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Chapter 1

INTRODUCTION

Photo by Tim Dodman

Chapter 1

INTRODUCTION

Gordon Claridge and Bernard O'Callaghan

Background

This manual is based on papers presented in Workshop 3: *Wetlands, Local People and Development* of the International Conference on Wetlands and Development held in Kuala Lumpur, Malaysia, 9-13 October 1996. The workshop was divided into three themes: increasing local input into planning, sustainable wetland management by local people, and increasing community awareness of wetland values.

These themes constitute essential elements of community involvement in wetland management, and indeed the papers presented under these themes provide a wide-ranging survey of many practical aspects of such involvement. It therefore seems fitting that they be made available in the form of case studies illustrating guidelines for practitioners in this field.

In a sense this collection of papers complements the case studies in the Ramsar Convention Bureau's publication *Towards the Wise Use of Wetlands* (DAVIS, 1993). The Ramsar Wise Use case studies illustrated a series of 'strong guiding principles' which included the conclusion that:

> "Special attention needs to be given to the local population who will be the first to benefit from improved management. Devolution of control over resources from central government to local structures may be a critical element in the success of approaches to wise use, and ways of achieving this need to be examined in all field projects." (DAVIS, 1993).

The case studies presented here follow on from the Wise Use case studies by reporting on different aspects of people's involvement in wetland management.

Progress in Fostering Community Involvement in Wetland Management

While Workshop 3 of the International Conference on Wetlands and Development was a follow-up to the Ramsar Bureau's Wise Use studies of 1993, it was also an updating of the 1989 International Conference on the People's Role in Wetland Management held in Leiden in the Netherlands (DE GROOT & ZANEN, 1990).

It is interesting to look back at the proceedings of that earlier conference and contemplate how much progress has been made in the eight years since 1989.

At the end of the 1989 conference a panel of experts in wetland management concluded that:

- enhancing participation of local people in rural development required a basic shift of attitudes within the development community;
- accepting people as co-experts and the idea that we should participate in their development strategies should be the 'countervailing inspiration', leading to true shared analysis of problems and shared design of solutions. (Successful overall approaches along these lines were seen to be emerging in 1989, but it was recognised that "there will never be a blueprint recipe");
- community development is a process, not a project. Therefore, enhancing participation of local people implies that the concept of a 'development project' should be abandoned;
- long-term and large-scale programmes, progressively building up their activities in many villages, should be initiated, instead of development projects that are restricted in area, scope and time. Core characteristics of these programmes should be:
  - flexible implementation of a large variety of activities, thoroughly monitored and evaluated, so that the programme learns while doing;
  - motivation of people, not primarily with money or other gifts from outside, but with ideas and the direct benefits of the activities themselves; and
  - multi-sectoral design that mirrors the communities' cultural views of resources;
- wetland preservation may imply a discrepancy between local and outside interests. Preferably, this discrepancy should be reduced through the shared design of wetland activities and emphasis on producing local benefits; and

- before there is any consideration of applying compensation or regulation, the community should be involved in exploring alternative livelihood activities. (DE GROOT & ZANEN, 1990).

In some respects we have come a long way from the situation in 1989. Certainly, the concept of community participation in wetland management is now widely accepted among the development community. In addition, the rapidly increasing use of RRA and PRA highlights how much community members have become accepted as co-experts, at least in theory.

However experience in the intervening years has shown us that the change of attitudes is slowest in government agencies involved in wetland management. Some of the case studies presented here suggest that even where there is government support for co-management it is mainly 'lip service' to the idea, rather than a whole-hearted acceptance of community involvement as a basic element of their management approach. The development of techniques for increasing government acceptance of, and commitment to, co-management is one of the major challenges facing wetland conservation in the next few years.

The notion that development (including the establishment of co-management arrangements) is a process and not a project has certainly been widely accepted among the NGO community - in fact the concept probably originated there. Unfortunately the practical recognition of this principle is less evident among development assistance agencies, despite their many fine words on the topic. Until these agencies can find a way to demonstrate real commitment to the quality of the process and the long-term benefits of their activities, rather than concrete outputs and short-term, expenditure-driven actions, they will have difficulty making significant and meaningful contributions to sustainable wetland conservation in developing countries.

It might be argued that the adoption of the integrated conservation and development (ICAD) and livelihood activity concepts by the development assistance agencies has shown an acceptance of process over product. However there is still no convincing evidence that the way in which large-budget projects generally implement these approaches is either primarily process-oriented or sustainable over the long-term.

In general, sharing of the design of wetland resource management projects among the wider group of stakeholders remains, for the most part, a desirable

goal that is seldom attained. The widespread requirement among funding agencies for the production of a detailed, costed project design prior to allocation of any significant funding works against the achievement of this goal. In this regard, national governments have an advantage over international agencies (NGOs, aid agencies or bilateral donors). They are on the spot, and can provide funding through budgets which can be modified annually to take account of emerging information. Unfortunately, few developing country governments yet seem interested in establishing meaningful broad participation in programme design, whether for routinely funded activities or for those supported by development assistance funding. This is another challenge for those striving for sustainable wetland management.

The conclusion must be that we have come a long way since 1989 and that there have been many practical achievements in involving communities in wetland management. More than this, we have developed a wide range of approaches to the various elements of community involvement and have greatly increased our understanding of the process. Nevertheless, there remain major challenges, particularly in changing the attitudes and values of international development assistance agencies and developing country governments.

One of the lessons that workers attempting to establish community involvement in wetland management have learned over the years is that the usual result of their work is not 'success' or 'failure' - we very rarely experience complete failures, and, unfortunately, more rarely have comprehensive successes. It is a case of 'learning by doing', and every activity yields some valuable results and experience, not only for the participating stakeholders but also for the field workers. It is only by reflecting on our experiences and sharing them in formats such as this manual that we can keep improving our performance.

Structure of the Manual

The next four chapters (Chapters 2-5) introduce the concept of community involvement in wetland management, identify this as what is broadly termed 'co-management', set out the characteristics of successful co-management, examine the many factors that must be considered in achieving true collaborative management, and then follow the steps in the co-management process. Each of these chapters is referenced to the case studies (presented in Chapter 7) so that the practicality of the guidelines is emphasised. Chapter 6 draws out and summarises the approaches canvassed in detail in the main body of the manual.

The comments on the case studies, presented as footnotes in Chapters 2-5, generally refer to specific elements of individual case studies, to allow users to go more or less directly to descriptions of 'real life' situations which illustrate the guidelines. The majority of the footnotes are thus based on the content of the case studies. However, a few of the authors of case studies have provided additional material in the form of personal communications to one of the editors (GC) to further amplify practical aspects of the situations described in their papers. Wherever possible these personal communications have been added as footnotes to the case studies. In a few cases the editors have used the footnotes to comment on specific lessons that can be drawn from a particular aspect of a case study. In this way it is hoped that the maximum practical value has been derived from the range of material presented by the authors of the case studies.

It needs to be stressed that the guidelines presented here are not meant to represent 'exact science'. Developing, encouraging and supporting community involvement in wetland management does not have hard and fast rules. Every situation is different, and the resource manager who would take on the role of catalyst to the co-management process has to rely mainly on past experience and whatever practical advice is available.

Chapter 2

WHAT DO WE MEAN BY COMMUNITY INVOLVEMENT?

Photo by Faizal Parish

Chapter 2

WHAT DO WE MEAN BY COMMUNITY INVOLVEMENT?

Gordon Claridge

'Community involvement' in wetland management can mean different things to different people.

It is essential for those attempting to ensure sustainable management of wetland resources to understand that the involved 'community' is not generally restricted to a particular user group. Management of wetland resources seldom takes the form of rational control by one or even two groups. In practice, it is generally better understood as a **process** in which a variety of groups is struggling for access to, or control of, different wetland resources. Different groups are often interested in quite different aspects of the wetland (MERMET, 1990). The struggle may be overt, though this is less likely when groups are interested in different resources in the wetland. More often the actors do not fully realise the extent of the impacts that they are likely to suffer as a result of management of the wetland area for a resource other than the one in which they are interested.

How Broad is the Community?

The wider community involved in wetland resource management is often described as the 'stakeholders'. A stakeholder, or stakeholder group, can be defined as any individual or group who may be affected by, or expresses a strong interest in, the resources or management of a wetland area.

Stakeholders may include:

- local user communities - those people who live in the vicinity and directly use the resources, and who, in developing countries, are typically partly in a subsistence relationship with the resources and partly in a market relationship;
- local communities having an indirect interest in the management of the resource; for example, local communities which rely on some function of

the wetland, such as flood control or coastal erosion protection, but do not directly use the resources;

- remote user communities who come from a distance to use the resources and who may be in competition with the local users (or may have a long-standing arrangement with the local community), or may use a different component of the resources;
- commercial direct users of wetland resources (individuals, groups or legal entities such as companies) who have a purely commercial relationship with the resources;
- commercial indirect users who sometimes do not realise that they are users of the wetland resource. Examples include companies which discharge wastes into the wetland, or commercial operations harvesting wetland resources 'downstream', such as offshore harvesting of shrimp which spend their larval stages in the wetlands;
- suppliers and marketers associated with wetland resource users can be a diverse group, including middlemen for wetland products, suppliers of inputs such as fuel and equipment, providers of credit, etc. This group can be extremely resistant to change in the status quo and often have much better political connections than the local user community;
- government agencies with responsibility for management of some aspect of wetland resources. This might include a range of agencies with sectoral responsibilities for different resources, for example, fisheries, forestry, and water supply;
- supporters of wetland communities, such as: environmental and conservation organisations, social and human rights advocacy groups, development assistance organisations and concerned individuals, and
- end consumers of wetland products.

Thus, interventions in the management process which focus solely on a particular user community, or even on a user community and the relevant government agency, are often undermined by parts of the wider community that have not been included in project design considerations.

From this perspective the range and scale of the difficulties facing the single operator (project team, government agency, technical advisor, NGO, individual community) in trying to influence wetland resource use and management

becomes clearer. No strategy for wetland management can be expected to succeed if it does not take into account the interests of the multitude of parties involved - in this sense the 'community' is very broad indeed.

The Local User Community

Where there is competition for wetland resources, or where resource management measures are being imposed by governments, the local user communities are generally the most affected and the least able to look after their own interests. In developing countries wetland user communities sometimes, though not necessarily always, include indigenous groups who may be 'marginalised' from the wider society. In the case of small-scale fishermen they are often people who have been displaced from other resource bases and frequently constitute the 'poorest of the poor'.

Where local communities are traditional users of wetland resources they will usually have developed a management regime with its own 'rules and regulations' and a body of detailed ecological knowledge. All too often these existing systems and knowledge are overlooked in the application of 'scientific' management solutions. Yet, throughout the world, local communities and indigenous groups have for centuries used, improved and maintained wetlands, securing livelihoods and maintaining their cultural identity.

Even where these traditional management regimes are breaking down under population, political or economic pressures, these communities often retain an understanding of the ecology of the wetland systems which is far superior to that of 'outsiders' such as government officials and researchers.

Involvement Leads to Co-management

This publication is mainly about enhancing the involvement of user communities in wetland management, though it necessarily takes into account the need for involving all stakeholders in the management process.

But 'involvement' is a weak and imprecise term. In the past it has been too often used by governments to mean a process of token participation in which community leaders have been coerced into agreeing to developments which

were later revealed not to be in the best interests of their constituents. By the same token, some NGOs have used the term 'involvement' as a smokescreen for the total ownership and control over resources by local user communities. Neither of these is a tenable or sustainable situation (see *Legal Basis for Resource Management* [p.53] for further discussion of this point).

In reality, community involvement in wetland resource management requires the collaboration of all parties - collaborative management - or 'co-management'. This term will be used in the following chapters to represent the range of levels of community involvement in wetland resource management.

The Role of Government

There will be considerable emphasis in these chapters on cooperation and collaboration between communities and government. The full role of government in co-management will depend on the degree of autonomy that the other stakeholders enjoy (see *Sharing of Authority and Responsibility* - Chapter 4). However the necessary minimum input from government will always be a policy and legislative framework which forms a basis for management strategies and actions and includes legitimisation for the involvement of non-government stakeholders in the resource management process.

Other legitimate roles for government in co-management include:

- bringing stakeholders to a forum for discussion of issues - local user communities and NGOs might not have the power to do this;
- providing links to other arms of government which may not have direct representation in the wetland region;
- providing incentives for introduction of, or compliance with, resource management measures;
- enforcing regulations when necessary;
- arbitration of disputes among stakeholders where these cannot be settled by the parties themselves;
- providing technical and financial assistance, particularly at start-up; and
- providing development inputs such as infrastructure which are part of the overall development process within which co-management operates.

However, those who provide assistance to the establishment of co-management need to recognise that in many instances the government will have put itself into the position of the adversary, or at least firmly on the side of those involved in unsustainable exploitation of wetland resources. In such situations the degree of cooperation which is possible might initially be extremely limited or non-existent.

Even without these complications, in many if not most cases government agencies will either not initially be supportive of community involvement, or will lack the capabilities to implement it. Therefore in some situations it is necessary to view the government as a part of the problem, as well as potentially a part of the solution. In such circumstances considerable effort will need to be devoted to changing government attitudes and approaches and to gaining community recognition of these changes.

Chapter 3

WHAT IS SUCCESSFUL CO-MANAGEMENT?

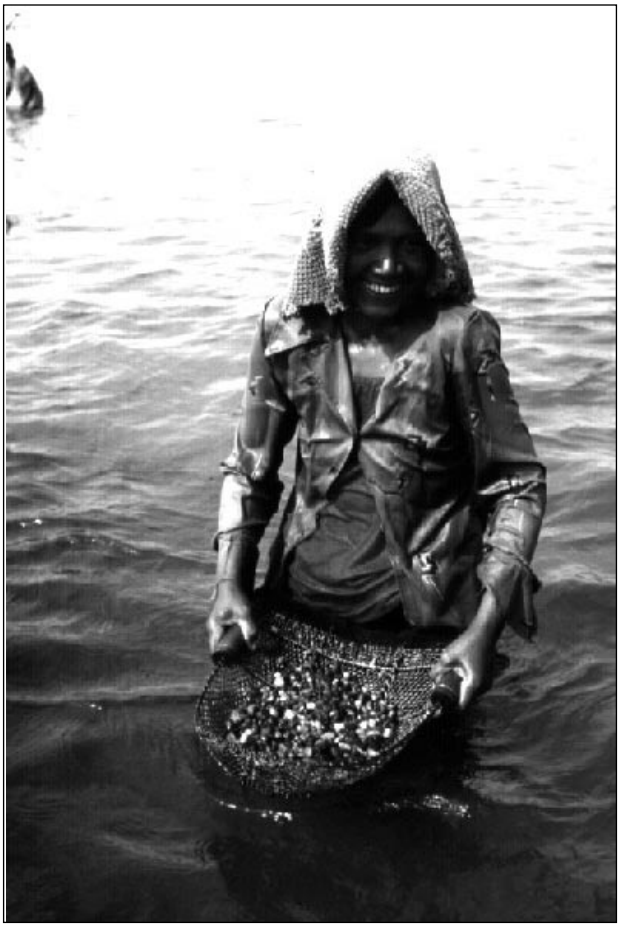

Photo by Taej Mundkur

Chapter 3

WHAT IS SUCCESSFUL CO-MANAGEMENT?

Gordon Claridge

What Exactly is Co-management?

Co-management is the active participation in management of a resource by the community of all individuals and groups having some connection with, or interest in, that resource[1].

Partners in co-management of wetland resources of necessity include the government and the relevant local user community, but may also include more distant communities, the business sector, NGOs and international bodies, etc.

Three elements particularly distinguish all true co-management regimes:

- sharing of authority and responsibility for resource management according to arrangements which are understood and agreed by all parties;
- social, cultural and economic objectives are an integral part of the management strategy; and
- sustainable resource management is a major objective.

Characteristics of Successful Co-management

Analysis of successful co-management arrangements shows that they generally share the following characteristics:

- there is recognition by government and other stakeholders of the benefits of integrating conservation and development;
- government agency staff support and facilitate the active involvement of the local people in resource management and conservation;

[1] Addun & Muzones - Case Study No.10 - quote Fellizar's (1993) definition of "community-based resources management" as: *a process by which people themselves are provided the opportunity and responsibility to manage their resources, define their needs, goals and aspirations and make decisions affecting their well-being.*

- all key parties (direct users of the resource and responsible government agencies) are willing and able to participate fully;
- there is appropriate sharing of resources, information, power and decision-making;
- each key party clearly understands the situation, and particularly the expectations, of the other key parties;
- there is trust between the parties;
- all parties to co-management play their assigned roles;
- all stakeholders, including government agencies, possess a sufficient level of organisational skills, financial resources and capability;
- root causes of problems are understood and agreed upon by relevant parties before actions are taken; and
- there are clear benefits (both short and long-term) for communities undertaking management responsibilities, and particularly for communities required to forego some resource use benefits[2].

Not all of these characteristics will exist at the commencement of a programme to establish co-management of wetland resources. However they constitute goals which need to be reached if effective community participation in management is to be achieved.

These characteristics will be more fully explored in the next chapter.

Can User Communities Manage Alone?

Addun and Muzones (Case Study No.10) distinguish between co-management and what they call "autonomous management". By this they mean management by the community without government involvement - apparently what WHITE *et al.* (1994) term "community-based management". Does autonomous wetland resource management really exist? It would appear to be one end of the spectrum of co-management, at the opposite end to management solely by government. However it is difficult to imagine a situation in which a community had a

[2] Addun & Muzones - Case Study No.10 - give the 'basic principles' of community-based resource management as: empowerment, equity, sustainability, systems (relations with other communities and ecosystems) orientation and gender-equity.

significant interest in a wetland area in which neither government nor industry also had an interest. In reality, autonomous management could only exist either under sufferance of government, or where the government was so weak as not to be able to fulfil its resource management responsibilities. Such conditions generally exist only in isolated areas in less developed countries.

User communities managing in isolation would be unlikely to be able to solve problems that originate outside the community. Experience has shown that even where government is not a willing partner in co-management, it is necessary to co-opt at least some parts of government if long-term results are to be achieved.

In addition, successful community management requires a supporting framework of policies, legislation, the judiciary and other functional links with government institutions.

Chapter 4

MAKING CO-MANAGEMENT OF WETLAND RESOURCES WORK

Photo by Marcel J. Silvius

Chapter 4

MAKING CO-MANAGEMENT OF WETLAND RESOURCES WORK

Gordon Claridge and Bernard O'Callaghan

This chapter examines the factors which need to be taken into account in establishing successful co-management of wetland resources.

Sharing of Authority and Responsibility

The establishment of a co-management regime requires the creation of a positive and flexible approach at all levels and the generation of trust and confidence within, and between, the groups involved. This in particular relates to a flexible approach to the decision-making process.

It is imperative to avoid fixed ideas of the degree of community involvement or the exact extent of sharing of decision-making. These things must be allowed to evolve through the dynamics of the particular situation. To attempt to impose them from outside is to place the success of the whole process in jeopardy. The different stakeholder groups within the wider community have different priorities, seldom have equal decision-making power, and seldom want the same degree of participation.

As indicated in the previous chapter, relevant government agencies need to be involved if co-management is to be successful in the long term. If government is not involved, and particularly if there are not components in the process to raise the understanding and awareness among government agencies of the capabilities of the community in resource management, then there is a danger that the innate power of government will eventually lead the situation back to that which previously existed.

It is particularly important that government agencies are willing to move away from rigid top-down approaches and embrace co-management as a legitimate

form of resource management[3,4] Achieving this state of affairs generally takes a long time.

Points to remember:

- **avoid fixed ideas, and be confident that the process will evolve**
- **develop a flexible approach to decision making**
- **try to involve all relevant government agencies and departments, NGOs and community organisations in the process as early as possible**
- **ensure that the government recognizes the importance of co-management through the development of policy and planning frameworks to support this approach**

The Need for External Assistance - the Role of NGOs

Successful co-management requires goodwill and cooperation between the government agencies and the local user groups. Often, the tensions that have developed and led to the recognition of the need for co-management have broken down this goodwill, and the issues and problems have become very polarised. This is where an outside influence such as an NGO may be able to assist in improving the communication between the parties involved[5].

In addition, it is extremely important that communities have an ongoing source of independent advice, ideas and expertise for developing their involvement in

[3] Ayres *et al*. - Case Study No.1 - describe an approach in which a specific programme has been created for community participation and socio-economic research as one of the five administrative and management programmes for running the reserve. This formalises the role of community participation in management and makes it very unlikely that attention to this aspect of management will be given less priority in future years.

[4] Wickham - Case Study No.5 - found that the responsible government agency did not fully absorb the import of the community-based participatory approach, partly because of the low level of involvement of staff above the field level with the project, partly also because of a lack of ongoing education in the philosophy, and particularly because it represented such a different paradigm from the top-down ethos which characterises Indonesian government institutions.

[5] Thole & Dodman - Case Study No.8 - recognise that there are very few cases where communities have themselves drawn up alternative approaches to resource management. They suggest that this is partly because communities are now rarely able to set their own agendas because natural resources are under diverse (and often novel) forms of exploitation pressure from outside the community. Communities which are still reliant on direct utilisation of wetland products generally do not have the resources or the experience to deal with these outside pressures. While it is important to recognise that traditional resource management systems are seldom static but constantly evolve to meet new situations, the pace and extent of change that they face in rapidly changing socio-economic situations in developing countries frequently exceed their capacity to adapt without outside assistance.

resource management. This might be a project team or an NGO, or it might constitute a committee with regional expertise. Such a committee could include: academics in appropriate fields, NGO representatives, business people, government representatives with appropriate expertise and approaches, and representatives of communities more experienced in participatory resource management.

NGOs are often well placed and well qualified to take on the catalysing role with user communities. The characteristics that NGOs often possess which fit them to this task include:

- commitment to a long-term presence in the area (as distinct from development project teams);
- willingness to work with local people;
- experience in working with communities with similar backgrounds, or access to other organisations with that experience;
- relatively low budgets available over extended periods (rather than large budgets which must be dispersed within a relatively short time frame, as in most development assistance agency projects);
- willingness to take an empirical approach to development, with the flexibility to change direction when initiatives are not successful;
- experience in campaigning on issues and often established contacts with media and politicians as well as international bodies;
- ability to focus on community objectives as a major goal rather than their being one element (and often an 'add-on') of a complex larger project; and
- not seen by communities as being 'tainted' by association with government agencies or multilateral funding bodies.

NGOs will not always be the ideal source of external assistance to communities in establishing co-management regimes. Typical problems associated with NGO assistance include:

- difficulties in recruiting appropriately trained and motivated staff;
- lack of in-depth experience on the part of NGO staff;
- NGO staff tend to be young and their advice may not be readily accepted by traditional societies;
- some NGOs (or NGO staff) have strong ideological views on development that:
    - may not be acceptable to government agencies, or which may make the NGO reluctant to involve government agencies fully as stakeholders;

  - may result in a reluctance to become involved with the business community even when that community is a stakeholder in the resource issue or is able to offer substantial benefits to the local community; or
  - may place unnecessary limitations on the forms that co-management can take; and
- NGOs may be under-funded or may not have the continuity of funding over the long periods necessary to establish effective co-management.

NGOs and all involved 'outside' parties need to maintain the trust of key parties. NGOs or other catalysing bodies should make efforts not be seen to take sides with one of the stakeholders, or even necessarily to take a major role in the process (see *Ownership of the development process* below).

Points to remember:

- **try to identify an outside agency that is able to offer independent advice;**
- **recognise the strengths and weakness of the outside agency (NGO, project team, etc.) and set reasonable expectations for its involvement;**
- **identify additional inputs to complement the skills of all parties involved;**
- **identify and involve key decision-makers from the local area - locals typically understand the situation better than outsiders; and**
- **maintain trust between all stakeholders and the outside agency.**

Large-budget Development Assistance Projects

Development assistance agencies potentially have an important role to play in the development and implementation of co-management projects. However, for a number of reasons their current mode of operation detracts from the results that might be achieved. Most of these issues have been canvassed under other headings and will not be repeated here.

Nevertheless, large-budget development assistance projects have a number of characteristics which, if properly harnessed, provide considerable advantages in promoting co-management of wetland resources. These include:

- large budgets;
- ability to recruit professional personnel;
- contacts at high levels in government and government interest in a successful outcome for the project; and
- potential for integration with other projects funded from the same source.

This potential can be met only if other characteristics of this type of project can be modified to make them more supportive of co-management processes. The necessary modifications include:

- overcoming the problem of project design being done by competing, profit-oriented companies in very short times. Neither time, funding nor incentives are available for any meaningful community participation in the design process. This might be overcome by:
  - setting up separate, funded activities to undertake community involvement and provide the results to each tenderer;
  - incorporating into the tendering scoring system adequate recognition of proven expertise/experience of proposed consultants and tendering firms in community-based approaches to resource management (this expertise should be judged not on the number of projects in which an individual has been involved but on the rated success of those projects in attaining their community-associated goals); and
  - providing a role for representatives of the communities in assessing tenders;
- finding ways to change the emphasis in project design from 'time efficiency' (resulting from the emphasis on profit on the part of the contractor, and on timely project completion on the part of the funding agency staff), to 'social efficiency'. In monetary terms the latter may be less costly in the long term. This might be achieved by:
  - changing the way in which projects are evaluated;
  - changing the organisational culture of the funding agencies and particularly the way in which their staff and programmes are evaluated; and
  - providing representatives of all stakeholders with representation on, or guaranteed regular input to, project steering and evaluation committees;
- allowing more flexibility in project implementation so that the activities can be modified to meet emerging situations. This might be done through a combination of:

- incorporating into project timetables clearly defined reviews of success of aspects affecting co-management;
- involving stakeholder groups in these review stages; and
- allowing significant changes in project direction where these are necessary to meet project objectives (either as originally set or as emerge during implementation).

