management initiatives that attempted to address both conservation and poverty issues. These projects were the only ones out of approximately 50 wetland projects with significant components in both conservation and poverty reduction. The majority of the other projects focused entirely or predominantly on conservation.

The IWMI researchers evaluated the seven projects by reviewing secondary material and external project evaluations (where these were available), and discussed the activities and outcomes with the project implementers. They used an integrated analytical framework developed by IWMI to identify key issues, underlying causes of issues, interventions, results and lessons in each initiative.

The seven initiatives were located in the following wetlands:

- Lake Fundudzi, South Africa
- Phu My, Vietnam
- Cao Hai, China
- Negombo, Sri Lanka
- Mamirauá, Brazil
- Hadejia-Nguru, Nigeria
- Bhoj, India

They are described in the section below.

This chapter summarises the lessons distilled from these seven cases, as well as from a study of literature on integrated conservation and development projects, and views expressed during an electronic discussion with conservation and development practitioners on wetlands conservation and poverty reduction held over 2 weeks in July 2007.

1 Based on Sellamuttu et al. (2008).

Seven development/conservation initiatives

Lake Fundudzi, South Africa

Lake Fundudzi, in Limpopo Province is South Africa's only inland freshwater lake. The lake's catchment includes peatlands, springs, slope seepages and valley-bottom marshes. The lake itself covers 144 ha and the 10 surrounding wetlands covers approximately 30 ha in total. Around 6,000 people live in the lake catchment. Many depend on the wetland, harvesting food (especially fish), medicine, construction material and water. Subsistence farming is the dominant form of agriculture. An increasing number of orchards and vegetable gardens are being established in the catchment, and more people are relying on cultivating both winter and summer crops for food security. Threats included clearing of natural vegetation for orchards, vegetable gardens and new residential areas. Excessive sedimentation in the catchment and surrounding wetlands occurs due to poor land management such as cultivation on steep slopes without soil erosion control measures.

The Lake Fundudzi Conservation Project, part of the Mondi Wetlands Project, implemented by the World Wildlife Fund and several southern African organisations starting in 2002, promotes and facilitates participatory wetland rehabilitation and sustainable use in communal areas to bolster local incomes. It promotes environmental awareness, and develops the capacity of the local community and government authorities to plan resource use. It runs demonstrations on wetland management, employs people in wetland rehabilitation activities, and develops their skills on topics such as primary healthcare, basic adult education, and financial management.

Phu My, Vietnam

The Phu My wetland is a seasonally flooded grassland of 2,900 ha in Kien Giang Province, in southern Vietnam. It is the largest remaining *Lepironia* grassland in the Mekong Delta. It also affords a key resource to the local economy, and especially to the Khmer people, who traditionally make handicrafts from the grass. However, access to the wetland it not controlled and it is being overexploited. Plus, it is at risk of being converted to agriculture.

The Sustainable Exploitation of Lepironia Grassland Integrated with Local Traditional Handicraft Conservation Project, implemented by the International Crane Foundation in 2004–6, aimed to protect the wetland from conversion, restore its hydrology, and develop a localised land-use plan to enable sustainable exploitation while still contributing to local livelihoods. It trained and organised local people to upgrade their handicraft production. When the provincial authorities saw the value of the wetland, they designated it as an "open" protected area with four zones for different types of use. A revolving fund provided money for people to start new enterprises. The project also introduced a new rice variety, trained farmers in integrated pest management and animal husbandry, and promoted the integration rice and aquaculture. It helped producers sell directly to local markets to eliminate a traders' monopoly.

Cao Hai, China

The Cao Hai wetland includes a 45 km^2 freshwater lake and the surrounding area in Guizhou Province. It is a wintering ground for the rare black-necked crane. It was drained and converted to farmland in the 1950s and again in 1972, but restored as a wetland in 1982 and designated as a nature reserve. That meant local people could no longer use the area, pushing them further into poverty and creating conflict between local people and reserve officials.

The Integrating Conservation with Rural Development Project, implemented by the International Crane Foundation in 1993–2005, sought to balance conservation with the need to alleviate poverty. This meant relaxing the reserve's strict rules to allow some use on one hand, and actively involving local communities in conservation on the other. The project used microcredit schemes to provide loans of up to $100 to individuals and groups so they could start new livelihood activities, as well as larger loans of $250 to communities to spend on projects such as roads, wells, health facilities and tourist infrastructure. Each recipient had to undertake a conservation activity of their choice as a condition for receiving the loan.

Negombo, Sri Lanka

The Muthurajawela Marsh Negombo Lagoon complex is a coastal brackish-water lagoon and marsh covering 6,232 ha in western Sri Lanka. Although the marsh is designated as a sanctuary, it is subject to degradation and pressures from a rapidly growing urban population: around 700,000 people live in numerous towns around the area, with population densities of 2,500–8,000 persons/km^2. Fishing in the lagoon supports around 15,000 people. Employment in industry, tourism and other sectors is also prominent. The poorest local residents are partially or entirely dependent on the natural resources of the wetland. Threats to the wetland system include overfishing, poverty-driven encroachment, pollution by industrial effluent and urban waste, eutrophication and sediment build-up, which obstructs the flow of water into the sea.

The Integrated Resources Management Programme in Wetlands, implemented by the Central Environmental Agency of Sri Lanka and Euroconsult in 1998–2003, aimed to implement a wetland management plan developed in 1994. The fundamental challenge was in reaching broad-based awareness on the need for resource management. The project sought to generate local support for a fishery management plan, establish an authority to manage fisheries in the lagoon, and divide the area into zones for conservation, resettlement, and sustainable use. However, political interference prevented this plan from being implemented fully.

The project initiated a microcredit scheme to support income-generating activities to compensate for the restrictions that would be introduced by the management plan, community fishery committees to facilitate stakeholder involvement in the plan, and a revolving fund to support fishery management interventions and to resettle encroachers.

Mamirauá, Brazil

The wetlands in Mamirauá, in Amazonas State in northwestern Brazil, are a complex of seasonally flooded forest with rivers, creeks and lakes, interspersed with forest and shrubland during the dry period. With a core area of 260,000 ha and a subsidi-

ary area of 864,000 ha, the area has exceptionally high global and local biodiversity. About 1,800 local and indigenous people live within the core area, and another 1,800 in the surrounding area. The area is under intense pressure from politically backed illegal commercial loggers, fishermen and wildlife hunters. Designating the wetlands as a protected area, however, posed a problem, since at the time such a designation did not recognise the rights of local and indigenous people to live in and use the area.

The Mamirauá Sustainable Development Reserve Project, implemented by Sociedade Civil Mamirauá in 1992–2002, successfully lobbied the government to create a new category of protected area that recognised these rights. It developed a participatory management plan with a focus on fisheries, which provide 80% of the protein that residents eat. Resource users were organised into village and producer associations to plan resource use and access markets. An ecotourism programme was started, with a floating lodge near the core area providing services to visitors.

Hadejia-Nguru, Nigeria

The Hadejia-Nguru Wetlands are an inland delta in northern Nigeria, home to 1.5 million people. Many people depend on farming, fishing, livestock rearing and collecting wild resources from the wetlands. In the early 1990s, these wetlands were estimated to generate $167/ha in benefits to local people, compared to only $29/ha from irrigated agriculture upstream. Two large irrigation schemes reduced the size of the wetlands from over 2,000 km^2 during peak flooding, to only 413 km^2 by 1993. Poor dam design and operation have subjected some parts to prolonged flooding and others to lengthy drought. The resulting degradation has aggravated poverty and forced people to exploit natural resources further, triggering a second round of ecological destruction, such as deforestation. Other threats include increased vulnerability to disease, siltation and invasive *Typha* grass (bulrushes or cattails). There was no basin-scale mechanism to deal with these issues by rationalising water management, prolonging and deepening the problems.

The Joint Wetlands Livelihoods project in the Hadejia-Nguru Wetlands, funded by the British Department for International Development and implemented by ITAD, a British consultancy in 2002–7, sought to develop institutional frameworks and practices to restore ecosystems and resolve livelihood conflicts. It operated at three levels: the larger river basin, the wetlands, and the community. At the basin level it promoted policies and plans for integrated water resources management, improved communication among stakeholders, raised awareness, and built institutions. At the wetlands level, it promoted the building of structures to manage the water more effectively. At the local level, it worked with village communities to clear channels, build dykes to control flooding, manage access by herders, empower women and diversify livelihoods.

Bhoj, India

The Bhoj Wetlands are a 36 km^2 artificial lake dating from the 11th century in the city of Bhopal, India. The lake's watershed covers 360 km^2. Rich in biodiversity, (including Sarus cranes), it was designated as a Ramsar Site in 2002. It provides about 40% of Bhopal's drinking water and supports several rural and urban livelihoods including 500 fishing families. Irrigated agriculture is also important, especially upstream of the lake and city. An estimated 34% of the rural population lives below the poverty line. With expanding populations (Bhopal's

reached 1.25 million in 2000), expanding settlements in the catchment, direct sewage inflow and runoff, and increased nutrient load from the rural catchment has caused the lake's water quality to deteriorate. Agriculture-driven eutrophication is compounded by inadequate soil management upstream, causing fish harvests to decline and health concerns over the deteriorating water quality.

The project Developing Markets for Watershed Services and Improved Livelihoods –Conservation of Bhoj Wetlands through Incentive-Based Mechanisms, was implemented by Winrock International India in 2005–7. It aimed to promote wetland conservation and wise use, with a particular focus on reducing agricultural runoff. It promoted organic agriculture upstream of the lake and explored the feasibility of getting downstream water users to pay to help the farmers switch from chemical agriculture to organic production.

Analysing the evidence from the seven cases

The remainder of this chapter draws on these seven cases to answer the following questions:

- Can wetlands be managed sustainably and contribute to poverty reduction?
- What factors influence a wetland's ability to reduce poverty?
- Is poverty a cause or result of wetland degradation?
- If people depend on wetlands, will they use them sustainably?
- Why integrate sustainable use with poverty reduction?

It also addresses the need for the following:

- Investing outside the wetland
- Flexible project management
- Support from policymakers

Can wetlands be managed sustainably and contribute to poverty reduction?

Yes, but not always

It is well known that wetlands in many parts of the world collectively benefit the poor in many ways. But the situation for a particular wetland will vary. In some projects, improved wetland management practices combined with livelihoods improvement measures benefited the poor.

- In Phu My, Vietnam, household income doubled or even tripled from less than US$1 a day to $1.90–$3.10. This was achieved by expanding traditional handicraft manufacturing that depended on wetland resources, combined with a wetland management plan that provided for biodiversity but also identified areas for supplying the resources necessary for the handicrafts.
- In Cao Hai, China, income more than doubled from yuan 857 to yuan 1,980.
- In Mamirauá, Brazil, the introduction of community-developed fisheries management rules and the construction of an ecotourism lodge helped communities earn extra income from the wetland and concurrently use their fish stocks in a sustainable manner.

- In at least one of the seven cases, though, the wetland's ability to contribute to poverty reduction was brought into question: the Negombo lagoon wetland in Sri Lanka is under severe pressure, and it is hard to see how it can be managed sustainably to benefit everyone who depends on it. There are just too many demands being made of the lagoon.

What factors influence a wetland's ability to reduce poverty?

Natural limitations

Several factors determine whether a specific wetland can reduce poverty levels of local communities without being degraded. Each wetland has natural limits to the ecosystem services it can sustainably provide and the number of people it can support. This limit will be influenced by certain features of the wetland itself, such as its size, stability and biophysical characteristics. For example, small, coastal wetlands may be less stable (i.e., their physical properties are liable to change over short periods through natural processes), and their ability to produce food or prevent floods may change over time. It may be possible to maintain or enhance productivity artificially, but the cost is often too high, and many countries may not be able to afford it.

- Negombo, Sri Lanka, is a relatively small coastal lagoon, linked to the sea by narrow, shallow channels. The natural processes that led to the lagoon's creation have also created conditions that will cause the lagoon to degrade naturally over time. In particular, the currents in the lagoon are not strong enough to flush naturally occurring sediments into the sea. This means that over time the lagoon has become increasingly shallow and has shrunk in size. This has in turn caused its fish and prawn productivity to decline, as has its effectiveness in controlling floods. These natural processes have been added to in recent years by human-induced pollution and sedimentation. Stalling these processes by building physical barriers and dredging was estimated to cost at least US$ 200 million in 2002. This is a very high cost, so it is not a priority for a developing country such as Sri Lanka.

Population density and wetland management

These natural limitations must be linked to the number of people a wetland is required to support. To get out of poverty, people have to be able to grow enough food and save enough to invest in other aspects of their well-being. Do the combined demands of local people exceed what the wetland can sustain? Improving how the resources are managed, mobilising local people and improving their access to markets may enhance both conservation and local livelihoods. But where human populations are already dense, even these strategies may not be able to serve everyone.

- In Phu My, Vietnam, the population density is fairly low. This meant there was enough room to divide the wetland into zones for conservation and exploitation. By improving the production and marketing of handicrafts, the local people could earn money from the *Lepironia* grass. The wetland is big enough to allow them to harvest the grass without damaging the ecosystem – including key habitats of rare birds.

- A similar approach worked in Mamirauá, a seasonally flooded forest in the Brazilian Amazon with high levels of poverty but low population densities which made it possible for the wetland to support people's needs. A zoning and collective market access scheme for fisheries management combined resource conservation and improved local livelihoods. By negotiating collectively, the

communities could reduce their dependency on traders and saw their fish prices rise from R$3/kg to R$8/kg.

- In Negombo, Sri Lanka, by contrast, there are many fishers, and the lagoon productivity is declining. Young people prefer to look for work in the nearby towns. The project focused on helping people diversify their livelihoods to release pressure on the over-exploited lagoon. The lagoon can support some poor people, but not all.

Pressures on a wetland change over time

As people become better off, their needs change – and how they use the wetland also changes. In the long term, how many people a wetland can serve will depend not only on the population and resource used today, but also on the demands people put on it in the future. A wetland may be able to support 1,000 very poor people whose priority is getting adequate food and income to meet basic needs, but not the same number of better-off people whose needs have shifted to more material acquisitions that require more money than the wetland can supply. Thus, changes in the consumption patterns of the same number of people may increase pressure on the wetland. The same effect may be created by rising populations: a wetland that can sustainably support 1,000 people may not be able to support 1,500 at the same standard of living.

Wetland initiatives must thus be linked to broader regional development and encourage at least some people to find ways to earn a living that do not depend on the wetland.

- In Cao Hai, China, the microcredit programme allowed people to begin new livelihood activities, and many of these did not depend on the wetland (e.g., a bicycle repair shop). This helped reduce the stress on the wetland. The additional income generated through the microcredit programme became savings which people invested in education and health care.
- The Negombo wetland in Sri Lanka is close to fast-growing urban areas. The population is growing quickly, and lifestyles are becoming more urban and materialistic, adding pressure on the wetland. The only way to ensure that such pressure does not cause further degradation would be to enable some of the people to adopt alternative livelihoods that do not use the lagoon resources – such as seeking jobs in the cities.

Look beyond income when assessing project impacts on poverty

We should remember that income is not the only dimension contributing to overall human wellbeing. Just as important may be when people learn new skills, organise themselves to solve problems, and above all, have a change in attitude and come to believe they can make a difference in their own lives.

- In Cao Hai, China, some families were able to get loans from a microcredit programme. They invested this money in various enterprises. Other families copied them by getting loans from better-off relations rather than from the project. Their rising incomes meant that people could work together on village-level initiatives. The microcredit programme thus expanded people's outlook, encouraged them to work together to solve problems, and improved village cohesion. That led to a shift away from asking what "the project" or "the government" should do, to discussions on what they could do for themselves as individuals and as a group.

- In both Mamirauá, Brazil, and Hadejia-Nguru, Nigeria, projects have built local people's knowledge, confidence and organisational capacity to demand services from the government. In Hadejia-Nguru, communities now use the media and the State and National Assemblies to lobby for the interests of people who depend on the wetland.

Is poverty a cause or result of wetland degradation?

It can be both

All seven cases had wetland degradation and high levels of poverty. In some, poverty was the result of degradation; in others, it was the cause. Once degradation began, a vicious cycle set in, with one problem making the other worse in an ever-deepening cycle.

- **Poverty as a driver of wetland degradation** Local people depend heavily on Lake Fundudzi in South Africa for fish – their main source of protein – and to water their livestock. They have planted a lot of orchards and vegetable gardens in the catchment. But land-use planning has been poor, and people have not realised that clearing the natural vegetation and building houses in a haphazard way would cause the lake to silt up. The problem has been made worse by cultivation on steep slopes without erosion-control measures. The project aimed to solve these problems and boost local incomes by promoting participatory wetland rehabilitation and land use planning for sustainable use.
- **Poverty as a result of wetland degradation** The Hadejia-Nguru inland delta in northern Nigeria used to be rich: in the early 1990s, the wetland provided more than five times the income of irrigated agriculture upstream. But building dams and irrigation schemes upstream caused drastic changes: the wetland shrank; some parts were flooded for long periods, while others were left dry for prolonged periods. This degradation undermined local livelihoods and prevented people from using infrastructure and reaching services such as credit and markets. More people became poor; people abandoned their wetland villages and started growing crops on slopes, causing erosion and further damaging the ecosystem.

If people depend on wetlands, will they use them sustainably?

It may help in the short term, but could also be a problem

Many projects try to conserve wetlands by organising the people who depend directly on them directly and helping them manage the wetlands better.

- In Negombo in Sri Lanka, the project mobilised enough fishers to persuade a local politician not to build a harbour at the lagoon mouth. That would have blocked the flow of water between the lagoon and the sea, hastening the demise of the lagoon and its fish and prawn fisheries.
- In Mamirauá, Brazil, the local fishing communities were mobilised by the prospect of ensuring good fish yields in the future and controlling access to the fisheries by outsiders. This involved developing a management plan for the wetland that zoned it into some areas that allowed fishing, and conservation areas that prohibited human use. This was supported by a commonly agreed set of rules which helped the communities monitor use.

At the same time, projects may also help develop new livelihood activities or income sources, especially those that do not use wetland resources. With higher incomes and collective organisation, people may be willing to conserve the wetland even though their livelihoods no longer depend on it. When people are very poor, they are unlikely to think about conservation; but if their basic needs are met and they can see the benefits of collective action, they may be in a better position to appreciate the value of conservation.

- In Cao Hai, China, two microcredit programmes have helped families boost their incomes, and communities as a whole to invest in schools and roads. The programmes have helped some wetland users develop new livelihoods which do not use the wetland. However, rather than losing interest in the wetland, the community agreed to help the nature reserve staff develop and enforce a zoning scheme. This scheme balanced the need for habitat for biodiversity with the continued need by some local people to use certain parts of the wetland resources.

Why integrate sustainable use with poverty reduction?

Looking at both ecological and human perspectives

Many ecological problems in wetlands are caused by people's decisions and activities at various scales: individual, household, community, national and international. Development activities that do not consider their impacts on the wetland may damage the wetland's ability to support local people directly, or harm people living elsewhere (for example, by causing flooding). Resolving these issues means looking at both the ecological and human perspectives.

Interventions and policies need to be based on an understanding of the problems, their causes, and how these affect the relationships between wetlands and people. In most cases, there is a complex web of causes and effects that relate to various aspects of the wetland: biophysical, ecological, social, human, cultural, political, economic, institutional and legal. Interventions need to take these links into account to ensure solutions will be effective.

- In Cao Hai, China, the project had to overcome a serious conflict between the nature reserve authority and local communities. The authority rigidly enforced rules that prohibited people from using the wetland, and local people in turn saw little option but to challenge the rules. The authority wanted to maintain the ecosystem's integrity, while the people were concerned about food security and other basic needs.

  The project recognised the importance of both perspectives: "wetland for biodiversity" and "wetland for people". This was because the project staff included people with both ecological and social science backgrounds. The ecologists provided an understanding of the nature of and problems in the wetland, while the social scientists developed ways of getting the authority and the communities to talk with each other – something they had not done before.

  The resulting compromise took the form of a microcredit scheme to raise household incomes whilst reducing their dependency on the wetland. Involving the authority staff in administering this scheme helped them dialogue with local people, enabling them to understand each others' perspectives. That cleared the way for a zoning plan that enabled the wetland to support the biodiversity needs as well as those of the communities.

- The Mamirauá project in Brazil used a similar approach. To reach its goal of sustainable fisheries management, it had to create a climate where people were willing to participate in planning and

implementing a zoning scheme. Local people were very suspicious of outsiders. By recognising the many different issues and employing staff with the right range of skills, the project could convince people that its intentions were genuine and that the community would benefit from collaboration.

These examples also illustrate how important it is for project staff to understand the perspectives of poor, marginalised people, build trust and stimulate dialogue. That may make it possible to find compromises acceptable from an ecological point of view, and which the local people can also adhere to voluntarily.

Although an integrated, multi-disciplinary approach to wetlands management has clear advantages, in 2006 only one-third of the projects funded by the Ramsar Convention used such an approach.

Microcredit and income diversification

Microcredit and income diversification schemes are common in both development and conservation projects. An integrated view may enable such schemes to achieve a win–win solution that both enhances livelihoods and conserves wetlands. Some lessons from the seven cases:

- Do not design schemes that merely try to reduce dependency on the wetland. They must also generate enough income for local people to make the alternative income source attractive.
- Evaluate the ecological implications of the alternative to make sure it does not lead to unsustainable resource use. This is especially true for pilot projects: some impacts will be hidden until the project is scaled up.
- Do not limit microcredit schemes to enterprises that use the wetland in some way. That may stress the wetland's resources and unduly restrict people's ability to improve their incomes in the long term. Instead, encourage the adoption of a range of livelihoods activities (where several options exist) including those that reduce dependence on wetlands. In addition, consider requiring borrowers to participate in conservation activities as a condition for receiving loans.

Here are examples that illustrate these points:

- A microcredit scheme in Negombo, Sri Lanka, had mixed results. It failed to evaluate the potential of alternative enterprises to raise household income, and it did not evaluate the market potential for the new products. These shortcomings may be because the project focused mainly on conserving the wetland, and project managers did not understand the conditions needed for a successful microcredit programme.
- During the microcredit pilot programme in Cao Hai, China, most groups of borrowers chose to raise pigs. That made sense for each household – they planned to cut vegetation from the wetland to feed to the pigs. But the project staff realised that if most people chose the same thing when the programme expanded, there would be more pigs than the wetland could support. This demonstrates the need to balance economic logic with the needs of sustainable resource use.

Trade-offs between wetland management and poverty reduction

Several of the cases reviewed here involved open-access wetlands – they were not owned by anyone, so anyone could use them. These projects tried to put rules in place to control to the number of people who could use the wetland, how much wood, vegetation, fish and water they could take

out, and even how to do this (some harvesting techniques are harmful). This did not mean keeping people out altogether, but rather balancing the need to maintain the ecosystem while allowing people to use it at a sustainable level.

Some individuals or groups are likely to lose access to the resource, or may have to reduce the amount they harvest. Such arrangements may help secure the resource in the long term but make people worse off in the short term. Other interventions, such as alternative livelihoods development, have to compensate for this loss.

Trade-offs are probably necessary between maintaining the ecosystem and maximising short-term economic gains. Negotiating these trade-offs should involve local people and officials responsible for conservation, along with other stakeholders. The nature of the trade-off will depend on the specific ecological and socio-economic conditions. It will also depend on the project team's skill in facilitating the negotiation and helping people identify opportunities for both conservation and poverty reduction.

- **Zoning as a trade-off mechanism** The project in the Mamirauá reserve in Brazil aimed to find ways to prevent overfishing by local people and outside commercial operators. It worked with the local community to design and administer a set of rules to regulate fishing. These rules divided the wetland into zones where fishing was allowed, and other zones where it was prohibited. The project also tried to create alternative sources of income through a locally managed ecotourism lodge built by the project. The high biodiversity of the area attracts tourists, and the lodge enjoys a good international reputation.
- **Linking conservation to microcredit as a trade-off mechanism** In the microcredit scheme in Cao Hai, China, each group of borrowers had to undertake some conservation activity in order to qualify for a loan. They could choose what to do from among several activities. For example, they could plant trees on hillsides to reduce siltation, or help nature reserve staff develop and administer a management and zoning plan for the wetland. The micro-credit scheme was designed as a way to compensate for the reduced access to the wetland.

Investing outside the wetland

Wetlands are vulnerable to many kinds of outside influences: dams and irrigation schemes upstream, pollution, erosion, migration, natural disasters, economic changes, climate change, policy changes and civil unrest, to name just a few.

Because of these external influences, if a project focuses too narrowly on the wetland and its immediate surroundings, it may treat the symptoms of a problem, rather than the root causes. The role of wetlands in development must be viewed within the broader biophysical landscape and socio-economic context if the trade-offs between the ecosystem and community development are to be sustainable.

- **Planning at the river basin scale** The poorly managed dams upstream from the Hadejia-Nguru wetland damaged the ecosystem and destroyed the source of livelihoods of people living many hundreds of kilometres away. Local people turned instead to farming on hillsides, causing erosion. In such a situation, a focus on the wetland alone would have been futile when the root cause of their degradation lay in what was happening upstream. The key problem was identified as the absence of an institutional arrangement for distributing water evenly across the 84,000 km^2 river basin through integrated water resources management. That in turn meant seeking

ways of balancing the needs of over 100 different organisations: governments, non-government, resource users, regulators and so on.

- **Migration and pollution** Even in its natural state, the shallow Negombo lagoon in Sri Lanka is vulnerable to siltation. But rapidly growing cities and industries in the surrounding area have accelerated this process and have polluted the lagoon. The adjoining Muthurajawela marsh is being drained to build houses as soaring land prices in the nearby cities mean that poor people have been forced into the marsh. Local fishers who want to break their dependence on the wetland have to look for jobs in the urban areas.

Many factors can drive changes in wetlands, so projects must design conservation and poverty reduction strategies that can deal with change. They may need to consider a range of interventions that enhance local people's ability to survive unexpected shocks and adapt if necessary.

Flexible project management

Make timeframes realistic

Wetlands are complex places, with a wide diversity of stakeholders and many factors outside a project's control. Project management must deal with all these somehow. That means establishing a process of continuous monitoring, learning and adjusting so that the project can respond flexibly to changes. Managers may discover they need more time and different types of inputs than were originally planned or budgeted for.

- Since it began, the Hadejia-Nguru wetlands project in Nigeria has undergone several cycles in design as managers and staff learned from experience. For example, by the time implementation commenced in mid-2002, the project memorandum developed between 1998 and 2001, was already out of touch with the rapidly changing reality on the ground. As the project progressed, staff came to understand better the opportunities and constraints faced by stakeholders. Along with continuous monitoring of the process, this helped to reshape the project's objectives and activities. At key stages between 2002 and 2007, the project's logical framework was transformed to reflect the new directions in which the process has led. The logical framework of the implementation phase is markedly different from that of the inception phase.

Capacity building is time-intensive

Change can be difficult for individuals and communities, especially when it requires them to adjust age-old traditions. Introducing new ideas takes time. It is a process based on trust and many explanations, clarifications and demonstrations. Only then will it be possible to implement project activities. Building stakeholders' ability to make changes is a slow process of understanding diverse views, building mutual trust, and inspiring a desire for collective action.

- The project in Phu My, Vietnam, introduced several new ideas to the community: wetland conservation through a protected area, handicraft production aimed at urban and international markets, and organising collective action. Project staff had to consult key people in the community first. This alone took a long time. And it took 5 years for the community to fully accept the project. Change was gradual to ensure the communities were ready to absorb new information and skills, and to make compromises. Forcing change too quickly would have resulted in the project being rejected.

Operating at larger scales

Where the project has to operate on a larger scale – river basin, regional, national or transboundary – it will have to deal with an even greater complexity of issues, more institutions and a more diverse set of stakeholders.

- In Hadejia-Nguru, Nigeria, the basin-wide project had to deal with over 100 actors at local, regional, national and transboundary levels. A particularly flexible project structure was needed to handle this – recognising the limited ability of a single project to influence this broad social, economic and political landscape, and the likelihood of changes in this landscape. It took 3 years to build enough commitment for changes to institutions and processes. Building stakeholder alliances and strong community and government partnerships proved critical, especially to ensure that changes continued after the project ended.

Support from policymakers

Political "champions" such as high-ranking government officials or politicians can make the difference between success and failure.

- Brazil used to have one of the most conservative protected area policies in South America. Environmentalists rejected the idea of letting people live within protected areas, let alone participating in managing them. When the Mamirauá project started, human settlements and any biodiversity use (including tourism) were prohibited, leaving the project with no legal basis to develop participatory resource management.

  The project's success in convincing the federal government to create a new, people-inclusive, category of protected areas owed much to the support received from the governor of the state of Amazonas. The project was able to enlist his support by presenting the project to him in a manner that illustrated the political mileage which he could gain by supporting it. This was possible due to the efforts made by the project to understand the project's objectives from the governor's perspective.

- In contrast, in the Bhoj wetlands in India, the project failed to establish an arrangement where downstream urban water users would pay upstream farmers for environmental services. This failure is partly because policymakers did not adopt the idea of such payments and partly because the project lacked the information necessary to convince the various stakeholders of the potential benefits of such a scheme.

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Poor land use in a wetland may lower the water table several metres in the dry season
Photo: Adrian Wood

Part 2 Themes

This part discusses six themes that cut across wetland conservation and development projects:

- Poverty and livelihoods (Chapter 7)
- Biodiversity and ecosystems services (Chapter 8)
- Water management (Chapter 9)
- Engaging communities (Chapter 10)
- Policy (Chapter 11)
- Project management (Chapter 12).

Each of these chapters draws on the experiences in the four Wetlands International-supported demonstration projects described in Chapters 2 to 5, as well as the seven initiatives reviewed in Chapter 6. It draws lessons that managers of other wetland conservation and development projects can use when planning and guiding their activities.

After weighing, these fish from the Inner Niger Delta will be packed with ice and taken to market in Bamako
Photo: Paul Mundy

7 Poverty and livelihoods

Mike Ounsted and Sander Carpay

"Mali holds some of the West Africa's richest resources – yet our people are amongst the poorest in the region."

—Abdoulaye Mamadou Diarra, Governor of Mopti Province, Mali

So rich, yet so poor

The province that Mr Diarra governs is the heart of the Inner Niger Delta, one of Africa's greatest wetlands. Wetlands are the most biologically diverse of all earth's habitats. They are home to a wonderful spectrum of birds, fish and animals, from the elephants of Kimana in Kenya, to the tiny deer mouse of Sembilang in Indonesia. They are rich in plant life: trees, grasses and other vegetation, that thrive in the moist conditions.

Local people hunt and fish in wetlands, and harvest wild plants as food. But that is not all. They grow crops on the rich alluvial soil left by seasonal floods. Their livestock feast on vegetation that flourishes in the wetlands. They use plants from the wetland as medicines to treat a wide range of ailments. They use palm leaves or grasses for roofing, and build their houses from river clay. The key to all this productivity is water: water for drinking, washing and cooking; water for livestock and for irrigating crops; water for transport.

Because of this richness, millions of people live in or near wetlands. Yet many of these people live below the poverty line. Over 75% of the people in Mr Diarra's Mopti Province are poor – more than in any other region in Mali.

If wetlands provide so many benefits, why are the people who live there struggling to make a living? Lack of infrastructure is one cause. Building roads and providing services is difficult in areas that are permanently or seasonally flooded. But that is only side of the story. Another is the degradation of the natural resource that people in wetlands rely on: declining soil fertility, shrinking numbers of fish, a loss of biodiversity, unpredictable water levels, and increasing demands being put on the resource by a rising human population.

Poverty is not only conditioned by livelihood

We often think of livelihoods mainly in terms of earned income, and we tend to determine wealth and poverty in the same way. But most of the rural poor see their economic status not in terms of income or employment, but in terms of food security and access to water and materials for medicines and shelter – many of which come from wetlands (see Box 8).

Access to water In the Malawi/Zambia and Kenya projects, access to water was a priority, and even in the Niger flood basin in Mali, the long dry season left crops and grasses parched. Everyone prayed for the rains to come. In the Indonesia project, this was not a problem – fresh water was

Box 8. Defining poverty

What do we mean by poverty? "Low income" is only part of the answer. An analysis of poverty in Kimana, Kenya, led to a more complex conclusion:

- Because the families were poor, they could not afford medicines (although they were available):

poverty = lack of access to medicines

- The root cause of poor health was frequent diarrhoea:

poverty = poor health

- Diarrhoea was common because the "poor" families had less access to clean water than the other families in the village:

poverty = lack of access to water

- The families had less access to water because people with water permits took precedence in accessing the limited water supply:

poverty = lack of status

- The families had no water permits because they was no equitable sharing mechanism within the village structure:

poverty = lack of representation

- They had no representation because the village decision-making structure favoured men and these families were single-woman-parent households:

poverty = gender discrimination

This analysis shows a clear link between poverty and water availability, and that the key to resolving the issue was not providing more water (which the project was using as an indicator) but the empowerment of women. *"How many women were members of the water management committee at the start of the project, and how many at its conclusion?"* would have been a better indicator of poverty reduction.

abundant. But in all the project locations, changes in the climate, with longer dry seasons and heavier floods, have made subsistence farmers and fishers more vulnerable to the loss or reduction in their livelihoods. The project villagers in Mali lost tree saplings in exceptional floods and had insufficient water for their vegetable gardens in the drought.

Land ownership and tenure Ownership or access to land or wetland was a problem in all four projects: people were poor because they did not own land, or did not have the rights to use it for farming or fishing. Often, rural people have traditional land rights, which are ignored or taken from them. The landowner (who may be the state) and local people often have informal arrangements, but that still leaves people uncertain about their future and unable to plan. Short-term planning, or no planning, is a symptom of poverty.

Tenure and access in wetlands have very specific problems. A resource (e.g., the right to cut trees or catch fish) may be controlled by one authority, and the land or wetland by another. Under the law, water is usually the property of the state, so a wetland may fall under one authority when it is flooded but be the responsibility of another when it dries out. The ministries of water resources, agriculture, forestry and energy all have a stake in available water.

Because land tenure rules varied from place to place, each project had to find a solution that worked in its own context.

Social status Poverty is also a question of social status and related issues – such as living in dignity, family relationships, good health, and opportunities for education. A blanket definition of poverty as "less than a dollar a day" is unhelpful: there are huge variations in the poverty status of people among the four projects.

Women and men Women and children tend to be excluded more than men in social and economic terms. Women in all four projects had fewer rights and less access to resources than men. This pattern of prejudice is true in many rural areas, but appears to be accentuated in wetlands.

Women form the majority of the poorest and are most vulnerable and marginalised. Women are more likely to be illiterate, to lack a voice, and to be politically and socially subjugated within their communities. Project designers often believe that microcredit can empower women and give them new ways to earn a living, but such interventions have to be based on a solid understanding of the local culture.

Despite this situation, all four projects demonstrated that it was usually women who were the instigators for action and who carried out a good deal of practical farming work. Most activities had clear divisions of labour, but men were always the key decision makers.

Managers of the four demonstration projects needed to understand clearly the social context they were working in before they could design viable interventions. Women and men in these areas extract and use wetland resources in different ways – and by no means the same way in all villages. Men and boys usually fish and hunt, while women process the fish. In Zambia and Malawi, growing different crops may be a male or female activity: pumpkins are considered female, maize male. The basis of this segregation lies in the marketing (Box 9).

Tradition and culture assign different tasks to women and men, not necessarily because one activity requires more physical strength than another: for example, women and children usually gather firewood. In Mali, it is the men who make charcoal to sell from wood fetched by women and children. Tradition and culture also determine power relations: men are normally seen as the heads of the households and make decisions on behalf of their families. Women in many areas of Africa are barred from owning or inheriting land – which makes survival difficult for widows. They may also be left in charge of the family while the men are away working elsewhere. In the dry season in Mali, for example, men from rural villages often move to the towns, mines or factories in search of a job.

Vulnerability to external changes No one is immune to threats to their livelihoods from factors beyond their control. The drive for national economic prosperity often leaves the disenfranchised poor particularly vulnerable. Because economic development is almost always dependent on water, people living in wetlands live in still greater insecurity. All four projects were subject to threats from huge changes in land or water use: tobacco farming in Malawi, oilpalm in Indonesia, upstream dams on the River Niger affecting the Inner Niger Delta in Mali, and water abstraction for the city of Nairobi in Kenya. The cases in Chapter 6 also illustrate this: urban growth in Sri Lanka, dams and irrigation schemes upstream in Nigeria, and conversion of the wetland for agriculture in China. All these changes are promoted in the interests of national economies, but they rarely benefit the local people who are most immediately affected. Such vulnerability and uncertainty, and the consequence of changes that lie beyond community control, are a primary cause of poverty.

Box 9. Male and female tomatoes

In the project in Zambia, family members usually work together in farming and marketing, although men and women divide up the work between them.

The main fields belong to men, who grow tomatoes, onions, maize and cassava for sale. The whole family may help with these crops, but it is the men who make the decisions.

"Female" crops are mainly those used within the household, rather than sold. Only women and children work on these crops – beans, leafy vegetables, groundnuts and pumpkins. These vegetables may also be sold at the roadside. Sometimes these "female" crops are intercropped in the man's main field (with his permission). Small-scale tomato cultivation and roadside selling is a woman's job; any larger-scale tomato growing is a masculine preserve.

Loans are often made to women, rather than men, because women are more concerned than men to repay credit. Even so, the woman is not the one who decides how the money is used.

Environmental degradation and poverty: What causes what?

It is hard for people living on subsistence to survive in a degraded habitat. To a greater or lesser degree, all four demonstration project sites in Chapters 4–5 and the seven cases in Chapter 6 were degraded. In wetlands, the degradation is frequently the result of outside interference: pollution from upstream farming or industry, irrigation that reduces water flows, water impoundments or transfer. Large-scale fishing, often by outsiders, is a common problem for indigenous fishers.

Long before the conservationists and development agencies recognised that they needed to understand each others' perspectives, Indira Gandhi said that "The greatest threat to the environment is poverty." Forty years later, few would agree that the issue is that simple, and many would insist that wealth and consumerism are the greatest causes of environmental degradation. However, in some cases, impoverished communities excessively deplete resources by gathering firewood or overgrazing. Often, local people are not aware that they are causing damage because the degradation is gradual.

Mostly though, poverty is a result of environmental degradation which is caused by external factors, then exacerbated by local people overusing a declining resource.

Maintaining a viable ecosystem has particular challenges for those working in wetlands, not least because local people use the natural resources there intensively. The overarching strategy of the four projects was to use an ecosystems approach (Box 1, page 5), in which the needs of people were central.

Which comes first – poverty reduction or wetland management? The hypothesis implicit in the Wetlands and Poverty Reduction Project was that if you manage wetlands wisely, poverty will be reduced. But the projects in Kenya, Indonesia and Mali all addressed poverty first in order to improve the environment, rather than the other way round (as the hypothesis would suggest).

Significantly, the Zambia and Malawi project did tackle the environment first. Its primary intervention was to promote the sustainable management of water as the means of reducing poverty. At the start of this project there was no clearly intended target of biodiversity conservation or restoration. It promoted tree planting on hillsides around some of the *dambos* in Malawi to improve water retention, and this provided some biodiversity spin-offs. Farming the *dambos* in the buffer zones around

the North Luangwa National Park in Zambia improved food security and benefited wildlife because local people turned from poaching to farming. However, this important change happened almost incidentally.

Why did the demonstration projects use different approaches? Perhaps because of the scale of the project sites: focusing on a larger area tends to draw projects to deal with the environment first, while a focus on a small area influences them to support local people directly. The projects in Indonesia and Mali used diverse tactics over wide areas, while the Kenya project was specific to one location. The Malawi and Zambia project operated at individual sites huge distances apart (and in different countries). But each *dambo* was site-specific.

Adopting poverty reduction as an entry point would be justified if it achieves the desired ends of ensuring a sustainable wetland. The reality was that project managers found they had to tackle certain priority concerns of poor people before they could consider other interventions. These concerns included:

- Access to resources, specifically water and land (and land tenure)
- Vulnerability to a loss of livelihoods through flood, drought, or external forces such as market fluctuations or big projects such as oilpalm plantations
- The limited options of local people to improve their livelihoods
- The degradation of habitat and loss of biodiversity caused by overexploitation by local people (e.g., collecting firewood) or outsiders (e.g., fishing).

The reality was also that subsistence people live and plan their lives day to day and not for the long term.