Points to remember:

- **for large-budget development assistance projects new approaches are needed to ensure meaningful stakeholder participation throughout the project cycle, but particularly in project design and review;**
- **more credit should be given in the assessment of tenders for large-budget development assistance projects for personnel and firms with proven records of attaining community-associated goals;**
- **major review stages need to be built into the programmes of large-budget development assistance projects to determine whether (i) approaches being used are achieving goals; and (ii) the original project goals and objectives remain relevant; and**
- **greater flexibility needs to be incorporated into large-budget development assistance projects to allow changes to project design on the basis of information emerging during implementation.**

Sustainable Resource Management

The ultimate goal of the co-management activities must be the sustainable utilization of the resources. This means that it will be necessary to balance the current needs of stakeholders against the needs of future generations. The assumption that underpins the co-management approach is that more efficient and effective sustainable management will be achieved through this approach.

Sustainable resource management must be the aim of those promoting community involvement in wetland resource management. This applies to objectives not only at the community level but also within government at the regional and national levels. Communities cannot operate in total disregard of higher level priorities, and they will find difficulty in achieving sustainable resource management if they are subject to unsustainable policies imposed by a higher level.

Points to remember:

- **the concept of sustainable resource utilization should be understood and agreed upon by all parties involved in the co-management process;**
- **there should be harmonization of resource management policies at the national, provincial and local levels; and**
- **the national framework for sustainable utilization of natural resources should recognise the role that co-management can play in efficient and effective resource management.**

Participation by All Stakeholders

Ensuring the participation of all stakeholders is one of the aims in the process of co-management. This may be difficult and time consuming, however in the longer term should result in more integrated management of the natural resources.

While it may appear that some stakeholders can be made to participate through legal sanctions, if such a group maintains continuous, determined opposition to the arrangements then it is likely that the system will ultimately fail.

A useful mechanism for initiating stakeholder involvement in the co-management process is to establish a consultation group where stakeholders can participate in discussions on resource management issues without being required to have commitment to the outcomes of the discussion[6]. This is often a useful strategy for involving stakeholders in initial exploration of management options.

Points to remember:

- **plan to involve all stakeholders in the co-management process and develop a strategy to meet this objective;**
- **establish a forum where the key resource management issues can be discussed in an informed and non-threatening manner; and**

[6] Addun & Muzones - Case Study No.10 - report the establishment of a Resource Users' Forum, though this is done in association with the implementation of a "resource management plan". This Forum evolved out of dialogues between fishers, who were already organised, and other users. It includes users of illegal fishing methods who might be wary of being involved in a government-backed discussion group. The Forum shares in the implementation of resource management measures with the Fishers' Organisation and the women's cooperative.

- **be flexible in the approach to soliciting suitable input from the range of stakeholders.**

Mutual Understanding of Situation and Expectations

A successful approach to co-management will require an understanding of the needs and expectations of the government, local communities and the other key stakeholders. However, in reality, often the parties most directly involved in wetland resource use - the user community and the relevant government agencies - are initially quite ignorant of each other's needs, responsibilities and expectations[7]. For a cooperative endeavour to succeed over the longer term it is necessary for the parties to have a good understanding of each other's positions.

Aspects which **government agencies** need to understand include:

- the relationships between communities and wetlands, including the types of wetland products utilised and other benefits conferred by wetlands;
- the degree of reliance of communities on wetland products and whether affordable alternatives to these exist;
- spiritual and cultural values associated with wetland areas or resources;
- the extent of traditional community knowledge of wetland ecology;
- the extent, usefulness and rationale behind existing community resource management measures;
- the socio-economic situation of the communities, including traditional authority structures which may be different from imposed government administrative structures;
- the full extent of the role of 'middlemen' in the user community (see Box 1);
- the community's development needs and aspirations; and
- the roles and responsibilities of other government agencies (including relevant legislation and government policies) in relation to the communities and the wetland area.

[7] Gujja & Pimbert - Case Study No.2 - describe a situation in Pakistan where participatory consultation after the completion of a management plan showed that the wildlife conservation professionals and the community had different views, not only about the importance of key wildlife species, but also about the origin of the wetlands on which the wildlife depended.

Box 1 The Hidden Roles of Middlemen

Too often outsiders, including government officials, assume that the relationship between middlemen and wetland resource users is an exploitative one that needs to be ended as soon as possible. This attitude characterises many interventions by government programmes and development assistance agencies. In fact the situation is often quite complex and on balance the benefits are not necessarily all in the direction of the middleman.

Considerations that need to be taken into account in assessing the value of producer-middleman relationships include:

- is the product harvested in sufficient quantity to make it worthwhile for the community to undertake its own transport and marketing arrangements?
- can the product be stored by the community until a sufficient quantity accumulates to make it worthwhile transporting to market?
- does the community speak the language that is used in the market place?
- how is the community treated in the market place?
- is the community sufficiently cohesive to group together to market their products?
- is the role of middleman a traditional one within the community with cultural characteristics which would make it unlikely that the community could usurp the role?
- does the middleman offer other services such as: advancing payment prior to harvest, lending money, transporting inputs to the community such as fuel and equipment?
- does the community have alternative access to these services?
- are community members sufficiently literate to make use of alternative sources of services such as credit?
- are community members sufficiently confident to be able to deal with alternative sources?[8]
- does the community view the relationship with the middleman as exploitative?

Until these questions have been addressed, no action should be taken to jeopardise relationships between the community and established middlemen dealing in wetland products.

[8] Bowe - Case Study No.7. Villagers lacked sufficient business acumen to get the maximum benefit from selling their deer meat in a market situation (in this case with project-approved middlemen). The project management stepped in and set a selling price to ensure a fair return to the community.

The process of establishing community involvement in wetland resource management needs to include an assessment of the level of understanding of relevant government agencies in each of these areas. In general it will be necessary to make provision for improving the understanding of government staff of the majority of the above topics.

Aspects which **non-government stakeholders** need to understand include:

- the structure, roles and responsibilities of relevant government agencies (it is surprising how often there are misconceptions among community members about this apparently self-evident topic);
- existing national and local policies and laws relevant to wetland resource management;

- the nature and objectives of any existing government programmes affecting the wetland area and its resources;
- existing government strategies for development;
- the extent of expertise available through government agencies;
- assistance available through government programmes; and
- their own rights and responsibilities.

The situation of stakeholders other than the local user community should not be overlooked. For example, distant communities which are using the wetland resource should understand the degree of reliance of local communities on that resource and the impact that their activities are having on the local community. Similarly the local community needs to be aware of the situation of the distant users. The same considerations apply to commercial users.

Points to remember:

- **develop a process that allows all parties to provide an overview of their needs and expectations;**
- **needs and expectations may not be straightforward. Consider and respect the values held by different groups, including cultural, religious and traditional beliefs;**
- **national-level priorities, policies and plans must be taken into account in the development of management approaches;**
- **try to incorporate the needs of all stakeholders;**

- **identify needs for education and awareness campaigns to develop in key stakeholder groups, includi ng within key agencies, a great standing of the important issues, and**
- **evaluate the approach to management of the sectoral government agencies and build awareness of the benefits of an integrated approach.**

Trust Between the Parties

All the parties involved in co-management are generally taking some risk in participating in the relationship. For example: communities are assuming that government agencies will not use information about wetland resource utilisation to levy a new tax; government agencies are assuming that communities will abide by agreed management measures and will not create a major resource issue that will embarrass local officials; users who agree to limit or forego the benefits from harvesting wetland products assume that promised alternative benefits will eventuate.

Communities involved in the process of developing co-management regimes need to feel that they can trust project staff and government agency staff to follow up on commitments that they have made[9]. If this does not occur, communities can quickly lose their confidence in the process. Box 2 shows some examples of early activities in a community management project in Thailand which had the effect of building up community trust.

Unless a relationship of trust can be established and maintained it is unlikely that a co-management regime, even at its simplest, can survive. Taking the simplest form of community involvement, where the community's role is limited to consultation on management issues, the community is providing information and expending effort to support its involvement - the community assumes that the government will take its information into account and the government assumes that the community's information is reasonably accurate. Without this trust even this basic involvement cannot be maintained.

[9] Wickham - Case Study No.5 - found that failure of government agency staff to meet their commitment to organise regular consultative meetings, and to follow up on promises made at those meetings when they did occur, led to a lack of trust not only in the government agency but also in the project.

However it typically takes a long time and considerable effort to establish this climate of trust[10]. In the majority of situations where communities are in a subsistence relationship with resources, their level of trust of the government agencies is extremely low or non-existent. Only long periods of dialogue and shared learning can build sufficient trust to make co-management work. This is one of the benefits associated with a long period of analysis and problem identification. (see *Situation Analysis and Problem Identification* p. [78]). It is also one of the reasons that large-budget development assistance projects with their tight, output-oriented timetables are often not good models for establishing sustainable co-management.

The more each side can demonstrate commitment to the principles of co-management and sustainable resource management the more rapidly trust can be built up.

Points to remember:

- **trust relies upon the meeting of objectives and mutually agreed targets. Concerted efforts should be made to ensure that these are met;**
- **identify activities that will assist in the process of building trust and focus effort of the successful implementation of these activities; and**
- **clearly identify communication channels, time frames and mechanisms for dialogue. Ensure that plans and targets are met.**

All Parties to Co-management Must Play Their Agreed Roles

Closely related to the question of trust is the matter of fulfilment of agreed roles. Resource management regimes require the carrying out of a range of roles, for example: law enforcement, adherence to laws, monitoring, information sharing, communication etc.

[10] Ayres *et al.* - Case Study No.1 - found that one of the greatest difficulties facing the establishment of community management in the Mamirauá Ecological Reserve was overcoming suspicion of the motives of those agencies assisting the communities. This suspicion was possibly most entrenched in local operators who had economic relationships with the community and among political representatives. Media attention to the project and increasing user community acceptance helped to overcome this lack of trust, though the environmental education programme also played an important role in promoting public acceptance of the initiative.

If one party to the co-management regime fails to play its role, ultimately the regime will be likely to break down. Often this may be due to a lack of communication and transparency in the planning or implementation of specific activities.

Points to remember:

- **clearly identify the roles and expectation of each stakeholder; and**
- **agree on the roles of stakeholders and establish milestones and outcomes for each activity.**

Community Organisation and Capability

A balanced and meaningful co-management regime will rely on an informed community with the capacity to engage in meaningful dialogue and to undertake specific activities. In some cases this may need to be facilitated by an outside agency.

However, often the concern over an environmental issue will cause the community to unite and it may be the community that approaches the government to develop a co-management regime. This is particularly the case in countries with an open system of government.

Any level of community involvement in wetland management requires an appropriate degree of community organisation and capability. At the basic level of participating in consultation the community needs to develop a mechanism for collating and presenting its views. More detailed involvement requires greater levels of organisation. Typically there needs to be at least one group within the community which has resource management or conservation as its primary focus. As management becomes more complex (for example, awareness-raising, development of rules and regulations or management plans, implementing alternative income activities) the organisational structure needs to diversify to match.

The capability to establish and run appropriate organisations will be unlikely to exist within the community. Similarly the range of skills and knowledge needed to deal with the different aspects of resource management will probably not exist. Skills such as accountancy, PRA, problem/priority identification, meeting facilitation, dispute resolution, etc. are key to successful community organisation (see *Establish Key Groups* p. [73]).

Points to remember:

- **identify the skills that exist in the community, and those that need to be developed;**
- **build upon already existing cooperatives and community groups; and**
- **if necessary build new organizations in the community to participate in the co-management process.**

Getting to the Roots Causes of Problems

Understanding the true nature of the key problems is crucial in any resource management situation. Superficially the problems may be easy to resolve, but the identification of the core problems, and approaches to address these, may require a more integrated approach.

Biodiversity conservation projects must be planned on the basis of more than superficial knowledge of the situation. Too often, little or no effort is spent on developing an understanding of the root causes of problems. This can lead to situations where conservation efforts are wasted. Gaining an understanding of the causes behind resource management problems is generally a time consuming activity. Typically, communities closely involved with resource issues have not fully analysed the situation and in most cases the immediate views of the communities involved will not be likely to yield a full or accurate picture of the root causes of problems. One Indonesian NGO insists that communities interact with its field workers for six months to analyse resource issues and identify root causes before making a decision on strategies to be adopted.

A simple hypothetical example might illustrate the problem. If a community is over-harvesting a wetland resource which is globally threatened, this represents a conservation problem. The simple solution would appear to be to introduce legislation to prohibit or limit the harvest. But what are the root causes of the problem and would the simple legislative solution address them, or would it merely change the nature of the problem? For example:

- is the resource used locally or sold for cash?
- are there acceptable and affordable substitutes?
- has the harvesting level remained constant but some outside influence has reduced the stock of the resource?

- is the harvest done by one disadvantaged group in the community with no other source of income, or whose other sources of income have suddenly disappeared?
- have economic relationships within the community changed - are money lenders putting pressure on clients for repayment, or have interest rates increased significantly - leading to a need for higher income?
- has some outside influence made a previously preferred resource unavailable?
- is the harvesting being done to meet a new need for cash income - e.g. has school attendance recently increased with a concomitant recurring need for cash for fees, books, transport, etc?
- was harvesting previously sustainable but traditional management regimes have broken down for some reason?
- has a government initiative changed, or threatened to change, the traditional tenure patterns for this resource, leading to an open access situation?
- have men somehow become involved in harvests that were traditionally controlled by women, without understanding the nuances of the situation?

Depending on the answers to these questions, quite different management interventions will need to be made.

Points to remember:

- **take time to identify the root causes of the major issues and problems;**
- **make a thorough analysis of the situation taking all factors (internal and external) into account;**
- **utilise a range of problem-solving techniques to identify the root causes of the problem; and**
- **be prepared to identify new and non-traditional approaches to address the problems.**

Time

A successful co-management regime will take time to develop. It may not be easy at the beginning of the process to predict the length of time that will be needed, but it is important to remember that the establishment of sustainable and meaningful community involvement in wetland management cannot be

achieved through a programme with a limited time frame and tight deadlines[11]. Components such as awareness-raising among the community, creating or enhancing institutions and skills within the community[12], and particularly reaching consensus among stakeholders cannot be done to a timetable in the same way that buildings are erected or training courses delivered.

This is one of the major factors operating against large-budget development aid. Such projects have finite lifetimes and are typically delivered by profit-oriented consulting companies which cannot afford to have open-ended timetables for project activities.

While it is not possible to place tight deadlines on the establishment of co-management regimes, it can be stated from experience that in most situations it will not be possible to reach the stage of beginning to implement appropriate resource management programmes in less than 18 months[13], and that a self-sustaining community management system, needing no further outside assistance, will not be established in less than three years[14].

Points to remember:

- **the process is lengthy and requires long-term commitment from all sides;**
- **clear strategic objectives must be established during the process;**

[11] Thole & Dodman - Case Study No.8 - provide details of the Zambia Wetlands Project supported by WWF from 1987 to 1995.A major lesson was that progress in achieving community integration into wetland management can be extremely slow, and that programmes need to be sufficiently flexible to adapt to varying levels of cooperation among communities in the project area.

[12] Wickham - Case Study No.5 - reports that after 4.5 years of project activity and the introduction of several income-generation activities the members of community groups were not yet at a stage when it was appropriate to provide them with training in organisational skills such as running meetings, budgeting and reporting on expenditure, credit management, etc.

[13] Bowe - Case Study No.7. The first two years of the project to develop a management strategy in Wasur National Park were spent mainly in examining social aspects of park management in order to design strategies for involving the communities in planning and implementation. However it is not clear that the community was closely involved in the evolution of management measures, a surmise that is supported by the simple factors (such as transport times from hunting areas to the village collection point) that led to the undoing of some initiatives.

[14] Ayres *et al.* - Case Study No.1 - describes the background to the preparation of a management plan for the Mamirauá Ecological Station. The proposal to develop the plan was circulated for funding in 1991 and the draft management plan was completed in July 1996, around five years later. The principal author estimates that negotiation of the details of the management plan with the local communities will take 2-3 years.

Box 2 Example of Preparation Times from a Small-scale Coastal Fishery Programme

Phase	Main Emphasis	Major Activities
Phase 1: First to twelfth month	Improve the quality of life among the poor.	• Improvement of economic well-being through savings and credit schemes to enable the poor to raise capital. • Study tours and training. • Public health improvement through wells, sanitary toilets and basic hygiene education. • Cooperative stores.
Phase 2: Seventh to twenty-fourth month	Develop a network among village leaders for collective action.	• Repair and construction of mosques. • Village road repair and maintenance. • Training for village leaders in community development. • Study tours.
Phase 3: Thirteenth to thirty-sixth month	Promote collective action towards local resource management.	• Collaborate with neighbouring villages in community development. • Establish functional links with district and provincial authorities. • Mangrove rehabilitation. • Prevention of illegal fishing activities.

SOURCE: NITI RITTIBHONBHUN and CHEN (1989)

- **activities should be oriented toward both establishment of community organisational structures and provision of other developmental benefits to the communities involved; and**
- **generally it may take at least 3-5 years for a co-management regime to be established and operating.**

Clear Benefits from Undertaking Management Responsibilities

Communities will be more willing to become involved in expending effort to manage wetland resources if they perceive that there will be clear benefits (both short and long-term) from their undertaking management responsibilities. Similarly the community needs to perceive that a problem exists before it can possibly see any benefit in overcoming it.

In many critical biodiversity conservation situations, communities may not actually perceive a problem because of the limited scope of their view of the resource situation. Considerable awareness-raising may be necessary to develop an understanding of the problem and of the benefits of overcoming it.

In other situations communities may recognise a problem, but may not agree that the possible solutions provide adequate benefits in the short or long-term to warrant their undertaking management responsibilities, particularly if these involve some immediate loss of benefit. Alternatively, community members may be unwilling to risk time, money or even livelihood to undertake management activities which take them away from other tasks such as fishing, farming, collecting forest products, etc. which have a more certain reward.

In many situations the benefits to be gained from responsible management may flow mainly to a broad group (possibly national or global in scope) while the costs of adopting this form of management are borne by the local community. People cannot be expected to be enthusiastic about adopting co-management if this is the case, and no off-setting benefits are available to them. Project staff need to assist in the development of off-setting benefits to the disadvantaged stakeholders.

Points to remember:

- **clearly identify the benefits (and costs) to all stakeholders in the adoption of a sustainable resource management approach;**

- **weigh up the short versus long-term benefits of a sustainable resource management approach; and**
- **consider compensation of the short-term losses that must be sustained for a longer-term approach to sustainable utilization.**

Opting Out

Sometimes communities will decide that they do not want to be involved in resource management. There might be many reasons for this. For example: they may not wish to cooperate with a particular stakeholder group because of past experiences with that group; they may not have sufficient trust in the process or the facilitator's delivering an equitable solution; or they may have reasons for preferring short-term gains over long-term sustainability.

Communities must always be given the opportunity of deciding whether or not they want to participate in a co-management arrangement. Where the community decides not to participate, this must be respected. If possible it is best to request communities to delay making this decision until community awareness-raising and problem analysis activities have been carried out.

Points to consider:

- **provide adequate information on the process of co-management before decisions on participation are made; and**
- **try to delay the making of this decision until there have been some awareness-raising and problem-identification activities.**

Ownership of the Development Process

It is important that all parties involved in the development process have a strong sense of participation and ownership of the process. However, there needs to be a balance among all parties in the process. In a situation where an outside body (NGO, project team, etc.) is acting as a catalyst to the formation of a co-management regime, it is essential that they do not lose sight of the need for the community to recognise itself as, and be acknowledged as, the controller and owner of the process.

This is one of the hardest lessons for field workers to learn. Their high level of commitment to the success of the process and their position as holders of

expertise, source of ideas, and link to other agencies make it all too easy for them to slip into the mind set that they are the 'owners' of the process. Once this situation arises, the judgement of field workers becomes suspect, and their ability to mediate impartially in disputes is impaired.

The same warning applies to staff of government agencies or any third party (though there is an argument for allowing high level officials and politicians to believe that they are responsible for initiating beneficial aspects of projects). While it is highly undesirable for government agency staff to adopt the view that they 'own' a development process to the exclusion of the community which is actually involved in the process, there is a real need for government staff to identify with the programme and to feel that they are making an important and necessary contribution to its success[15]. There is always the risk that these staff will view the project as an undertaking by foreign experts which is not relevant to their current major tasks or to their future roles.

There is no easy solution to this problem. One Indonesian NGO insists that field staff rotate every six months so as to avoid their identifying too closely with project successes. This is certainly successful, and appears to be justified given the often emotional scenes when staff have to leave a project community. Since this NGO has an excellent record of project successes, the strategy is clearly not detrimental to the outcomes of projects. However the rotation of staff makes it necessary to ensure that very detailed records are kept of project discussions and activities so that incoming field staff can quickly be brought up to date.

Points to remember:

- **it is crucial that all parties involved in the process have a strong sense of ownership of the process and a commitment to the project's long-term objectives;**
- **provide opportunities for all parties to demonstrate their commitment to the process and build confidence between the stakeholder groups; and**

[15] Wickham - Case Study No.5 - describes a long running project in which government agency staff had not developed any 'project ownership' or identification with the outcomes of the project. He traces this in part to the fact that the field staff had never received a detailed explanation of the goal, objectives and expected outputs of the project, and that they had rarely been involved in any planning of project activities. The main Work Plan for the project had never been translated into Indonesian. The fact that there had been three different project management teams in 4.5 years also contributed to the lack of field staff identification with the project.

- **consider a flexible approach to the staffing of projects, with experienced staff providing specialist inputs into particular aspects of the process, and the rotation of field based staff, if appropriate.**

The Wider Development Process

Co-management depends on the support and cooperation of many factors outside the parties to the regime. Co-management activities cannot succeed for long in a situation where other aspects of community life are not also developing[16], or surrounding communities and institutions are not developing at approximately the same pace[17]. Eamples include the need for other communities to respect the resource protection controls put in place. If other communities, sometimes very distant from the co-management area, are not experiencing development, they may begin exploiting the managed resources in unsustainable ways. Similarly, if government agencies are not undergoing institutional development, their capability to contribute to the co-management process may be limited.

More fundamentally, if infrastructure such as transport, markets, credit sources, and legislation is not available to support the development of co-management, then the process is likely to founder[18,19]. Box 2 provides practical examples of development activities incorporated into a resource management project.

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[16] Wickham - Case Study No.5 - found in the Danau Sentarum Wildlife Reserve Conservation Project that the uppermost concern in the minds of local user community members was making a living. It was clear that the project was unlikely to be successful with its conservation agenda unless it could show that there were ways to address this primary concern. In this case the wider development issue had to be addressed before the conservation issues. Unfortunately these initial 'supplementary' income generation projects took over 18 months to establish. This is not an unusual period for the establishment of such activities, but it cut into the time available to address critical resource management issues affecting the reserve. However, eventually community members began to realise the connection between biodiversity-based income and the need to protect the forest resource.

[17] Chileshe - Case Study No.4 - illustrates the need for development in the various aspects of community life to proceed in concert with conservation. The needs identified by the community in her paper appear at first to have little to do with conservation of wildlife, but the point she is making is that all these needs must be addressed if the community is to turn any attention to more specific environmental matters.

[18] Gichuki - Case Study No.3 - reports a situation in which the Kenya Crane and Wetland Project of the National Museums of Kenya had to change its focus from the birds to the development needs of the local people because these were so intimately linked with the loss of wetlands and waterfowl.

[19] Ayres *et al.* - Case Study No.1 - describe a situation in which the integration of biodiversity conservation and social development is an acknowledged basis for the management of a reserve.

Points to remember:

- **the co-management activities should complement local, provincial and national development activities;**
- **the co-management process may need to be supported by development initiatives; and**
- **the concept of co-management should be supported through national development plans and polices.**

Those with the Biggest Stake Are Not Necessarily the Best Managers

Though it seems to run counter to the philosophy of community involvement in wetland management, it is necessary to realise that those with the biggest stake in utilising wetland resources are not necessarily the best managers. This is a difficult idea for many community-oriented NGOs to accept. However, a little reflection will reveal a number of situations in which it is true.

Examples might include situations in which:

- the traditional management systems of a local user community have broken down and social and economic pressures have so fragmented the community that self-interest predominates over long-term resource conservation;
- one community has the largest single direct stake in wetland resource utilisation, but a larger community (or group of communities) is significantly affected by aspects of resource management but cannot achieve any recognition from the local community because of long-standing antagonisms between the communities;
- development is moving away from dependence on direct utilisation of wetland products, the largest user community of wetland products is no longer reliant for its livelihood on those products (which now represent only an additional source of income) and therefore is not willing to adopt conservation management measures which would assist smaller, less developed communities;
- the user with the biggest stake in wetland resources is a company which is the biggest user but is negatively affecting the long-term wetland benefits derived by local communities even though the major user is not dependent on the wetland resources.

It is also important to realise that in many cases traditional management systems might never have been sustainable over the long term, but only appeared to be so because low population levels or lack of access to markets did not allow the effectiveness of traditional controls to be tested.

Ideologically-based Approaches to Co-management

Flexibility is required to develop a successful co-management regime. Those who play the role of catalyst in the establishment of community involvement in wetland resource management need to be cautious of adopting ideologically-based approaches which might either limit the range of options available or deter involvement by other stakeholders[20].