Alternative livelihoods

The projects combined many of the issues they had identified and attempted to solve them by promoting alternative livelihoods – a common development strategy. Alternative livelihoods may be a realistic proposition, but providing such alternatives means accepting that degradation and livelihood loss are inevitable rather than addressing the root causes of the resource loss. As the project implementers came to understand their situations better, they realised that wetland residents have few alternative sources of income. Some lacked the right skills: fishers in Mali neither know how to keep livestock, nor is it culturally acceptable for them to do so. For others, alternative livelihood resources were simply not available – as in Zambia and Malawi where the project tried to introduce new farming practices.

Indonesia, however, was more successful in training and supporting new enterprises. The difference here would seem to be that the Indonesian beneficiaries were generally far better off than their African counterparts; the villages structures were well organised, most people had received schooling, the transport links were good, and so on. People had more confidence to adapt. The Indonesian strategy was rather loose, based on a premise that improved production and higher incomes, combined with increased environmental awareness, would release pressure on the natural resources. It used a range of mechanisms to improve the local people's circumstances quickly. These included improving access to markets, and providing new farming and livestock-keeping skills.

This strategy is not possible at all sites. It is most applicable in places that already have community organisations, or could form one quickly. Elsewhere, harvesting produce for the market may not be an option. The first priority is to ensure that subsistence farmers and fishers have food security. Encouraging impoverished people to reduce their resource exploitation – for example, getting them to take less firewood – is a longer-term goal that cannot be addressed within a 4-year project. An important consideration for all four projects was that local people wanted (and needed) to improve their livelihoods quickly if they were eventually to be committed to improving the environment.

New, unexpected sources of livelihood may appear out of the blue. The discovery of oil, or a mass tourist boom, may not be part of the development plan.

- An example of this occurred in southern Sumatra (Chapter 4), where a huge market emerged for edible bird's nests. The swiftlets that build these nests normally dwell in caves, but are quite happy to inhabit suitably designed buildings. That can earn the owner with up to $6,000 in a single season – an attractive alternative to trying to restore a waterway to improve fish productivity.
- Another example is the caterpillar harvest each November in northern Zambia, when children abandon school and all community activities stop while everyone harvests wild caterpillars (Box 3, page 33).

Such income sources are to be welcomed, but should be treated with caution. How stable and sustainable are they? Do they (like caterpillar harvesting) damage the environment? And who benefits?

Microcredit and Bio-rights

Many projects support alternative livelihoods by providing microcredit. The Indonesia and Mali projects adopted a microfinance scheme that required borrowers to do environment-related work. In Mali, for example, loans were provided to poor people who had no collateral and had no way of getting a loan. In return, it was a condition of a loan for borrowers undertake work that improved their environment or biodiversity – such as by planting trees. Wetlands International calls this type of payment for environmental services "Bio-rights". Details of this mechanism are described in the chapters on the Indonesia (Box 7, page 46) and Mali projects (page 57).

Bio-rights have various potential interpretations:

- The rights of the ecosystems themselves to function and flourish
- The rights of citizens to have biological functions maintained for the sake of humanity
- The rights of communities to be compensated for activities that maintain biological functions for themselves and others (especially in light of competing claims on the uses of these systems).

However in these projects, Bio-rights were used as a simpler microfinance mechanism: loans provided on condition that the recipients restore habitat or biodiversity.

Bio-rights were central to the projects in Indonesia and Mali, where both the programmes were led by Wetlands International, and all the communities involved strongly supported the scheme and asked that it be extended. In these projects, the Bio-rights concept was adjusted to suit the local culture and national procedures for microfinance projects. In some cases only women could receive the loan; funds were provided for a capital investment (such as a rice husker); the funding was a revolving fund; and interest could be repaid or waived as part of the compensation package.

The advantages of the Bio-rights approach include the following:

- **Entry point** They can establish an entry point to the community that local people recognise.
- **Quick results** Microfinance can bring quick results in livelihoods, which are necessary before other environmental activities can be considered.
- **Environmental benefits** The work done benefits the environment or enhances biodiversity.
- **Environmental awareness** The approach can create awareness among local people of the value of the wetland and the need to conserve it.
- **New alternatives** People stop environmentally harmful activities if they have good alternatives.
- **Skills** Local people can learn skills they need to conserve the wetland (such as tree planting or firefighting).
- **Organisation** Local people can become organised to do work that conserves the environment.
- **Targeting** Bio-rights are an effective means of channelling funding so it goes directly to local communities.

Chapter 6 shows that Bio-rights-like interventions are quite widely used, but still remain somewhat experimental, and have mixed results. The projects in Malawi–Zambia and Kenya did not use the Bio-rights approach. As with other development tools, and as shown by the four Wetlands International-supported projects, Bio-rights are very case specific. For example, imposing conditions may quite acceptable in one location but inappropriate in another.

Criticisms and concerns with the Bio-rights approach include the following:

- **Inappropriate conditionality** Some critics feel it is not appropriate to impose conditions on microfinance borrowers.
- **Lack of link between loans and environmental improvement** Others say the link between the enterprises supported by the loans and the environment is not strong enough.
- **Sustainability** Bio-rights appear to be a top-down payment for environmental services on the basis of "You do this and we will give you that."
- **Scale** It may not be feasible to scale up Bio-rights approaches. In Cao Hai in China (Chapter 6), a microfinance programme raised incomes, and several alternative livelihoods became important. But many people wanted to keep pigs – more than the wetland could support.
- **Choice of activities** In many projects, the beneficiaries choose what type of compensatory activity to do. That may not be the best option for biodiversity: for example, people may decide to plant fruit trees rather than other species that would be more environmentally beneficial.
- **Poor execution** Success may be limited by poor management for example, poor market research and engagement with the communities.

More time is needed to show that the Bio-rights mechanism used in Indonesia and Mali benefits both livelihoods and the environment. This is difficult in a short-duration project. They stand the best

chance of being successful and being scaled up if they are executed in partnership with large, existing microfinance institutions, as was the case in Mali.

Addressing vulnerability

Obviously, projects alone will not prevent the major causes of today's increasing poverty – climate change, floods, drought, and wide-scale shifts in land use. But such projects can help local people adjust to such changes, and make policymakers and the outside world aware of their dangers. The four projects described in Chapters 2–5 helped people get enough food and water and find new ways of making their livings , without directly addressing habitat and biodiversity loss.

In projects that are more deeply concerned with conserving endangered or vulnerable wildlife, conservationists might want to come up with a different initial strategies than those tested in the Wetlands and Poverty Reduction Project. The speed of degradation and extinction or near-extinction of many species is so rapid and critical. For example, southern Sumatra has been almost completely deforested in a single generation, and some villagers are relieved they are no longer threatened by prowling tigers. But the Sumatran fishers also say that they now catch less fish and can no longer survive from subsistence. Some work for logging companies, while others cut trees illegally. In such circumstances, a process-driven community approach is particularly difficult.

However, the Indonesia project came up with novel ways of dealing with these issues. It helped establish community fire brigades, which quelled fires that were destroying biodiversity and that might reach the villages themselves. And it provided funds for Sungai Merang, a small village next to a logging concession, to lease from the government the fishing and transport rights for the river. The villagers controlled the fishing and removed dams that had been built to deepen the water for transporting logs.

These strategies improved local people's immediate livelihood security. But their ultimate purpose was to demonstrate to government that working with communities and protecting their livelihoods could also conserve the environment.

Restoring the environment

Chapter 6 raised the question of the links between poverty and environmental degradation. The four projects in Chapters 2–5 assumed that if they focused on reducing poverty, the environment would benefit. They made relatively few efforts to improve the environment directly, except the work done under the Bio-rights schemes in Mali and Indonesia, walls built around the springs in Kenya, and efforts to reduce the use of pesticides and herbicides in Malawi.

Each project ran awareness campaigns at different levels, which focused on concern for the environment rather than reducing poverty. There was a continuous emphasis on creating awareness amongst children of the need to conserve the environment for the next generation. But in practice the projects and their beneficiaries were aware that unless habitat degradation was reversed immediately, the new generation would be living in a very different world from the one we know today. Helping children to understand environmental issues is of ongoing importance, but children are not decision makers. If the new generation is to live with sufficient food and secure livelihoods and in an environment of sustainable wetlands, then every effort has to be made to target awareness campaigns at today's politicians.

What happened, what can we conclude?

Wetlands and livelihoods are clearly linked. Working to reduce poverty while at the same time maintaining or restoring wetland biodiversity is a highly complex undertaking. Defining poverty and identifying strategies to help marginalised people are themselves long processes, even before the project implementation starts. The four projects did not have enough time to prove the hypothesis that well-managed wetlands can reduce poverty. But 3 years was long enough to identify specific problems faced by people living in wetlands and to identify and test some ways to tackle these problems.

Wetlands and the way they are managed are linked to the wealth, health and well-being of people who use wetland products. Increasingly, access to and use of these products is governed by external interests, specifically the demand for water.

Searching for these linkages between livelihoods and poverty in wetlands provided a focus for the project teams to develop new understandings of poverty and biodiversity. It seems that communities have learned from this experience too, as shown by the establishment of local natural resource committees in Zambia and the wetland association in Kenya, and the willingness of local communities to undertake environmental restoration in Indonesia and Mali.

But interventions on alternative livelihoods or protection measures alone are not enough. In the longer term, development and conservation strategies must involve full community engagement in good water management. The demonstration projects indicated that reduced poverty and the conservation of wetland biodiversity would follow. The sustainable use of wetland resources is intrinsic to this process.

Despite their short time frame, the four projects started to find a balance between conservation and livelihoods. The community in Kimana, Kenya, went so far as to develop a management plan, perhaps because the project addressed the underlying water management issues rather than poverty or livelihoods *per se*, and because it had taken the view that this project was only one of a series of interventions that made up a long-term development programme. Like the Kenya project, the Malawi and Zambia project also targeted a specific small-scale wetland habitat – *dambos* (though widespread and in two countries). It might also soon be able to show tangible, long-lasting benefits to people's economic status, health and well-being. Growing vegetables for home use is now a part of a national programme to improve nutrition and increase people's immunity to HIV/AIDS.

Development aid for wetland communities has had the benefit of a large number of pilot and demonstration projects – not only the four supported by Wetlands International. Demonstrating what can be done is an enormously important way of showing policymakers and aid agencies how well-managed wetlands bring benefits to all, and not only to poorer people. Yet it is less common to go one step further, to build on what has been learned from on-the-ground action, and to scale up best practices so as to improve the lives of thousands of people and not only the inhabitants of a few "demonstration" villages. However, as the Wetlands and Poverty Reduction Project drew to a close, there were examples in each the four demonstration project sites where villages from outside the project area saw how their neighbours were benefiting from community planning and more equitable sharing of their wetlands. These new communities made plans to replicate what they saw.

Sharing experience between communities and imitating success is surely a lasting legacy of the demonstration projects. And it is only by recognising the peoples' role in the management of their own wetlands that wetlands will be conserved or restored and remain stable. And it is only in a stable wetland ecosystem that peoples' livelihoods and food security can be sustained.

Elephants in Amboseli National Park, on their way to the Kimana Sanctuary, Kenya.
Photo: Paul Mundy

8 Biodiversity and ecosystem services

Hazell Shokellu Thompson, Marcel Silvius, Moussa S. Diop, Rebecca D'Cruz and Sander Carpay

Without its biological resources, a wetland would be nothing more than a temporary or permanent water reservoir. Without the wetland plants and animals, people living in and around the area would have no fish to catch, no plants to harvest, and no wood to gather. Together, the various life forms and their complex interdependent networks of life are often referred to as "biodiversity". People are a part of this. This chapter explain what this biodiversity represents and what makes wetland biodiversity so important for people and their livelihoods.

What is biodiversity?

Biodiversity is the variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species, and of ecosystems.

- Biodiversity is more than just the variety of species; it involves the full range of species, variation within species, biotic communities, and ecosystems in a dynamic, ever-changing process.[1]
- Biodiversity forms the foundation of the vast array of ecosystem services that critically contribute to human well-being.
- Biodiversity is important in human-managed as well as natural ecosystems.

In short, biodiversity is the foundation of ecosystem services to which human well-being is intimately linked. Biodiversity benefits people through more than just its contribution to material welfare and

Wetlands are home to many bird species – as well as a wide variety of plants and animals

1 Noss and Cooperrider, 1994.

livelihoods. It contributes to security, resilience, social relations, health, and freedom of choices and actions.

Ecosystem services

Ecosystem services are:

> ***the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious, and other nonmaterial benefits.***
>
> **—Millennium Ecosystem Assessment, 2005b, p. 23.**

Many people have benefited from the conversion of natural ecosystems to human-dominated ecosystems over the last century, and from the exploitation of biodiversity. At the same time, however, these gains have been achieved at growing costs – in the form of losses in biodiversity, degradation of many ecosystem services, and the exacerbation of poverty for other groups of people.

In all regions of the world, and particularly in sub-Saharan Africa, the condition and management of ecosystem services is a dominant factor influencing prospects for reducing poverty.

Wetland ecosystem services

Wetland ecosystems, including rivers, lakes, marshes, rice fields and coastal areas, provide many services that contribute to human well-being and poverty alleviation, as shown in Box 10.

Of all these services, the one that affects people most is water availability. Wetlands store much of the fresh water that people use – a fact that is well known. Less widely recognised is the fact that wetlands need a consistent supply of water to continue to provide the services that people depend on. In all four projects described in Chapters 2 to 5, the quality and quantity of water in the wetlands

Box 10. Wetland biodiversity in brief

Freshwater wetlands hold more than 40% of the world's species and 12% of all animal species.

Some wetlands contain significant numbers of endemic species. Lake Tanganyika has 632 endemic animal species, and the River Amazon has an estimated 1,800 endemic species of fish.

Wetland biodiversity is a significant reservoir of genes that have considerable economic potential in the pharmaceutical industry and in commercial crops. Commercially bred crops, such as rice, have a "lifespan" of 10–15 years before new genetic material is required to combat pest and disease problems.

Eighty percent of the world's population depends on traditional medicine derived from wetland plants and animals for primary health care.

Source: Ramsar Convention on Wetlands. Wetlands values and functions www.ramsar.org/info/values_biodiversity_e.pdf

Box 11. Ecosystem services from wetlands

Provisioning	
Food	Production of fish, wild game, fruits and grains
Fresh water	Storage and retention of water for domestic, industrial and agricultural use
Fibre and fuel	Production of logs, fuelwood, peat, fodder
Biochemical	Extraction of medicines and other materials from biota
Genetic materials	Genes for resistance to plant pathogens, ornamental species, and so on
Regulating	
Climate regulation	Source of and sink for greenhouse gases; influence local and regional temperature, precipitation and other climatic processes
Water regulation (hydrological flows)	Groundwater recharge/discharge
Water purification and waste treatment	Retention, recovery and removal of excess nutrients and other pollutants
Erosion regulation	Retention of soils and sediments
Natural hazard regulation	Flood control, storm protection
Pollination	Habitat for pollinators
Cultural	
Spiritual and inspirational	Source of inspiration; many religions attach spiritual and religious values to aspects of wetland ecosystems
Recreational	Opportunities for recreational activities
Aesthetic	Many people find beauty or aesthetic value in aspects of wetland ecosystems
Educational	Opportunities for formal and informal education and training
Supporting	
Soil formation	Sediment retention and accumulation of organic matter
Nutrient cycling	Storage, recycling, processing and acquisition on nutrients

Source: Millennium Ecosystem Assessment, 2005a

is the most important determinant of human well-being. For example, Zambia and Malawi (Chapter 3) both suffer periodic droughts; the *dambos* are a vital source of water and food during this difficult time. But not only during droughts: they are also places where local people grow crops or graze their animals, catch fish, gather medicinal plants, and quarry clay and sand for building. And of course they supply water for domestic use, farming and urban uses.

Other wetland services with strong linkages to human well-being include:

- **Water purification and detoxification of wastes** Wetlands, and in particular marshes, play a major role in treating and detoxifying wastes. Some wetlands have been found to reduce the concentration of nitrates by more than 80%.
- **Climate regulation** Wetlands sequester and release a big proportion of the carbon in the biosphere. For example, although peatlands cover only an estimated 3% of the world's land area, they are estimated to hold 540 billion tons of carbon, or about 25–30% of that contained in terrestrial vegetation and soils. That is twice the amount of (the above-ground) carbon stored in the world's forests and 75% of all carbon in the atmosphere.
- **Mitigation of climate change** A changing climate raises sea levels and makes storm surges more common, erodes shores and habitat, increases the salinity of estuaries and freshwater aquifers, alters tidal ranges in rivers and bays, changes sediment and nutrient transport, and increases coastal flooding. All these in turn could increase the vulnerability of people who live near the coast. Wetlands such as mangroves and floodplains can play a critical role in buffering against such impacts.
- **Cultural services** Wetlands provide significant aesthetic, educational, cultural, and spiritual benefits, as well as a vast array of opportunities for recreation and tourism. The Inner Niger Delta, for example, is a major tourist destination and foreign exchange earner in Mali.

Wetland species diversity

Wetlands support high levels of biological diversity: they are, after tropical rainforests, among the richest ecosystems on the planet, providing essential life support for much of humanity, as well as for other species. Coastal wetlands, which may include estuaries, seagrass beds and mangroves, are among the most productive. Other wetlands also offer sanctuary to a wide variety of plants, invertebrates, fishes, amphibians, reptiles and mammals, as well as to millions of both migratory and sedentary waterbirds. Levels of species diversity do, however, vary considerably between different wetland ecosystems: some lakes have high levels of diversity and endemism, whereas others support little life.

Wetlands are dynamic, complex habitats; each wetland is unique in the way it is formed and the way it functions. The species they harbour are adapted to wetlands and in many cases cannot survive elsewhere. Wetlands are renowned for their high levels of endemic species, especially fish and invertebrates, and they play host to huge numbers of migrating waterfowl. The Inner Niger Delta is especially important as it is one of the first freshwater bodies south of the Sahara and is destination for millions of migratory ducks and waders every year. The Berbak–Sembilang wetlands in Indonesia are home to many endangered and vulnerable animals and birds, as well as over 150 different tree species.

Drivers of change to wetland ecosystems

Wetlands are being degraded more quickly than other ecosystems, and wetland species are declining faster than those of other ecosystems. Damage to wetland ecosystem services harms people who live nearby and reduces national development prospects.

The main **indirect drivers** of degradation and loss of wetlands are population growth and economic development. The main **direct drivers** include infrastructure development, land conversion,

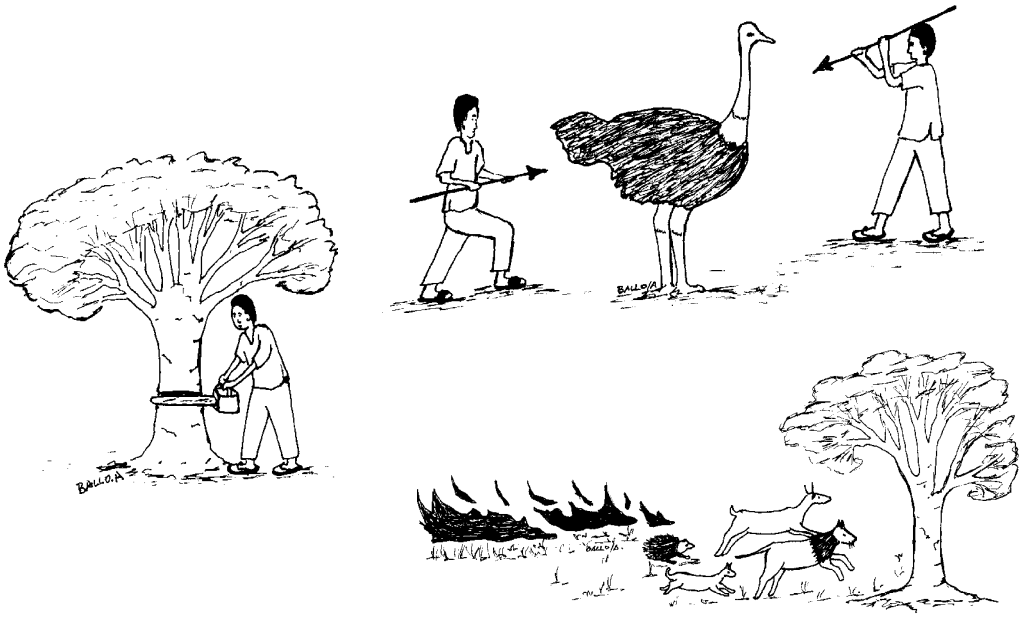
water withdrawal, eutrophication and pollution, over-harvesting and overexploitation, and the introduction of invasive alien species.

The adverse effects of climate change, such as sea level rise and changes in hydrology and in the temperature of water bodies, will lessen the services that wetlands provide. Excessive nutrient levels threaten rivers, lakes, marshes and coastal zones. Growing pressures increase the risk that wetland ecosystems will change abruptly, in ways that are difficult, expensive or impossible to reverse.

If wetlands continue to degrade, they will be less and less able to mitigate these effects. The poor in developing countries will suffer most. At the same time, demand will increase for many wetland ecosystem services, such as denitrification and flood and storm protection.

In all four Wetland International project sites, wetland ecosystems have been subject to some degree of degradation, and the negative impacts of this on biodiversity and people are already being felt:

- The Kimana wetland in Kenya (Chapter 2) shrank from 5 km^2 to 3 km^2 between 2003 and 2008 due to over-extraction of water and damage to the springs that feed it. The over-extraction occurred as a result of changing land use and tenure within the wetland, which in turn were driven by policy changes. Local people compounded the problem by building new canals instead of clearing out existing silted and overgrown canals.
- In Malawi (Chapter 3), deforestation in upland catchment areas causes soil erosion and runoff that have reduced the amount of water available for dry season planting in the *dambo* wetlands.



Wetland biodiversity faces many threats: among them, deforestation, overexploitation and fire

- In Indonesia (Chapter 4), illegal logging, digging drainage canals, fire and land conversion lead to loss of biodiversity, allow the peat to dry out, cause smog that blankets huge areas, and replace diverse forest with monocrop plantations.
- In the Inner Niger Delta of Mali (Chapter 5), dams built on the River Niger have affected the amount of water available to communities downstream as well as the wetland habitat itself. The flooded forests within the delta have been dwindling, reducing the availability of firewood, shelter for livestock and breeding areas for waterbirds and fish.

All these threats degrade the natural wetland habitat, and reduce its value as a reservoir of biodiversity, and as a provider of vital ecosystem services.

Impacts on people's well-being

Some groups of people, particularly those living near wetlands, are highly dependent on wetland ecosystem services and are directly harmed by their degradation.

- Conflicts arise between wildlife officials, farmers and the Maasai pastoralists in the Kimana wetland area in Kenya (Chapter 2). Confined to ever-decreasing areas, elephants invade farms, while farmers, pastoralists, wildlife and the tourist industry all compete for scarce water.
- Farmers in sparsely populated northern Zambia (Chapter 3) have traditionally used *dambo* wetlands to grow crops after poor rainy seasons when upland crops have failed. But the intensity and level of use has increased in the last 15–20 years as a result of rising populations, drought, and people's need earn a living. Zambia has been particularly hard-hit by the HIV/AIDS epidemic, and people weakened by the disease need to find ways to support themselves and their families. That forces them to use the *dambos* in new ways, for example by planting gardens in what was lush grassland. In densely populated Malawi, by contrast, people have long used the *dambos* more intensively. Here, the very existence of many *dambos* is under threat as the natural vegetation gives way to ever more cultivation and other uses.
- In Indonesia and neighbouring countries (Chapter 4), tens of millions of people are affected each year by smoke from forest fires. Carbon dioxide emissions from burning peat are a major contributor to climate change. Logging and drainage of peat swamp forests leads to an average annual emission of an alarming 2 billion tons of carbon dioxide: 600 million from oxidation and decomposition caused by drainage, and 1.4 billion from fires. That equals 8% of all global emissions from burning fossil fuels, while it takes place on only 0.1% of the global land surface.[2]

Impacts on wetland species biodiversity

Degradation and loss of wetland habitats lead to a loss of species biodiversity. The effect may not be immediately apparent; it may take months, years or decades to notice the loss. Once a species population is lost, particularly one that is entirely dependent on the wetland habitat, there may be no chance to restore it unless another population elsewhere can be used as source of reintroduction.

- In Kimana, Kenya (Chapter 2), less water in the wetland restricts hippos to smaller pools, and papyrus (*Cyperus papyrus*) swamps have started to dry out.

2 Hooijer et al. (2006)

A healthy wetland means a healthy ecosystem and as well as a sustainable source of livelihood for the people living around it

- The burning or cultivation of peatlands and other coastal wetlands in the Berbak–Sembilang area in Indonesia (Chapter 4) are expected to have a huge impact on species in the area, especially those that depend on the forested wetland, such as the false ghavial (*Tomistoma schlegelii*), the white-winged wood-duck (*Cairina scutulata*), tiger and tapir. Loss of mangrove forests will affect the nutrient base of coastal mudflats and impact on internationally important resident as well as migratory waterbird populations.
- In the Inner Niger Delta in Mali (Chapter 5), fish populations are shrinking, with many species getting rarer or disappearing altogether.

Conservation and management strategies

The four projects adopted a range of conservation and management strategies to reduce the degradation and loss of biodiversity. These included habitat management, the introduction of alternative livelihoods, community engagement, and capacity building and awareness-raising.

Habitat management

All four projects undertook various activities to manage and restore the wetlands habitat. They included:

- In Kenya (Chapter 2), restricting irrigation takeoff to restore water flows, fencing springs to prevent pollution and erosion, and developing an ecosystem development plan.
- In Zambia (Chapter 3), preventing the cutting of trees, controlling fires, and replanting upland areas with trees to regulate water flows into the *dambos*.
- In Indonesia (Chapter 4), preventing and extinguishing fires that burn the swamp forest and peat, and planting trees.
- In Mali (Chapter 5), planting trees along the river banks to prevent erosion, conserving and restoring flood forests and *bourgou* pastures (which act as breeding grounds for fish and birds), developing an agreement for managing natural resources, and drawing up a plan to protect rare and threatened species.

Due to the timeframe of the projects, it is difficult to measure the impact of these activities on biodiversity.

Alternative livelihoods

Over-exploitation by humans is one of the important causes of biodiversity loss. To reduce exploitation to a sustainable level, the projects helped local people find alternative livelihoods.

- In Zambia (Chapter 3), people who used to cut trees during the dry season when they could not cultivate their lands now farm the edges of the *dambos* in a sustainable way.
- In Indonesia (Chapter 4), the project offered soft loans through a Bio-rights arrangement. That let people buy cattle, seeds or planting materials, encouraging them to abandon illegal logging.
- In Mali (Chapter 5), the project's Bio-rights programme provided microcredit to local women to set up vegetable gardens instead of hunting waterbirds for sale.

Community engagement

Involving the community (rather than using a top-down approach or working with individuals) was a key aspect of all four projects. Here are two examples:

- The project in Mali (Chapter 5) provided local people with incentives to restore ponds where threatened fish species breed: it helped them plan and establish vegetable gardens and equipped them with wells and manual pumps. It also established a cereal bank with four tons of rice to use during droughts. The long-absent fish species *Polypterus senegalus* and *Parophiocephalus obscures* have reappeared in the successfully restored fishponds.
- In the Indonesia project (Chapter 4), community members patrol the national park's buffer zone jointly with park rangers to prevent poaching and illegal logging.

Capacity building and awareness-raising

Capacity-building and awareness raising about biodiversity and natural resource management were part of all four projects.

- In Indonesia (Chapter 4), the project did awareness-raising especially in its later stages, after the livelihood activities had produced results. It was thought that local people would accept

conservation messages more readily if their basic needs were fulfilled. Awareness-raising activities targeted both local people and general public, and local people were encouraged to join a provincial environmental group. Project partners attended various training courses, both as participants and as trainers, covering subjects such as tiger monitoring and forest fires.

Conclusions

The Millennium Ecosystem Assessment reports recommend a series of methods to ensure the sustainable management of ecosystems, including empowering local people who depend or are affected by the ecosystem, promoting technologies to increase crop yields without harming the environment, and restoring the ecosystem.

The Wetlands International projects employed one or more of these methods. They have shown that it is possible to empower local people to manage wetlands in low-tech, cost-effective ways that improve their livelihoods and benefit biodiversity.

The key requirements for success? A holistic, ecosystem-based approach, sufficient funding support, and the right policy, planning and institutional frameworks for the approach to be sustainable.

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Irrigating a field to be planted with tomatoes in Kimana, Kenya.
Photo: Paul Mundy

9 Managing water in wetlands for people

Adrian Wood, Sonali Senaratna Sellamuttu and Rebecca D'Cruz

It is impossible to speak of wetlands and not speak of water.

Wetlands are areas that are flooded, or where the water table is so close to the surface for enough of the year that it influences the ecology. That in turn influences human activities.

Wetlands area may be flooded for only a few months, preventing trees from growing – as in the *dambos* of southern Africa. The flooding may last long enough to fill shallow wells that provide safe domestic water for the rest of the year, and there may be enough left over for people to plant gardens in the dry season. They may also make handicrafts from reeds that grow where the ground is wet for longest.

Or wetlands may be permanent, as in the Inner Niger Delta in Mali, where the water levels rise and fall, but parts are permanently flooded. These areas provide a whole range of services: fish for sustenance, grazing lands, and water for irrigating crops.

Where does the water that feeds wetlands come from? What might take it away, and so threaten the wetland and the people who depend on it? It is in this context that water management is critical.

Water supply

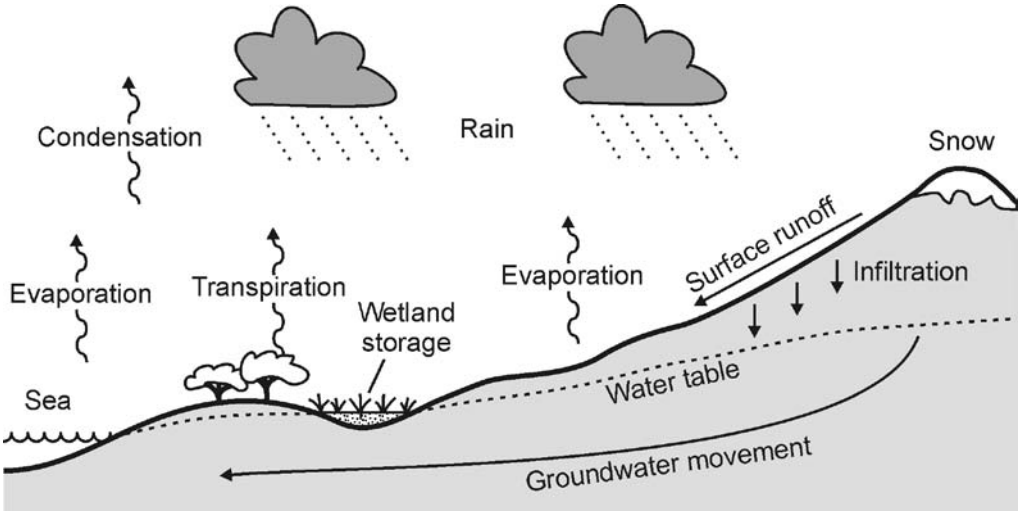
Wetlands get their water from three sources (see the figure on the next page):

- Rain that falls directly onto the wetland
- Water flowing into the wetland in streams or over land
- Groundwater trickling through the soil, the subsoil and fissures in rock.

These flows must be maintained for wetlands to survive, and factors that reduce them or change their nature have to be minimised. People influence mainly the second and third of these sources. For instance, taking water from a river may reduce the amount of water the wetland receives. Or boreholes may lower the water table and reduce the flow of groundwater into the wetland.

Changes in land use upstream may compact the soil or remove the vegetation. That may increase runoff, causing sudden floods but reducing the steady, year-round trickle of water through the soil. Dams or irrigation schemes may divert water away from the wetland. Trees may encourage infiltration (so increase the groundwater supply to wetlands), but some types of trees take up lots of water and release it into the atmosphere as evapotranspiration. That may also limit the duration and depth of flooding and the amount of groundwater that recharges the wetland.

Water management is needed to maintain the original hydrological flows in order to sustain the wetland.



Where does the water in a wetland come from, and where does it go?

Water loss

Water can be lost from wetlands in various ways, both direct and indirect. Four key problems which face wetlands are as follows:

- **Water extraction** Water may be extracted to irrigate crops, sometimes on a large scale, but also on a small scale using tubewells and pumps. Water may also be extracted to supply drinking water (as in the Kimana wetlands in Kenya and in the Inner Niger Delta in Mali). In the peatlands of Indonesia, canals are dug to drain out water so companies can establish oilpalm plantations there.
- **Evapotranspiration** Some crops, such as sugarcane, eucalyptus and cotton, take up a lot of water and can dry out wetlands. Sugarcane is one of Malawi's main export products, and in Mali it is also grown to produce biofuels.
- **Gullies and drainage** Gullies may form in small wetlands. They lower the water table and let the wetland dry out, as has occurred in some *dambos* in Malawi and Zambia. Gullies can be formed in a number of ways: if a degraded catchment leads to flash floods and rapid surges of water across the wetland, if growing crops in the centre of the wetland makes the soil prone to erosion, and if wells dug in the centre of wetlands create turbulence. Digging drains, as in the Indonesia project area, may allow the wetland to dry out irreversibly.
- **Siltation** Erosion in the catchment area can lead to deposits in wetlands which can reduce the soil fertility. This is a problem in many of the *dambos* in Malawi, as well as in Lake Fundudzi in South Africa and the Negombo lagoon in Sri Lanka.

We have to manage the water in wetlands

The amount of water on this planet is finite and fixed: it is the same amount that existed when dinosaurs walked the land. Demand for water and pollution levels continue to increase as populations rise. Water scarcity and limited access to water for domestic, agricultural and industrial

uses limit development in many countries. Climate change is likely to compound these problems. Infrastructure such as dams intended to address such problems, may harm wetlands and impair the services they provide.

Wetlands are an important source of water for human use. A natural, well-functioning wetland needs little by way of management, and can withstand natural fluctuations in the quantity and timing of the water it receives. Problems arise when a wetland is degraded to the extent that it affects the natural functioning of the system. This can happen, for example when so much water is taken out that the wetland cannot replenish itself, or when the water flowing into the wetland is reduced. Climate change also disrupts how a wetland functions because it affects the amount and timing of water in it.

The four Wetlands International projects used different approaches to water management. To make sure wetlands get enough water, a "landscape approach" is needed. This looks at the use of land and water in the wetland and in the catchment that feeds it. "Integrated water resource management" is the most fully developed example of this approach. This considers all the different uses of water resources together; it considers how each type of use affects others before determining how to manage and allocate water. It can also take social and economic goals into account.

On a smaller scale, the "functional landscape approach", used by the Zambia/Malawi project (Chapter 3) can be used for a single catchment or wetland. Examples of such measures include:

Within the wetland:

- Good agricultural practices to reduce cultivation of water-demanding crops or trees, and to reduce erosion
- Land use planning or zoning to reduce erosion risks (especially preventing cultivation in the centre of the wetland)
- Maintenance of natural vegetation in much of the wetland, especially the core and head, to maintain environmental processes.

Outside the wetland:

- Good agricultural practices in the catchment area, with use of organic manure and soil and water conservation measures to increase water infiltration and reduce flash runoff and erosion
- Afforestation of degraded catchment areas to improve infiltration
- Establishment of a protection zone around the wetland to prevent siltation.

To be effective, wetland and catchment management have to be coordinated. That means developing local institutions at a community or catchment scale. These must include all stakeholders so that agreement can be reached and conflicts resolved. This in itself is a major process and undertaking, and can take a long time.

A recent FAO publication[1] explores other approaches to catchment/wetland management. This identifies the need for trade-offs in wetland use at a higher level, focusing on:

- Trade-offs and a balance of land use within the river basin
- Functional planning of wetlands for different primary and secondary uses

1 Wood and van Halsema, 2008

- Payments for environmental and biodiversity services to reward farmers for better land use in wetlands.

The remainder of this chapter discusses how the projects described in Chapters 2 to 6 addressed four water-related issues:

- Catchment-scale issues
- Conflicts among water users
- Water quality
- Enhancing knowledge to better manage water.

Catchment-scale issues

Many problems within the wetland may be driven by pressures and activities outside. So rather than focusing narrowly on the wetland, it is necessary to understand the catchment as a whole. That will enable the management of water to conserve the wetland and benefit the people who rely on it. The projects aimed to improve the supply and quality of water reaching the wetlands or control the amount of water that is extracted from them:

- In Kenya (Chapter 2), the project attempted to ensure water supplies to the wetland by bringing all the stakeholders together to agree on how to conserve water (for example, by cleaning and lining irrigation canals) and divide up the water fairly, so reducing conflict among the various users. The result was an overall management plan for the wetland.
- In Malawi and Zambia (Chapter 3), the project encouraged people to conserve soil and water in the *dambo* wetlands and in the catchment areas above them – for example, by applying soil and water conservation measures.
- In Indonesia (Chapter 4), the project tried to prevent digging drainage canals that allowed the peat to dry out.
- The project in Lake Fundudzi, South Africa, (Chapter 6) promoted soil and water conservation measures on steep slopes to regulate inflow into the lake and prevent siltation.
- The project in Bhoj, India, (Chapter 6) promoted organic agriculture in the catchment area as a way of reducing the amount of pollution reaching the wetland.

Such local actions are generally appropriate for small areas. For larger wetlands, projects engage in policy advocacy at provincial or higher levels to encourage water conservation and discourage building infrastructure changes in land use that might damage the wetland.

- In Mali (Chapter 5), dams on the River Niger affect the amounts of water in the Inner Niger Delta, reducing the inundated area and the area that can be cultivated in the Delta. As well as its local work, the project has worked with provincial, national and international bodies to promote sustainable management in the whole of the Delta.
- The project in Nigeria (Chapter 6) did the same for the Hadejia-Nguru wetland, working at a variety of levels: community, wetland, and river basin.

Box 12. A drought in a wetland

CENTRAL MALAWI, OCTOBER 2005 – The drought was at its height. It was the third year in a row of poor rains. One-third of the pumps in Simlemba, Kasungu District, had dried up, and people were walking long distances to find water.

In one place, three women were taking turns to collect water from a 4-m-deep open well, dug in the middle of a seasonal wetland. One woman was almost out of sight down the well. She waited for maybe 5 minutes before enough water had seeped through the gravel in the bottom of the well to allow her to collect half a cup of precious water. Then she carefully transferred it to a plastic bottle. It was a long and tedious job.

Around the women the crops had died, and the reed bed in the wetland was almost a shadow. But the trees were starting to turn green as the heat of the hot season brought them into life and they drew up water from deeper in the ground. The eucalyptus trees planted in the wetland seemed to be doing especially well as they competed with the women for water. There was water somewhere.

Farmers everywhere were asking for dams so they could store the water from future rains. The underground storage, the virtual dams in the sediments of the stream valleys and the wetland *dambos* were not so obvious to them. Nor did they know how to manage them better.

In three months, the *dambos* would be inaccessible, flooded with water half a metre deep. The rush of water would start to cut gullies into the *dambos,* threatening to lower the water table further in the next dry season.

Resolving conflicts among water users

Water is one of the most precious resources to humans, and wetlands are a major source of water. Within a river basin, the demand for water may come from agriculture, domestic use, industry and wildlife, not to mention the wetland itself. When the amount of water in the wetland decreases, competition increases among the different users, and conflicts may arise.

- In the Kimana wetland in Kenya (Chapter 2), a three-way dispute already occurs among pastoralists, farmers and wildlife (and the tourist industry it supports). This conflict is worse during periods of drought. Local organisations had appointed scouts to regulate water allocations, but tensions remained. This was taken a stage further with the formation of the Kimana Wetland Association to act as a platform to bring the different user groups together to resolve issues.
- In the Malawi and Zambia sites too (Chapter 3), conflicts arise between different user groups. For example in Malawi, some villages get their water for drinking and washing from boreholes in the village, while they use the *dambo* to water their cattle. Other villages depend on shallow wells in the *dambo* alone for all their water, so do not want cattle getting water from nearby *dambo* ponds. In one of the sites in Zambia, there is conflict between livestock owners and farmers. The cattle use the *dambo*, but often damage vegetable gardens there. In both these cases, the project has resolved the conflict by designating zones within the wetland for cultivation, grazing, water collection and a protected no-use zone.
- In the project sites in Indonesia (Chapter 4), conflict may arise between the local community and the oilpalm industry as a result of the unplanned and uncoordinated digging of drains within the wetland, which leads to it drying out.
- In the Inner Niger Delta in Mali (Chapter 5), fishers, farmers and cattle breeders all compete for the same, limited water resource. Conflicts over water have existed for many years – for exam-

ple, if the Bozo fishermen set out nets in part of the river and the Fulani herders lead their cattle there and disturb the fish. The project did not address the conflict directly, but involved both Bozo and Fulani communities in the project work, so creating dialogue between the two groups, increasing awareness of the issues involved and reducing conflict.