There is no particular ideological approach to resource management which is better than others for all situations. In fact it is one of the characteristics of the co-management approach that it represents a spectrum of degrees of involvement, resource ownership arrangements, production patterns, etc.

Adopting a particular ideological line can lead to fixed, inflexible approaches and views, which might preclude the most appropriate arrangement in particular situations.

Points to remember:

- **the co-management approach represents a spectrum of degrees of involvement and resource ownership arrangements;**
- **ideologically-based approaches need to be carefully evaluated to ensure that they are fair, balanced and suited to the particular situation; and**
- **a flexible approach to co-management will assist in ensuring that the views of all stakeholders are incorporated in the process.**

[20] The views expressed by Addun & Muzones - Case Study No.10 - that "Efforts towards the sustainable use of resources ... should, therefore, be grounded on the empowerment of coastal communities to have access and control over their resources. Indeed, the essence of [community-based coastal resource management] is the endowment of property rights over coastal resources to the community" seem to suggest an ideological approach to establishing community involvement in coastal resources. It is not clear that the factors mentioned are essential prerequisites of community involvement.

Advocacy

Advocacy is the action of arguing the case for a particular situation or course of action.

The need for communities to develop advocacy skills is frequently overlooked[21]. However it is an essential capability if the co-management regime is to be maintained against outside influences. These influences might arise from a number of directions, typically through the emergence of competing demands for the wetland resources or through nearby development proposals which would have negative impacts on wetland benefits.

In addition, it should not be overlooked that threats to co-management arrangements can arise from changes in government agency personnel or changes in the balance of political power and that these situations might require the community to use advocacy skills to protect their interests.

In attempting to impart advocacy skills, field staff should bear in mind the need for development of skills which are consistent with the culture in which they are to be used. Direct and confrontational advocacy which might succeed in western societies might be totally inappropriate in another cultural setting[22].

Points to remember:

- **analyse the ability of each stakeholder group to act effectively as an advocate for their position and rights ;**
- **provide opportunities for the development of advocacy skills in the stakeholders; and**
- **in advocacy training, ensure that the approach is culturally appropriate.**

[21] Addun and Muzones - Case Study No.10 - seem to be the only authors to mention advocacy as a component of community involvement in wetland management, though they apparently use the term to mean the advocacy actions of the NGO, both to advocate to the local community and to decision-makers. They do not seem to include the transfer of advocacy skills to the community as a part of their programme.

[22] Wickham - Case Study No.5 - reports that advocacy skills utilised in the Indonesian context were applied in an informal and often indirect way that suited Indonesian cultural norms. He also noted that, in the context of his project, advocacy was generally reactionary rather than preventative - communities would argue their case after an event had occurred.

Networking of Community Organisations

The development of a network of community organisations is a powerful tool in assisting in establishing the process of co-management. Communities are able to compare strategies and approaches, solutions and achievements.

Networking of communities involved in similar resource management issues provides significant benefits which act to increase the chances of success of individual communities as well as helping to attract other communities to the co-management approach.

Alliances and coalitions can help solve larger issues as well as strengthening the hand of individual communities in their dealings with other parties.

Participation in networks of similar organisations provides the opportunity for communities to learn from the experience of others and to share new approaches as they happen. Mechanisms for achieving this shared learning include study tours, newsletters, annual conferences, regional coordination meetings, and regular informal meetings of community leaders and advisors working in nearby localities.

Networks can take many forms: alliances, unions, discussion groups etc. and can operate in different ways, such as: formal meetings, informal consultation or study tours[23,24].

The Internet is a recent development that allows NGOs and other organisations and individuals serving as catalysts to the co-management process to establish or participate in international networks for more widespread information-sharing.

Points to remember:

- **investigate options for linking with other communities with similar resource management issues;**

[23] Addun & Muzones - Case Study No.10 - report an unusual networking approach. Organisers and leaders of community management activities undertake exchanges with other organisations from other parts of the county so as to experience different resource management approaches.

[24] Wickham - Case Study No.5. A study tour by honey producers from Danau Sentarum Wildlife Reserve to honey producing communities in the U Minh forest in Vietnam led to rapid adoption of improved techniques by the Danau Sentarum community. This resulted in increases in the quantity and quality of honey and wax yields.

- **be prepared to create links in a flexible manner and develop a cooperative approach to problem solving; and**
- **networks can take many forms: alliances, unions, discussion groups, etc. and can operate in different ways, study tours, informal consultation.**

RRA and PRA

RRA and PRA are a series of techniques which offer alternatives to the traditional top-down approach to project design. Because of the very wide range of techniques involved, it is difficult to find clear and concise definitions of the methods. JACKSON and INGLES (1995) offer one of the most useful descriptions:

> **Rapid Rural Appraisal** (RRA) emphasises the importance of learning rapidly and directly from local people. RRA involves tapping local knowledge and gaining information and insight from local people using a range of interactive tools and methods.
>
> **Participatory Rural Appraisal** (PRA) involves field workers learning with local people with the aim of facilitating local capacity to analyse, plan, resolve conflicts, take action and monitor and evaluate according to a local agenda.

Both approaches are carried out by multi-disciplinary teams and differ from conventional information-gathering approaches in that field workers learn directly from local people.

Because of the apparent simplicity of many RRA/PRA techniques, many people believe that they can be learned in the classroom or from a book. This is most definitely not the case, but unfortunately the misconception is so widespread that there are many 'practitioners' of these techniques who simply do not comprehend how limited their understanding and capability are in this field. The subtleties of understanding and USING the methods can be learned only by applying them under experienced supervision. It is important to understand clearly that RRA in particular is NOT a modified questionnaire technique.

RRA as described above is an appropriate technique for data gathering and problem identification, whereas PRA is more appropriate to project design and

Box 3 Characteristics of Good RRA and PRA

Appropriate behaviour and attitude of field workers is the key to successful RRA and PRA. Good RRA and PRA are characterised by behaviour and attitudes that include:

- building rapport with men and women[25], rich and poor, young and old, and people in different ethnic and social groups;
- being aware of potential suspicions and taking action to dispel them;
- being friendly, interested, culturally sensitive, relaxed and open;
- avoiding placing people in situations or discussing topics which make them uncomfortable;
- listening and probing and leaving space in conversations for additional comments from participants;
- avoiding using RRA and PRA tools in a mechanical way by selecting tools to suit local needs and circumstances;
- taking advantage of local events and activities rather than staging events and activities;
- engaging in conversations that have a two-way exchange of information;
- being patient but proceeding at a moderate pace;
- seeking the views of weaker, less powerful people or groups;
- sharing information;
- giving people time to communicate and consider ideas;
- being self-aware and self-critical, using your own judgement, concealing personal biases;
- learning from people, not lecturing to them;
- checking and rechecking the validity of information using different sources and techniques;
- frequently reflecting on what information has been gained and where gaps remain;
- identifying and testing assumptions;
- trying to ensure that people's expectations are not raised too early;
- recognising that not all RRA and PRA tools are suited to all situations or all social groups;
- asking questions that invite explanations or viewpoints rather than "yes" or "no" answers; and
- scheduling RRA and PRA activities so that they fit in as far as possible with daily and seasonal routines of local people.

(JACKSON and INGLES, 1995)

[25] Gujja & Pimbert - Case Study No.2 - report the results of PRA which show that women had different priorities and objectives for development from the men in a Pakistan wetland complex.

planning. The distinction is not merely one of proper sequencing. Inappropriately used, PRA can generate false expectations of what the project will provide or what local people can achieve. This can cause problems in the relationship between communities and the project which can be extremely difficult to overcome and which can threaten the success of the co-management process.

Another potential problem with these methods springs from the speed with which they allow information to be collected and strategies to be formulated. This is a positive advantage of the methods, but it introduces the risk of accepting superficial descriptions of situations and adopting superficial solutions to issues. Good practitioners will use techniques for cross-checking information and the applicability of proposed solutions, and will use some of the time gained by these methods to improve the depth of their understanding of the situation.

Box 4 Potential Dangers Associated with Adopting RRA and PRA Approaches

The potential dangers of adopting RRA and PRA approaches are that they can be:

- misused through superficial adoption of methods in the absence of complete understanding and adequate training;
- seen as a replacement for other forms of investigation and study even in situations where more formal or analytical research is called for;
- rushed if they are seen as providing shortcuts, thus yielding unreliable information;
- disruptive to social routines of the village;
- time consuming if done properly;
- biased towards local people who have time and motivation to talk to field workers;
- biased towards those people who appear to have knowledge;
- biased towards people who have power (e.g. male administrators); and
- either facilitated in a highly formalised way, or applied too rigidly and repetitiously, both of which reduce their potential effectiveness.

(JACKSON and INGLES, 1995)

Points to remember:

- **see Boxes 3 and 4.**

The Legal Basis for Resource Management

The provision of an adequate legal basis is crucial for the long-term success of resource management activities by stakeholders who are not government agencies. In addition, there should be a clear understanding of the rights and responsibilities of all resource users and legislation to support these rights.

There are three aspects of the question of a legal basis for community involvement in resource management. The first has to do with whether or not the user community concerned has the right to use a particular wetland resource, the second relates to the ownership of the resource, and the third has to do with the legal framework for implementation of co-management measures. These issues should be fundamental concerns of bodies assisting in the establishment of community involvement in wetland management.

Right to Use a Resource

The establishment of a co-management regime for wetland resources needs to be built on a sound legal basis. Outsiders acting as catalysts cannot run the risk of promoting illegal activities. If there are any problems associated with a community's right to use a resource, or to occupy a wetland area, they need to be identified and addressed very early in the process.

Problems are particularly likely to be an issue where a user community lives in, or uses resources within, a protected area[26]. It is not exceptional for protected areas in developing countries to encompass settlements or traditional resource use areas, though probably the majority of these countries do not have provisions in their legal regimes to permit this situation[27].

While in many instances there is *de facto* recognition of the situation, long-term resource management arrangements should not depend on the continuation of

[26] Wickham - Case Study No.5 - shows how, because people are not legally permitted to live in the Danau Sentarum Wildlife Reserve, the government is unwilling to give official recognition to their traditional resource management regime, even though this is still intact and represents an effective and money-saving resource management option.

[27] Ayres *et al.* - Case Study No.1 - describe a situation where national legislation needed to be changed to allow communities to remain in the Mamirauá Ecological Reserve and to continue to use and market the natural resources of the flooded forests in an ecologically sustainable manner.

Box 5 Territorial Use Rights in Fisheries (TURFs) - Panacea or Mirage?

The concept of allocating Territorial Use Rights in Fisheries (TURFs) to traditional user communities is sometimes promoted as a community-based solution to resource use conflicts in shallow coastal waters. The TURF approach is based on the premise that community-based management of fisheries cannot proceed without some form of exclusive right to a particular area. These rights might take the form of the right to: harvest a particular fish stock, fish a particular part of the water column (bottom, mid-water or surface), or use a particular gear or vessel type.

The holder of a TURF may be an individual person or company, a group of fishermen or a community, or a local government. It is in the nature of TURFs that the holders participate in their management. The size of TURFs is governed by a number of considerations, including: the size should be sufficient that use of resources outside the area does not significantly affect the resource within the area, and the partners in management (usually the holder and the relevant government agency) should have the ability to enforce controls within its boundaries. In general, TURFs for different resources, or for different parts of the water column, can overlap.

TURFs become more difficult to manage as the number of participants increases.

The concept has intrinsic appeal to many who support community-based resource management. This is partly because it harks back to some more simple time when communities held traditional territories over adjacent aquatic resources and managed these themselves.

However there are a number of practical considerations that are likely to reduce the effectiveness of TURFs in many situations. These include:

- exclusive use of aquatic, and particularly marine, resources is not a common notion in most modern jurisdictions and legal provisions to support it are rare;
- the reality of introducing and implementing a TURF approach is generally anything but simple. In this era of motorised vessels, many fishermen are not limited to areas near their community, and as a result there is usually a complex web of interactions involved in the various fisheries in one locality. Documenting these resource relationships and negotiating the establishment of a series of TURFs would generally require large amounts of time, funding and human resources, as well as substantial political will to resist the objections that would be generated from some quarters. These essential elements are not likely to be present in many situations;
- in many cases the negotiation of TURFs will involve the exclusion of some current

resource users, leading to claims for compensation which are unlikely to be received favourably by governments;
- those favouring this approach frequently expect that the establishment of TURFs will overcome all major difficulties and thus do not include in their programmes activities to empower communities to deal more successfully with outside impacts or with government agencies; and
- the introduction of TURFs is frequently proposed as a component of sectoral programmes which do not provide any incentive for parallel development in other related spheres such as institutional development, infrastructure, legislation, etc.

Before implementing TURFs it is necessary to take a realistic look at the cultural situation, the realities of resource availability and political support, and the benefits that this approach will provide over alternative, less complex, approaches.

(Based partly on CHRISTY (1992) and partly on the author's observations.)

this recognition. In addition, access to government assistance programmes often requires communities or individuals to be able to document their right to use land.

Points to remember:
- **clearly identify the rights and responsibilities of the users of particular resources and wetland areas, in particular in protected areas; and**
- **long-term resource management arrangements should be formalised through a legal process.**

Ownership of the Resource

Management of resources is not necessarily the same as ownership. And ownership is not a prerequisite for responsibility for management. Those who benefit from the use of resources may be the best placed to manage those resources, even though they may not legally own them (but see *Those with the Biggest Stake Are Not Necessarily the Best Managers* above).

In general, collaborative management approaches assume that the resource is not privately owned, but is under the control of, or owned by, the state.

Nevertheless 'ownership' in the sense that the community and the government recognise that the community is the primary user of the resource, and that its needs will generally prevail, can be a strong basis for responsible management. This is particularly the case if the community derives some of its cultural values from that ownership. In some situations it may be extremely beneficial to take steps to enhance this sense of ownership of wetland resources[28].

Another side of the ownership issue is that if communities do not feel that they have secure long-term access to resources they may not be likely to adopt long-term sustainable management objectives in using those resources.

The concept of 'stewardship' is relevant here. Communities with stewardship over wetland resources have responsibilities for the sustainable management of those resources. Such responsibilities might be owed to other communities with an interest in the resources, to the nation as whole through the government, to future generations, or to a combination of all of these. Stewardship necessarily includes responsibility and authority, but need not mean outright ownership.

The question of control of access to the wetland or its resources is a complex one and is closely related to ownership. Two characteristics of ownership are that one has guaranteed ongoing access and that one can restrict the access of others. Certainly, guaranteed ongoing access to wetland resources is a necessary condition for community participation in co-management. In addition, while absolute restriction of access by others to wetland resources is seldom either desirable or necessary for good management, the ability to control access so as to limit unsustainable actions is necessary to achieve long-term management goals. In particular, there is a need to prevent an open-access situation developing, since this will frequently result in resource users' attempting to maximise their short-term benefit from the resource before it can be depleted by others. Open-access situations typically develop when government

[28] Bowe - Case Study No.7 - concludes that the support generated for park management as a result of initiatives which reinforced the communities' identity as the owners of the resource was "unprecedented". In part this reinforcement came from management's attempts to stop hunting by outsiders while encouraging the development of an economically and ecologically sustainable hunting regime by the community.

superimposes a form of access limitation or tenure which is incompatible with existing (traditional) community resource access and ownership[29,30].

Project planners need to balance this against any detrimental effects on the long-term collective interest of restricting access. In co-management situations, sharing of responsibility might mean that a government agency takes on the responsibility for controlling access to the resource, possibly on conditions negotiated with all stakeholders.

Another consideration in deciding on the tenure approach that is to be adopted in community management situations is that the measures put in place must not only be sufficiently robust to cope with present pressures, they must also survive under likely future conditions. Typically in developing country situations a range of factors is putting stress on resource management regimes. These factors include: increasing populations (particularly in rural communities, but also in nearby urban areas), changes in the economic situation (typically from subsistence-dominated to market-dominated), and accompanying breakdown in traditional authority structures. Co-management regimes must be able to cope with these factors as they emerge, either by having built-in measures or by ensuring sufficient flexibility and community capability for appropriate changes to be introduced.

Points to remember:

- **clearly identify and reach agreement on the ownership and management responsibilities for the areas and resources under consideration;**
- **if necessary, establish formal agreements on the ownership and management of the areas and resources contained therein;**
- **clearly define the tenure and the rights and responsibilities of all user groups; and**

[29] Thole & Dodman - Case Study No.8 - describe a situation in which a law recognising the traditional resource management regime in Zambian wetlands was replaced in 1974 by a Forest Act which placed incompatible restrictions on resource use. The result was resentment of the rules (and of the lack of consultation prior to their introduction) by the local communities which lead to an open-access situation with resultant environmental destruction. Similarly, when national parks were declared over community resource areas the communities lost interest in protecting a resource from which they were prohibited to benefit because of the national park status.

[30] Gichuki - Case Study No.3 - describes a situation in which government sub-division of common grazing lands in the Lake Ol Bolossat basin has hindered progress in environmental protection.

- **remember in particular that this is quite a complex issue and it may take a substantial amount of time to reach agreement between all parties.**

Legal basis for implementation

Co-management arrangements require some legal basis if they are to be sustained over time. While co-management might persist for a time, the lack of a legal basis for any of the following:

- the community's role in decision-making;
- enforcement of rules and regulations;
- access to the resource; and, in some cases,
- continued occupation

will eventually undermine the situation.

Points to remember:

- **develop a legal agreement for the implementation of the co-management arrangement;**
- **ensure that approaches for co-management regimes are recognised in national policies, legislation and national development plans.**

Rules and Regulations for Resource Management

The development of useful and relevant rules and regulations for the resource co-management activities will provide a sound basis for a long-term management arrangement.

It is in the area of rules and regulations governing community management of wetland resources that it becomes apparent whether the situation is really one of co-management, or merely a disguised 'top down' system. This is not to suggest that rules and regulations applicable to co-management approaches must be totally derived by the community. However the community must have an ongoing and meaningful role in their development, implementation, monitoring and review. One of the first considerations in developing rules and regulations for resource management is whether or not traditional controls are still in place and are appropriate to the current situation[31].

[31] Wickham - Case Study No.5 - describes a situation in which traditional laws are still used (though they are not recognised by the government). Project staff actively sought details of traditional resource management controls and found that 17 different aspects of resource utilisation were covered by existing traditional laws. Because these differed in their detail from one village to another, descriptions of the different regulations were circulated to allow communities to become aware of the differences.

As with other aspects of co-management, there will be a spectrum of possible arrangements in relation to rules and regulations, depending on the balance of control applicable in the particular situation. However if the resource management controls are imposed entirely from outside (by government agencies or 'experts'), or do not take into account the situation of the community, then the approach cannot properly be called co-management and will not be likely to survive for long. By the same token, governments cannot adopt a community management approach and then apply so many conditions and restrictions that the community is prevented from taking effective management decisions.

It is too easy for governments to fall into the trap of believing that there is only one acceptable approach and only one acceptable set of rules for managing a particular type of resource[32]. In fact, government should be concerned only that rules and regulations applied to a specific situation meet its needs in terms of policy and management objectives, including those expressed in national laws.

The community should be concerned that rules and regulations meet their needs, are consistent with their social norms and economic situation, and provide for a sustainable situation, if not an improvement in their resource base.

Careful consultation and compromise will generally be needed to achieve agreement between communities and government agencies on the details of co-management controls for resource protection.

It is often the case that the resource controls implemented by the affected community will be more strict than those which would have been imposed by the government, though in virtually every case the community controls will be in sympathy with their cultural values - something which often cannot be said for government-initiated regulations.

Points to remember:

- **identify the role that traditional management structures can play in the development of the longer term management strategy;**

[32] Gujja & Pimbert - Case Study No.2 - point out that the use of coercive methods of resource-use control that are assumed to be valid for all people, at all times and in all places is counterproductive in most wetland contexts, and once relationships deteriorate as a result of such a regulatory approach rebuilding them can be difficult.

- **the development of the rules and regulations must take into account the needs and aspirations of all the stakeholders in a fair and equitable manner; and**
- **a flexible approach towards the development and formalisation of the rules and regulations should be adopted recognizing the cultural and traditional patterns of utilization of the site.**

Management Plans

The concept of management plans as a framework for managing wetland areas is an integral component of most government approaches to wetland resource management. In considering whether a management plan should be a component of community management of wetland resources it is necessary to examine very carefully the role that the management plan will play[33].

Too often, management plans are developed and 'owned' by government agencies. Even where communities play a meaningful role in their formulation, there is no guarantee of ongoing community participation in management[34]. The very fact that a government agency 'owns' and is responsible for the implementation of a management plan tends to downgrade the role of the community[35]. Management plans tend also to be popular with development assistance agencies and international NGOs. In the first case the development assistance agency staff are likely to feel that the management plan provides them with: a) a 'product', which is evidence that their programme is achieving

[33] Liyanage - Case Study No.6 - provides a description of a highly participatory management planning process which resulted in the identification of five zones in the mangrove area. Participatory management was adopted as the key strategy in the multiple use and reforestation zones, and the buffer zone provided for economic activities such as bee-keeping, home garden development, and establishment of community fuelwood blocks. A 3 year trial period for the management plan will be followed by a participatory review and establishment of a 5 year management plan.

[34] Gujja & Pimbert - Case Study No.2. In this regard it is interesting to note that a management plan for the Ucchali wetland complex was completed in 1993, but that the PRA reported in this paper was done in late 1994 "to build up pictures of natural resource endowments, the means by which they are managed, and the socio-economic make up of the communities". This is often regarded as the basis for a management plan covering areas where there are resident communities.

[35] Gujja & Pimbert - Case Study No.2 - conclude that the most difficult and complex task in implementing management plans is to achieve community ownership of plans. They see this being done through assisting communities to establish or strengthen local institutions and through providing them with the required legal, technical and scientific tools for implementation. It is much easier to take the traditional top-down enforcement approach to implementation and requires far less adaptation on the part of the government agency staff.

something; and b) a programme against which implementation can be measured, so as to ensure that it is 'on track'. Development assistance agencies are generally very wary of programmes which change direction during implementation, no matter how necessary this may be. The reasons why NGOs are attracted to management plans are more difficult to discern. In part it is likely to be a wish to have an agreed programme that locks government agencies into a desirable course of action. In part it may also stem from a lack of knowledge of alternative approaches. In other cases it may be that the management planning process provides a legitimate role for NGOs in government resource management activities.

In reality, it would be difficult to find any 'traditional' community management regime which even remotely resembled a typical management plan. The management planning approach is far more bureaucratic than the internal workings of most communities which are still close to their natural resources. In addition, not only does the approach embody concepts which are foreign to most communities at this stage of development but also the utility of many of the concepts would be difficult to explain convincingly.

This is not to say that communities should not be encouraged to document their own rules and regulations and their understanding of the benefits of wetlands and the management issues involved. The extent to which this can be achieved (and the extent to which it will be useful) will depend on the individual situation. Over time communities can move toward more formal management plans, but this should happen only as they develop a perception of the usefulness of such an approach.

In some situations communities will find themselves in cooperative management arrangements with government agencies which insist on the development of a management plan, possibly because of some legislative requirement for plans to be produced. In such cases it is highly desirable that the plan is broken into separate components which describe the roles of government and of the different stakeholders within the community. Each separate component might then be prepared largely by the relevant stakeholder group and that group can then be primarily responsible for its implementation. In this way it is possible to have multiple ownership of the management plan, and also for each stakeholder to monitor the fulfilment of its own responsibilities under the plan, and those of others.

Box 6 Community Regulations for Mangrove ConservationBan Laem Po* - Yaring District - Pattani Province, Thailand

A community organisation formed in Laem Po village to deal with illegal intrusions by large trawlers into coastal waters also turned its attention to mangrove destruction.

The fishermen in the community organised the replanting of 275 rai (44 ha) of mangrove forest in cooperation with the District Forestry Office. This was done at the end of October 1993 with more than 2,000 people participating. Some of the seedlings were a gift from villagers in Trang Province, who had replanting experience and who were contacted through a fishermen's network.

The replanted forest was designated Community Forest with the agreement of the Regional Forestry Officer. This in itself was a victory for common sense over bureaucracy, since the official procedures laid down by the central government for declaring a community forest would have taken around two years and would have placed unacceptable limitations on community use of the forest. A management code was developed by the community and approved (again informally) by the Forestry Officer for management by the local Imam under Muslim law. In many ways the code is stricter than the controls which would have been imposed by the government, but since it was developed by the community it is in keeping with their cultural values and economic needs. A key aspect of the code is that the mangrove resources perform a welfare role for the more needy members of the community.

* 'Ban' = village

Points to remember:

- **the development of a management plan should be seen as an optional part of the development of a co-management regime, but should not be seen as the objective of the regime. It is only one of the available tools in the management process;**
- **management plans, where appropriate, should incorporate traditional management practices; and**
- **management plans should be developed through a consultative process with all stakeholders having a sense of ownership of the process and the resulting plan.**

Law Enforcement

Effective law enforcement requires the cooperation of all stakeholders and an agreement to be reached on the rules governing resource usage and methods for enforcement.

Planners of community management of wetland resources often either ignore the question of law enforcement or assume that laws can be fully enforced by the community or its leaders. This is unfortunate, first because it is a key factor in the success or failure of co-management regimes, and second because in many situations law enforcement is a matter of life and death for the community.

Local leaders typically have power, status and influence which will support law enforcement within their communities. This might be achieved through locally recognised, culturally ingrained positions combined with their ability to use social censure, fines, embarrassment, cultural norms, customary belief systems, etc. These are often more likely to be effective within their community than the threat of action by some frequently absent outside enforcement officer.