In all these cases, the key to resolving the conflict was involving local people in finding and implementing a solution.

Maintaining water quality

If the water quality in wetlands deteriorates, it can harm human health. Contamination by human and animal faeces is a frequent problem. Poor sanitation was an issue in the Kimana and Mali project sites.

- Few houses around the Isinet spring in Kimana, Kenya (Chapter 2), have sanitation facilities. Villagers were using areas close to the spring as toilets, contaminating the water. And farmers used to wash out empty pesticide containers in the spring. The result was over 100 cases of water-borne diseases such as dysentery and amoebiosis in the village. The Kimana project arranged for the spring to be fenced off to avoid further contamination of this vital source of water. It also involved the local public health officer in an effort to get the government to provide the villages with proper sanitation facilities.
- In the Inner Niger Delta in Mali (Chapter 5), many villages along the river do not have toilets; people just use the river for this purpose. While the Wetlands International-supported project did not address this issue directly, the project partner, CARE, is running another initiative to build awareness about sanitation in the project villages. This illustrates the importance of partnerships with organisations with different sets of skills in such integrated initiatives.
- Industrial and agricultural pollution also affects the water quality in the River Niger. Water plants such as *Salvinia molesta* cover large areas of water, interfering with fishing and using up oxygen in the water, leading to fish kills. The presence of this species indicates that a lot of fertiliser is coming into the river water. The project did not address this problem directly, but training and awareness raising activities included how to eradicate the species, and what the impact of the species was on the biodiversity and ecosystem.

Enhancing knowledge to better manage water

If local people are to be involved in managing the water resources they depend on, they need to have the knowledge to do so.

- In Kimana, Kenya (Chapter 2), farmers were unaware of how much water a particular crop requires, so they tended to over-irrigate their crops – wasting much water and perhaps damaging the crop. When irrigation canals were dug in early 2000, local people were not trained how to maintain them. The farmers were not aware of the dangers of handling agrochemicals and did not know how to dispose of pesticide containers properly. They either threw the containers away or washed them in springs (polluting the water) and used empty containers to store food (risking poisoning). The project trained farmers about what crops needed how much water on different soils, and showed them how water moves in the soils. It also trained farmers on cleaning and repairing canals to prevent seepage.

- In the Malawi and Zambia field sites (Chapter 3), some people did not understand that deforestation of the uplands degrades the *dambo* wetland and makes water scarce. The project educated local people about these linkages and encouraged them to protect the forest (for example, by preventing fires and creating firebreaks) and plant trees. It also taught them how to make contour ridges in the uplands to prevent erosion, and how to grow crops in the *dambos* in a way that does not damage the wetland.

Conclusions

Water management is an essential part of sustaining wetlands and the services they provide. Such management has to be undertaken at a scale which recognises the functioning of wetlands, and so includes the wider catchment and land use. Sustainable wetland management and use is possible only if the demands and needs of the communities living in and around the wetland are considered. In this context, the development of institutions at the local level, such as village committees to manage natural resources in Zambia and Malawi, and the Kimana Wetlands Association in Kenya, is key for addressing the pressures on wetlands and their water supplies, and for developing community capacity for water and land use management essential for sustaining wetlands.

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A community agricultural worker inspects crops in Simlemba district, Malawi
Photo: Alan Dixon

10 Engaging communities

Violet Matiru and Marie-José Vervest

In many parts of the world wetlands are populated, densely or sparsely, by people who depend on the products and services they provide. But wetlands are fast being destroyed or degraded, often driven by outside commercial interests or large-scale government projects. In the wetlands described in Chapters 2 to 5 these include logging companies, oilpalm concerns, tobacco manufacturers, rice irrigation schemes.

Poor communities also sometimes resort to activities that degrade their environments in a bid to survive: examples include deforestation, drainage, inappropriate crop production methods, conversion of land to other uses, and over-harvesting of fish, wild plants or animals.

When the natural resources are depleted, communities that have few livelihood options sink deeper into poverty.

NGOs and communities

Non-governmental organisations often come in to help and support the communities to reverse the trend of environmental degradation and increasing poverty. They design and implement projects that aim to improve the local people's livelihoods and restore the wetlands. To do this, NGOs need to involve and work with the communities. But a failure to understand the communities and how to work with them sometimes undermines the NGOs' best intentions.

The four projects described in Chapters 2 to 5 illustrate some of the issues NGOs encounter working with communities and the strategies they use.

Who is the community?

Communities can be defined in various ways. Since all four projects promoted sustainable wetland use and management, they all worked with the people who lived in and around the wetlands. This may seem obvious, but it may be different in other cases. For example, pastoralists who use a wetland may live a long way away for much of the year (like the Fulani herders in Mali), and people who live some distance upstream and downstream from a wetland may also have an interest in it.

Which particular groups of local residents did the projects work with? This varied from case to case. Some projects worked with people who used the resource directly, such as fisherfolk, loggers and farmers. The Mali project used socio-economic data to identify the "poorest of the poor" within each village. However, this approach did not work well in Malawi because many villagers lied when asked about their socio-economic status.

> ***"During the socio-economic surveys that were part of the baseline studies, we would ask the villagers to tell us how much maize they had harvested, and they would tell us 'nothing'. When we asked them what they ate for dinner the night before, they would***

again say 'nothing'. This is because they all wanted to appear poor, because they thought that would increase the chances that the project would provide them with inputs."

—Patrick Thawe, Malawi Enterprise Zones Association

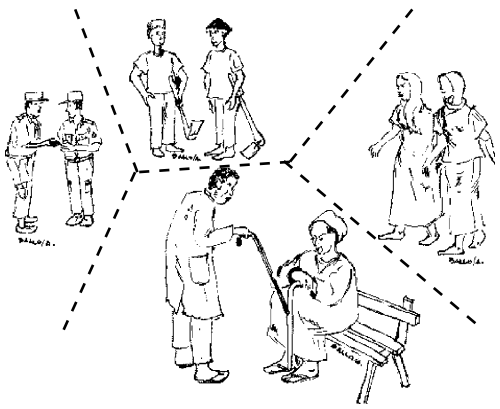
Each group defines itself in terms of ethnicity, caste, status, age, gender and occupation. How old someone is, his or her ethnicity, and whether the person is a man or woman, may determine whether he or she can own or use land, water and forests, as well as the sort of occupation that person can practice (in Mali, the Bozo ethnic group are traditionally fishers, while the Fulani keep livestock; in Kenya, it is the Maasai who usually herd animals and rarely till the soil). Sometimes such unwritten rules are not obvious. Failing to understand how communities define themselves may result in unpleasant surprises during project implementation. Some examples:

- In Indonesia (Chapter 4), the project helped form a women-only group. But staff realised that the women were reluctant to work on project activities because they did not have the support of the men. So the project started to involve men in planning to get their support for the women's activities.
- In Malawi (Chapter 3), the project promoted a landscape approach to managing and using the *dambo* wetlands. But two neighbouring clans there had been feuding for many years. "We don't talk to them," said one villager, pointing across the valley to his neighbours who share the same wetland resources.
- Competition for resources in Kimana, Kenya, (Chapter 2) is mainly between pastoralists and farmers. There are also ethnic divisions, including tribes, clans and sub-clans, not to mention the fact that some people are indigenous to the area while others are immigrants.

Start with existing groups

It is not possible to work with everyone in a community. And forming new organisations is difficult, at least to begin with. So the projects decided to start working with existing groups or organisations within the community.

- In Kenya (Chapter 2), the lead organisation at first worked with a local community-based organisation. This brought representatives from the broader community together for a meeting where they decided to form the Kimana Wetlands Association to represent the diverse interest groups. The initial idea of setting up an association came from the project staff; rising tensions over sharing water was a good opportunity to introduce this idea to the participants.
- In the Malawi case (Chapter 3), the Malawi Enterprise Zones Association worked through local government authorities: the village development committee (the lowest



The "community" may in fact be composed of many different groups

unit), as well as higher levels of local government. Each village had natural resource management committees, which the project worked with directly. But project staff soon realised that these institutions reflected existing clan and class divisions within the communities. They still had to deal with the issues that arose because of these divisions, such as convincing feuding clans to work together on solving common problems in wetland management. Plus, they found that the membership of the village development committee changes depending on the issue being addressed.

- In the Berbak-Sembilang area of Indonesia (Chapter 4), Wetlands International decided to operate through local organisations working directly with the communities. The project used a vetting process to identify organisations with the best integrity and reputation, and those that were well-versed in wetland management issues. One condition was that the organisation had to commit to having a staff member living in the village throughout the project. As there were no pre-existing groups in the project area, these local organisations facilitated the formation and training of various resource user groups – a lengthy and resource-intensive process.
- The project in the Inner Niger Delta in Mali (Chapter 5) selected officially registered women's groups because they represented the poorest members of the village. According to Bakary Koné of Wetlands International, "because there was a limited time to implement the project, we decided to work with these groups, because women are more honest, they keep their promises – making the chances of success of our project activities higher. Besides this, if you work with women, it will also be beneficial for men and children."

What's in it for them?

"Restoring the wetland will improve your livelihoods" is a long-term message. It does not work with people who are worried about how to meet their short-term needs.

Each project had to deal with how to capture the interest of community members and convince them to get involved in restoring the wetland. The projects showed that the best way to do this was by helping them meet their basic needs.

- In Indonesia (Chapter 4), the project used a Bio-rights approach: it offered loans to the villagers to invest in small businesses and other ways to make money. In exchange, the borrowers agreed to restore the degraded peatlands, plant trees and maintain the replanted area.
- Similarly, in Mali (Chapter 5), the project provided either microcredit or equipment such as rice huskers to the women's groups, in return for their planting trees or rehabilitating fishponds.

The issue of meeting long-term versus short-term needs was illustrated by the Indonesian project, where awareness raising about the need to restore the peatland was one of the very last activities. People were interested in this only once they had experienced the benefits of the Bio-rights approach.

The literature review in Chapter 6 also came to the conclusion that awareness-raising by putting up billboards or distributing leaflets was not an effective way to get communities to participate in restoration work. An interesting exception was highlighted by the Indonesian project, where loggers were convinced to plant trees on their idle land as a way of securing their own livelihoods for the future.

But, how to keep communities engaged? After some time, when the loan has been returned or when local people need to focus on their daily tasks, it can be hard to keep them engaged in the

restoration work. Some projects give the community members small allowances to attend project-related meetings. That is often difficult to sustain, especially when project resources are limited.

Make use of traditional knowledge

Indigenous knowledge can get communities involved in conservation. Most societies have traditional systems for conservation, often including taboos, such as the belief that cutting certain trees will bring on a curse. Among the Maasai of Kenya (Chapter 2), the elders fenced off certain areas, prohibiting people from cutting the trees there. Project staff have been able to invoke these traditional systems and to convince communities of the need to revive and enforce them for the sake of conservation.

People need an incentive to engage in conservation work

Disasters and conflict as driving forces

Sadly, disasters, in their various forms (floods, landslides, etc.), are often effective to get people aware and involved in conserving the wetland.

- In Kenya (Chapter 2), the project focused on existing conflicts over water, especially between pastoralists and farmers, as a way to promote long-term mechanisms to manage the Kimana wetlands.
- In Malawi, (Chapter 3), three years of drought showed the adverse effects of environmental degradation coupled with the impacts of climate change.
- In Indonesia (Chapter 4), people were very alert and convinced of the need to conserve and restore mangrove forests, as they serve as important barriers against high tides and tsunamis.

Improve livelihoods: increase consumption?

The project in Zambia (Chapter 3) taught farming skills to ex-poachers so they could grow food in the *dambos*. This approach combined the promotion of livelihoods with reducing degradation through poaching and slash-and-burn agriculture. But the danger is that as the *dambo* farming becomes more commercialised, it will use the wetlands more extensively, thereby damaging them.

This leads to the question of where to draw a line between getting people out of poverty and promoting consumption. In Zambia and Malawi, initially some communities could not produce enough to feed themselves. After they learned how to farm in the *dambos*, they are now buying bicycles and radios and expanding their businesses. Although the project is trying to promote a diverse range of alternative activities, such as chicken and pig-rearing, cultivation of the *dambos* is still expanding.

Women and men

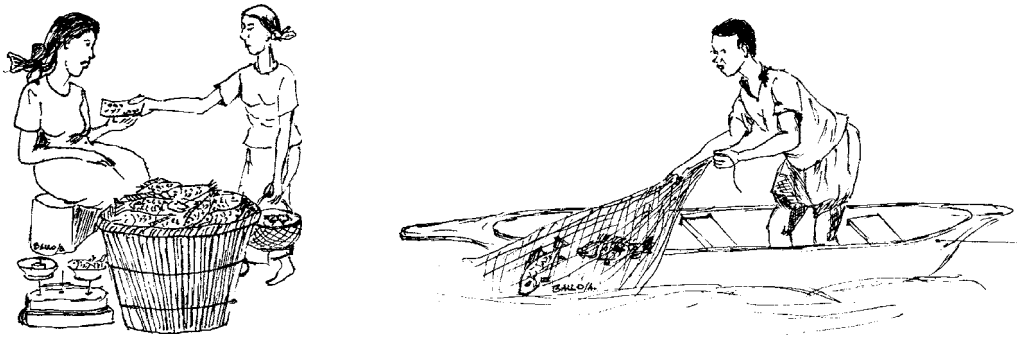
The issue of gender should be considered thoroughly before engaging with a community. Staff from all four projects realised that with regard to gender, things are rarely what they seem.

- In the case of matrilineal communities in Malawi and Zambia (Chapter 3) women controlled everything in the household. The same was true in Mali (Chapter 5), where Bozo women controlled the income from the sale of fish, and Fulani women managed the money from selling milk.
- This was not the case in Kenya (Chapter 2), where the project staff could not imagine a situation where a woman controlled the income that resulted from the man's hard labour. "How can the woman control everything when there's a man around?" they asked. The assumption that "money is power" does not hold in Kenya, as "When men notice that the women earn much money, they will insist to get it otherwise they would beat the women up." So money does not always empower women.

One should look beyond mere numbers of men and women with seats in associations or boards of community organisations. Such figures do not always illustrate an equitable sharing of roles, responsibilities and privileges between men and women.

Did the projects challenge the existing power relations between men and women, or did they merely entrench them? Recognising that gender issues are complex, the project in Malawi (Chapter 3) started with a modest approach: it required that all data on project activities be gender-disaggregated. The aim was that local people would notice when the numbers were skewed in favour of men or women, and would start asking whether this was fair. Towards the end of the project, staff were trained in gender analysis and given simple tools for facilitating people to think about who has access or control over land, water and other resources used in production, and who has access or control over the outputs, such as food and cash.

A participatory gender analysis with communities in Zambia (Chapter 3) showed that although it is the men who traditionally decide on which trees to cut down, it is the women who bear the brunt of the damage: they are the ones who have to walk further to fetch water and firewood. The women began to understand why they should be involved in making decisions about how to use and manage the natural resources. The men also started realising that the current situation was not fair to the women: the men made most of the decisions on how to use the natural resources – where in



Women and young people often have predetermined roles in society

the *dambo* to cultivate, what crops to plant, how to spend the income from farm produce and so on – without consulting the women. One man observed, "I have realised that if I die before my wife, she will be the one to look after our children. So it is important to start involving her in making decisions, so that she can also learn how to make decisions on key issues. When we are together, she can assist me in these decisions, but she will then also be better able to look after our children if I am not there."

Young people

When project staff visited villages in Mali (Chapter 5), there were very few young men around. They were working in the fields, said some villagers, or they had gone to the towns in search of work. In Malawi (Chapter 3), village elders do not take young men seriously, so they are often sidelined and are reluctant to participate in development and conservation activities. There are significantly more women than men in these villages due to factors such as migration, HIV/AIDS and drought.

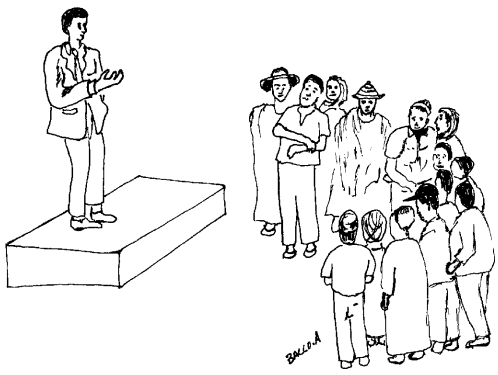
Local politics

Initially, each of the projects attempted to portray itself as being non-political. In Indonesia, project staff steered away from any local politics by specifically not getting involved. In Malawi, staff thought that by working through the officially recognised village development committees they could avoid getting involved in political divisions within the villages they were working in. In Mali, there was concern that the local NGO had become part of the community, and that this would undermine its ability to act in a non-partisan manner. The project therefore sought to clearly demonstrate the linkage between the local NGO and Wetlands International, an international organisation, thereby increasing the perception of its objectivity.

However, despite their efforts to stay objective and keep out of local politics, most of the projects found themselves dealing with political issues.

- In Kenya (Chapter 2), the formation of the Kimana Wetlands Association coincided with the 2007 national elections. Many local people thought that the Association and its elected officials were tainted by politics. Eventually, the project had to repeat the process of establishing the Association in order to dispel these fears.
- In Malawi (Chapter 3), project staff soon realised that partisan politics pervaded the whole government structure. Due to corruption, members of these committees were hand-picked by the Chief to serve his own interests. Resources such as government-subsidised fertiliser meant to benefit the poorer members of the community were often diverted to wealthier villagers because of their connection with the politicians.

Most project staff were caught unawares by the divisive local politics they ended up having to deal with. The Indonesian project staff were amazed by how important local politics and hi-



Politics can be a big influence on wetland projects

Box 13. Falling foul of local politics

The Malawi Enterprise Zones Association had been helping local people for more than two years to grow food in the *dambo* wetlands. But the staff sensed that some villagers were unhappy because they felt that some groups got preference over others. Then the staff received a nasty anonymous letter, accusing them of bias and threatening to report the matter to the authorities – that the Association was using donor money to divide the community.

In another incident, one faction in the village set fire to the tree nursery that the project had planted, and burned down large sections of the forest, killing recently planted saplings as well as many mature trees. The level of suspicion is now running high in the village, and the staff's efforts to help the farmers to form a marketing cooperative have been unsuccessful. Patrick Thawe, one of the Association's staff members, concludes that "Sometimes, whether you like it or not, the local politics and dynamics in a community can undo years of hard work."

erarchies were. In Mali, though, Wetlands International had been working in the project area for more than 10 years, so were better able to deal with local politics.

Being an "insider" or an "outsider"

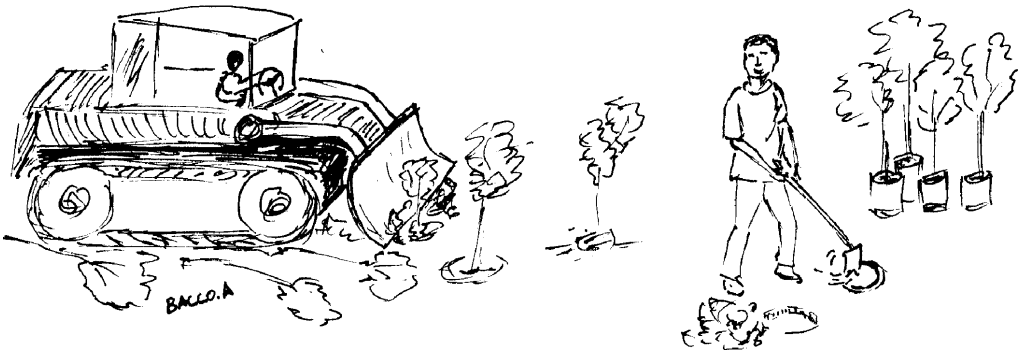
For project staff, there are advantages and disadvantages to being an insider or outsider to a community. The benefits of being an insider include being able to understand the culture, language and local politics of the community. But being an insider means that local people perceive the staff as partisan – after all, they know the exact class, clan and family the staff member belongs to and their position in the local community.

- In Kenya (Chapter 2), the charged political atmosphere during the 2007 elections created perceptions of lack of project objectivity, such as in selecting community groups to work with. Eventually, it took a project manager from outside the community to calm the political temperature and restore some semblance of harmony among the different sections of the community.
- In Malawi (Chapter 3) there are matrilineal and patriarchal communities. Although the NGO employed staff from both, the perception persisted that staff favoured villagers who are not matrilineal.

Dealing with externalities

Each of the projects worked in areas affected by outside actors, such as commercial companies. They differed in the extent they attempted to address these external factors.

- In Malawi (Chapter 3), curing tobacco requires a lot of firewood. The tobacco manufacturers and their agents entice farmers to sell them the trees on their communal lands with money, fertiliser and other farm inputs. But it is these same communities that bear the brunt of this destruction. The project is part of a lobby group that is trying to ensure that the companies contribute to the rehabilitation of forests. But this is a Herculean task: tobacco is Malawi's main cash crop and a key source of foreign exchange.
- Similarly, in Indonesia (Chapter 4) large-scale oilpalm and acacia plantation companies try to persuade local people to sell their land so they can establish plantations. The project is try-



It can be very difficult to deal with externalities – such as a big land-conversion project

ing to ensure that local communities are well informed before they decide whether to sell. The companies apparently want to learn from the project how to combine livelihood aspects with conservation. But are companies genuine, or is this just an exercise in "greenwashing"?

- Traders who buy farm produce in Kimana in Kenya (Chapter 2) often pay very low prices, forcing farmers to further expand the area under cultivation so they can earn enough to live on. The recently formed Kimana Wetlands Association is yet to design strategies to address this problem.

Facilitating community linkages with policy makers

These were demonstration projects, so it was important that they establish linkages between the project activities and policy. These linkages would ensure that lessons from the projects were used to inform policy decisions.

- In Mali (Chapter 5), the project facilitated the community groups to implement aspects of the National Wetlands Plan, which the government did not have enough resources to do. The project staff documented the results of the activities and ensured that the communities presented them to government officials.
- The Kimana project in Kenya (Chapter 2) set out to demonstrate aspects of the draft national wetlands policy. It has linked the communities with other relevant institutions, such as the water resource management boards.
- The project in Malawi and Zambia (Chapter 3) is lobbying for policymakers to recognise the role wetlands play in food security, not just biodiversity conservation.

All the projects appreciated that NGOs do not replace government functions, but can fill gaps left by the government in terms of capacity and financial resources. However, on the ground, it becomes difficult to draw a line, especially as conservation is often one of the lower priorities for cash-strapped governments.

From engaging and raising awareness to mobilising communities for collective action: how do we do this? There are not so many examples from the four demonstration projects. But Chapter 6 does

contain one case: in the Negombo Lagoon in Sri Lanka, the project organised the local fishers to protest against plans for a large harbour that would damage the lagoon.

Capacity building

Were the projects able to enhance the capacity of the community groups they were working with? Not enough: none of the four projects had sufficient resources to do this. Because they understood their limitations, they employed various strategies to ensure that the community groups gained the skills necessary to engage in conservation. "It is better to know your limitations right from the beginning", said one project manager.

- The project in Indonesia (Chapter 4) worked with existing organisations that had the skills and capacity to train the community groups.
- The Malawi project (Chapter 3) subcontracted an NGO to train the project staff and the farmers on sustainable agriculture, fuelwood-saving technologies, project management, bookkeeping, facilitation skills, group dynamics, transformation, gender and HIV management.
- The collaboration between CARE and Wetlands International in the Mali project (Chapter 5) was beneficial because each organisation had a different set of skills and competencies. CARE is good at facilitating the formation and strengthening of community groups and in tackling various attributes of poverty. Wetlands International is strong in the biodiversity and conservation aspects. The two organisations therefore relied on each other's strengths during the capacity building activities.

Conclusion

With hindsight, all the demonstration project staff, except those in Mali, felt that they did not spend enough time understanding the social, cultural and economic dynamics within the communities they worked with. The staff in Mali had the benefit of being in the area for more than 10 years, so they were quite knowledgeable about the communities – almost to the point of being perceived as being part of the community, which has some disadvantages. In Kenya, project staff had to deal with the consequences of not investing in understanding the community dynamics at the beginning; luckily they were able to make adjustments.

Ideally, projects design, implement and monitor activities in a participatory manner with the communities they are working with. This is not always possible or easy because of many factors, including the project's own capacity to understand the community. Regular monitoring can highlight problems before they escalate. The projects emphasised the critical role integrity plays – both of individual project staff and of the organisation at the local and international level. If the reputation of either the individuals or the organisation is tainted, it can have negative impacts on how the communities engage with them.

Field days are a good training method as well as a way to introduce policymakers to a project's work
Photo: Adrian Wood

11 Influencing policy

Rebecca D'Cruz, Sanjiv de Silva and Marie-José Vervest

It is important to address policy issues even if you work only at ground level… because there are many, often conflicting policies that have an impact on your work…

For those working at the ground level, policies can either support or undermine their work. The services provided by wetlands (e.g., food, water, biodiversity) are often dealt with under different, and sometimes conflicting, policies. For example, an agricultural policy may treat wetlands as a source of water for irrigation, so aim to get as much water out of the wetland as possible. A poverty reduction strategy, on the other hand, may deal with wetlands as a vital source of food and water for local people, so aim to retain as much water as possible in the wetland. The challenge lies in managing the wetland so there is enough water for agriculture, and enough left in the wetland to sustain the lives of the local people as well as biodiversity. For this to happen, existing policies may need to be reviewed and possibly changed, or new policies will need to be developed.

….and because policy development processes at the national, regional and global levels can benefit from your experience.

One of the biggest challenges in developing a policy is the lack of information on which to base it. For policies to be effective, policymakers have to be able to draw on sound information and experiences from the ground.

Projects that are working on new and innovative approaches to wetlands and poverty reduction, such as those described in this book, have a crucial role to play in this regard. It is up to the project proponents to ensure that this information gets to the attention of policymakers in an appropriate format (e.g., as policy briefs) and in language that non-technical people can understand easily.

Global policies affecting projects

Various global treaties and agreements may affect wetland livelihoods and conservation projects. An example is the Millennium Development Goals, which set targets for governments in terms of human health, poverty eradication, food security and environmental management. Governments have committed to these goals and are taking steps at the national and local level to deliver the targets. Not all of these steps bode well for wetlands. For example, in an effort to ensure food security for the people, governments may decide to divert more water from wetlands to irrigate new agricultural areas. Similarly, in an effort to fight malaria, they may drain wetlands because that is where mosquitoes breed.

Box 14. Wading through the mire: The Kimana experience

No wetlands-specific legislation, a national wetlands policy still in the works, and 77 other laws with a bearing on wetlands management. That was the situation in Kenya at the beginning of the Kimana project (Chapter 2). But one law, the Water Act of 2005, stood out: it dealt with exactly what the project was interested in – community participation in wetlands management.

The project had already set up the Kimana Wetlands Association as a forum for conflict resolution and collective planning. This was registered as a community organisation at the district level. Although this did not confer a legal identity on the Wetlands Association, the process was uncomplicated, affordable and allowed communities to plan how to manage resources. On examining the Water Act, however, the project realised that it regulated the establishment of associations of water users. The Water Resources Management Authority (WARMA), established under the Act, issued water permits to these water user associations, and had jurisdiction over water development, conservation, allocation and use. Its mandate also included wetlands as water resources.

These rules appeared to undermine the function of the Wetlands Association. Furthermore, WARMA was granting water permits in the absence of a rational water management plan and on a first-come, first-served basis. This threatened to increase the conflict between various water users in Kimana, and promote unsustainable water use. The project responded by revising the mandate of the Watershed Association to focus on addressing the gaps in the system of water user associations. In particular, it became clear that these associations did not have the capacity to deal with conflicts among water users, and that they focus was on allocating water, not managing it. This suggested that the Wetlands Association could act as an apex body where each water user association in the area could be represented. This would not only help coordinate the allocation of water permits, but would make the Wetlands Association a vital link between the water user associations and WARMA.

One other challenge emerged: WARMA regulations required water user associations to be legal entities with a written statute. This meant that the Wetlands Association would have to be re-registered with the government. Doing so would enable WARMA to recognise it as having a broader mandate to deal with water and wetland management functions not addressed by water user associations or WARMA. The Wetlands Association now has to convince the water user associations in the area to join it as members.

Establishing links with WARMA was critical to the project's work because WARMA's mandate overlapped with that of the National Environment Management Authority, which develops wetland management strategies and had driven the wetland policy drafting process. The project's link to a national Policy Linkage Group ensures it access to both agencies.

By carefully analysing the legislative and political landscape, the project has managed to address weaknesses in current policy or legislation, and turn sectoral overlap into an advantage.

Treaties on the environment, such as the Convention on Biological Diversity and the (Ramsar) Convention on Wetlands, oblige signatory governments to implement their provisions. Mali's Inner Niger Delta is designated as a wetland of international importance – a Ramsar site – under the Ramsar Convention. So too is the Berbak National Park in Indonesia. So the Malian and Indonesian governments are obliged to manage them in a sustainable way.

Influencing global treaties may seem unrealistic for small-scale projects with limited funding. But such treaties have regular conferences bringing together the contracting parties (one on the Ramsar Convention was held in South Korea in 2008), as well as standing committees and scientific and technical reviews. These discuss issues relating to the treaty and formulate and pass resolutions.

The process of formulating these resolutions draws on experiences from ground-level actions. This is where projects have an opportunity to influence the global policy process.

Choosing the most relevant policies to work on

Begin with the most obvious ones. With projects in wetland areas, the starting point should be the national/provincial/local wetland policy, strategy or action plan, if these exist.

Mali is one of only four countries in Africa to have an approved national wetland policy. This identifies the Inner Niger Delta as one of the key wetlands in the country, and stipulates the need to restore degraded habitats there. Unfortunately, the policy's action plan has not been implemented because of a lack of funds. This presented an opportunity for the Wetlands International project to implement parts of the plan through on-the-ground action (Chapter 5).

The project was eager to maximise the links to other policies and plans. The first phase of the country's Growth and Poverty Reduction Strategy, which ran from 2000 to 2006, did not mention the role of wetlands in reducing poverty. The project addressed this gap by engaging with the people responsible for writing the second phase of the strategy, to run from 2007 to 2011. The project submitted a paper to the drafting committee explaining how the Inner Niger Delta wetlands were a lifeline for poor people there. As a result, the new strategy included a section on wetlands as well as an action plan specific to the Delta. The links to the new Growth and Poverty Reduction Strategy document did not end there. Recognising that this was now the key reference document for development planning at all levels, the project set out to facilitate its implementation on the ground through its microcredit programme and tree-planting activities.

In Kenya (Chapter 2), the fact that the government was in the process of drafting a wetlands policy offered the ideal opportunity for the Kimana project to feed practical experiences from the ground level into the drafting process. The draft wetlands policy contains a provision for involving local communities in the management of wetland resources, but does not prescribe how to do this. The project demonstrated how to organise local community groups to resolve disputes and work together to protect their wetlands. The project was granted official recognition as a demonstration project by the Ministry of Environment, which is responsible for drafting the wetlands policy.

> ***"We began with a focus on the draft national wetland policy, but after some time we found that wetland management is dealt with in 77 sections of various Acts in Kenya, and that all of these had an impact on our objectives and on the lives of the communities we work with. We had to adapt our strategy to include these, and began to engage with a whole set of partners,"***
>
> **—Nyokabi Gitahi, Kimana Wetland Project, Kenya**

Whether or not a clearly defined wetland policy and legal framework are present, project managers must be aware of developments in other sectors given the high probability of overlaps among these sectors. In Kimana, not only was there a policy and legislative vacuum with regard to wetlands; developments in other sectors also threatened to undermine the local institution the project had invested in, and which lay at the centre of the project's strategies to improve wetland management. The project skilfully turned this dilemma into an opportunity (Box 14). This also demonstrates the need for adaptive management where multiple jurisdictions are involved.

As the Kenya and Mali (Chapter 5) experiences have shown, it is also important to review the relevant policies and strategies in the country for opportunities to advance a project's objectives. The link between wetlands and poverty reduction is not yet an obvious one, especially with regards policy development which often follows sectoral lines: governments tend to have separate policies on water, poverty reduction and agriculture. Each of these is likely to contain one or more provisions that support a project's objectives, or that undermine the very outcomes the project is trying to achieve.

It is important to facilitate linkages between local people and policymakers

Timing of policy interventions

Policy interventions can begin at any point within the lifetime of the project, from design through implementation. When this happens depends on the policy objectives of the project, and on the amount of information needed in order to engage convincingly with policymakers and inform the policy reform process.

It is interesting to note how the demonstration projects decided when to begin their policy interventions, and why.

- In Mali (Chapter 5), the project was designed in line with the principles of the National Wetland Policy. This was a deliberate attempt to demonstrate how its activities could contribute to the implementation of the policy, and ensure that their project enjoyed the support of the relevant government agencies.
- In designing their project, the Kenyan team (Chapter 2) decided to include a significant component on involving the community in the management of the Kimana wetland because this was a priority strategy in the draft national policy. The intention was to use the Kimana experience to inform the policy development process and to use the area as a model for replication in other parts of the country. Establishing the institutional pathways between the project and the policy development group was thus key to enabling the project to communicate directly its lessons to the policy level.
- In Malawi (Chapter 3), the challenge was to expand the scope of the national wetland policy (which has existed in draft form since 2002) to cover the sustainable use of wetlands for poverty reduction; the current draft policy focused mainly on conserving wetland habitats and species. The team decided to focus first on getting evidence of the vital link between wetlands and local livelihoods so they could justify their policy intervention. Their policy intervention thus began only in the second year of the project, once the initial results were available.

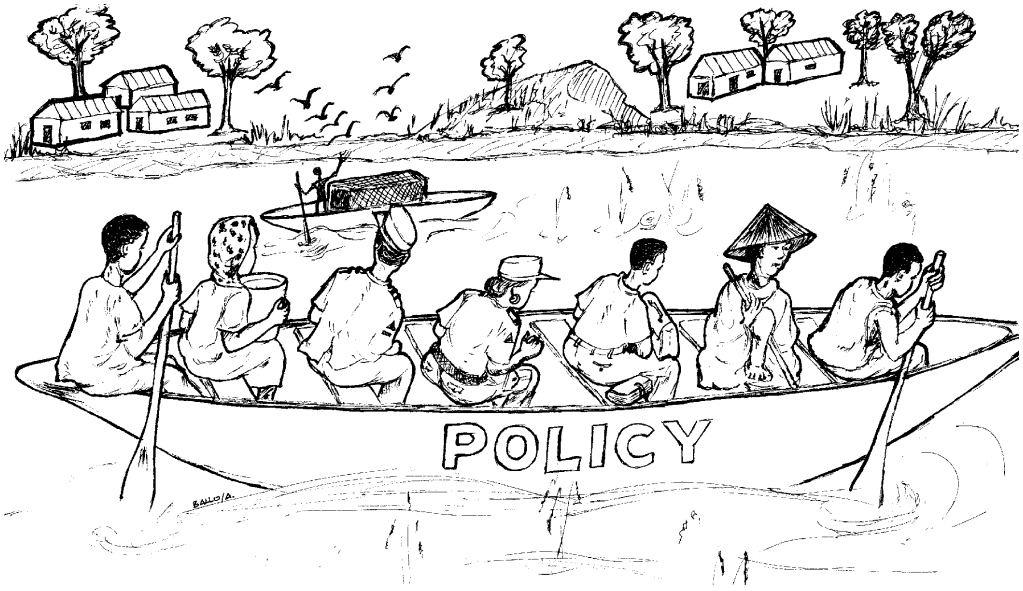
Bridging the gap between on-the-ground actions and policy development

Field-based projects can provide valuable input to developing policy at the national level because they deal with real issues faced in managing wetlands for poverty reduction, and can identify approaches to resolve these issues. These can strengthen policies and facilitate their implementation. A project can do this in various ways, including by demonstration (as in the Indonesia case) or by using existing avenues to communicate their findings (as in Kenya).

The project in Indonesia (Chapter 4) benefited from the existence of a National Wetlands Management Strategy (1992), as well as a Peatlands Management Strategy which reflects the particular importance of peatlands in the country. But there was little evidence of these strategies being implemented at the provincial, district and local levels in Sumatra. Some officials did not even know that these policies existed.

The project set out to bridge this gap by demonstrating practical ways of implementing some aspects of these strategies. In doing so, the project hoped to inform and influence the decision-making process, beginning at the local level, and then up the chain of command to the provincial level. The practical approaches promoted by the project included:

- How to organise local communities and link them to other local, district and provincial level actors to reduce the incidence of forest fires
- How investments in improving local livelihoods options combined with awareness creation can prevent more wetlands being converted for oilpalm cultivation (the main cause of deforestation and peatland degradation).



Only by working with many different stakeholders is it possible to find common interests and develop policies that benefit everyone

The project also made a concerted effort to raise the awareness of the local communities of the provisions contained within these strategies so that they community could make informed decisions about the utilisation of their land.

In Kenya (Chapter 2), from the outset, the project established contact with the Policy Linkage Group as a means to channel the project's results and experience into the policy development process. This group comprises representatives from the Ministry of Environment's National Environmental Management Authority, the Ministry of Water and Irrigation, and the Kenya Wetlands Forum (the original driver of the draft policy). This channel of communication meant that the lessons from the project were consistently fed back into the policy development dialogue. It also helped motivate the local community who realised that they had an opportunity to influence decisions that were being made at the national level of government.

Choosing and influencing your target audience

Conservation and development policies are set by the government, as are policies for various other sectors such as agriculture, fisheries, water and land development. The government is therefore, the primary target audience for any policy intervention.

However, the level of government at which the project pitches its efforts may differ.

- In Indonesia, for example, the project chose to target the local development planning office, whose policies and plans had direct and often negative impacts on the wetland ecosystems and communities. This office has included the project's outcomes in its planning processes. As a result, local communities, not just those living in the project area, have received support for alternative livelihood activities. At the project site, the project had introduced alternative livelihood activities. That let it engage with government agencies dealing with agriculture, forestry and fisheries and illustrate livelihoods–wetland links, in the hope that these messages would trickle up into their respective policy and planning processes.
- In Mali, the project chose to direct its policy intervention efforts at both the district agencies as well as the national government. At the district level, the aim was to catalyse the implementation of the National Wetland Policy. At the national level, the aim was to inform the policy reform

Box 15. Going straight to the top

"Mr President, please accept this book for your reading pleasure during your vacation in the Inner Niger Delta," said Bakary Koné to the President of Mali.

Bakary works for Wetlands International in Mali, and has spent the last 25 years working with local communities in the Delta, 650 km from the capital, Bamako. The book he gave the President, *The Niger, a Lifeline*, is about the importance of the Delta's wetlands for people and biodiversity.

Some time later, the President gave a series of speeches in which he used some of the information from the book, and made special mention of the importance of the Delta.

Bakary's gift resulted in the President becoming a champion for the wetlands cause. It shows the need to be opportunistic in finding a champion.

process to recognise the vital contribution made by wetlands ecosystem services to poverty reduction.

Finding a champion

Policy development and implementation usually involve a broad range of actors operating at various levels in the geographical, social and political landscapes. Projects seeking to influence these processes may need to identify one or a few key individuals or organisations which they believe can act as champions for their cause. These may be high-ranking and influential government officials (Box 15), or another organisation with strong links to decision makers.

- In Kenya (Chapter 2), the project saw the Permanent Secretary of the Ministry of Environment as a key actor given his influence with the Minister of Environment. He was instrumental in getting the Kenyan government to recognise that the project was relevant to the ongoing wetlands policy drafting process.
- In Indonesia, the Governor of South Sumatra became a champion for the project's new and innovative efforts to fight peatland fires. As a result, the project's fire brigade model has received attention at the national and international level, and funding from Singapore (which suffers from the trans-boundary smog generated by the peatland fires) to support continued efforts.