While it is reasonable in many situations to assume that communities can take on the responsibility for enforcing resource management controls among their members[36,37], this is not always the case. In some situations, for example Aboriginal Australians, it is not socially acceptable for just any member of a community to take on a resource law enforcement role. Members of the community who do not have traditionally derived responsibilities regard themselves as equal and do not take well to being regulated by another community member, no matter how reasonable the restriction or what the outside source of authority. In other situations communities may lack the power to enforce resource controls against members of powerful families. In general,

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[36] Addun & Muzones - Case Study No.10 - describe a situation in which a local government council enforces resource management controls even though it has no police powers. This is done through reliance on a close, kinship-based, community structure in which the threat of ostracism is a powerful deterrent to breaking community environmental codes.

[37] Ayres *et al.* - Case Study No.1 - raise the issue of enforcement of controls against family and friends who live outside the community. This becomes a major issue in some cultures. For example, in Laos and Thailand, communities will find it very difficult to take action against not only family and friends, but also people who are known to them. It is a strongly held cultural value that individuals are responsible for their own actions, and this, coupled with a high value placed on sharing, can place communities in a difficult situation.

Box 7 Law Enforcement in a Small-scale Fishing Community Ban Laem Sak - Ao Luk District - Krabi Province, Thailand

Small-scale fishermen, who make up the majority of the community in this village, previously had problems with illegal fishing by push-net operators from the local area and larger trawlers from Phuket. The community sought assistance from a local NGO based in Krabi town. This NGO operates under a committee which has the Vice-Governor of the Province as its Chairman and contains representatives of local leaders, the business community, academic institutions and other NGOs.

Villagers identified and declared a Marine Conservation Zone (MCZ) which they would protect and manage for small-scale fishing and conservation. There is no provision in law for this, so the community based the controls in their MCZ on the laws which should have applied in the coastal waters but were not enforced by the relevant government agencies. In addition they adopted voluntary controls over their own members. One of the sub-villages of Ban Laem Sak decided to replant 30 rai (4.8 ha) of mangroves as a part of the MCZ initiative.

In addition, the NGO assisted the villagers to identify viable alternative income sources with the assistance of business people who were members of the NGO committee.

The Provincial Governor attended the ceremony which established the MCZ, as did representatives from many media organisations.

District Fishery Officers had not previously enforced fisheries laws in coastal waters around Ban Laem Sak, partly because they were not willing to prosecute boat operators belonging to large companies. Any action against these boats would have been likely to result in complaints to their superiors and the threat of physical violence against the officers. Once the community had become organised and had developed powerful contacts who supported law enforcement in the MCZ, Fishery Officers gradually began to cooperate in enforcing the laws.

Enforcement patrols involve villagers, District Fishery Officers and District Police, using boats provided by, or hired from, local fishermen. Around 80 trawlers and push-net boats were arrested in the first twelve months of operation of the MCZ.

These actions had an adverse impact on fuel sellers and middlemen who dealt with the arrested vessels. These people protested to Government about the enforcement actions and tried to have the cooperating District Fishery Officers transferred to another District.

Because the Officers had strong community backing and the area had the attention of the Governor, Vice-Governor and the media, no official action was taken against the Officers.

When it became obvious that stocks of marine organisms were increasing in the vicinity of the MCZ, four other communities in Krabi Province asked for assistance from the NGO involved at Ban Laem Sak.

although it is desirable for communities to be responsible for enforcing their own internal resource management rules and regulations, there will be a need for an outside enforcement body which can be brought in when the situation warrants this.

It is a very common situation that resource management controls need to be enforced against outsiders - in fact co-management arrangements will generally not prove viable if controls cannot be enforced against those outside the local community. In some situations it may be possible for community members to be delegated law enforcement powers by the government and to use these against outsiders. However those advocating such an approach are frequently ignorant of some important characteristics of normal law enforcement agencies.

Law enforcement agencies provide their enforcement officers with a range of support which is crucial to the successful, ongoing fulfilment of their responsibilities. This support includes:

- training in aspects of law enforcement such as:
  - legislation;
  - collecting and maintaining evidence;
  - arrest procedures;
  - presenting evidence in court;
  - self-defence and use of firearms;
- appropriate symbols of power (uniforms, badges, official transport, etc.);
- firearms and other weapons;
- availability of reinforcements when needed;
- a perception in the mind of the public that any individual enforcement officer is a part of a large and powerful organisation that will react forcibly if the officer is threatened or harmed.

This support is not usually available to community members (including community leaders) who are placed in law enforcement situations[38]. As a result they are likely to have less cooperation from the public, are likely to be less motivated to carry out law enforcement activities, and in some situations their property, or their lives and those of their families, are likely to be endangered. Those involved in establishing co-management regimes should think these issues through very carefully before proposing that community members should be responsible for law enforcement against outsiders.

Points to remember:

- **establish good communication between the stakeholder groups and the enforcement agencies;**
- **clearly define the roles and responsibilities of the parties involved in the enforcement process; and**
- **provide adequate training and support to the parties involved in the enforcement process.**

[38] Ayres *et al.* - Case Study No.1 - report on a law enforcement approach in flooded forests of the Amazon in which the community approaches outside fishers who are fishing in protected lake areas and explains the restrictions. If the outsiders do not cease fishing, the community can contact officers of the Brazilian Environmental Institute or police, using short-wave radios provided as part of the management infrastructure. In this way the community members do not need to take physical action against outsiders, but are still able to play a meaningful role in law enforcement. The effectiveness of such a system will depend ultimately on how reliably and quickly the government agencies can respond. Experience of a similar arrangement between small-scale fishermen and Fisheries agencies in southern Thailand suggests that many factors (e.g. lack of funding for field work by enforcement staff, breakdowns of boats and vehicles, and low priority given to community problems) can cause an apparently workable system to fail. The effectiveness of the arrangements in the Mamirauá Reserve can be judged by the decline in the percentage of fish originating in the Reserveeaten in the nearby town - from 20-23% in 1993 to 7% in 1995.

Chapter 5

DESIGNING AND IMPLEMENTING A CO-MANAGEMENT APPROACH

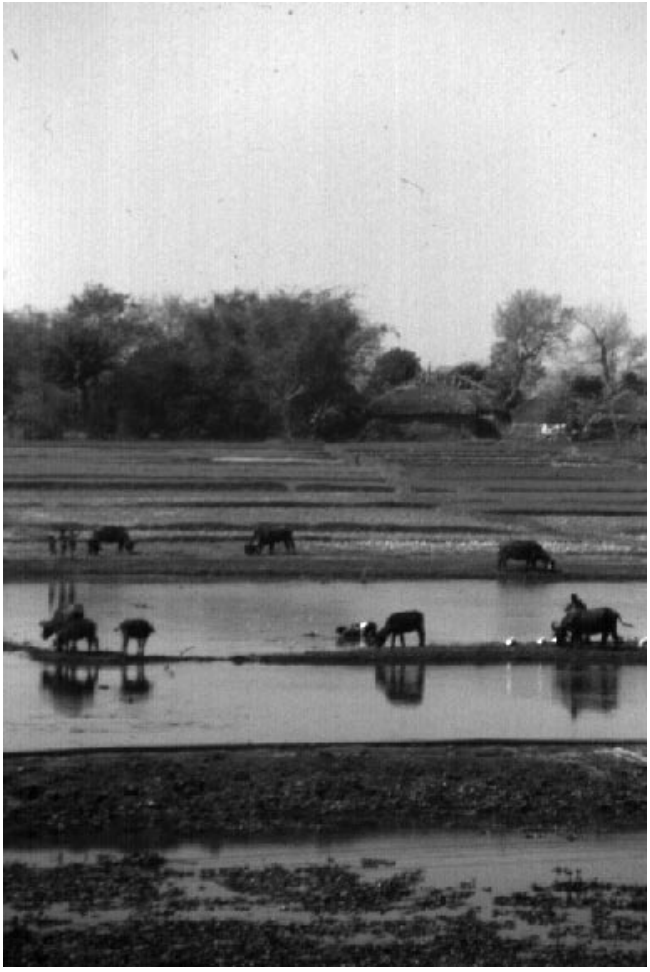

Photo by Tim Dodman

Chapter 5

DESIGNING AND IMPLEMENTING A CO-MANAGEMENT APPROACH

Gordon Claridge

The Design Process

To some extent this section on designing and implementing a co-management approach assumes that no clearly defined project exists at the outset and that time is available to carry out necessary preliminary activities. These include: involving the community in project design, raising the level of community awareness of resource management issues, increasing their capability to identify and analyse problems, and having the community participate in strategy development.

This is a somewhat idealised situation which, if it exists at all, is more likely to occur where an NGO has made itself available to assist a community to address resource management issues.

In reality, project identification and design generally take on a far less ideal structure and timetable with little or no community involvement. Figure 1 shows the project cycle used by the Asian Development Bank, which makes no mention of community involvement in project identification, design or development. This is fairly typical of the process used by development assistance agencies (CLARIDGE, 1993). It is unusual for meaningful participatory processes to be used by the major aid donors in the design of biodiversity conservation projects, and virtually unknown for the design phase to include any institutional strengthening activities to improve the efficacy of community involvement.

This chapter is based on the project processes illustrated diagrammatically in Figures 2 and 3. Figure 2 attempts to illustrate a flow process and to convey the links between the various project components. However, it is not possible to show clearly in such a diagram how the various elements of the different components need to proceed simultaneously. Figure 3 attempts to illustrate this. These diagrams should not be taken as rigid patterns to be followed. They are attempts to convey the nature of the process in a generalised form.

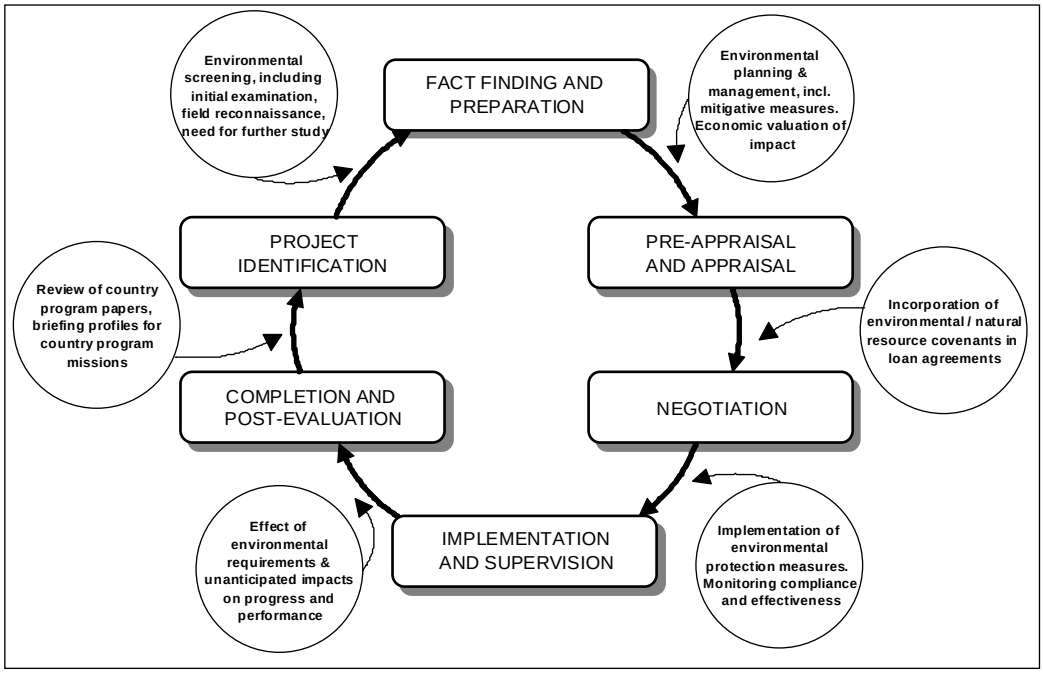

Figure 1 Asian Development Bank Project Cycle (source ADB, 1991)

Identify Key Individuals and Groups and Build Rapport

Upon making contact with the community it is necessary to begin identifying key individuals and groups with an interest in resource matters, or the ability to influence community views on these matters[39,40]. Often the early stages of using RRA techniques for situation analysis and problem identification will reveal who these are.

[39] Addun & Muzones - Case Study No.10. Started by establishing a partnership with a local fishers' organisation.

[40] Gichuki - Case Study No.3 - describes a situation in Kenya in which there were 14 village-based community groups around a lake which is 25 km long and no more than 3 km wide. Of these 10 were self-help groups, three were religious and one was cultural. These groups were already involved in a wide range of activities aimed at generating income and protecting the environment.

Figure 2 Proposed Approach to Establishment of Co-management - Flow Chart

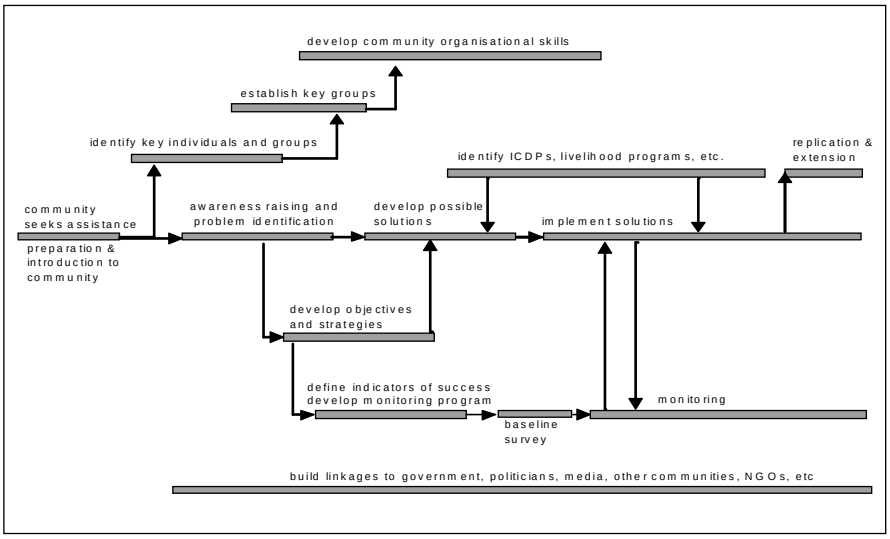

Figure 3 Establishment of Co-management - Indicative Time Lines

It is important to remember that women and youth constitute groups within the larger community which often have their own roles, information, development priorities and lines of communication[41].

In addition, it is necessary to recognise that the stakeholder community is broader than the local user community and that all stakeholder units will have key individuals and groups.

It is also vitally important to begin establishing rapport with the community and particularly these key individuals from an early stage. Where project personnel are necessarily working closely with user communities and may even be living in these communities, it is particularly important to establish good relationships with other stakeholders in the broader community[42].

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[41] Wickham - Case Study No.5 - found that the major community consultative group (Head Fishermen's Group Meetings) never included women and that the members of these groups rarely imparted the decisions made at the meetings or the knowledge that they had gained there to women in the community. This was despite the fact that women were often more involved in the use and management of wetland resources than were the men.

[42] Molina - Case Study No.9 - reports on a situation where there was an extreme need for the field workers (in this case park rangers) to win over a hostile community who had misconceptions about their role.

Building rapport will be facilitated by:

- meeting with leaders of stakeholder groups (not forgetting local officials) to dispel suspicion when beginning work in a rural area. However, building rapport should not stop with just meeting these people;
- initially working with local people who are more approachable and have less to fear from field workers; for example: older people, shopkeepers and village health workers;
- clearly explaining reasons for coming to the area to a wide cross-section of local people, both men and women (and remembering that children often provide an immediate channel to other members of the community);
- showing genuine interest in local issues;
- choosing times and locations that are convenient for local people;
- ensuring that the 'host' community understands the reasons and need for talking to other stakeholders, and also that village men understand motives for wanting to talk to women;
- adopting the behaviours and attitudes of good RRA and PRA (see Box 2 p.[41]
- remaining impartial and avoiding becoming involved with local factions;
- avoiding making unrealistic promises and countering any wildly unrealistic assumptions voiced by community members; and
- being persistent and patient in establishing rapport. (JACKSON and INGLES, 1995).

Establish Key Groups Within the Community and Develop Skills

If co-management is to be successful, there must be a group within the community which is ready to take the lead in resource management[43,44]. The community as a whole generally cannot take on this role, even though all may participate in the implementation of management measures once they have been adopted.

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[43] Molina - Case Study No.9 - refers to a situation in which problems in the only key group have slowed the development of a community strategic plan, even though this was identified as an important concern of the community. This highlights the importance of building up more than one key group within a community so that organisational problems in one will not abort the co-management process.

[44] Bowe - Case Study No.7. There is no indication in this description of management of the deer hunting (and therefore the impacts of deer on the wetlands and wetland products) that any community group was established. Perhaps this is part of the reason for the series of setbacks to management that are described in the paper. Similarly, it does not appear that any mechanism was established that might have provided a forum for all stakeholders to discuss their perceptions of the issues. Once the Indonesian Army became a stakeholder by undertaking illegal hunting and renting out their weapons to other illegal hunters, the previous gains made by the government management agency seem to have been undone fairly rapidly.

The identification or establishment of appropriate groups needs to commence as early as possible in the process of developing a co-management regime. Functional groups within the community may already exist, or may be established as understanding of issues develops among a key core of community members. If possible, existing or traditional structures should be utilised so as not to cut across cultural norms[45]. Studies have shown that traditional community groups adapted to current needs are more likely to result in viable local institutions than new organisations created for project purposes (THOMAS-SLATYER *et al.*, 1991).

Such groups should become the leaders of awareness-raising, problem definition and strategy development and implementation processes. In addition, specialised groups, such as cooperatives, may play significant roles in the development process. The contribution by members of effort, and sometimes funds, to resource management groups serves to strengthen their commitment to the co-management process[46].

If appropriate structures do not exist, the leaders of new structures should be individuals who are acceptable to the community and who can command sufficient respect. Awareness-raising activities can be used to help increase support for the key group and understanding of their role.

Inputs needed to build capability within key groups include: training, financing, legal counsel and technical assistance. In addition, study tours to visit other communities which have experience of co-management are useful.

Training might include: leadership skills, organisation, financial management and accounting, literacy, awareness and educational skills, PRA skills, issue identification and prioritisation, consensus building, meeting facilitation, dispute resolution, ecological and socio-economic monitoring and evaluation, report preparation, and technical aspects of resource management as well as construction and maintenance.

[45] This, however, raises difficult questions in relation to gender equity. Established bodies within the community will often exclude women or give them a less than equitable role. In this regard, establishing new groups would provide a way of setting new group norms. However if gender inequity is a strongly established part of the culture, the question of whether or not to counter this is not easily resolved.

[46] Addun & Muzones - Case Study No.10 - point out that there may be legal and bureaucratic requirements associated with particular types of people's organisations, and that these need to be taken into account in deciding the nature of community groups which are established. Sometimes in order to avoid onerous requirements, or even government control, it may be necessary to develop novel organisational approaches.

Efforts to increase institutional capability within the community should not be limited solely to the local user community. All too often the deficiencies in resource management evident in local government agencies are due to a lack of training and infrastructure. It should be a part of the establishment of co-management of wetland resources to ensure that all stakeholders have the capacity to play their parts[47].

In general, when the resource management situation has become sufficiently difficult to warrant outside involvement through a project activity, there will be little effective collaboration among the stakeholder groups. Therefore the process of identifying and strengthening key groups within the community necessarily must include developing skills and processes in dispute resolution, consensus building, and consultation and collaboration.

Awareness-raising

Raising the community's awareness of ecological, economic and political relationships is an essential part of the co-management process[48]. Awareness-raising can take many forms, including such diverse approaches as community discussion of wetland values and resource issues, education in schools, and study tours. One of the most effective methods is to involve the community in a structured investigation of the benefits and values that they derive from wetlands. This highlights the need for awareness-raising to utilise terms, concepts, and examples which are relevant to the target group[49].

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[47] Addun & Muzones - Case Study No.10 - make the point that competent community organisations make a contribution to the quality of society in general.

[48] Lwanga - Case Study No.11 - reports on an awareness-raising programme that utilises seminars and demonstration sites at the district level. After two years she believes that. though the programme has brought together the community and the government's district technical officers, the demonstration sites are still in their initial stages and no replication has yet occurred. This emphasises the need to be wary of setting rigid timetables at the outset of a resource management project, as it will generally not be possible to predict how long each phase will take.

[49] Hulyer - Case Study No.12 - describes an approach which includes grass-roots awareness-raising, but from an international base, that can be contrasted in terms of its likely effectiveness with the approach described by Liyanage - Case Study No.6. It is also useful to contemplate the likelihood of Hulyer's brochures, wall charts, videos, CD-ROMs, etc. ever reaching the fishing community in Puttlam District in Sri Lanka even if they are in an appropriate language. This type of material which has to be distributed 'top-down' is famous for lodging in government agency offices, or being distributed to family and friends of officials, rather than reaching the grass-roots communities for which it was intended.

A common problem with awareness-raising activities at the community level is that they are not targeted at the groups who are most important in resource utilisation and management and in forming community opinion. There is a tendency to focus on the easy parts of awareness-raising, such as education in schools, or on general presentations through posters, etc. An effective awareness-raising programme must include an analysis of the target groups and of the ways in which they can be influenced.

Too often awareness-raising programmes are conducted on the basis that any educational activity will have a positive effect, so that it does not matter if it is not optimally targeted. This is not necessarily true and, since the community's awareness of ecological and resource conservation issues is at the heart of its willingness to be involved in management, the success of this part of the process is vitally important to achievement of overall goals. It is therefore important to develop criteria for success of the awareness-raising programme as well as mechanisms for evaluation. Community members who are involved in awareness-raising activities should be a part of the evaluation process.

It should not be assumed that awareness-raising or even community education alone will cause people to stop unsustainable resource exploitation by community members. Experience has shown that this almost always does not work - there need to be several factors acting concurrently, such as changed community values, availability of alternative behaviours, and possibly sanctions for unsustainable activities.

It is important to monitor the effectiveness of awareness-raising activities, including changes in the community's attitude to the need for resource conservation and co-management initiatives. Often resistance or outright opposition to participation is a useful indicator that the co-management regime being developed is not going to meet the perceived needs of the people in its present form. Instead of being taken as failure, this can be cause for an effort to find out the reasons for resisting participation. This should then lead to a review of the awareness-raising activities and possibly also re-examination and redesign of project objectives - preferably with the participation of the resisting community members.

Conversely, it is always a good idea to seek clarification of why communities, or groups within communities, are willing to participate. Their motives may

not always be consistent with the sustainable resource utilisation objectives of the project. Even in the usual situation of motivation through a desire for sustainable development, understanding the motivation of participants can provide a guide to ways in which involvement can be increased. Again, the awareness-raising activities are closely linked to community attitudes and any perceived problems with motivation should feed back into the contents and methodology of the awareness-raising programme.

Improve Understanding of Issues

Chapter 3 listed a wide range of topics which need to be understood by different stakeholder groups (see *Mutual Understanding of Situation and Expectations* p. [32]). Achieving the necessary level of understanding can often be achieved in part through the process of dialogue necessary to reach agreement on the nature of the problems and the likely solutions (see *Situation Analysis and Problem Identification* below). However the necessity for training in various forms should not be overlooked.

In some situations training government staff may present some difficulties as they may not be willing either to admit their lack of knowledge or to put effort into learning about groups whom they consider to be ignorant and uneducated, or too far down the social scale. For these reasons it will often be better to find alternatives to conventional 'classroom' training situations so that government staff do not lose face by being seen to need training in how to do their jobs. Effective alternatives include study tours to wetland areas (with much of the input coming from community members), 'field days' at community events, and on-the-job training. An important aspect of increasing government staff understanding is to make them aware of the breadth, depth and practicality of the ecological and resource management knowledge that exists in the community. For this reason it is preferable to involve community members in presenting training activities, rather than their being dominated by experts such as local academics or foreign advisors[50].

[50] Liyanage - Case Study No.6. The community organisation formed to enhance co-management identified a lack of knowledge of mangrove functions and values among government agencies and other communities not directly dependent on mangrove resources. They then carried out a data gathering programme so as to be able to present a convincing statement of the importance of mangroves to these bodies. The information was also used to classify the mangrove habitat in terms of its importance at national, regional and local levels.

However it is important not to underestimate the very limited experience that most local user community members will have had in the 'trainer' position. They are likely to be uncomfortable as the leaders in formal training situations, especially where government agency staff are trainees. Such individuals generally find it much easier to fill the role of 'possessor of legitimate knowledge' in field conditions. This should be a guiding consideration in the design of training events which utilise local skills and knowledge.

Situation Analysis and Problem Identification

A basic principle of intervention in community affairs is that root causes of problems must be understood and agreed upon before actions are taken.

A period of research is necessary for gaining an understanding of the situation and helping the community to understand the root causes of problems, and also to analyse their relationship with government, other communities, middlemen, etc.

Information from secondary sources can often provide a broad understanding of the situation and may allow preparation of a general draft framework for approaching issues. Secondary sources of information about community resource management issues include such things as: maps, earlier consultants' reports, environmental impact assessments, local government records, statistics (e.g. on population and settlement, production of primary products, etc.), and market records kept by individual traders.

Use of secondary sources provides a more complete picture of local conditions, particularly by setting detailed local information into a broader framework. However it is necessary to remember that secondary information can be as misleading as poorly collected primary data. Field workers must be trained to cross check secondary data for reliability.

None of the case studies emphasises the importance of using existing materials to research the situation before going into the field. This is to some extent symptomatic of the 'trendiness' of techniques such as RRA and PRA, which has drawn attention away from the wealth of information that is often to be found in existing documentation.