Partners can further your cause

> ***When you see something that's wrong, no matter how big the problem is, think "Who else would like to change this? How can we work together?"***
>
> **— Kofi Annan, former UN Secretary-General**

Advocacy is an important part of any policy intervention. The old adage, "No man is an island," is particularly relevant when it comes to policy interventions. Building partnerships and networks with other like-minded organisations or groups gives you a stronger voice and extends your area of influence.

- In Kenya (Chapter 2), through its work with Wetlands International, the project managed to link with the Kenya Wildlife Service, the Kenya Wetlands Forum and National Environmental Management Agency. This expanded the project's influence and impact, and illustrates how reaching out to other organisations can lead to a wide-ranging network.
- The Malawi/Zambia project (Chapter 3) sought the help of other conservation and development NGOs to advocate for the project results to be included in the development of wetland policies. This had the added advantage of ensuring that these partners also took up the project's findings.

"Communicate, communicate, communicate"

This should be the mantra of any person working on policy reform. If a project does not tell people, especially policy and decision-makers, about its efforts and successes, it cannot expect them to make the changes it would like to see. A communications plan should therefore be a vital part of any policy intervention strategy.

A number of communications channels (e.g., radio, print media, site visits) and materials (policy briefs, newsletters, leaflets, posters, videos, websites, etc.) can be used to spread the policy message to the larger world. The choice depends on the target audience and the expected outcome.

Communications opportunities may often present themselves.

- In Zambia (Chapter 3), a chance meeting with a radio announcer resulted in project staff participating in a national radio talk show. As a result, many people – farmers from other villagers, townspeople and government officials – visited the project site to learn about sustainable *dambo* farming.

Communications must be grounded in sound information and facts or the project risks undermining its credibility.

- To prepare their policy brief for national level policy and decision-makers, the Zambia project team first undertook a review of *dambo* utilisation in many different projects and used the results of this review to strengthen their case.

Finally, projects should communicate with other like-minded organisations and individuals because there is great potential for sharing experiences and mobilising support for common policy objectives.

Building capacity in government institutions

The most compelling reason for including capacity building in projects stems from one of the basic rationales for the existence of NGOs: to fill the capacity shortfalls of government institutions.

- We see this clearly in Mali (Chapter 5), where the project recognised the lack of state funds as a limitation for implementing the National Wetland Policy and Action Plan.
- The same was true in Indonesia (Chapter 4), where weaknesses in decentralised institutions meant that the National Wetland Strategy was not being implemented at the provincial, district and local levels. The project involved all actors in developing and demonstrating practical solutions for reducing poverty in the wetlands. This enabled the strategy to be implemented and increased the capacity of the government actors along the way. The project's fire brigades are a case in point.
- The project in Malawi and Zambia (Chapter 3) provided the governments with concrete, field-based messages: each project site was a laboratory for experimenting on sustainable *dambo* utilisation to address the countries' key concern, food security. The project acted as the catalyst within a resource vacuum.

Capacity building as a process and not an activity

Effective capacity building is often not a one-off activity; it is a process. It consists of specific actions: static, time-bound activities such as awareness workshops, pamphlets, or training in financial management. But it is also organic, where actors absorb information and skills by being involved in a process that plays out over the project's lifespan. This is especially so when introducing new ideas and methods, particularly those that challenged traditional values and ways of doing things, or existing government policy or procedures.

In Indonesia for example (Chapter 4), a one-day course for local people on firefighting was not enough to get them to organise themselves into local fire brigades. What finally led to the creation of these brigades was a longer-term and continuous process involving several interventions: joint patrols between villagers, national park staff and others, training in law enforcement and forest fire prevention, and monitoring of illegal logging. The joint patrols were a powerful tool for validating ideas and methods the project was keen to demonstrate.

Moreover, because the project continuously involved local government agencies as well as other non-state actors, it not only showed that its methods worked, but also why and how to do them. If the project had not involved the government, officials would have been unlikely to accept these methods as readily.

A process-based approach to capacity building seems especially suitable when change requires a process of evaluation, processing and demonstration before it is accepted.

Capacity of whom?

Local communities and government agents may be the most common targets for capacity building. But others may also be important. In the Mali and Kenya projects, traditional leaders make decisions on behalf of their communities, so need to be kept well informed. In Indonesia too, it was the village heads who represented their respective communities in dealings with outsiders, such as oilpalm companies wanting to lease community land.

What do we mean by capacity?

The use of incentives (loans for livelihoods development) to encourage community members to join fire brigades in Indonesia also illustrates the need to understand capacity through a broad lens. In this case, the brigade members had to balance between firefighting duties and working to make ends meet. For the project, that meant combining institutional development (of the brigades) with livelihoods development (the loans).

All four projects sought to demonstrate the application of an integrated conservation and development approach. That highlights the notion that capacity development applies not only to providing funds, skills and information, but also transmitting ideas that lead to desired changes.

Livestock and irrigation: the Kimana wetland, Kenya
Photo: Paul Mundy

12 Managing projects

Mike Ounsted, Marie-José Vervest and Maria Stolk

If our foresight were as good as our hindsight, we would never make mistakes.

—American proverb

This chapter looks at issues relating to the management of the four demonstration projects described in Chapters 2 to 5, as well as Wetlands International's larger Wetlands and Poverty Reduction Project, of which they were part.

Are wetland projects different from working in other habitats?

The theory behind the Wetlands and Poverty Reduction Project was that good wetland management would help reduce poverty. Yet the overriding experience of the demonstration project managers was that they had to address immediate, basic socio-economic needs before they could turn their attention to longer-term wetland management. There are a wealth of well-tested development tools to help address poverty issues, but for most of the managers, the Wetlands and Poverty Reduction Project was new ground. So although it was helpful for the managers to have a sound knowledge of the way wetland ecosystems function, experience in working with community and on socio-economic issues was more useful – maybe essential.

- The Mali and Indonesia projects (Chapters 4 and 5) were essentially motivated by a need to conserve wetland wildlife and were driven by Wetlands International as a wetland conservation organisation. In both these projects, the partnerships with development organisations provided a hugely successful learning platform for all concerned.
- The African Wildlife Foundation in Kenya (Chapter 2) and Wetlands Action in Zambia and Malawi (Chapter 3) had to a greater extent internalised both socio-economic and wetland conservation skill sets.

"Before I joined this project I knew nothing about wetlands. Now I see that when you work with wetlands you work with all life's problems!"

—Nyokabi Gitahi, specialist on legal and policy issues, Kimana, Kenya

The implementation and management of the demonstration projects was different in each country, indeed at every wetland location. However, these differences were not so much a consequence of the different ways that wetlands function – since wetland types have many common characteristics. Rather, they were because the cultures of each of the wetland communities were unique; in each of the project sites, farmers and fishers use their wetlands and their resources in different ways. For example, the projects include Maasai herdsmen and women needing access to water for grazing cattle, coastal fishers in Sumatra, small-scale farmers in Malawi and Zambia, and seasonal fishers

and hunters in Mali. In all of the projects there are conflicts for access to and use of the wetland resources, yet the way managers in the four projects had to handle a common issue differed greatly.

Management in a water catchment

Projects that focus on a specified wetland ecosystem face particular challenges, since interventions in one place will impact on the wetland downstream, perhaps some distance away. Such impacts are unlikely to concern local project beneficiaries themselves, who reasonably are concerned with their own immediate water and livelihood needs. Most wetland conservation managers have been trained to use integrated river-basin management and participatory watershed planning, in response to the "ecosystem approach" to development. However, it is quickly apparent that rural communities rarely live and make their livelihoods in a single catchment. Indeed the communities in the demonstration projects were threatened by external factors depleting their own resources, rather than themselves having an impact on neighbouring villages or the bigger river basins in which they were located. All four projects had complex water catchment zones, and the more the project progressed, the more the managers realised the complexity of the catchment issues they were addressing.

Managing for equitable access to water

A second and related consideration is that wetlands are not only sources of food and other produce for local people to eat and sell. They are also reservoirs and conduits of water. Naturally all countries hosting the demonstration projects have set economic development as their national priority, arguing that the best way to reduce poverty is to improve the economy at the macro level. That means extracting water, fundamental to development, to meet the needs of growing urban and rural populations, as well as for irrigation, energy, industry and transport. Cutting timber and converting land for monoculture crops have a huge impact on previously functioning wetlands. The interests of local people living in or around the wetland, perhaps somewhere up- or downstream, are often of lesser concern than contributing to what is seen as the "greater good".

All this means that a wetland project management team has to take a much wider perspective than addressing merely technical hydrological issues and immediate local concerns of access to and use of wetlands. All four projects focused on the local level, but the managers had also to work on the macro level and address national or regional policy and practice as well. These were **demonstration projects**: they had to have a positive local impact so they could demonstrate development options ministries and decision makers. But it was easy for managers faced with day-to-day problems to forget this aspect of the project.

Managing wetlands as protected areas

Third, although wetlands are among the most biologically diverse of all habitats, governments of most developing countries no longer see conservation as such as a priority. Poverty reduction, by whatever means, tops the development agenda, and these "means" rarely recognise the potential to reduce poverty by restoring or sustainably managing wetlands. This shift away from direct wildlife conservation is mirrored in the principal international agreement on wetland conservation – the Ramsar Convention. This has evolved from its founding rationale in 1971 of conserving wetlands as critical habitats for migratory waterbirds by establishing protected areas, to a management ap-

Box 16. Developing the Kimana management plan, Kenya

The Kimana management plan was developed with the support of the African Wildlife Foundation and with considerable cooperation from all the key stakeholders in the wetland. These stakeholders include district department heads and their staff, local community members and their representatives, group ranches, farmers, concessions, hotel, NGOs, women's groups, and faith-based organisations. Developing this plan was a continuous process that relied on information from four different areas: pastoralism, farming, wildlife husbandry and business.

Core planning The Kimana Wetlands Association and the African Wildlife Foundation held a meeting to agree on the formation of a core planning team whose work was to hold meetings around the Kimana basin. A team of eight key people were chosen from different departments and given the responsibility to collect data. The core planning team divided the wetlands into four blocks (2 upstream and 2 downstream), with a meeting held in each.

Consultation The Wetlands Association and Noomaiyant, its partner community organisation, cooperated in coordinating the plan's development. The African Wildlife Foundation supported stakeholders to participate in the consultations. The block meetings were held at school buildings or churches, facilitated by the Wetlands Association and Noomayianat. Issues discussed at the meetings included water use and management, human–wildlife conflict, health issues such as waterborne diseases, drought, and infrastructure needs (such as roads and schools).

Participants Around 150 members participated in every block meeting and the number was divided between the following group members: faith-based organisations (pastors' association), community organisations and women's groups, environmental groups, educational institutions, youth groups, livestock keepers, farmers, wildlife managers and government departments (Kenya Wildlife Service, National Environmental Management Authority, Ministry of Water). Five members per group were included in the planning process, except for livestock keepers and farmers as they were more numerous in the zone.

Strategies Strategies in developing the plan included:

- Involving community members all stages of writing the proposal. This enabled the key issues to be identified and helped gain their recognition and support.
- Working closely with government departments. Noomayianat is a member of the district environmental committee, the body that advises the national government on assessing environmental impacts of development projects.
- Working with other stakeholders' institutions involved in conservation.
- Transparency and accountability.

Funding Local community organisations find it difficult to raise funds as donors tend to think they lack capacity. But since the wetland project was initiated, Noomayianat has managed to secure funds from two donors. The Wetlands Association is also working out how to raise funds so it can implement the activities it has planned.

proach described as "wise use" of wetlands. In 2005, the convention passed a resolution to guide its members to manage wetlands to reduce poverty, and in 2008 to manage wetlands in order to improve human health and well-being.

Despite this, key contact points for all the project managers were with forestry and wildlife ministries or departments, where there is usually little expertise in socio-economic issues. It was generally harder for managers to access and influence more powerful ministries of energy, water resources and agriculture, each of which has huge vested interests in wetlands and their water.

Developing a wetland management plan

The complexity of wetland systems and the way they are used call for management plans that cover a range of aspects and draw on a variety of skills. Historically, wetland management plans have often been prescribed by engineers working in response to political or economic demands, which have lacked holistic considerations. Engineering or infrastructure solutions alone usually have unsustainable consequences. Integrated water and resources management and an ecosystems approach (Box 1, page 5) involve genuine stakeholder participation, setting managers a new challenge.

Participatory management planning takes a long time, and within the timeframe of most of the projects described in this book, producing an agreed management plan was not possible. The Kenya project (Chapter 2 and Box 16) spanned a longer timeframe, so the community was able to work together to produce a comprehensive plan in which water management practices were agreed and community by-laws were formalised. Wetland management planners would find it useful to refer to this model document.

The manager's skills

As we have seen, the manager of a wetland project needs a wide range of skills: knowledge of wetland functions and values, and the related legislation for water and the wetland habitat, as well as experience of socio-economic development, microfinance, conflict resolution, negotiation, trade-offs, community participation and strengthening, and more besides. Of course, such a "super-manager" does not exist, but his or her management team does. The manager must be able to pick a team that works together, learns from each other, and shares their expertise in the same way as the project as a whole.

How about training ourselves?

Some of the difficulties experienced by the projects reviewed in Chapter 6 came about through poor implementation rather than problems on the ground. Each of the four Wetlands International-supported projects described in Chapters 2 to 5 aimed to build the skills of the project beneficiaries as well as local leaders and government officials. Rarely though, did they take time to train their own staff so as to boost the special skills needed for a successful integrated project. Most staff training was on-the-job and incidental. Nevertheless, by forming management teams comprised of a mix of development and conservation staff, all team members greatly increased their understanding of each others' professional skills and their own capacities to manage integrated conservation and development work. Perhaps future projects should have a more structured approach to internal training. Since most of the project managers had backgrounds in wetland conservation, their foremost needs were to deepen their understanding of poverty and to establish poverty/livelihood indicators to let them measure socio-economic improvements.

Engaging with wetland communities

Although the demonstration projects had broader goals, the managers found they focused their time on the direct beneficiaries themselves. Involving the community in the design, planning and implementation of project activities proved important – which may seem obvious, but is not the case in many conservation (or indeed, development) projects (Box 17). The projects that had engaged with their beneficiary communities from the inception phase on moved forward much more

Box 17. Koné le Wetland

Villagers in Severy, Mali, used to see Bakary Koné and his team from the national Wetlands International office counting birds in their hunting grounds, but they never knew what they were doing. The project brought the villagers and the project together for the first time. Now the villagers help with the bird studies by collecting bird rings, and Bakary is now known affectionately as "Koné le Wetland".

quickly than those that did not. In those projects that had been essentially planned externally, staff spent considerable time developing relationships and responding to community inputs that were not scheduled in the project original design. Designing a project together with the beneficiaries can have drawbacks too: local people may come to expect that the project will actually happen, even though funding may not be secure. Inclusive processes can raise unrealisable expectations.

Building trust between beneficiaries and their supporting agencies is the prerequisite to maximising the benefits of a short-term project. Wetlands residents may be hard to approach. Fisherfolk, for example, may have closed social networks and often work alone. And there are other wetland-specific considerations: competition for water or fishing grounds may be fierce and result in local conflict; residents may live on boats and have no land; women may lack a say in decisions but be responsible for fetching water. Building trust is rarely written into project implementation, and project timetables do not allow enough time for trust to develop. Yet groups such as wetlands or fishery associations will only form in a trusting environment. The projects found that often informal women's groups would form to discuss a particular issue, but as soon as the group was formalised, men would take up leadership positions.

Projects as part of a "change landscape"

The projects can be seen as part of a long-term investment – a "change landscape" comprised of several projects and other interventions that extend over 20 years or more. The landscape starts with project inputs, which have a series of outcomes, which cause certain changes. At the same time, other projects and interventions also result in changes. It is likely to be some time before all these changes bring about the eventual project goal – to reduce poverty.

- The project in Kimana, Kenya, (Chapter 2) was one of many interventions within such a broad change landscape that aims to adjust wetland management in Kimana to allow wildlife in the nearby Amboseli National Park to survive and to meet the diverse development needs of people living nearby. The Kimana project itself cannot reach this ambitious conclusion.

The four projects were not designed to be start-up interventions. They were most effective where they built on existing structures, partnerships, capacity and institutional arrangements. Similarly, the projects could not expect to be self-contained or to terminate with the end of the project funding. Concern about post-project sustainability naturally increased as the project period drew to a close. Small demonstration or pilot projects like these can only work well if they are part of a wider "change landscape". By their very raison d'être, demonstration projects may not necessarily find the right solutions – they are test beds. But if their results are sound, they should be capable of being scaled up or replicated. This is certainly the plan in Mali, Zambia and Malawi. In Kenya, the project contributes to a bigger programme with the implementation of the community management plan.

Demonstration projects take on a life of their own

Managers found that the concept of "scaling up" was a particular challenge. A demonstration or pilot approach of projects is often the result of the short-termism of the project system rather than a need to demonstrate anything. Donors are frequently unable to plan and think strategically for the longer term, and more often than not they are in a position to provide funding only for three or four years at a time. As a result, short term projects are often set up as "demonstration" projects rather than projects with a longer term and perhaps more meaningful purpose.

Thus, managing demonstration projects poses particular problems. On the one hand, the project manager tries to test a hypothesis (if wetlands are well managed, poverty will be reduced) that will benefit the target community itself. At the same time the project tries to demonstrate good practice in a specific location to an external audience – the government or prospective donor. For the beneficiary community the project is not just a demonstration – it is real life.

Understandably, the four Wetlands International "demonstration projects" all took on lives of their own. They became projects in their own right, giving rise to a conflict of management interests. This attempt to meet two purposes – demonstration and real-time impact – is brought sharply into focus when the issue of sustainability is raised. If the project is only there as a demonstration, once this is done should the managing agent withdraw? Therefore an additional task for the project manager has to be to look for future funding and ensure the project is sustainable. So fundraising is yet another skill demanded of wetland managers and more and specific help could be given to help managers find new donor support.

In some respects, it may be no bad thing that projects take on lives of their own, since this implies that the project is self-reliant. Advice to managers might be that they should maintain distance from the work on the ground – and encourage the project go its own way and find its own independence outside the demonstration project system.

Biodiversity and poverty

The four project sites have very different levels of biodiversity and poverty:

- The Kenya project (Chapter 2) most clearly targeted a critical need for wildlife conservation.
- In Indonesia, Malawi/Zambia and Mali, wetland biodiversity was not overtly addressed. These three projects looked more at restoring or creating new habitat which, in due course, might demonstrate biodiversity benefits. The Malawi/Zambia project helped project managers to think of wetland conservation in terms other than wildlife conservation – in terms of soil and hydrology conservation, with indirect benefits for wildlife.

Project managers discovered that they each were working with quite different levels of poverty and within different social structures. In the poorest situations, the project managers found they had to address basic needs before conservation issues could be discussed.

Setting biodiversity and poverty indicators

All the projects struggled to measure success. They tended set separate indicators for biodiversity and poverty, while the essence of the Wetlands and Poverty Reduction Project was to demonstrate that the two are totally interrelated. There was difficulty, too, in separating indicators of process and

of impacts. Without firm indicators, reviewing and evaluating success are impossible; in a demonstration project, demonstrating success is even more poignant.

Biodiversity data. It is relatively easy to accurately assess a resource that people use to make a living. Wetlands offer some unique and tangible ways to measure their status and change – water quality and quantity, counts of waterbirds or fish, and so on, much of which can be undertaken in a participatory way. Changes in water systems can be very quick and easy to register. At many wetland sites, data on flora and fauna are available, but there are few empirical data on how these resources are used. Often, an area is already known for its ecological importance and may have a protected status. Yet in many (and maybe most) instances, regulatory, protectionist approaches in fact fail to conserve biodiversity. All the demonstration projects were looking for new ways to conserve biodiversity and the environment by involving the communities, who know their own resource best and who ultimately are the custodians of these lands and wetlands.

The projects in Kenya, Indonesia and Mali were managed by conservation NGOs with long histories of engagement in their areas, which were either close to or situated in protected areas. The project in Zambia also happened to be near the North Luangwa National Park, though this relationship was not planned. Despite the availability of data on biodiversity, three of the four projects did not consider that gathering biological data in their sites was a priority. The exception was in Mali, where the fish population of a lagoon was measured before and after restoration, and there was existing detailed data on waterbird populations. Hard, scientific evidence is essential if other projects are to be persuaded that the projects' methodologies can improve biodiversity as well as livelihoods.