However, once data collection moves to the field, it is vitally important that the community play a major role in data gathering and analysis[51]. Apart from the obvious benefits such as obtaining highly relevant data, involvement of the community will make a very significant contribution to raising community awareness of wetland resource values and helping to confirm the real nature of resource issues.

Situation analysis should include particular attention to describing: traditional management systems, existing economic and political relationships, including resource ownership and land tenure, and religious and cultural values and traditions. The latter should be closely examined for possible bases for supporting sustainable resource management.

Involving the community in situation analysis increases the likelihood of developing successful strategies in the next phase, since local people generally have detailed ecological knowledge of their surroundings, particularly as they relate to resource use[52]. Frequently local communities will be able to provide ecological and land use histories of wetland areas which will explain the current ecological situation, providing a level of understanding which could often otherwise be achieved only through long and costly research. Such community histories also provide valuable insights into the origin of community attitudes to resource management[53].

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[51] Liyanage - Case Study No.6 - cites the establishment of a Mangrove Conservation Society in the main local user community to ensure participation in the co-management process. The group was involved in data collection, identification of objectives, development of management strategies, planning and implementation. Three sub-groups were formed within the Society and these worked with Forestry Department officers to study: conservation of mangrove habitats, lagoon fisheries and home garden development.

[52] Thole & Dodman - Case Study No.8 - cite the management of the Barotse Floodplains in Zambia where the government has introduced a number of resource management systems which have largely failed, partly due to the failure to consult and involve local people who had an effective traditional management regime. Mechanisms for the incorporation of this traditional knowledge into management strategies are now being investigated with the assistance of IUCN.

[53] Gujja & Pimbert - Case Study No.2 - show how participatory appraisal techniques revealed detailed community knowledge of the origins and management of the wetland areas being investigated and explained their attitudes to restrictions on land use in the wetland areas. The origins revealed by the communities showed that professionals had mistakenly assumed that two significant wetland bodies were natural and longstanding features, when in fact they are recent artefacts. This had a direct bearing on the question of land rights over the wetlands and their margins. The communities also provided their own explanations of the loss or reduction of certain environmentally significant species, linking the changes to human interventions. Such insights assist managers to avoid repeating past mistakes as well as offering clues to appropriate measures for restoring wildlife population numbers.

Develop Possible Solutions

In very few instances will there be a discrete period during which the co-management approach appropriate to a particular situation is designed in full. In reality the various elements of the co-management regime will emerge and evolve over a period of up to several years. Nevertheless, those supporting the development of co-management regimes need to identify a time in the process when discussion of the elements will commence. If nothing else, this will prevent the endless gathering of information without progress toward a goal.

In general, the beginning of design of solutions will be marked by a change from the use of appraisal techniques (RRA) to participatory planning techniques (PRA).

It is vitally important that stakeholders are meaningfully involved in project design. Despite what is said here about the need for a long period of awareness-raising and problem analysis before any actions are decided on, many wetland conservation projects which include resource management are designed on paper in donors' and consultants' offices, and the first contact with the community is when the implementation team arrives in the area. In such situations early and detailed community involvement in planning how to achieve project objectives is crucial.

Incorporation of local expertise into project design significantly increases the meaningfulness to, and acceptance by, local communities of proposed co-management strategies.

As a part of involving the community in project design there should be a transfer of skills to the community, including particularly RRA and PRA capability. This will provide a long-lasting benefit by way of improved problem-solving approaches within the community[54]. The same consideration applies to government agency staff. Too often, community-based projects bring in outside experts in RRA and PRA who have little or no contact with government staff

[54] Addun & Muzones - Case Study No.10 - trained communities in PRA techniques and found that these were not only a long-lasting benefit but the use of the process acted as a rallying mechanism for the various groups within the community.

and who are not required to transfer any of the necessary skills and knowledge to those staff[55].

An important part of developing strategies for wetland resource management is achieving agreement on the nature and balance of stakeholder group interests. This requires identification of the different stakeholder groups that make up the community in relation to a particular set of wetland resources and defining their interest in the resources. Often this interest will have cultural, economic and political overtones, and all of these need to be understood in relation to each stakeholder group.

Unless mechanisms for dealing with conflicting interests can be identified during the design phase, it is necessary to question whether it is worth proceeding with the development of a co-management regime. This is not to say that the groups need to agree on a fully developed and clearly potentially successful strategy at this time. However if they are not willing to discuss their differences and are unable to identify strategies which might be acceptable to the majority of parties, there may be little chance of success. In such a situation field workers need to examine possible strategies for: further awareness-raising with uncooperative parties, developing processes that will promote collaboration and agreement, or using legal means to ensure compliance with a regime agreed by all other parties.

Identify ICDPs, Alternative Livelihood Programmes, etc.

What is an ICDP?

The question of exactly what constitutes an Integrated Conservation and Development (ICAD) Programme (ICDP) is much debated. Rather than enter into the details of the discussion here, a definition of an ICDP is offered and then the variations on this approach are mentioned.

[55] Wickham - Case Study No.5 - took over a community-oriented project which had been under way for around three years and found that government agency staff had not received any formal training in working with communities and consequently had not acquired the necessary knowledge or skills to work effectively with communities. Such a situation can severely jeopardise the long-term sustainability of project achievements hinder any replication of the programme in other areas, and increase the likelihood that the situation will revert to top-down management at the end of the project.

An Integrated Conservation and Development Programme is one in which the major material benefits of the development components are clearly linked to the adoption of actions/practices/lifestyles which contribute to the achievement of biodiversity conservation objectives.

In the ideal situation the benefits flow directly and obviously from the adoption of the desired behaviours. The community is in no doubt as to the linkage and the likely loss of benefits if it is broken.

Sometimes ICDPs include benefits which are in reality a reward for pro-conservation behaviours, or compensation for ceasing harmful activities. This can be a dangerous strategy for at least three reasons. First, the community has not based the adoption of the new behaviours on its own values, and therefore the level of commitment to them is not strong. Second, the community is placed in a strong bargaining position - if the reward is not maintained or even increased, then pro-conservation behaviours may cease. Third, the knowledge and understanding of the link between reward and behaviour may be lost over time, or the society's perception of the value of the arrangement may change, resulting in a loss of commitment to the pro-conservation behaviours.

In the same way, a development activity in which development objectives are the ends, rather than a means toward biodiversity conservation, even if carried out in conjunction with a conservation activity, is more properly an 'environmentally sensitive development project', rather than an ICAD project (BROWN and WYCKOFF-BAIRD, 1994). Nevertheless such projects are often labelled as ICDPs. LARSON and SVENDSEN (1995) tend toward the view that an ICDP is a project which seeks to "maintain the diversity of biologically important wildlands while improving the quality of life of people whose livelihood depends on those resources" - in other words, the activities happen concurrently but they do not see a necessary close connection between biodiversity maintenance and improvement in quality of life.

It is important that those who seek to achieve wetland biodiversity conservation through ICDPs fully realise that this is an unproven methodology. The ICDP approach grew out of buffer zone management attempts to integrate communities and protected area management which themselves have a doubtful success rate (see, for example, WELLS *et al*., 1992).

Until now it seems that ICDPs run by NGOs are much more likely to succeed than those run by large-budget aid programmes. Nevertheless the development assistance agencies involved in biodiversity conservation have enthusiastically taken up the ICDP model, probably partly because previous approaches have been less than successful and no other model has presented itself.

Alternative Livelihood Programmes

Development is a process which implies improvement in the situation of communities. In some cases, conservation projects introduce alternative ways of generating the benefits (usually income or consumables) which were previously derived from unsustainable resource use. Unless the alternatives are intended to

Box 8 Elements of Effective ICDPs

The Biodiversity Conservation Network's Core Hypothesis is that if enterprise-oriented approaches to community-based conservation (ICDPs) are going to be effective, then the enterprise must: 1) have a direct link to biodiversity; 2) generate benefits; and 3) involve a community of stakeholders.

More specifically, these three elements of the core can be stated as:

1) Linkage between the enterprise and biodiversity. The enterprise must directly depend on the *in-situ* biological resources of the region, and should be one that would fail if the biological resource base upon which it is dependent were degraded.
2) Generation of short and long-term benefits. The enterprise must generate benefits (economic, social, and/or environmental) for a community of stakeholders both in the short run and, with a high probability, in the long run, after project funding ends.
3) Community/stakeholder involvement. The enterprise must involve members of the local community, and often others who are stakeholders in the enterprise and thus in the maintenance of biodiversity values of the area.

In effect, the hypothesis is that if a community is receiving sufficient benefits from an enterprise that depends on biodiversity, then it will act to counter internal and external threats to that biodiversity.

(BCN, undated)

result in a materially better situation for the community, they cannot properly be called development activities. In effect they are a non-legal form of regulation (and the approach should not be termed an ICDP), though they can be an extremely useful component of the co-management approach.

Frequently it will be necessary to assist communities to develop alternative livelihood sources to compensate for restrictions that need to be placed on utilisation of former sources in order to protect important biodiversity values[56]. The identification, consultation and feasibility studies for such alternative activities are usually time consuming. Once the alternatives are agreed upon, project workers generally still need to be involved for a number of years to assist with monitoring to ensure economic and ecological sustainability.

In identifying their priorities for livelihood projects the community may not necessarily decide on initiatives which have any direct connection with biodiversity conservation. It is then up to project advisors to try to develop some connection, or to advise whether the development initiative should possibly be taken up outside the framework of the resource co-management approach[57].

Not uncommonly, communities are willing to undertake resource conservation measures once they understand the need for them and their global significance. However since there is almost inevitably a cost involved in this, the communities, not unreasonably, generally expect some compensation for their efforts[58].

No matter what form livelihood projects take, they must be economically viable and ecologically sustainable. This necessitates the carrying out of feasibility

[56] Ayres *et al.* - Case Study No.1 - worked with communities to develop a zoning-based management plan in which the zones largely recognised the existing use of land and water bodies by local people. Nevertheless, a substantial period of negotiation is necessary to reach agreement on alternative livelihood sources to compensate for restrictions imposed on community activities.

[57] Molina - Case Study No.9 - tells of a community associated with a park which decided that their highest development priority was for health and education. This was linked to the conservation of biodiversity in the park through funding from a $1.00 per visitor levy on lodges serving the park. Thus the continued funding of the health and education programmes is dependent on the continued quality of the environment in the park.

[58] Gujja & Pimbert - Case Study No.2 - carried out participatory processes involving two-way information flows and found that once local communities understood the global significance of their local wetlands some community members were willing to take care of wetland ecology provided they received compensation for their losses in doing so and their legal and traditional rights were recognised.

studies prior to commencement[59,60] (and indeed prior to any commitment on the part of project personnel to the undertaking of a particular livelihood initiative), as well as ongoing monitoring of the activities for some time afterwards.

Livelihood projects often provide an opportunity to involve the business sector in the wetland management process. Project personnel can build on this connection not only to increase the level of involvement in community development, but also to make the business community more aware of wetland conservation issues.

Building Linkages

Linkages developed by communities with external entities are crucial for the long-term success of co-management initiatives. There are a number of significant aspects of such relationships. First, communities need to be integrated into the planning process and other government mechanisms so that their interests and concerns are taken into account. Second, such linkages can provide an ongoing source of technical assistance and knowledge transfer. Third, linkages with similar initiatives provide a range of advantages, including sharing of experiences and successful strategies[61].

Linkages fall into four general types: linkages to other communities and projects involved in similar co-management initiatives, linkages to NGOs and business, linkages to relevant government agencies and linkages to sources of power and influence.

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[59] Addun & Muzones - Case Study No.10 - mention feasibility studies as part of the necessary research studies for the preparation of a resource management plan.

[60] It is interesting that while Wickham - Case Study No.5 - reports that the Danau Sentarum project did not carry out a detailed feasibility study, the livelihood projects did not commence in earnest until orders for their products were in hand from retailers. Project staff felt that it was better to undertake small trials which showed immediate results to the communities, rather than engage in time-consuming feasibility studies that may or may not have provided an accurate prediction of the likely outcome. This was partly a preferred strategy, but also partly dictated by the short time available to show 'results' of income-generation activities to the project's funders and to the communities.

[61] Ayres *et al.* - Case Study No.1 - document an effective community networking arrangement which has evolved over a number of years.

Box 9 Criteria for Socio-Cultural Feasibility Analysis

The following list indicates the kind of questions that must be asked in the feasibility assessment of ICDPs and livelihood programmes. Each question presented here should be seen as the overall heading for a whole range of more detailed questions which need to be answered using a variety of methodologies.

- is the activity consistent with the objectives of the communities which will participate in, or be affected by, the proposed activity?
- will the proposed activity create conflict at any level of the community? Will it result in increased socio-economic stratification?
- will benefits spread equitably from the proposed activity to different groups within the community?
- is there a realistic plan to mitigate any foreseen negative impacts of the proposed activity?
- how much have local people participated in the design of the activity, and how representative were the participants of the different groups within the community?
- has preparation addressed all relevant sociopolitical and socio-economic issues that might impact the project?
- is there a programme for monitoring the economic viability and ecological acceptability of the project during its lifetime?

(BROWN and WYCKOFF-BAIRD, 1994)

Linkages to Other Communities

One of the most useful support mechanisms available to communities involved in developing co-management structures is linkage to other communities which are similarly involved or which have already succeeded in this process. This is discussed in more detail in Chapter 4 under *Networking of Community Organisations.*

Linkages to NGOs and Business

Communities can derive significant benefits by forming linkages with NGOs other than those directly involved in catalysing the co-management process.

Such NGOs might include those involved in issues such as health and welfare, human rights and rights of indigenous peoples, agriculture and irrigation and various aspects of biodiversity conservation.

Linkages with business are likely to result in mutually beneficial arrangements[62], though in some situations business communities may provide assistance to community groups on a philanthropic basis.

Linkages to Relevant Government Agencies

Communities can often gain significant benefits by developing linkages to government agencies with which they do not generally have contact. Often the existing government linkages are restricted to those agencies which have initiated contact with the community. In many cases there will be other, possibly more powerful, government bodies which can benefit the community. Examples include: regional and national planning, coordination or development bodies, health and welfare agencies, transport agencies and export promotion agencies.

Linkages to Sources of Power and Influence

Where communities are experiencing difficulty in having government bodies such as law enforcement agencies play their proper role, linkages to sources of power such as politicians and the media can be employed to apply pressure which may lead to cooperation. In other situations such powerful contacts may be necessary to deter outsiders who can not be influenced by the community or local law enforcement agencies. Where communities adopt the strategy of developing powerful contacts they must gain the widespread and continuing publicity for these contacts to make sure that they gain the maximum effect.

An Indonesian NGO has a strategy of inviting provincial officials to be associated with project activities and encouraging them to take the credit for successful initiatives. Their view is that the goal is much more important than getting credit for steps in the process.

[62] Wickham - Case Study No.5 - assisted the community to establish close relationships with the retailers of their products. In one case a local bottling company took over bottling of the honey using a more hygienic and marketable technique which increased the value of the product and therefore the return to the community.

Typically, communities can find reasons to hold ceremonies (launching, opening, inauguration, finalisation, handover, etc.) and these give them the opportunity to invite the attendance and involvement of high-level figures and to provide them with some prestige.

Box 10 Some Effective Linkage Strategies from Thailand

Strategies which have been used by small-scale fishing communities in Thailand who were unable to obtain protection of their fish stocks and mangroves by local government agencies included: establishing fisheries management reserves and inviting high level politicians, provincial governors and the media to dedication ceremonies; establishing contacts with university researchers; establishing a mangrove rehabilitation programme and encouraging politicians and provincial officials to be associated with it; making contact with other communities experiencing similar problems and sharing information; making contact with international NGOs and becoming involved in projects with them; organising a national conference on coastal zone management; and attendance of community leaders at scientific conferences.

Monitoring and Review

In a general sense, monitoring provides a way of establishing the success of management measures. This is important over the long-term so that effort is not mis-directed. However short-term monitoring is important because it can show the community that their efforts are having positive effects on the resource which they are managing. This will sustain and encourage participation by community members.

Monitoring data is used for:
- improving management decisions;
- measuring project progress (in achieving milestones or objectives);
- assessing effectiveness or impact of an activity such as in ICDP; and
- determining lessons learned which can be used in future projects (LARSON and SVENDSEN, 1995).

Where community management of wetland resources includes some type of ICDP it is important to remember that monitoring and evaluation need to include assessment of the ICDP activities.

Time Scale

In designing monitoring programmes it is necessary to understand clearly that the success or failure of a project from a wetland biodiversity conservation viewpoint is not usually apparent within the lifetime of the typical project.

Natural systems are subject to a range of temporal changes as a result of influences such as climatic cycles and incidents such as forest fires. These temporal variations create problems for biodiversity monitoring in two ways. First, there are likely to be significant differences between the observed impacts of a perturbation shortly after it has occurred and after a 'recovery' phase. A forest fire provides an example. Immediately after a fire the understorey biodiversity will appear to have been catastrophically reduced, though after a much longer period it may be difficult to detect subtle impacts of the fire on the understorey. Yet it is the sum of these subtle, longer-term changes resulting from repeated fires that are most important in managing biodiversity. Unfortunately, in many cases they may not be able to be clearly distinguished among larger-scale, short-term changes until several decades have passed.

The second way in which temporal changes cause problems for biodiversity monitoring, and one that is much more difficult to deal with, is that of natural variations over time. These may be background or biological changes, possibly due to successional changes, or fluctuations due to stresses such as drought, longer-term cycles of climatic variation, global climate change, etc. Such changes form a background that cannot be separated from changes due to management without reference to long-term data sets.

In reality the time scale for monitoring biodiversity is generally outside project time frames and often outside human time frames. Not infrequently, the appropriate time frame for monitoring specific aspects of biodiversity will not be known with any accuracy.

What Can Be Monitored?

Nevertheless what we can monitor during the period of the project are:

- the effectiveness of different stages of the co-management process, e.g. awareness-raising, development of community capability;

- the outcomes and impacts of ICDPs and livelihood programmes to ensure that they continue to be economically viable and ecologically sustainable;
- trends which show whether the overall wetland resource situation is going toward or away from biodiversity conservation goals; and
- changes in the components of biodiversity, particularly those that are important to the user community or of conservation significance.

Changes in harvest per unit effort of economically significant biodiversity resources such as fish stocks, wetland plants, water birds, etc. can be measured relatively easily. While these data alone might not prove the re-establishment of a sustainably managed population, they can provide encouragement to the community to continue with their management and monitoring efforts.

Community Monitoring Creates Ownership, Skills, Confidence and Credibility

Monitoring should, wherever possible, be done by the community, not by outsiders. In general, monitoring activities are more effective as a means of feedback and encouragement if they are designed, implemented and interpreted by the community. However the community may need assistance to identify appropriate indicators, design monitoring strategies, or to interpret the results. Often it will take longer to establish a truly participatory monitoring programme than one done by expert outsiders, and in reality the community's role may need to be gradually increased as their capability and understanding increases[63].

Though their criteria might be very different from those of a government agency or a conservation NGO, the community should be the ones to decide what will constitute success of failure of their activities. In addition, the community should always be closely involved in discussion and evaluation of monitoring data and should be seen as the owners of the data and the interpretation.

Monitoring and evaluation by the community also creates new skills and an improved degree of confidence in their ability as wetland resource managers. Finally, it can be important in helping to establish a valid role for the community as resource managers in the eyes of government agencies.

[63] Bowe - Case Study No.7 - reports that, in her view, documentation and monitoring were the major weaknesses of the project to manage deer hunting in the Wasur wetlands. Monitoring of hunting does not seem to have involved the local user community at all, either in its design or in implementation. Park guards and an NGO did the monitoring of the harvest, and records were so poor that is was difficult to quantify the success of the activities. It is noteworthy that the author reports that "the most reliable data on poaching came from the communities themselves".

Characteristics of Indicators

In choosing indicators, communities should be aware of certain criteria for defining their usefulness and practicality. Biodiversity monitoring indicators should:

- be cost-effective (maximum information with minimum sampling time, effort and expenditure);
- be quantitative;
- reveal meaningful trends;
- point as directly as possibly to the state of biodiversity in the subject area;
- be factors about which there is good understanding, so that interpretation is relatively unambiguous;
- allow the identification of effects of 'background' processes such as weather, climate, catastrophic events, etc;
- be applicable over a range of different ecosystems; and
- be amenable to sampling by non-specialists, and preferably be able to be collected by user/local communities.

It is highly desirable that the relationship between the indicators used and wetland biodiversity is clear and well understood. In practice this is probably seldom the case. Often indicators are selected intuitively, or on the basis of incomplete research or research that cannot be extrapolated to all situations. Many times there will be disagreement over the relationship even after considerable research. In some situations a particular trend in an indicator may point to either a positive or a negative trend. However, insistence on the establishment of defined and unambiguous relationships before using indicators would usually considerably delay monitoring programmes. In all situations it needs to be recognised that the main purpose of indicators is to suggest emerging or real problems in biodiversity conservation. Secondarily they are useful for gauging the environmental performance of project activities.

Baseline Surveys

Baseline surveys need to be done, not because they are essential to the interpretation of monitoring data but because they provide the community with a 'before' situation from which to measure their progress. Therefore the collection of baseline data about economically significant resources should be

started as soon as possible. These baseline data often constitute a useful component of the awareness-raising activities and situation analysis.

Replication and Extension of the Co-management Initiative

The process of developing co-management at a particular wetland or with a particular community should seldom be carried out as an end in itself. Every successful co-management initiative carries the potential to stimulate the commencement of similar initiatives in other locations. Co-management sites can contribute to the replication of this approach in a number of ways, including: providing an example which can be evaluated by members of other communities, creating a cadre of community members who are experienced in the various aspects of the methodology and who can relate easily to members of other communities, and creating a precedent for involvement of government agencies in collaborative resource management, making it easier for agencies in other locations to initiate involvement.

The commencement of replication and extension activities does not have to wait until the co-management regime at a site is fully developed and implemented. In the process of establishing the co-management approach, project staff and community members are continually developing methodologies and solutions to problems which can be utilised in other places. The development of community confidence and capability in RRA and PRA techniques is one example. Once this stage is reached the community members most closely involved can become advocates and trainers for the methodology with other groups. Similarly, practical initiatives such as mangrove replanting can be transferred from one community to another by those who have overcome the problems and created their own revegetated areas.

It is clear that adopting replication and extension strategies can significantly multiply the benefits of an investment in a co-management activity.

Chapter 6

SUMMARY

Photo by Bernard O'Callaghan

Chapter 6

SUMMARY

The following sections offer point-form summaries of the ideas presented in the foregoing chapters. Rather than repeating the structure already used in those chapters, the material is set out under headings which relate to concerns that may be identified by those facilitating co-management. It is recommended that this chapter be used as a checklist when planning and reviewing co-management activities.

The Process

- try to involve all relevant government agencies and departments, NGOs and community organisations in the process as early as possible;
- take time to identify the root causes of the major issues and problems;
- do a thorough analysis of the situation taking all factors (internal and external) into account;
- utilise problem-solving techniques to identify the root causes of the problem;
- be prepared to identify new and non-traditional approaches to address problems;
- the development of a management plan should be seen as part of the development of a co-management regime, but should not be seen as the objective of the regime. It is only one of the available tools in the management process;
- develop a flexible approach to decision making;
- long-term resource management arrangements should be formalised through a legal process;
- the process is lengthy and requires long-term commitment from all sides;
- clear strategic objectives must be established during the process;
- activities should be oriented toward both establishment of community organisational structures and provision of other developmental benefits to the communities involved;

- generally it may take at least 3-5 years for a co-management regime to be established and operating;
- the co-management activities should complement local, provincial and national development activities;
- the co-management process may need to be supported by development initiatives;
- consider compensation of the short-term losses that must be sustained for a longer-term approach to sustainable utilization;
- the co-management approach represents a spectrum of degrees of involvement and resource ownership arrangements;
- if necessary, establish formal agreements on the ownership and management of the areas and resources contained therein;
- a flexible approach to co-management will assist in ensuring that the views of all stakeholders are incorporated in the process;
- consider a flexible approach to the staffing of projects, with experienced staff providing specialist inputs into particular aspects of the process, and the rotation of field based staff, if appropriate; and
- develop a legal agreement for the implementation of the co-management arrangement.

Local and Traditional Knowledge and Values

- indigenous and local knowledge is critical in project design and should be central to the process of co-management;
- preconceived project designs often exclude local people;
- management arrangements should incorporate traditional values, knowledge and local rules and regulations which support sustainable natural resources utilization;
- identify the role that traditional management structures may play in the development of the longer-term management strategy;
- a flexible approach towards the development and formalisation of the rules and regulations should be adopted recognizing the cultural and traditional patterns of utilization of the site;
- management plans, where appropriate, should incorporate traditional management practices;

Sustainable Development

- monitoring of wetland management and particularly of wetland resource use is crucial to the long-term success of wetland conservation;
- the concept of sustainable resource utilization should be understood and agreed upon by all parties involved in the co-management process;
- the use of the resources must be economically viable and ecologically sustainable; and
- people should be seen as central actors in wetland conservation and management.

Planning for Co-management

- all actors in the field of wetland resources conservation, including international convention agencies, national governments, donor agencies and NGOs have to recognize and make appropriate changes in their policies so as to empower local communities;
- all stakeholders should be involved in the design and implementation of wetland conservation and resource management projects;
- clearly identify the rights and responsibilities of the users of particular resources and wetland areas, in particular in protected areas;
- weigh up the short versus long-term benefits of a sustainable resource management approach;
- government agencies and management arrangements should not impose but empower; and
- planners should learn from experience and build upon case studies containing relevant community involvement initiatives.

Involving All Stakeholders

- analyse the ability of each stakeholder group to act effectively as an advocate for its position and rights;
- ideologically-based approaches need to be carefully evaluated to ensure that they are fair, balanced and suited to the particular situation;
- the nature of arrangements for community involvement in wetland resource management should be appropriate to the local situation, including population, socio-economic status, density and cohesiveness;

- identify activities that will assist in the process of building trust and in the early stages of the project focus effort on the successful implementation of these activities;
- clearly identify communication channels, time frames and mechanisms for dialogue;
- ensure that plans and targets are met, or, if they cannot be met, that stakeholders understand the reasons for not meeting them;
- clearly identify the roles and expectation of each agency;
- agree on the roles and establish milestones and outcomes for each activity;
- evaluate the approach to management of the sectoral government agencies and build awareness of the benefits of an integrated approach;
- national-level priorities, policies and plans must be taken into account in the development of co-management approaches;
- plan to involve all stakeholders in the co-management process and develop a strategy to meet this objective;
- avoid fixed ideas, and be confident that the process will evolve;
- where appropriate, management arrangements should recognise and promote local organisation;
- planners and managers should make an effort to understand the history and culture of local people;
- pilot projects or evaluation periods should be used to test the acceptability, workability and relevance of any management arrangement before it is accepted as final;
- formulation and implementation of management arrangements should have the active involvement of local people and relevant stakeholders;
- there needs to be a shift from a project-oriented to process-oriented approach;
- the development of the rules and regulations must take into account the needs and aspirations of all the stakeholders in a fair and equitable manner;
- be prepared to create links in a flexible manner and develop a cooperative approach to problem solving;
- clearly identify and reach agreement on the ownership and management responsibilities for the areas under consideration;
- investigate options for linking with other communities with similar resource management issues;

- clearly define the tenure and the rights and responsibilities of all user groups;
- remember that establishment of co-management is a complex issue and that it may take a substantial amount of time to reach agreement between all parties;
- provide opportunities for the development of advocacy skills in the stakeholders. In advocacy training, ensure that the approach is culturally appropriate;
- management plans should be developed through a consultative process with all stakeholders having a sense of ownership;
- co-management success depends on the presence of appropriate social structures within the community;
- trust relies upon the meeting of objectives and mutually agreed targets. Concerted efforts should be made to ensure that these are met;
- needs and expectations of all stakeholders may not be straightforward. Consider and respect the values held by different groups, including cultural, religious and traditional beliefs;
- develop a process that allows all parties to provide an overview of their needs and expectations from a co-management approach;
- be flexible in the approach to solicit suitable input from the range of stakeholders;
- establish a forum for discussion of the key resource management issues an informal and non-threatening manner;
- identify the skills that exist in the community, and those that need to be developed;
- identify and involve key decision-makers from the local area - locals typically understand the situation better than outsiders;
- identify additional inputs to complement the skills of all parties involved;
- build upon already existing cooperatives and community groups;
- it is crucial that all parties involved in the process have a strong sense of ownership in the process and a commitment to the project's long-term objectives;
- provide opportunities for all parties to demonstrate their commitment to the process and build confidence between the stakeholder groups;
- there needs to be a proper appreciation of the needs of all stakeholders and this can only come from consultation;

- provide adequate information on the process of co-management before decisions on whether or not to participate are made;
- clearly identify the benefits (and costs) to all stakeholders in the adoption of a sustainable resource management approach;
- benefits of development and livelihood projects should be shared fairly among stakeholders;
- the establishment of co-management arrangements should include providing the community and government agencies with skills in conflict resolution;
- if necessary, build new organisations in the community to participate in the co-management process; and
- management arrangements need to incorporate mechanisms to reduce conflict between stakeholders.

Awareness-raising

- the sustainability of wetland management approaches will depend on awareness of the values of the wetland being perceived by local communities, other users and government;
- successful awareness programmes can be conducted at all levels of society, locally as well as globally. A successful awareness programme will address the following main issues:
  - developing 'criteria for success' for awareness programmes and developing the mechanisms for evaluation;
  - a consideration in designing and implementing any awareness raising programme should be the sustainability and longevity of the programme beyond its development phase and implementation. Motivation of local individuals and groups and transfer of skills and knowledge to these should be included in the objectives of any awareness raising programme;
  - the mixture of different awareness raising methods in a particular situation will vary depending upon a range of factors, including: the target group, the objective of the awareness raising activity, the stage of development of the community and its social structure, the resources available, and controls imposed by government or culture on different forms of awareness-raising;
- Identify needs for education and awareness campaigns to develop a greater

understanding of the important issues in key stakeholder groups and within key agencies;

- it is necessary to remember that there is a range of target groups for any education and public awareness activity, and that the priority of addressing any one group will depend on the situation;
- education and awareness-raising programmes should depend on a mixtures of concepts and activities to address the needs and perceptions of a range of user groups; and
- recognize that a global approach may address some of the needs, but that effective action can only be taken at local level, addressing the needs of the local situation and local people, developing suitable and effective approaches for a range of target groups, learning from a range of disciplines that have proven success e.g. social marketing, public relations, and sharing information on both 'successful' and 'unsuccessful' models of co-management. A prerequisite for this is the need for an efficient means of networking of those responsible for the development of these programmes.

Supporting Frameworks

- networks can take many forms: alliances, unions, discussion groups, etc and can operate in different ways, study tours, informal consultation;
- ensure that approaches for co-management regimes are recognized in national policies, legislation and national development plans;
- there should be harmonisation of resource management policies at the national, provincial and local levels;
- community management cannot work in a vacuum, where there is no supportive framework of policies, legislation, the judiciary and other functional links with government institutions. In particular, the issues of land tenure, resource access and property rights and adjacent activities need to be addressed;
- co-management arrangements should be based on sustainable biodiversity conservation principles;
- ensure that the government recognizes the importance of co-management through the development of policy and planning frameworks to support this approach. Try to identify an outside agency that is able to offer independent advice;

- recognise the strengths and weakness of the outside agency (NGO) and set reasonable expectations for its involvement;
- establish good communication between the stakeholder groups and the enforcement agencies;
- clearly define the roles and responsibilities of the parties involved in the enforcement process;
- provide adequate training and support to the parties involved in the enforcement process;
- the national framework for sustainable utilization of natural resources should recognise the role that co-management can play in efficient and effective resource management; and
- the concept of co-management should be supported through national development plans and policies.

CASE STUDY NO. 1

MAMIRAUÁ: THE CONSERVATION OF AMAZONIAN FLOODED FORESTS

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Key words wetland, flooded forest, community, consultation, law enforcement, management plan, zoning plan, awareness, research, Amazon, Brazil, Mamirauá

Flooded forests account for less than 5% of the total area of the Amazonian basin, however 80% of the human population of the region lives in this habitat. Central Amazonian inundated forests are unique because they experience floods of 12-13 m annually and are the habitat of several endemic species of fauna and flora. A multi-disciplinary team from several Brazilian and international institutions (CNPq, ODA, WWF, WCS and EC) is conducting studies in order to produce a management plan for Mamirauá Ecological Station, located between the Amazon and Japurá rivers (Brazilian Amazonia), an area of 11,200 km² of entirely flooded land. Fishing, small-scale agriculture and selective logging are the three most important activities in the area. Mamirauá has a human population of approximately 2100 inhabitants living in 14 communities that actively participate in the management decisions of the area as well as in the vigilance system.

The paper describes the research being undertaken in the area, its most important economic resources and biodiversity, as well as how the community participation programme is being carried out. This system has proved to be at least partially effective, as the amount of large-scale fishing has considerably reduced in the past three years.

INTRODUCTION

There are few areas on this planet that are 7-15 m underwater six months of the year. The few flooded forests that still exist in the tropical regions are located on the margins of some African rivers and, mostly, on the Amazonian rivers. It is estimated that the Amazon basin has approximately 200,000 km² of flooded forests. There are many types of flooded environment in the Amazon: forest formations are more common in the middle and upper Amazon basin, mainly in Peru and in Brazil, while flooded fields are predominant in the lower part of the basin and in the Amazon River estuary. The flooded rainforests are known as várzea and igapó and differ according to their origin. The igapó areas are formed by blackwater- or clearwater rivers, poor in nutrients, from the central plains and from the Guianas shield. The várzea areas are associated with the whitewater rivers from the Andes which, unlike the blackwater- or clearwater rivers, carry great quantities of sediments.

The first areas of forest in the Amazon probably appeared at the end of the Tertiary period with the surfacing of the Andes and the consequent formation of the large Amazonian lake; these flooded areas were formed by sedimentation caused by annual floods. The várzeas slowly became 'terra firme' (dry-land forests), thus creating the great network of rivers and tributaries of today's Amazon basin. The várzeas have an important biological significance: their plant and animal species have had to adapt themselves to the variations provoked by the annual seasonal flooding of several metres; consequently, there are many endemic species in the várzea areas. The biological diversity is lower in the várzea areas than in the neighbouring dry-land forests, however there is a visible increase in diversity of trees and arboreal mammals as one travels up the Amazon River (AYRES, 1986, 1993).

Due to the annual renewal of nutrients through the rivers that bring sediments from the Andes, the várzea areas are very productive and have become a focus of economic exploration by the human population of the region. It is believed that at least 80% of the population in the Amazon lives near these flooded areas, on the margins of the large rivers. Reports from the famous expedition led by the Spaniard Francisco Orellana (some 450 years ago) which discovered the great river, described large groups of people living and exploring the várzea along almost its entire length (Carvajal, in MEDINA, 1988). Due to the importance of the várzea to the regional economy, this ecosystem is probably the one that has suffered most from the impact of man's arrival in the region. Today these areas are used for intensive fishing, logging and some seasonal agriculture. Until the 1980s there was no conservation unit located entirely in the Brazilian Amazon várzea.

THE MAMIRAUÁ ECOLOGICAL STATION

The Mamirauá Ecological Station (MES) was created in 1990 by the Amazon State Government based on a proposal elaborated by J.M. Ayres in 1984 with photos by L.C. Marigo, who have made scientific studies and photographic documentation in the area since 1983. The original proposal was for an area of approximately 712 km², defined by natural limits, having the River Japurá in the east, the River Jarauá in the north and the River Solimões in the south. However, on the legalisation of the MES, the area was expanded to 11,240 km², to include the region between the Japurá, Solimões and Auati-Paraná rivers. Mamirauá is the only conservation unit in Brazil located entirely in várzea flooded forest.

The MES várzea areas are mainly from the Holocene period, the majority being very recent in origin, at less than 10,000 years of age (KLAMMER, 1983). The region between the Rivers Solimões and Japurá is characterized by hundreds of lakes, many of which originate from abandoned channels, paranas, canos, small islands, restingas (levees) along the channels and lakes, and large swamps that are interconnected during the floods; a recent inventory identified 499 lakes in the 260,000 ha focal area of the reserve. In the Mamirauá Ecological Reserve there is a 12-m difference between the lower (September/October) and the higher (May/June) water levels.

The várzea in the lower River Japurá region comprises many habitats of which three are of great importance to the arboreal fauna. Two of these habitats are characterized by forest areas (high and low 'restingas') while the third is the chavascal. On younger islands there are also formations of embaubais (stands of *Cecropia*) and mungubais (stands of *Pseudobombax*). The physiognomy of the vegetation is determined by altitude.

The high restingas, high ground that is subjected to annual floods for 2-4 months, with a water level varying between 1 and 2.5 m, represent around 12% of the várzea forest type. They are structurally similar to the dry-land forests, however the composition of the species is very different. In the várzea, the high restingas possess greater species diversity in the arboreal environments; the low restingas are a transition between the forest areas of the várzea and represent 85% of its forest cover. The low restingas are under water 4-6 months a year and, in some patches, the water level may be up to 5 m. The restingas are found, in general, along channels, paranas and lakes (AYRES, 1993).

The chavascal, open swamps at lower altitudes, probably represents the larger part of the MES várzea. It consists of low, scrubby and swampy vegetation, almost impossible to penetrate. The chavascal remains under water from 6-8 months every year, with a water level of 6-7 m. In the middle of this scrubby vegetation there are emergent trees and islands of restinga. The chavascais are usually located behind the restingas.

Due to the annual flooding of 11-12 m, which covers all the várzea lands of the middle River Solimões and the lower River Japurá, the terrestrial fauna characteristic of the neighbouring dry-land forests does not occur in the MES. Among the mammals, only aquatic species (e.g. river dolphins and otters), good swimmers (e.g. Painted Jaguar), arboreal mammals (e.g. primates) or flying mammals (e.g. bats) occur. Terrestrial mammals are replaced by the aquatic fauna that enters the forest in the flood season.

Mamirauá ('baby manatees' in the local, indigenous language) is the habitat of many rare and endangered species of Amazonian fauna such as Manatee *Trichechus inunguis*, Black Caiman *Melanosuchus niger*, White Uakari Monkey *Cacajao calvus calvus*, Blackish Squirrel Monkey *Saimiri vanzolinii*, and Amazonian Turtle *Podocnemis expansa*, all of which are officially catalogued as endangered.

Of the eight primate species found in the MES, only the White Uakari and Blackish Squirrel Monkeys are endemic to the reserve. Although the latter is the most abundant in numbers (approximately one individual per hectare of forest), it is found only in the extreme east of the reserve, between the channel of the River Jaraua and the mouth of the River Japurá. The White Uakari, which is found practically everywhere in the reserve, occurs in lower densities (approximately one individual per 14 ha of forest).

In size, the Black Caiman is the largest predator in the Amazon; it can attain a length of more than 5 m. This type of caiman almost disappeared between the 1940s and 1970s due to illegal hunting; its skin is highly prized on the international market. Today the largest known population in the Amazon Basin is found at the MES (R. SILVEIRA and J. THORBJANARSON, pers. comm.), however this population is hunted and its meat is sold clandestinely to the State of Pará (Brazil) and Colombia.

Of the five turtle species known in the reserve, the Amazonian Turtle was most exploited in the past. Today it is much rarer than the tracajá *Podocnemis unifilis* and the iaça *Podocnemis sextuberculata*. In the middle River Solimões region these two smaller species of *Podocnemis* are threatened because of their commercial value.

To date, approximately 290 fish and 310 bird species have been identified in the focal area of the reserve. Many of the bird species are aquatic and migratory (CRAMPTON and HENDERSON, pers. comm.). The reserve is an area where many reptiles, amphibians and valuable fish are found, including species such as the tambaqui *Colossoma macropomum* and the pirarucu *Arapaima gigas*, which are threatened by intensive fishing. In general, the lakes serve as a refuge for young tambaquis during the dry season while the more shallow lakes supply shelter to the pirarucus so they can build their nests during the flood season. During the flood period, the forest areas of the reserve supply food for the many different types of fish that are sold in the nearest towns, e.g. matrinchà *Brycon* sp., pacus *Mylossoma* spp., *Myleus* sp. and *Metynnis* sp., pirapitinga *Pyaractus bidens*, sardines *Triphorteus* spp. and the aracus *Leporinus* spp. and *Schizodon fasciatum*.

Tree diversity in the Mamirauá várzea is superior that of other várzea regions of the middle and lower Amazon (AYRES, 1993). More than 250 species with diameters greater than 10 cm have been identified. Many of these trees, e.g. the samaumeira *Ceiba pentandra*, have had their populations greatly reduced by selective logging. Nevertheless, there are still reasonable populations of assacu *Hura crepitans*, muiratinga *Maquira coriacea* and ucuuba *Virola surinamensis*, all light, white timber that has been extracted extensively by the plywood industries of Manaus. Additionally, there are noble trees such as louro-inamui *Callophylum brasiliense* and mulateiro *Calycophyllum spruceanum*, which have been extracted by logging industries from towns adjacent to the reserve for some decades. The timber is used in construction, boatbuilding and furniture-making. Recently, the envira-vassourinha *Xylopia frutescens* has been in great demand by the masonry furnaces in Tefé.

This logging activity is a threat to the region's fauna. Many species, especially arboreal animals and fish, depend on the fruits or seeds of these trees for their nourishment, e.g. the fruit of the envira-vassourinha is the third most important item in the diet of the White Uakari Monkey.

THE MAMIRAUÁ PROJECT

The founding of the MES has brought many challenges. First, there is the need to alter national conservation legislation. The residents of the reserve should be able to remain there and have the right to use and commercialize its natural resources in a controlled manner. Historically, the communities have the right to own the areas they have occupied. Second, there is a need to integrate interdisciplinary research in a challenging process of conciliating academic, theoretical approaches with the real needs of guaranteeing nature conservation and the survival of the families that reside in the várzea. Third, and most important of all, there is a need to strengthen the community participation that is seen as a fundamental activity in order to make this ecological reserve viable. Together with the strengthening of the community, the creation of a non-governmental organization has as its objective to complement government action by gathering financial resources and the formation of a specialized technical crew, in order to secure, in the long term, the continuity of the structure developed during the reserve's implementation period.

The Wildlife Conservation Society and the CNPq (National Research Council) financed the preliminary studies that served as the basis for the elaboration of the proposal to create the reserve. In 1991, a project was devised and sent to national and international financial institutions, proposing the creation of a focal area of 260,000 ha between the Rivers Aranapu, Japurá and Solimões. This area was to be used to implement pilot activities for reserve management; these activities would be later expanded to other areas. Today, the Mamirauá Project has the participation of approximately 80 researchers and extension agents. It is carried out with the financial cooperation of 16 research institutions, financial agencies and Brazilian and foreign federal organs. Its objective is to elaborate the reserve's management plan and its implementation. The project is divided into five programmes of administration and development, research and extension.

i) Central operations: This programme includes project administration, planning and development of the Sociedade Civil Mamirauá (Mamirauá Civil Society-MCS), fundraising, elaboration of new projects, negotiations and contracts between MCS and other institutions, issues of legislation of the reserve, the project internal agenda, book publication, and report writing.

ii) Terrestrial systems: The terrestrial systems programme develops research on phenology, dispersion of seeds by vertebrates, subsistence hunting, ecology and management of caimans, extraction and abundance of timber, agroforestry systems, and arboreal plant, bird, mammal and insect inventories.

iii) Aquatic systems: The aquatic systems programme has been producing inventories of the fauna and aquatic macrophytes, and ecology and biology of aquatic species. These studies are complemented by the study of commercial fishing and market preference; they verify the source of the fish and the conditions of their commercialization.

iv) Data base: This programme concentrates all the pertinent information and data obtained by all the other programmes. It is responsible for developing a GIS for the reserve.

v) Community participation and socio-economic research: This programme studies the geographic mobility of the settlements in the reserve and other socio-economic issues; it also conducts epidemiological research as well extension activities. It is active in the organization of community participation and develops education, health and environmental education activities. The education programme in particular has been very successful because of a workbook on environmental issues geared to children and young people that was distributed to schools.

The management plan, which should be completed by 1996, will delimit the area with specific zones of permanent settlements, commercialization and subsistence, and total conservation[1]. A five-year period is allocated to support the reserve's administration process and to implement the management plan once it has been defined.

Parallel with the activities developed by the project, in 1992 the MCS was created. Its objective is to contribute to the preservation and conservation of the natural renewable resources, especially in the areas of flooded rainforests. The creation of this society represents the search for alternatives that guarantee the implementation and maintenance of the reserve in the long term.

The implementation model of the MES is based on the broader definition of nature conservation. It follows the most recent orientations in national and international discussions on the issue. It aims to avoid ecological sectarianism and acknowledges the importance of integrating the areas of preservation into the process of social development (LIMA-AYRES, 1994). The coordinating group of the MES programme has been working on a proposition to include a new category of reserve to the present state legislation on conservation areas: the inclusion of the right of the local population to stay on their settlements. The implementation of the reserve also seeks to conciliate the interests of the local population (traditional users) to the objectives of biodiversity conservation, which is the basis of conservation units, through permanent community participation. Moreover, the decisions regarding the structuring of the MES have been formulated based on the result of research and the strengthening of community leadership. The Mamirauá Project seeks to contribute, with its successes and failures, to the implementation of conservation practices that are integrated into social development.

[1] The management plan was completed in July 1996. Negotiations with the community on the details of the plan are expected to take 2-3 years. Even though the zoning proposed in the plan is largely based on present land use, preliminary discussions with communities suggest that the development of alternative income sources will be a major issue.

THE USE OF NATURAL RESOURCES AND THE SOCIAL CONDITIONS IN MAMIRAUÁ

As in other areas of the rural Amazon, there were neither census data nor maps of the settlements in the Mamirauá region when the research began. Many expeditions were undertaken to collect data on the socio-economic reality of the region and to map and identify the communities that use the reserve. The results of this research made possible the adequate planning of the project's extension activities and will constitute the basic outline for the future evaluation of the impact of the reserve's implementation. The combination of data obtained through vertical cut research and from monitoring economic activities and health conditions of the human population throughout the year will allow an adequate understanding of the social reality, including the identification of the effects of the seasonal variations. These data will be integrated with the results of the biological research in a GIS based on which the zoning of the reserve will be defined[2].

In October 1991 a demographic census and a survey of economic production were carried out in the reserve. The objective was to identify the distribution of the human population in the reserve and adjacent areas together with their main sources of income and their survival strategies. Forty-four communities, five sítios or compounds and 73 isolated households were registered in the focal area of the reserve and adjacent areas; the communities comprise approximately 13 houses with seven people per unit. The estimated figure for the total number of reserve users is 4637.

The settlements located within the reserve are all in the várzea areas, in both high and low várzea. The people that live in these settlements need to develop mechanisms to adapt to the flooding periods - 4-6 months of the year. Due to these changes in the environment, the várzea presents certain limitations to human occupation and reduces both the duration of the settlements and time available for the inhabitants to explore the natural resources. In general, deep floods limit the population of the várzea. Added to this, the geomorphological fluvial modifications - beach formations and bank debasement - lead to the mobility and extinction of settlements, and may impact on the foundation of new settlements or in the reduction of their numbers. According to data obtained from research on the history of the settlements within this area, they have existed for approximately 41 years. However, in spite of the important role of the environment in determining the pattern of human occupation in the MES várzea, the characteristics of the economic production system and the social organization: land tenure, parentage, economic production system, political system and religion, are those that historically and ultimately have defined the pattern of the settlements (LIMA-AYRES and ALENCAR, 1994).

[2] Environmental and social indicators such as: a) resource population parameters and b) social baseline information such as mortality, education, income, community participation will be monitored and will be fed into 3-yearly reviews of the management plan.

The main economic activities of the MES users are agriculture, fishing and logging, which are conditioned to the seasonal changes in the várzea environment and to the alterations in the composition of the domestic groups, which, in peasant societies, are divided into units of production and consumption. Manioc (cassava) is the main agricultural produce and, together with fish, the main source of nourishment of the riverine population. It is cultivated at the beginning of the summer and, in general, harvested 6 months later because of the flooding period. Families frequently lose a significant part of their manioc plantation due to the huge strength of the waters. The second main agricultural product is the many varieties of cultivated bananas.

For the riverine population of the reserve area, fish is the most important source of animal protein. Fish consumption per person is high; it is estimated at around 500 g of fish per person per a day. This represents approximately 240-300 tons of fish consumed by the reserve's focal area population each year. It is equivalent to more than 12% of all the fish consumed in Tefé, where the population is about 95% larger. During the dry season, in the summer, when the water level is low, fishing activity has a more dominant economic role with the beginning of pirarucu and migrant catfish (Siluriformes) season. Remote communities dry and salt their fish and sell it regatões, while the communities that are closer to the urban areas have a chance to sell their dried and salted fish, sometimes even fresh fish, direct to the market. The chance to sell fresh fish allows the commercialization of more species, such tambaqui and tucunare *Cichla* sp., which are kept inside small ice boxes, as well as acari-bodo *Pterygoplichthys* sp., which is sold alive in the local markets.

The fish become more vulnerable to fishermen when they abandon the flooded rainforests when the water recedes. Many species (e.g. curimata and tambaqui) migrate to the river during the dry season, while others (e.g. bodo, aruana *Oesteoglossum bicirhosum*, pirarucu and acaras (Cichlidae)) remain in the lake, where they are easily captured. At the beginning of the flood season the fish return to the flooded rainforests where they look for shelter and food. During this period the fishing of the tucunares with facho, (night fishing with a trident in the shallow areas), is more intensive. When the forests are flooded, fish become more difficult to catch because they are scattered. However, the riverine population's knowledge of the environment they inhabit aids them: they look for the trees whose fruits are common in the tambaqui's diet in order to locate and capture this species.

The pirarucu is the species of the greatest economic importance within the reserve and its harvest is highly seasonal; more than 85% of the annual catch is obtained between September and December. The size of the fish caught varies from 80-240 cm or 5-35 kg, the average size being 134.5 cm or 13.4 kg. In 1993 and 1994 the harvest of pirarucus in the reserve was estimated at 63 and 115 tons respectively.

The harvest of ornamental fish used to be intense in the reserve area. In 1991 the existence of fish tanks used to keep ornamental fish was noticed in the reserve; this seemed to diminish the numbers of acará-disco *Symphysodon* sp. Today, the number of individuals of this species in the reserve is very much reduced; this activity no longer occurs in the reserve.

Timber is logged at the end of the summer and transported and sold in the winter. In years of high flooding (e.g. 1993 and 1994) this activity intensified. In 1993 and 1994, for example, the extraction of timber reached approximately 20,000 m³. The extraction is highly selective and nine species constitute 85% (by number) of all timber extracted. White timber, representing 80% of the total extracted, is destined for plywood industries in Manaus, Itacoatiara and Belém. Heavy wood and firewood, which constitute a smaller proportion by volume of this extraction (although in terms of numbers of trees, it constitutes almost all the timber extracted) is destined for local consumption, mainly of Tefé. Approximately 300 inhabitants are annually involved in this activity in the focal area of the reserve. Those who are able to sell their production directly to buyers from Manaus and Itacoatiara earn about 50% more than the ones who sell their production to buyers from Tefé.