Socio-economic information. Unlike their conservation counterparts, development organisations rarely gather biodiversity data before designing and implementing projects, whereas they are likely to have extensive socio-economic information on which to base strategies for poverty reduction. Yet setting a viable socio-economic baseline is generally much harder than preparing ecological indicators. For example, one of the simplest biological indicators used in the Ramsar Convention is the number of wintering waterbirds at a given site. These data are often gathered by enthusiastic volunteer birdwatchers.

Equivalent data on population and household status will probably be found in national census statistics; they are certainly not gathered by enthusiastic amateur sociologists! The government figures may help guide the choice of potential project locations but will rarely provide the detail needed to formulate intervention strategies. This has to be gathered at each site. Various assessment tools can be used for this: participatory rural appraisal is one. But such development tools have to be facilitated by well-trained people with a deep understanding of the complexity of gathering social, and often very personal, information. In any case, measuring social change or the way that people use their resource may show no meaningful results in a 3- or 4-year project, and an uncertain data baseline will not help to demonstrate the success of a particular intervention.

It is particularly hard to gather information from people living in and near wetlands. Fishers, for example, often live in areas that are hard to get to. They may be reluctant to divulge information on their livelihoods to outsiders, or even to their peers, and the data may be hard to analyse.

Gathering information from the community is not always an exact science, whereas biological and hydrological information can usually be backed by hard, indisputable data. And even when a wealth of data is gathered, anecdotal information may lead to misdirected strategies.

In Kimana, Kenya, for example, a diminishing flow of water was clearly making people poorer. But why was the supply reduced? That was not clear. Was it because of less runoff from the snowmelt of Mount Kilimanjaro, or from an evident decrease in rainfall over recent years? The African Wildlife Foundation's technical partner, Enterprise Works, showed with hard data that the actual water volume had not changed, but that more water was being extracted upstream – reducing the amount of water available downstream. Without this evidence, the project might have adopted the wrong strategy.

Using data to revise strategies. Given these complexities, not surprisingly the projects found it challenging to gather and interpret data. Three of the projects were used to establishing biodiversity indicators (mostly population and habitat data), but indicators of poverty proved very difficult. When this became apparent, a training session was held in 2007. The managers concluded that their initial logical frameworks and monitoring indicators were not appropriate, so they revised their project documents and strategies accordingly. This was a valuable learning exercise for all concerned.

Even so, there remained a tendency to view poverty only in terms of income, and there was relatively little understanding of the "sustainable livelihoods framework" (a commonly used approach to analyse the processes and causes of poverty).

Are conservation–development partnerships the way forward?

Integrated conservation and development projects tend to be driven by conservation agencies concerned with species protection, rather than by development agencies more used to addressing humanitarian relief and rights issues. Most conservation agencies have adopted the Convention on Biodiversity's ecosystem approach, which recognises that people should play the central role within any ecosystem. This people-centred approach is nowhere more significant that in a wetland ecosystem. In an attempt to harness conservation and development approaches, a condition for each project within the overall Wetlands and Poverty Reduction Project was that it be structured as a more-or-less equal partnership between a conservation organisation and a development agency.

- The outstanding example of this cooperation was the partnership between Wetlands International and Care in Mali (Box 18 and Chapter 5). The reports from both partners repeatedly emphasised what they learned from each other and how the sharing of expertise led to greater efficiency. The Mali project also formed partnerships with microfinance agencies to deliver its Bio-rights programme, and this clearly worked well. The project staff knew that microfinance was beyond their own expertise. Besides, working with established, authorised networks provided a chance to scale up environmental concerns into existing microcredit systems.

The other three projects interpreted the stipulation that they should be based on conservation–development partnerships rather differently.

- The African Wildlife Foundation (Chapter 2) might consider itself as both a conservation and a development agency, and its partnership with Enterprise Works, as its "official" development partner, was more a way to provide specific technical support to the project.
- Similarly, Wetland Action in Malawi and Zambia (Chapter 3) might feel that it worked in both conservation and development areas, though the biodiversity conservation aspect of the project was not a priority.

Box 18. An equal partnership

Care and Wetlands International in Mali formed the strongest, most equal partnership, and was the only one that fully adopted the Wetlands and Poverty Reduction Project's requirements for joint development and conservation foci. Both parties repeatedly reported the mutual gains of this arrangement.

- Wetlands International in Indonesia (Chapter 4) formed partnerships with more local development NGOs and government extension programmes, and these tended to emphasise the development side of the project.

All these approaches have provided positive results in terms of learning, though the benefits seem greatest from the Mali example.

Keep thinking strategically

When one has responsibility for managing a project, it is very easy to stop thinking strategically. Managers might feel that the implementation of a project is so pressing that "someone else should do the strategising".

The landscape approach used in the Kenya project encourages strategic thinking. Other planning tools, however, such as the logical frameworks, may have been used more as a management obligation rather than as a tool that aids discussion, planning and strategising. In fact, halfway through the project period, managers decided to review their logframes, with the intention of adopting a stronger multi-stakeholder discussion.

Using task groups

To widen the outreach options and strengthen capacity of the demonstration projects, the Wetlands and Poverty Reduction Project established a number of task groups to support capacity building, policy, communications and the demonstration projects themselves. This was an innovative approach and worth consideration by future wetland project managers.

For the demonstration projects, an external Demonstration Project Task Group was established. The group had diverse backgrounds and skills so as to try to cover the complexities of the wetland ecosystem. Its seven members came from six countries: Brazil, Japan, Kenya, Malaysia, Senegal and the UK. The group had the role of supporting the projects through mentoring and bringing their experiences of working on wetland and poverty issues to the demonstration projects and the umbrella Wetlands and Poverty Reduction Project. The group's members were also asked to take their experience of working with the demonstration projects back to their own organisations and associates as a way of spreading their lessons to as big an audience as possible. The initial hope was that the members of this task group would be supported by their organisations, but in practice those with full-time jobs could commit only limited time to the group. So a core group was formed. The task group members reviewed all the progress and technical reports produced by the demonstration projects, facilitated all the workshops, and commented on other project outputs. Five of the group also made site visits and in one case provided training. This task group was generally considered to have had a catalysing, positive influence on the project.

In future, other structures of task groups could be considered. A task group could be comprised of members of the implementing projects themselves, charged with reviewing and sharing each others' work. Or there could be a single group consisting of members of the different thematic elements of the project – policy, communication, capacity building and demonstration project, which might bring more cohesion to a multi-faceted project.

Taking risks, being innovative

The Wetlands and Poverty Reduction Project provided the opportunity to experiment with management systems – to try new or innovative approaches. The partnership approach was one such innovation, as was the establishment of the task groups. In terms of project implementation and management, the projects followed traditional design and management patterns. Perhaps the short time frame of the projects, the pressures to "deliver" and the immediate responsibilities managers had for their beneficiaries, limited the risks or new innovative approaches that managers felt willing to take.

Institutional change

The ultimate donor, the Dutch Ministry of Foreign Affairs, wanted the Wetlands and Poverty Reduction Project to build the capacity of Wetlands International to approach wetland conservation in a different way. Changing an organisational mindset and the way an organisation is perceived from the outside is challenging for managers at all levels. The demonstration projects will have gone a long way to help Wetlands International integrate the needs of wetland people into its worldwide wetland conservation work. This is not just because working with communities is perhaps the only way to meet the objectives of conserving wetland wildlife. It is also because well-managed wetlands are essential for their communities and for all people.

> *"We have to become the change we wish to see in the world."*
>
> —Mahatma Gandhi

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Sander graduated in journalism at the University of Applied Science, Utrecht, and holds a Master's degree in international relations from the University of Amsterdam. The latter study included an internship with the development cooperation department of the Royal Netherlands Embassy in Bogotá, Colombia. He has extensive field experience in Colombia with the Environmental Research Institute of the Pacific Coast and with indigenous and Afro-Colombian community organisations in the Chocó biodiversity hotspot through the Chocó Community Autonomy Project.

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Rebecca is a specialist on wetland conservation and wise use, and is co-owner of a natural resources management company. She is known for her work with the Ramsar Convention; she is currently the vice-chair of the convention's scientific and technical review panel and was formerly the regional coordinator for Asia/Oceania at the Ramsar Secretariat. She was also co-chair of a synthesis report on *Ecosystems and human well-being: Wetlands and water* for the Millennium Ecosystem Assessment. She works with governments, international development assistance agencies and non-governmental organisations, both in a voluntary capacity and as a specialist consultant.

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Mori received a degree in agriculture in 1986. After working in the Institute of Rural Economy and private firms for 5 years, he has been involved in wetlands resources and biodiversity issues in Mali since 1998. Acting first as a research assistant on waterbird monitoring and hydrological issues for Wetlands International, he has since been appointed a rural development officer.

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Moussa holds a PhD in biology and ornithology, and has worked with conservation institutions for 15 years, including the University of Dakar in Senegal, the Institut de recherche pour le développement (formerly known as Orstom), the Ecotoxicological Research Centre in Sahel (CERES-Locustox), and international NGOs such as IUCN and Wetlands International. He has considerable experience in developing project proposals, collecting and managing field data, and editing reports. He is interested in topics related to global ecosystem functions: the link between wildlife, their habitat and human impact, and particularly on wetland conservation and integrated management.

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Nyokabi is a lawyer with the African Wildlife Foundation. She has a bachelor's degree in law and is studying for a master of law degree at the University of Nairobi. Her interests include law and policy research related to natural resources, land, wildlife, water, forests, minerals and wetlands. She has experience in development of legal structures for community participation and land conservation, as well as in property rights-based mechanisms for habitat conservation.

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Bakary holds a degree in animal husbandry from the Institute Polytechnique Rural de Katibougou, Mali (1980) and an MSc degree in animal and poultry sciences (1994) from Tuskegee University, USA. He has also attended several postgraduate courses in natural resources, biodiversity, water management and ecology. He has worked for universities, government organisations and international NGOs, gaining substantial experience in agricultural issues and sustainable management of wetlands, natural resources and biodiversity in various countries. His other professional activities include project management, project planning and coordination of complex project activities and training. He has published extensively on these subjects.

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After completing high school in 1980, Peter went to a forest training school, then worked for the government for 4 years before studying for a diploma at the East Africa School of Theology. After 5 years working as an enumerator with World Vision, he became a full-time church pastor. He then worked for 8 years in a tourist facility in Amboseli National Park as a supervisor in landscaping and garden management. He became interested in conservation work, particularly on wetlands conservation, and participated in community activities. In 2008 he was elected chairman of the Kimana Wetlands Association.

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Reza graduated as a biologist in 1995 from Padjadjaran University in Bandung, Indonesia, and continued his master's degree in biodiversity in Uppsala University and the Swedish University of Agricultural Sciences. He is been working for Wetlands International since 1996, mostly on species conservation, as well as a wide range of conservation issues such as wetland assessment and management, land use planning, policy making, peatland restoration, awareness and environmental education, community development and climate change issues, capacity building, project management and proposal development. He has worked in various wetland sites in Indonesia, including Sumatra, Kalimantan and Java. Since 2000 he has been the national representative for Indonesia in the Otter Specialist Group of IUCN's Species Survival Commission.

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Violet is currently an independent consultant in the areas of natural resources management, gender and monitoring and evaluation, and also a programme adviser with the Millennium Community Development

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Paul is a British consultant in development communication. He holds a PhD in journalism and mass communications from the University of Wisconsin-Madison. He specialises in easy-to-understand extension materials, developed through intensive writeshops like the one used to produce this book. He also provides consultancy services in various aspects of development communication. He has worked extensively in Southeast Asia, South Asia and Africa.

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Ndiyoi is a graduate in agronomy with a minor in farming systems research and rural development from the University of Florida in 1988. He has worked in rural development and agricultural research since 1981, where he was chief agricultural research officer in the Farming Systems and Social Sciences Division of the Zambia Agricultural Research Institute. With 20 years of field experience, he has been team leader in different projects. His work has taken him to several countries in southern Africa, where he has worked with national departments of agriculture, international donors, national governments, research trusts, NGOs, development projects and UN agencies.

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After completing high school in 1994, Leonard taught as a community volunteer in Kimana primary school for 2 years. He then was employed as a clerk in Kimana community wildlife sanctuary, and joined the Kenya Wildlife Service training institute for a diploma course in wildlife management. In 2003 he attended an internship programme with the East African Wildlife Society and was appointed assistant project officer responsible for education and awareness projects for young Kenyans in communities near national parks, and on endangered primates in Trans-Nzoia district in Western Province. In 2005 he joined a group of community members from Kimana and co-founded the Noomayianat organisation, which partnered with the African Wildlife Foundation to implement the Kimana Wetlands project. As project coordinator, community mobilisation was one of his main tasks. In addition, he continued working with Noomayianat on water resources conservation and sustainable livestock keeping in Kimana.

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Yus is a wetland ecologist specialising on waterbirds ecology. Since 2000 he has broadened his interest to cover community development in wetland areas and poverty and climate change issues. He has led and participated on various poverty/climate change activities, including the Climate Change, Forest and Peatlands in Indonesia project, Wetlands Poverty Reduction Project, and Central Kalimantan Peatlands Project. His work on migratory birds and climate change has taken him to Asia, Australia, Western Europe, South America and East Africa.

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Jonas earned his certificate in general agriculture in 1989 and an advanced certificate in general agriculture in 2003. He worked as an agriculture supervisor in government for 13 years. He also has experience in identifying business opportunities in rural areas, and training in animal draught power and mechanisation and in facilitation skills. In his current job he acts as wetland coordinator for the Striking a Balance project.

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Sonali's research at the International Water Management Institute focuses on the linkages between wetland ecosystem services, livelihoods and poverty dynamics using integrated approaches. Her current work involves wetlands systems in Sri Lanka, India, Cambodia and China. Before this, she worked for the International Union for Conservation of Nature for 6 years in Sri Lanka as head of the National Marine and Coastal Programme, and in the USA as a policy fellow working on community participation in the sustainable management of marine and coastal resources. She has a BSc in biology and an MSc in ecosystems analysis and governance from the University of Warwick (UK). Her doctoral degree is from Imperial College, London (UK), where she studied livelihood dynamics in a coastal wetland system.

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Dramane studied in the former Soviet Union, where he obtained a master's degree in water engineering. He then became professor of agricultural engineering at the polytechnic and rural institute of Katibougou for 6 years, before turning to the NGO world. He has worked with CARE Mali for 12 years, during which time he has gained experience in providing wells, water and sanitation, irrigation, flood plain management, community mobilisation and small and medium-sized enterprises.

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Sanjiv is an environmental lawyer with a master's degree in international environmental law from the University of Nottingham, UK. He worked with the IUCN Sri Lanka Office for 5 years on various conservation issues in Sri Lanka and Asia, including legal and policy reform, protected area management planning, forestry, species conservation, and capacity building on national and international policy and legal frameworks for government agencies, NGOs and education institutions. He is currently a researcher at the International Water Management Institute based in Sri Lanka, studying links between wetlands management and poverty reduction and the role of water and water-related institutions in water management and equitable development.

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Marcel has a doctorandus degree (equivalent to an MSc) in biology, including nature conservation from the Agricultural University of Wageningen, and zoology and tropical soil sciences from the State University of Utrecht. He started his international career in 1983 with studies of peatswamp forests, tropical coastal ecosystems and waterbirds in Indonesia and Malaysia. He founded the largest country programme of Wetlands International in Indonesia in 1986, and supervised the establishment of offices and programmes in Thailand, Cambodia, China, Russia, Ukraine, Senegal and Mali. Marcel has considerable experience with integrated wetland conservation and sustainable development programmes, strategic planning and fundraising. Since 2001 he has developed and managed the global Wetlands and Livelihoods Programme of Wetlands International. He has published over 50 scientific articles and reports.

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Maria trained as a conservation biologist. She has an MSc in human ecology, in which she studied mangrove use by local people in rural areas of northern Vietnam. Her experience and interests include project management support and monitoring and evaluation. She previously worked for Unesco's Division of Ecological Sciences and an environmental NGO in Venezuela. She has worked at Wetlands International's headquarters office since 2004.

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Ook graduated with a bachelor's in economic management from Jambi University. Since 1998 he has been Director of Pinang Sebatang Foundation, where he is responsible for coordinating field activities. He has experience in implementing programmes based on ecotourism and people's power, and established his organisation as the centre for environmental information in Jambi province. In the Berbak area, he is involved in the Climate Change, Forests and Peatlands in Indonesia project, funded by the Canadian International Development Agency, which aims at the sustainable management of, and community participation in, peat swamp forest. He is experienced programmes that combine income improvement and conservation efforts, including those that prevent fires. He is involved in a community capacity building programme in Jambi province, together with various government institutions.

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Patrick has a bachelor's degree in environmental sciences from the University of Malawi, with emphasis on environmental management. He has management experience in development programmes and in the design, implementation, monitoring and partner collaboration in development projects, and in community mobilisation. With the Malawi Enterprises Zones Association he has worked on rural relief management and livelihoods strategies with in collaboration with Kasungu Rural Development Project and District Forestry Office. For the last 3 years he has been natural resources management coordinator with Malawi Enterprises Zones Association under its Simlemba community initiative for sustainable rural livelihoods project and the Wetland International-funded Striking a Balance project.

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As head of BirdLife International's Africa Division, Hazell has overall responsibility for development and implementation of BirdLife's programme in Africa covering over 20 countries. This has given him leadership experience in multi-country project implementation and administration, logical framework development and analysis, project monitoring and evaluation, technical support, capacity development, and liaison with

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Marie-José has a master's degree in cultural psychology and has been trained in management consultancy. She has worked in Southeast Asia for a number of years on "nature and poverty" projects and has coordinated several NGO programmes on sustainable development. Most recently, she has led "Green Coast", a post-tsunami ecosystem and livelihood restoration programme implemented by Wetlands International in collaboration with IUCN, WWF and Both ENDS in tsunami-hit coastal areas in Asia. Currently, she manages a large-scale wetlands and livelihoods programme focusing on "adaptation to the impacts of climate change" and "water and food security" in a number of regions in Africa, Asia and Latin America.

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Fiesta is an ecologist with a master's degree in wildlife conservation from Reading University, UK, and a first degree in wildlife management from Juba University, Sudan. She currently works with the African Wildlife Foundation in implementing its landscape-level conservation programme in the Kilimanjaro Heartland – a cross-border landscape covering southern Kenya and northern Tanzania.

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Adrian is a professor of geographical and environmental sciences who has taught in Zambia and Ethiopia, as well as the UK. He strongly believes in applied research to help improve the livelihoods of the rural poor through better natural resource management. To support this goal he helped set up Wetland Action, which mainly seeks to address the problems of sustainable use faced in many small seasonal wetlands in Africa. Adrian's work has been mainly in eastern and southern Africa on issues of food security, resource management and wetland-related policies.

Mission

To sustain and restore wetlands, their resources and biodiversity for future generations.

Conservation organisations value wetlands for the richness of their biodiversity – especially for their birds, fish and plants. Conservationists want to see wetlands preserved. Many governments and development organisations, on the other hand, see wetlands as unexploited resources or a hindrance to development: as essential supplies of water for domestic and irrigation needs, as land to be drained for agriculture and forestry, or simply as wastelands infested with mosquitoes.

The truth is that wetlands are vital environmental sanctuaries, critical to the viable functioning of the ecosystems in which we all live. More specifically, wetlands are the sources of livelihood for the people – often poor farmers and fishers – who live in and around them. The subject of this book is the challenge of reducing poverty whilst at the same time as conserving the biological and intrinsic values of wetlands.

The book draws on the experiences of four projects with financial support from Wetlands International, in Indonesia, Kenya, Zambia/Malawi and Mali, that combined conservation and development goals. The four projects demonstrated – each in a different way – how improving livelihoods and conserving wetlands can go hand in hand. The book tells the story of the problems that the individual projects faced, and how they were addressed. In addition, there is a review of seven other wetland-based projects from around the world.

Each project is analysed in terms of six cross-cutting themes: poverty and livelihoods, biodiversity and ecosystem services, water management, community engagement, policy, and project management.

The book is written by and for practitioners involved in planning and managing conservation or development projects in wetlands. The book should also be an aid to policy makers and all those trying to reconcile the apparently conflicting goals of environment and development programmes.

For further information please visit our website or contact our office.

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