The main hunting economic activity involves the caimans; this happens during the dry season, normally after the fishing of the pirarucus, i.e. between December and March. The most persecuted species are the jacaré-acu (Black Caiman) and jacaré-tinga *Caiman crocodilus*. A third species, the jacaré-pagua *Paleosuchus palpebrosus* occurs in lower density and has no commercial value. Tons of caiman meat from the MES and its periphery are sold each year. Caiman is sold as pirarucu meat in Pará (Brazil) and in Colombia, which makes this activity much more lucrative considering that, at the source of production, the price of the pirarucu is higher than the price of the caiman.

Most of the caiman meat sold is Black Caiman, a threatened species. Approximately 6500 kg of caiman meat displayed in markets near the reserve between January and March 1995 were from the MES. More than 50% was Black Caiman, 25% jacare-tinga, and the rest unidentified species. The great majority of the jacaré-tinga were adult males (in the proportion 11 males to 1 female) while for the Black Caiman the proportion was smaller (2 males to 1 female). This indicates that the hunting of the Black Caiman can compromise the survival of this population. In a recent inventory of caiman offspring in various parts of the reserve, approximately 955 jacaré-tinga young and 14 Black Caiman young were found. It is estimated that nearly 250 people in the reserve are occupied in caiman hunting.

Caiman hunting is prohibited by law in Brazil, however it is an important source of income for the riverine population of the middle River Solimões at certain times of the year. In the MES this activity is very intensive on the periphery of the channels of the Aranapé and Panaué. Recently, riverbank dwellers reported that Colombian merchants had begun to ask for caiman skins inside the reserve. This is very worrying considering that in the past the skin of large- and middle-sized caimans had the same value. Consequently, the hunters used to extinguish the subadult population of caimans: by contrast, in the meat business, the bigger the animal the higher its value.

Subsistence hunting is less important in the várzea than in the neighbouring dryland forests because fishing supplies the major proportion of the animal protein consumed by the population.

The communities' dependence on wild resources can not be ignored, however: the Manatee, for example, which is a large species, can represent a good source of protein for local people. Despite being protected by law since 1967, the Manatee is still hunted within the reserve. Usually the meat is consumed locally and distributed among the members of the community; all the parts are used, and sausages often are prepared. Small-scale selling of Manatee meat (fresh, salted, or preserved in its own fat - mixira) occurs in the larger towns of the region, where it is greatly appreciated. Being a Manatee hunter is a specialized activity which requires patience and skill. The present hunters are few and ageing; apparently the young people are not interested in learning the capture technique, which may assisting in the preservation and continuation of the species (MARMONTEL, 1995).

Other species subject to subsistence hunting are the Red Howler Monkey *Alouatta seniculus*, curassows *Crax globulosa* and *Mitu tuberosa* and the wild duck *Cairina moschata*. In addition, many others species are caught opportunistically in the course of other activities such as fishing, agriculture and logging. In three of the sampled communities in the focal area of the reserve, with 14 domestic groups each, 15 howlers, 8 curassows and 2 wild ducks were hunted according one year's inventory (SANTOS, 1995). Of 27 families interviewed in the MES, only three (11%) had hunted in the week previous to the interview; however, 59% of the sampled communities possessed shotguns. This contrasts with the dry-land forests of the neighbouring Amaña Lake, in which of 17 families only seven (37%) had hunted in the previous week, although 95% of the families had shotguns (AYRES, 1990).

Occasionally, hunted game is sold to the neighbouring towns. The sale of 42 curassows, six ducks, five howlers and one Manatee in an approximately 10 month period was recorded in Tefé and Alvarães, the two most important towns of the region. Offspring of many species of wild animals are captured to become pets and, apparently, they also sometimes serve as trade items. In this context, parrots *Amazona aestiva* and parakeets *Brotogeris versicolorus* and *B. sanctithomae* may be of importance in the future (SANTOS, 1995).

The combination of economic activities described above is the basis of market production as well as direct consumption of the domestic groups in the reserve. The average income of the families is about US$ 566, representing an annual *per capita* income close to US$81, much lower than the national average. In reality, due to the relative distance of the markets, and the fact that the major part the diet is provided directly by the producers, monetary values should not be considered as the absolute basis on which to evaluate the livelihoods of these families. However, as a baseline indicator, they are necessary in order to monitor the alterations in the market in relation to the sale of natural resources taken from the reserve area.

In terms of the total expenses incurred in one year by the households investigated, the data show a concentration of expenses around the basic supplies to maintain the family: the acquisition of foodstuff takes almost 70% of the income. Expenses for working tools and the maintenance of equip-

ment take 25% of the domestic income. The remaining 5% is used in the acquisition of domestic patrimony valuables (LIMA-AYRES, 1993).

The information on the households' patterns of income and expenses will be used as a basis to estimate the quantity of natural resources (timber, fish, area for agriculture and hunting) necessary for their survival. These values will be integrated with the results of the research on the geographic distribution and reproduction rates of the exploited species, in a system of geographic information, to define the areas used by the communities. Even with no more than the socio-economic and ecological research as a basis, the zoning definition of the reserve will nonetheless be submitted to discussions with the inhabitants of the area. The aim is not to maintain the *status quo*, but to promote the improvement of the present conditions of the local population.

The areas of the reserve that are of human use should meet the economic needs of the reserve's communities, ensuring both the sustainability of the natural resources and the optimum health of the population. To this end, in 1993 a socio-epidemiological survey was conducted in 35 of the 55 communities of the reserve area at two different times, one during the rainy season and the other during the dry season, in order to register the population's health and nutrition condition, in particular, of women and children.

The resulting epidemiological data revealed that, in general, the health of the examined population is good. The major diseases detected were considered not to be serious; they reflect, in general, inadequate hygiene habits. Worms and diarrhoea were frequent, especially among children. Muscle and back problems were also frequent due to the extreme physical strength required to perform the work activities (MARANHÁO and LINS, 1993; ALBERNAZ, 1994). The most serious problem identified referred to child mortality: according to women from the sampled communities, the data reveal a child mortality rate of 85 deaths per 1000 births. The causes are related to neonatal tetanus, breathing problems and diarrhoea (MOURA and LIMA-AYRES, 1994).

In general, the health problems identified during the surveys indicate that improvement of health conditions can be attained through prevention programmes supported by health education and the improvement of the sanitary conditions of the communities. To this end, based on extant research and the monitoring in progress in the area, health education activities have been undertaken prioritizing the strengthening of the communities' health workers' activities (MARANHÁO and AZEVEDO DO SILVA, 1994). This programme, entitled Weeks of Health, has been well accepted by the communities.

RESULTS ATTAINED AND NEW CHALLENGES

Before the creation of the reserve, the major problem faced by the residents was the concept of total conservation and sustainable lakes. The idea of defining lakes for different uses sprang from the works of Tefé's Catholic Church in conjunction with the communities of the reserve. Today, the practice of using some lakes for sustainability and others for conservation has been adopted by nearly all the várzea along the Amazon River. The right to guard these lakes gained legitimacy and

became the major factor for the communities' support for the creation of the reserve. The communities' participation in the project was defined by their members based on their own experience with community development through the Movimento de Educacío de Base-MEB (Base Education Movement) in the late 60s. The model adopted is as follows: 1) groups of the reserve's neighbouring communities constitute organized clusters that meet every two months (each community sends two representatives to these meetings); 2) there are eight clusters of communities; 3) each cluster elects a coordinator who is responsible for organizing meetings; 4) all the clusters meet annually in general assemblies (REIS, 1993). To date, there have been four general assemblies. During these assemblies, two new definitions of lake categories were created: commercial purpose lakes for the communities, and commercial purpose lakes for the municipality. These two new definitions were added to the previous ones: lakes for sustainable use and lakes for total conservation.

In the general assemblies the communities presented the names of the lakes and their respective categories; signs notifying the lake categories were posted in the localities. Another of the general assembly's resolutions was the prohibition of logging in the restingas around the total conservation lakes. The surveillance of these lakes, under the responsibility of the communities, has already proved to be effective. Invasion by fishermen from Manaus and Manacapuru, previously very extensive, has practically disappeared. Moreover, data from the monitoring of the market in Tefé show that, in the first year of the communities' surveillance, there was a reduction in the volume of fish sold from the reserve's lakes: 20-23% of the fish sold in the Tefé market had come from the reserve; this percentage dropped to approximately 7% in 1995.

The logging situation, however, is more complex. First, unlike in fishing, the results of tree conservation are not visible in a short period of time. Second, this activity is made more profitable by the few who control the logging industry. For these reasons, improvements in the tree conservation issue are more modest and more difficult to be conceptualized. Selective logging was discussed with the communities' leadership during the second general assembly in July 1993. It was decided that logging was not to take place in the total conservation lakes' restingas, and that it was permitted in the sustainable lakes' restingas for community use only. Commercial logging was permitted in the commercial purpose lakes' restingas. At the third general assembly, July 1994, permissible minimum diameters for logging different types of trees in the reserve was discussed. While the federal law sets a minimum of 45 cm diameter for any type of tree, in the Mamirauá Reserve the communities decided to determine the minimum diameter for tree logging according to species. In 1994, there was no logging around the areas of the total conservation lakes with exception in some communities in which there was dispute over the use of the lakes.

On the issue of acceptable minimum diameter for logging, in general the extracted logs in 1994 had larger diameters than those extracted in 1993. This happened despite of the fact that the communities reached a consensus on minimum diameters for different species.

Caiman, Manatee and turtle management issues were introduced to reserve users during the IV General Assembly, where participants were invited to comment and suggest further recommendations to those offered by researchers. One of the communities recently decided not to continue to hunt caiman. As it was an illegal activity, according to federal law, they feared that outsiders might use this argument against them in order to be able to fish in their area.

Today the Mamirauá Reserve has a reasonable infra-structure when compared to other conservation units in the Brazilian Amazon. However, it is still insufficient to fulfil all the research and surveillance demands. To date, one house and six floating houses have been built in different strategic surveillance points of the reserve. Each of these units is equipped with a solar energy system that activates, *inter alia*, a short-wave radio that is used to communicate within the reserve, with the project bases in Tefé and Belém and with the Brazilian Environmental Institute (IBAMA) office in Tefé. The reserve has some 15 aluminum motor boats and five diesel-fuelled wooden boats, which are used for research, extension services, supplying the floating units and transporting the comunitários. There is a boat for the exclusive use of residents and users of the reserve so they can organize community and cluster meetings as well as the surveillance of the lakes. The base in Tefé has a small library, a computer room, a video room, lodging for researchers, an administrative sector and a warehouse to keep the equipment and supplies.

The surveillance system is simple and involves the residents policing the area and if necessary calling in back-up from IBAMA and the police in Tefé. The major problem in this type of system is the difficulty that residents have in controlling the invasion of friends and family members who live in the bigger towns around the reserve. This creates conflicts with other residents and groups, however the negative repercussions of this type of permissiveness make it a rare occurrence.

The central administration of the Project is housed in the Pará Federal University and in the Emilio Goeldi Museum, both in Belém, Pará. The administration of finances, geographic information system (GIS), data base, and analysis of the research performed in the MES are all concentrated in Belém. There is also a CNPq executive secretariat in the Research Units Directory that connects the CNPq with the MES administration in Belém.

With the foundation of the MCS a mixed system of management was created with the active participation of governmental organs with the flexibility of non-governmental agencies. The MCS allows the foreign financial aid (nowadays from ODA, WWF and WCS) to lend to the reserve's activities a guarantee of continuation without the risks of interruption that stems from the majority of the Brazilian governmental organs. The foreign aid does not guarantee the maintenance of the reserve and the project in the long term, thus the need of a compromise from the federal and the state governments is important in order to guarantee the existence of the MES.

One of the MCS's objectives is to create new ways of obtaining funds, including the creation of a trust fund to assist research and extension activities in the Mamirauá area. To this end, the selling of books, workbooks and postcards is already in place, and an agreement between Aqualung (a garment manufacturer) and the MCS has been reached to gather funds in the medium- and long terms. Other activities to obtain funds are in their initial phase of implementation.

The most important action to guarantee the sustainability of the reserve in the long run was taken by CNPq/MCS: at the end of 1994, CNPq bought around 13 ha on the bank of Lake Tefé on the outskirts of the city. Here CNPq will build, in the near future, a research centre geared towards the study of the várzea areas in the MES. CNPq has taken the Mamirauá programme under its umbrella and included the programme in its budget for 1995-1996. CNPq also approved a scholarship programme in order to maintain a permanent research team in the reserve area. This flooded rainforest research centre will be of extreme importance in the maintenance of the activities in the reserve in the long term. It will also be a third plank of research in the Amazon.

One of the major challenges is the legalization of the proposal that conciliates conservation with the existence of the local population in the MES. According to federal legislation, an ecological station - a unit of conservation classified as an area of indirect use - must keep at least 90% of the area untouched and the remaining 10% for experimentation. In units of conservation of direct use, as in the case of Environmental Protection Areas (APAS), Extractive Reserves and National Forests (FLONAS), the existence of locals is permitted within their boundaries.

None of the direct-use categories, however, has a system of mixed areas of sustainable use, commercialization and total conservation areas. In order to maintain biodiversity, it is necessary to retain isolated areas, following the indirect-use units model. However, in order to preserve ecological and evolutionary processes (including the maintenance of the gene flux between these areas and the total conservation areas) it is necessary to have areas of total conservation. These areas should be sufficiently large in order to contain viable populations, even of those species that occupy the top of the food chain that, normally, require larger spaces.

The human presence in the areas specially allocated for sustainable use and governed by a management plan that defines the scientific bases of sustainability of the natural resources, must guarantee the protection of total conservation areas based on the recognition, by the population, of the benefits of conservation. Due to the complexity of this problem and the lack of a model unit that resembles the situation of MES, we are collaborating with Prof. Nelson Ribeiro (Pará) to develop a proposal of ante-projeto for the creation of a new type of conservation unit that would be akin to the needs of the MES. It is possible that this mixed model of conservation units be more viable and could be duplicated in other units in the Amazon. The model proposed by the Mamirauá Project is already part of the Sistema Nacional e Unidades de Conservaçáo - SNUC (National System of Conservation Units), that will be taken to the National Congress for approval.

One of the greatest difficulties faced by the Mamirauá Project was the lack of trust by the locals in the real objectives of the project. Inspite of its acceptance by some communities, there was resistance from others, local economic agents and some political representatives. The national identity of the project was questioned because of the foreign aid it receives. This type of resistance has diminished, partly because of the attention the media has devoted to the project in the last two years. This, probably, promoted a better acceptance of the project by the local population.

The Environmental Education Programme has played a very important role in raising of local population awareness in regard to the project's objectives. The success of this programme is fundamental to guarantee the viability of a conservation unit with the actual participation of the communities. The rationality of the sustainable use proposal when contrasted with the effects of predatory exploration of nature is the strongest argument that one can put forward in order to promote popular acceptance of a conservation unit.

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CASE STUDY NO. 2

COMMUNITY-BASED PLANNING FOR WETLAND MANAGEMENT: LESSONS FROM THE UCCHALI COMPLEX IN PAKISTAN

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Key words participatory planning, wetland management, White-headed Duck, Pakistan

This paper describes the outcome of a participatory planning exercise carried out with and by local communities living in a wetland site located in Pakistan: the Ucchali complex, made up of three lakes in the Salt Range of north central Punjab. The wetlands are important for international conservation as they presently support the only wintering flock of White-headed Duck *Oxyura leucocephala* to visit Pakistan. Participatory Rural Appraisals (PRA) were carried out in several villages to develop wetland management plans. The PRAs were conducted to build up pictures of natural resource endowments, the means by which they are managed, and the socio-economic make up of communities. The management plan for the Ucchali complex will need to address the conflict of interest between internationally defined agendas for wildlife protection and local needs and priorities. The villagers were encouraged to share their own analysis of the history of this conflict and how it might be resolved. This then led to an exploration of management options which could, in the villagers' opinion, help reconcile conservation objectives with the well-being of the local community. The two village case studies described below highlight the value of such local level adaptive planning for the sustainable management of the Ucchali complex. The broader implications for wetland management in Asia are discussed in the light of this experience. Community participation is best seen as an opportunity for wetland conservation in Asia.

INTRODUCTION

Asia is estimated to have about 280 million ha of wetlands, including permanent rice fields and river channels. This is about 13% of the total area of the continent - equivalent to the size of Western Europe minus Finland. Of these, 120 million ha are supposed to be 'natural' wetlands. The *Directory of Asian Wetlands* (SCOTT, 1989) lists 947 sites with an area of 73 million ha - the combined areas of France and the UK. In June 1995 a total of 58 wetland sites from 13 countries in Asia were mentioned in the Ramsar list; these sites had a combined area of 3.2 million ha, or 4% of the area included in the *Directory*.

The estimated human population living around the 947 Asian wetlands sites could be around 131 million. However, there are no proper data on the socio-economic profile of communities living in wetland areas - even though the threats to wetlands most often cited (e.g. encroachment of land, 'illegal' settlements and hunting, overgrazing, overfishing, logging etc.) have social origins.

Wetland conservation in Asia is viewed primarily as an issue of law enforcement and/or imposing new restrictions on the local communities. "A significant proportion of the wetlands of international importance in Asia enjoy some form of legal protection (47% of sites or 15% of the area). However these figures relate only to the level of legal protection on paper. In reality, the enforcement of protect areas leaves much to be desired. Some of the most seriously threatened wetlands are amongst those supposedly under complete protection" (SCOTT, 1989).

However, the Ramsar Convention Bureau clearly argues for the need to involve communities in wetland management. According to the 1994 Ramsar Convention Manual, community consultation and participation are critical. Local people must perceive and obtain benefits from rational management; they must have a stake in management and must be provided with alternatives if they are deprived of wetland use; local communities should have security of tenure and/or access to natural resources and there is a need for decentralised management (DAVIS, 1994).

Whilst this thinking represents significant progress, the reality on the ground is quite different. Wetland management is still based largely on the 'protection' and law enforcement approach mentioned earlier, and there is considerable confusion over both the meanings and implications of terms such as decentralised management, tenure and participation. For example, community participation is normally viewed as a favour or concession to the local communities. 'Participation' is usually interpreted as some sort of public relations tool and "it has been given different meaning by different people in different contexts, mostly in ways convenient and acceptable to those who manage the resources" (GOPAL, 1994).

Asia offers a great opportunity for wetland conservation through community participation. The 'population pressure' on wetlands should be seen as an opportunity in this context (this is not to suggest that the pressure should grow). Many local people depend on these wetlands for their livelihood. This is one of the most important political, social, and economic tools to be used by conservation agencies.

Wetland conservation is being challenged both conceptually and operationally. These challenges are particularly acute in Asia where the future of conservation will depend primarily on the extent it can contribute to meeting basic human needs. The World Bank is but one of the many institutions calling for reforms in the way aquatic ecosystems are managed: "We must fundamentally change the way we think about and manage water. The lessons of collective experience demonstrate that we must make a decisive break from past policies to embrace a new approach that is comprehensive, market-oriented, participatory and environmentally sustainable" (SERAGELDIN, 1995).

This paper describes the outcome of a participatory planning exercise carried out *with* and *by* local communities living in the Ucchali complex, an internationally important wetland site located in

Pakistan. Lessons learnt from this process are based on two of the village case studies summarised here and described in greater detail elsewhere (WWF and PUNJAB WILDLIFE DEPARTMENT, 1995). The broader implications for wetland management plans are discussed in the light of this experience.

MATERIALS AND METHODS

The Ucchali Wetland Complex

This site is located in the Salt Range in the north central Punjab, Pakistan. The Ucchali complex is a combination of three interdependent wetlands: Ucchali, Khabbaki and Jalar. The three lakes are in a closed basin surrounded by hills that form the catchment areas. The wetlands are important for international conservation as they presently support the only wintering flock of White-headed Duck *Oxyura leucocephala* visiting Pakistan. Along with the White-headed Duck, three other bird species also listed in the IUCN Red Data Book are found on these lakes: Cinereous Vulture *Aegypius monachus*, Imperial Eagle *Aquila heliaca* and Sociable Plover *Vanellus gregarius*. Other important avian species visiting the wetlands include Greater Flamingo *Phoenicopterus ruber,* Pied Harrier *Circus melanoleucos*, Greylag Goose *Anser anser* and the Ferruginous Duck *Aythya nyroca*.

WWF-Pakistan and the Punjab Wildlife Department have prepared the first integrated management plan for the Ucchali complex (KHAN and CHAUDRY, 1993). The plan seeks to maintain the *natural integrity* (our emphasis) of the site through appropriate conservation measures and also to cater for the needs of local communities through sustainable development.

Participatory Rural Appraisals (PRA) were carried out in several villages surrounding the lakes to develop this management plan further. The PRAs were conducted to build up pictures of natural resource endowments, the means by which they are managed, and the socio-economic composition of communities (CHAMBERS, 1992). Outside professionals who facilitated the PRAs were either employed in Pakistan Government Departments (e.g. Wildlife, Forestry) or were part of the staff of WWF-Pakistan and WWF International. The participatory methods were used not just for local people to inform outsiders, but also for people's own analysis of their conditions. Group and team dynamics methods, interviewing and dialogue as well as sampling, visualisation and diagramming methods were all structured so as to foster an enabling process whereby village communities analyse, plan and act on the basis of their own knowledge, priorities and diverse needs. The conceptual and operational shifts that distinguish this participatory, local level planning from the more conventional approach to preparing wetland management plans are summarised in Box 1.

Box 1 Methodological shifts from normal conservation planning and wetland management

Involving local communities in wetland conservation involves major conceptual and operational shifts from established procedures. Community participation is neither a quick fix nor is it one more dimension to conservation. It should ideally be the CORE of conservation, in theory and practice.

1. Conceptual shifts include:
   - From wetland conservation as an end in itself to a means of simultaneously improving ecosystems and local livelihoods
   - From local communities as part of the problem to party to the solution
   - From people as passive beneficiaries to recognizing them as major stakeholders
   - From educating the communities to learning from them
2. Operational shifts should be informed by the notion that local communities can carry out most, if not all, the planning and management functions normally undertaken by outside 'experts', in a relatively shorter time and at a much lower cost. Empirical evidence from other domains of natural resource management (e.g. forests, soil and water conservation, watershed management) highlights the ability of local people to:
   - analyse their natural resources and understand the limits to their use very well
   - plan and manage the resources
   - come up with solutions for many conservation problems
   - resolve their internal conflicts and impose regulations and resource allocation schemes
   - select suitable technical options
   - build required local institutions for monitoring and coordinating inter-household cooperation and group action
   - negotiate joint management agreements with government institutions.

Genuine people's participation in wetland management implies new roles for conservation professionals and other outsiders. These new roles all require a new professionalism with new values, methods and behaviour (CHAMBERS,1993; PIMBERT and PRETTY, 1995). Enabling policies are also needed to provide appropriate forms of support for local initiatives in wetland management.

RESULTS

As the PRA teams interacted with local people living around the lakes, it became clear that the management plan for the Ucchali complex would have to address the conflict of interest between internationally defined agendas for wildlife protection and local needs and priorities. The villagers were encouraged to share their own analysis of the history of this conflict and how it might be resolved. This then led to an active, collective exploration of management options which could, in the villagers' opinion, help reconcile conservation objectives with the well-being of the local community. The two village case studies described below highlight the value of such local-level adaptive planning for the sustainable management of the Ucchali complex.

Case Study 1: Lake Khabbaki and Dhadar village

Lake Khabbaki was designated as a Ramsar site in 1976, when Pakistan ratified the treaty recognising the importance of the wetland for migratory waterfowl. This 283-ha freshwater lake is the only Ramsar site in Punjab. As a wildlife sanctuary, the lake is considered of to be international importance because many ducks and other waterfowl overwinter on the lake as they migrate southward or northward. Dhadar is the largest of the two villages that border the lake.

Reconstructing Wetland History

According to the inhabitants of Dhadar, the lake is of very recent origin and 'sits' on some of the most fertile land of the Soon valley. Village men reconstructed the history of Lake Khabbaki in the form of a time-line analysis (Box 2). When the British colonial powers gave the first land titles to villagers of Dhadar, the land that now forms the bottom of the lake was farmed. In 1894, heavy rains caused flooding of about 75-100 acres of shallow land. Repeated heavy rains in 1912 increased the area under water to 500 acres. Severe droughts in 1955 caused the total drying up of the lake and allowed farmers to grow crops until 1957, when heavy rains recreated the lake. Since then the lake has remained on top of prime agricultural land, with slight changes in level at different times of the year. The expansion and shrinking of the lake does generally not exceed 16 m on either side (east and west).

According to the local inhabitants, Lake Khabbaki used to accommodate several thousand ducks and other waterfowl during the winter season. Villagers reported that coot was the dominant species on the lake (about 60% of total bird count) followed by species such as Pochard, Ferruginous Duck, Tufted Duck and White-headed Duck. The bird species observed by the villagers in the past occur in the same ratio today - but bird populations are about 90% less abundant than 12 years ago.

Box 2 Time-line analysis of Lake Khabbaki

1860	First land titles (settlement) of Dhadar village given.
1892-93	Second land titling took place.
1894	Water gathered at the lake site.
1912	Heavy rainfall in the area and lake size increased to about 500 acres; third land titling took place.
1913-14	Third land titling of Dhadar villages completed.
1955	Lake totally dried and farming at the lake site was possible.
1957	Heavy rain in the area and lake site flooded again.
1973	Heavy rain in the area: fourth land titling took place.
1977-78	Fourth land titling completed.
1982	Heavy rain in the area.
1983	More rain: lake size increased considerably, which flooded the old Nushara Jaba.

After the Punjab Fisheries Department introduced fish (carp and tilapia) into the lake in 1982, the waterfowl - and the White-headed Duck in particular - began to decline in numbers. The villagers gave two reasons for this: food competition between the fish and the over wintering birds, and disturbance by the fish as they bite or tickle the feet of White-headed Duck and other waterfowl.

Local Perceptions of Wetland Values

Most inhabitants of Dhadar had strong negative feelings about Lake Khabbaki. Several farmers even expressed anger and were clearly resentful about the continued presence of the lake, as can be seen in the selection of quotes shown in Box 3.

When individual farmers assigned values to the wetland area and ranked them in order of preference, the majority highlighted the lake's potential to yield productive land following total drainage. Next, farmers viewed the lake's water as an important resource for the village economy. Many

Box 3 Some perceptions of Lake Khabbaki held by inhabitants of Dhadar village

- "This is not a lake - it's a disaster zone created by floods".
- "The recreation value of the lake is only for wealthy people, not for us farmers".
- "Already two villagers from Dhadar have been fined by the Fisheries Department for just sitting near the lake. The lake is not for our enjoyment".

wished to use the lake water to irrigate rainfed fields 100 m above the lake's surface. Although some farmers eat fish and hunt waterfowl on the lake during winter, the least appreciated values were the fishing and hunting opportunities offered by the wetland.

The recent formation of the lake has undermined the productive assets and livelihoods of the vast majority of farm households in Dhadar and the neighbouring Derajats, areas where farmhouses are interspersed among agricultural lands. Of the 700 households identified during the social mapping exercise, about 630 are farming households. In village meetings, the farmers pointed out that the majority of villagers depended on farming and that 90% of the farmers only own 4-5 kanals of land (1 kanal equals 0.125 acre). The village assembly unanimously agreed with the statement made by an old man: "One acre of land under water is equivalent to three acres in the hills. The most fertile land we have is on the lake bottom". Moreover, the villagers were angry that the water sitting on their land had been stocked with exotic fish species and that the fishing rights had been auctioned to outsiders by the Fisheries Department. Although they own most of the land that supports the fishing operations, villagers are not allowed to fish. Villagers risk severe punishments if they hunt on the lake whereas government officers and powerful outsiders can shoot the White-headed Duck and the other birds with total impunity. This compounded the villagers' intense sense of frustration with this site of international importance for conservation.

Non-farmers pointed out that, by restricting the farmers' ability to grow crops, the lake's presence hurts them also. Their livelihoods as cobblers, musicians, weavers, shopkeepers and artisans are dependent on the income generated by farming households in Dhadar.

However, farmers from the Derajats viewed the lake as important for the continued water supply of both Dhadar and the Derajats. Whilst they broadly shared the view that the lake had undermined productive assets, most valued the water resource that it provided. Similarly, the majority of the female population of Dhadar and the Derajats highlighted the value of the lake for drinking water and for washing clothes. Women spend much time carrying heavy water containers to meet the needs of their families in Dhadar. Most women have to walk to the water tank. Several women said that they walked 4-6 km to collect water. Any water shortage immediately results in many more hours of difficult work for both young and old women.

The fishermen's perceptions of the lake are generally much more positive. The livelihoods of this small community of immigrants from Sind are directly dependent on the fish catches, and they value the aesthetic qualities of the lake as well as the presence of wildlife.

Wetland Management Priorities: Conflict Resolution and Compensation

After several group discussions and semi-structured interviews with men and women representing the different social categories identified on the social map, the villagers of Dhadar put forward

several options to improve local livelihoods and manage the wetland site. The pros and cons of each option were hotly debated within separate groups of men and women until the villagers decided to rank the management options, bearing in mind each option's objectives, results, likely impacts, feasibility, advantages and disadvantages (Table 1).

Male villagers emphasised the importance of the first option they had prioritised. Most villagers face acute shortages of agricultural land: 90% of the farmers own very small plots (4-5 kanals). Increasing the size of their land holdings will improve their livelihoods, benefit the next generation and increase the agricultural production of the whole area. They argued that giving up their rights to the land at the bottom of the lake in exchange for substitute land in the Reserve Forest would be a workable deal for the villagers and the government. Seventy-five percent of the land under the lake water belongs to Dhadar farmers who live in the main village and the Derajats. The substitute land that villagers wish to have in exchange for the land on the lake bottom used to be farmed by Dhadar villagers until 1860, when the British Government acquired the land to create the existing Reserve Forest, in the lake's catchment area. The villagers pointed out that there are more trees on the private lands than in the Reserve Forests managed by the Punjab Forest Department. The PRA team was able to validate these claims during a transect walk undertaken in the company of villagers and a senior member of the Forest Department. In stark contrast to the barren Reserve Forest, the

Table 1 Ranking of management options by the men and women of Dhadar village

Wetland management options	Men's preference ranking	Women's preference ranking
Exchange the land on the lake bottom with substitute land located in the Government's Reserved Forest in the extreme north of the Derajats of Dhadar village.	1	2
Exchange of rights to land under water for a community welfare package.	2	1
Utilization of lake water for irrigation of rain fed agriculture leading to partial reclamation of land through reduction in size of lake.	3	3
Payment of the revenue obtained from the fish auction to the villagers for community improvements.	4	5
Beautification of the lake by planting ornamental and fruit trees on the periphery of the lake, development of a children's park and construction of a few lodges near the lake.	5	4
The lake should be left as it is, because its drainage may cause reduction in water level in near-by wells which are the only source of water supply for the village and the Derajats.	6	6

trees and woods on privately-owned land were well managed and comparatively richer in biological diversity.

However, the village men said that if the first option could not materialize, they would want compensation in the form of a welfare package that should not only benefit the farmers who lost their land to the lake, but also the whole community.

Whilst the substitute land option was a high priority for the village women, their ranking emphasised health and education issues first and foremost. A regular supply of water to each household in the main village and the Derajats, as well as health care facilities, were their main priorities. The diminishing supply of water in Dhadar is the most serious problem for the women. The average village woman makes at least 3-4 trips a day to collect water from the local wells at a considerable distance from home. Similarly, great interest was expressed in family-planning services. Due to the lack of health facilities, maternal mortality during childbirth is very high in Dhadar. The women were acutely aware of the importance of education and keen that higher study facilities be opened for girls as well for boys.

The villagers thus identified their preferred management options and were aware that these provided a basis for negotiation both within the community - between men and women - and also with government authorities. In the final village meeting they looked forward to that political process and indicated that they would use the information generated during this PRA to assert their rights.

The villagers agreed to fulfil the following obligations if they could reach a meaningful agreement with the government to resolve this conflict of interest:

i) they will leave Lake Khabbaki alone and respect its conservation status if they receive compensation for their land now under water;

ii) they will not hunt and fish on the lake;

iii) they will consider the lake to be government property.

However, they said that the government would also have to meet certain obligations to ensure that the wetland is well managed to conserve the White-headed Duck and other species of international importance:

i) restriction of fishing operations;

ii) sanction and enforcement of strict laws against poachers, irrespective of their status;

iii) appropriate steps for the beautification of the lake, taking due account of the villagers' choice of preferred tree species.

An elderly man from Dhadar concluded that, "if the government cannot do anything for the lake and the people, then the lake's future will depend on the blessings of Allah".

Case Study 2: Ucchali Lake and Ucchali Village

Unlike Khabbaki, Lake Ucchali is saline, with a pH fluctuating around 10; its total area is 923 ha. The lake is surrounded by five villages, Ucchali being the largest with a population of 7500-13,000 inhabitants. According to village records, its 600 households are home to 7500 people. Many people do not actually reside in the village because they earn their living outside Ucchali. More than 45% of households are supported by people working far away, primarily in the military services. Most landowners are farmers or work in government services or in trade and business. The poorest people in the community include labourers, musicians and sweepers; the more affluent villagers include goldsmiths and merchants. The main natural resource of Ucchali village is land, which, villagers explained, is particularly scarce. Some 8000 kanals of farm land are submerged under the lake. Very few farmers have land holdings of more than 80 kanals (10 acres). The average land holding is around 24 kanals (3 acres). The small size of the land holdings and the high productive potential of agricultural land encourage intensive cultivation, with several crops per year. Agricultural land located near Lake Ucchali is very precious because of its high fertility and ground water potential. Land prices range from Rs/- 40,000-200,000 per local unit land area and are highest for plots of land closest to the lake. Such high rates are on a par with land prices in major city centres like Lahore.

Wildlife on the lake includes many bird species: geese, flamingos, Mallard *Anas platyrhynchos*, Pintail *A. acuta*, Gadwall *A. strepera*, Tufted Duck *Aythya fuligula*, coots and egrets. Wild pigeons have become scarce. Local knowledge about the waterfowl was minimal and there was no real interest in knowing more about it. The women were unaware and uninterested in wildlife apart from wild boar, a major pest; their numbers had risen to 800-900 and villagers had seen herds of 100 wild pigs.

Reconstructing Wetland History

Lake Ucchali is reported to have formed more than 400 years ago; local village land records care available for the last 420 years. The villagers' recollection of the high points of the lake's history were as follows:

- Around 1910, when the lake expanded and encroached on much of the village common land (shamlath), the ruling British Government compensated villagers by allocating land. This shamlath is still being used. There are some privileges for the people who lost land in the lake.
- In 1956, lake size was at a minimum. The total area covered by the lake water in this year was less than 25% of the present area. This is due primarily to a considerable reduction in rainfall. Villagers recall having walked to the nearby villages of Chitta and Uggali, which are now separated from Ucchali by water. In this year some unexplainable smell came from the lake. This bad smell not only caused great concern but turned gold and silver ornaments black. Even currency and coins turned black, resulting in considerable loss to villagers. Most of the villagers recall this event.

- In 1968, the road to Sakesar was built through the southern end of the lake.
- In 1973, the lake reached its maximum size due to heavy rains. The water flooded part of the village and the road was totally inundated and subsequently had to be raised. This is the year when farmers recall maximum land submergence.
- In 1983, a coloured strip looking like a rainbow appeared on the lake water and remain for more than 15 days; this freak event caused much concern.
- In 1987, there was a rumour that the government was planning to drain the lake.
- In 1987, electricity came to the village and the nearby Sakesar military air base was established. This is also the year that restrictions on hunting were imposed on the local communities. Villagers noticed that the lights on the Sakesar mountain disturbing the behaviour of the migrating waterfowl. Since the opening of the air base fewer birds come to overwinter on the lake.

Local Perceptions of Wetland Values

The villagers' perceptions of Lake Ucchali were entirely different from those of outsiders who praised the conservation values of the wetland. Ucchali villagers made many derogatory remarks about the lake (see Box 4); some even refused to recognise the lake as a lake. To them, a lake or wetland is an ecosystem brimming with aquatic life and which has some functional value (bathing, drinking, washing clothes, reed collection etc.).

The dominant local perception is that Lake Ucchali is not only useless to the villagers but actually harms the livelihoods of many households. The lake does not provide any services to the villagers since its water is brackish. Most of the people do not perceive any direct or indirect benefit from the lake. There are no fish, no reeds, no grass - not even snakes can live in or by the lake. Eight thousand kanals of land are submerged and 1000 acres of land are waterlogged (of that 550 acres is government land).

Whilst no single farmer in Ucchali lost all his land to the lake, about 200 farmers lost a small portion of their most fertile land. These farmers were vocal in raising their concerns about past losses and possible future losses. All the farmers who claimed to have lost some land own at least five times as much land near the lake. The fertility of the land near the lake is much higher than that of any other land in and around the village. The production and quality of the most important commercial crop of the region (ghobi or cauliflower) increase with proximity to the lake. This could be due to the water quality and/or the cooling effect in summer.

The farmers' negative feelings about the lake are said to have increased after cauliflower was introduced in the area as a cash crop. After the introduction of off-season cauliflower, in 1988, income from agriculture multiplied several-fold. Cauliflower prices can rise as high as Rs.20/per kg. An acre of land under cauliflower can produce as much as Rs/80,000 in fewer than four months. This potential

for high returns puts additional pressure on the land near the lake. The soil and climatic conditions of the fertile land on the edge of the lake are particularly well suited to this high-income generating crop. Any loss of this land to the lake water significantly reduces the farmers' income.

Restrictions on hunting waterfowl also contributed to the anti-lake sentiments. There used to be only 10-15 hunters in the village, but many people benefited from their activities. The ban on bird hunting has not reduced hunting on the lake, but villagers feel that this traditional form of income generation has been denied to them in favour of outside hunters who have power and influence. The villagers were more divided in their perception of the role of the lake in ground water recharge - an indirect value/benefit that is often mentioned by outside scientists and conservationists. Most people believed that the water in their wells came from the mountains. However, a relatively large group of farmers who did not own land near the lake shore believed that Lake Ucchali contributes to maintaining water levels in wells and in the ground.

According to the villagers, the only worthwhile value of the lake was its therapeutic properties. The brackish water offers a effective cure for skin diseases. Emphasising the medicinal value of the lake water, one of the villagers jokingly said, "Do not write about the medicinal value of the lake water, because if they come to know then all the diseased people from all over Pakistan may come to take bath and might bring diseases and spoil the area!!".

The village women's perception of the lake and its values was not different from that of the men. Although they conceded that the brackish water was good for skin diseases, they said the lake was useless since its water could not be used for washing clothes or cattle, or drinking, cooking, irrigation or breeding fish. In addition, they are simply tired of the bad smell given off by the lake. The women were also not aware of the birds on the lake. Whereas most of the men recognised several species of bird, the women did not differentiate between the various bird species. For them, all the birds are 'murghabiss'.

Box 4 Villagers' comments reflecting local perceptions of Lake Ucchali

"You call it a lake - to us it's stagnant water". (Aap jheel kehtay hain — hamarey liye to khara paani hai.)

"How can the ducks back in Russia find out the Lake Ucchali is no longer hospitable!" (Roos men murghabiyon ko kaun batata hai keh Ucchali jheel ab achhi nahin rahi.)

"The wrath of the White-headed Ducks! Around 1956 the lake shrank in size. Its colour changed to red and a foul smell was emitted from the lake with a lot of bubbling. Wherever the smelly gas spread, the colour of gold and silver jewellery as well as currency notes turned black".

Wetland Management Options

Given the local resentment and anger towards the lake, it took a long time for villagers even to consider workable management options for the wetland. The villagers initially had only one management option in mind: remove the lake and make the fertile land available to the farmers who own the land. They envisaged draining the whole lake or reducing the flow of incoming water by constructing dams upstream, particularly on the Ucchali Nallah (the largest feeder canal).

During group discussions, villagers subsequently pointed out that any management options for the lake should take the following into consideration:

i) Land beneath the lake water belongs to the community;

ii) Over the last 30 years the lake changed size three times. Its present size is the largest ever;

iii) Landholdings are relatively small in Ucchali village;

iv) Pressure on the land particularly increased during the last seven years after introduction of cauliflower cultivation.

The high productivity of the agricultural land near the lake encourages farmers to cultivate as much land as they could recover from the lake. Land under water is perceived as a wasted economic opportunity.

Animated village discussions gradually focussed on the following issues:

i) Lake boundaries

ii) Alternate management options

iii) Afforestation

iv) Introduction of suitable salt tolerant grass species.

In the process, villagers reached a common understanding that the lake would continue to exist. The removal of the lake as a possible management option was ruled out: this was seen as neither technically feasible nor desirable. However the following management options were proposed by the villagers:

i) *Social forestry around the lake*
Villagers proposed to reafforest the lake shore which is flooded every year with the arrival of the rainy season. This 10-m strip of land surrounding the lake is not very productive in its present condition. Most farmers whose land is periodically submerged accepted this idea. Village meetings elicited a list of the social and ecological benefits that could be expected: firewood supply, beautification of lake, habitat and food for the bird species, reduction in soil salinity and screening out of the nearby military base lights that disturb bird behaviour.

According to the villagers, the exact demarcation of the land and the choice of tree species to be planted can be explored while preparing the feasibility report. A village social forest committee should be formed to work out the details, coordinate group action, and distribute benefits in a transparent and accountable manner.

ii) *Control salination by digging channels to facilitate the flow of excess water into the lake*
This management option is the direct outcome of local experimentation by a few farmers. Its importance had not been realised by the village community until these extensive group discussions took place. In the few situations where the farmers had dug channels to drain the excess water from their soils into the lake, their plots of land were very productive compared to neighbouring fields that had not received this treatment. Adjacent plots of land located upstream of the treated plots also lay fallow unless they had been managed in this way. Extending this indigenous soil management practice could thus help control salination of the fertile lands. Villagers suggested digging five channels from the Nowshera road to the lake (about 1 km in length and 1.60 x 1 x 1.60 m in profile).

iii) *Identification of salt-tolerant grass species for planting around the lake*
Introduction of salt-tolerant grass species along with improved vegetative cover through social forestry could encourage birds to visit to the lake.

iv) *Introduction of suitable fish species*
The possibility of introducing salt-tolerant fish species should be explored.

v) *Ecological restoration*
Scientific investigations could be initiated to investigate the possibilities of lake rejuvenation. This may include reducing the salt content and/or introducing plant and aquatic species that help life to flourish in the lake.

vi) *Catering for children's needs around the lake*
Creating a facility on the lake shore where children could play.

vii) *Clean up feeder canals*
Cleaning and building a wall for the Ucchali nalah, which flows through the village and causes some inconvenience to villagers (sight, smell).

DISCUSSION

A central objective of this participatory process was to initiate local-level planning exercises that take full account of local needs, perspectives, capacities and aspirations. The use of Participatory Rural Appraisal methods in the context of wetland management planning highlighted the following:

i) The quality and depth of information generated on local livelihoods and their relationships with natural resources was much richer than that generated by more conventional survey

and questionnaire-based studies. Moreover, this information was obtained in a relatively short period (two weeks) and at a lower financial cost than conventional management plan formulation by outside experts.

ii) The profound mismatch between local experience of wetland histories and the perceptions of outside professionals who have invariably assumed that Lakes Ucchali and Khabbaki are *natural* and longstanding features of the landscape. The failure of conservationists to understand the relatively recent social and ecological history of the wetlands has led to the neglect of the existing land rights of the local communities and has thus created conditions for conflicts between the state and those communities.

iii) Many villagers had a very good understanding of the wetlands' ecology and of how watershed management practices (e.g. forest clearance) impacted on the lakes. Complex issues such as patterns of migratory bird activity, changes in water quality, rates of sedimentation, relationship between groundwater levels and wetland presence were monitored locally and often well understood. Villagers established causal links between recent outside interventions and their detrimental effects on avian species of international importance e.g. negative impacts of introduction of exotic fish species (carp and tilapia) on White-headed Duck populations affected by competition for food and harassment by the carp on Lake Khabbaki; strong lights of a newly opened military base which interfere with the orientation and landing behaviour of migrating bird species on Lake Ucchali.

iv) Declaring the Ucchali wetlands as 'internationally important' conservation sites is meaningless for local resource users as long as the issues that emerge from such declarations have not been discussed and resolved to the satisfaction of local communities. Farmers who had lost land and/or traditional rights over resources could not appreciate the value of vague, 'long-term' conservation benefits for society or humanity. In their view, conservation benefits should be immediate and quantifiable, with villagers getting a fair share of the benefits accruing from the successful management of the wetlands, or a fair compensation for loss of productive resources.

v) Local communities are willing to enter into agreements with appropriate external agencies to manage the wetlands, with the help of adequate financial and technical assistance. Whilst securing livelihoods, health and well-being were the dominant preoccupations, several villagers also expressed pride in the fact that the overwintering birds travelled from afar and added colour to the lake. They are willing to take care of the wetlands' ecology provided their legal and traditional rights are recognised and they receive compensation for their losses. The participatory planning process revealed not only the villagers' ability to identify problems but also elicited a range of management options to reconcile the conflicting interests between local people and outside conservationists. Moreover, the villagers' management scenarios also contained ideas for building appropriate local institutions and resource-user groups or for strengthening existing ones e.g. forest protection committees in the Ucchali watersheds.

vi) It is difficult to rebuild the relationship between local people and conservation organisations (government and NGOs) after a history of policing and exclusion. The use of coercive methods that are assumed to be valid for all people, all times and all places is counterproductive in most wetland contexts. These measures most often disempower local communities and, directly or indirectly, impose more restrictions, from total exclusion to the denial of access to resources (see Box 5). Top-down approaches to wetland management in situations where local people depend directly on natural resources for their livelihoods usually result in high management costs for governments, with the majority of benefits accruing to national and international external interests.

vii) Wetland management is likely to be sustainable ecologically, economically and socially only if the overall management scheme can be made sufficiently attractive to local people for them to adopt it as a long-term livelihood strategy. From the outset, the formulation of

Box 5 The management of Lake Khabbaki as an example of coercive conservation based on the Punjab Wildlife Act, 1974

Lake Khabbaki is classified as a wildlife sanctuary and is managed as a protected area under clause 16 of the Punjab Wildlife (protection, preservation, conservation and management) Act (1974) which reads as follows:

16 (2). The 'Wildlife Sanctuary' shall be set aside as undisturbed breeding ground for the protection of wildlife and access therefore to public shall, except in accordance with the rules, be prohibited and no-exploitation of forest therein shall be allowed except for reducing fire hazards, epidemic or insect attacks or other natural calamities.

16 (3). No person shall:

i. enter or reside;
ii. cultivate any land;
iii. damage or destroy the vegetation;
iv. hunt, kill, or capture any wildlife or fire any gun or other firearm within one mile of the boundaries;
v. introduce any exotic species of animal or plant;
vi. introduce any domestic animal or allow it to stray;
vii. cause any fire, or
viii. pollute water in a wildlife sanctuary.

Provided that Government may for specific purposes as are deemed expedient, authorize the doing of the aforementioned acts (other than those mentioned in clause iv).

wetland management plans should be based on interactive dialogue to understand peoples' priorities, needs and knowledge. The preparation of wetland management plans should be the beginning of a long partnership between external institutions and local communities. The most difficult and complex task will be implementing the wetland management plan by assisting communities to establish or strengthen local institutions and providing them with the required legal, technical and scientific tools. The whole process should empower local communities to manage natural resources in the context of modern realities.

viii) The challenge for external institutions and professionals promoting wetland conservation is to become more enabling in their relationships with local communities living in and around wetlands. A paradigm shift is needed from a top-down, blueprint approach towards a bottom-up, people-centred, process-oriented approach. (PIMBERT and PRETTY, 1995). This means that outside institutions no longer see themselves as 'implementors' (who are responsible for planning, implementing, managing, and evaluating projects *for* local people), but 'enablers' (who help people to plan, implement and manage their own projects). In this more enabling context, outside organisations could usefully support community wetland management by providing:

a) assistance in developing national legal and policy frameworks that support tenure and usufruct rights, equitable; distribution of benefits, and local management structures.

b) support for the claiming by communities of legal rights to make use of natural resources in and around wetlands;

c) pragmatic approaches that build on indigenous systems of local knowledge, natural resource use and locally recognised decision-making structures and initiatives;

d) strong commitment to the institutionalisation of participatory approaches and methods in conservation through the transformation of formal sector organisations and NGOs into enabling institutions;

e) flexible, field-based training programmes in participatory methodologies for professional staff, an organisational culture in which it is safe to experiment and learn from mistakes, and appropriate rewards and incentives to encourage professional reorientation away from top-down conservation interventions;

f) incentives for collaboration between government (local and national departments), NGOs and local communities in joint wetland management schemes, research and the development of appropriate technologies and processes.

ix) Community participation is not the ultimate answer to all the problems associated with wetland degradation. Threats to wetlands originate from the catchment areas and from urban centres. Threats come in many different forms: international trade, agricultural policy, major water diversions, pollution etc., but, in many ways, these debilitating trends provide further justification properly to empower local communities (farmers, fishermen etc.) to conserve, and benefit from, wetlands and their surrounding watersheds.

ACKNOWLEDGMENTS

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The views expressed here are the authors' own and do not necessarily represent those of their employer.

CASE STUDY NO. 3

COMMUNITY-BASED WETLAND MANAGEMENT IN AFRICA: A CASE STUDY OF LAKE OL BOLOSSAT, KENYA

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Key words: Kenya, wetlands, management, Lake Ol Bolossat, community, initiatives

In Africa today, many natural ecosystems are threatened with destruction, primarily because of unsustainable exploitation and negative impacts of development activities. Wetlands are prime targets for exploitation because they contain the basic natural resources - water, land, plants and animals - that are commonly used to fuel economic development. In Kenya, wetlands support the rural economy and up to 7,000,000 people depend on them for their livelihood. In addition, there is considerable inter-institutional competition for wetland resources, particularly water. While a wetlands policy is being developed by the government, widespread damage to wetland ecosystems continues at village level. The participation of communities in the protection of their own environment and in the conservation of wetland resources has therefore become a crucial requirement to stem the loss of biological diversity and minimize damage to the environment.

In central Kenya, riparian communities have initiated activities aimed at protecting Lake Ol Bolossat and its watershed. The community around the lake has organized self-help groups that carry out activities aimed at generating income and also protecting the lake and its watershed. Among the community projects is wild honey production. Traditional and modern bee-hives have been placed in indigenous woodland along the Sattima escarpment. The honey harvested is refined in one of the members' kitchens and is then bottled for sale in nearby towns. Another community group has established tree nurseries that produce seedlings of fruit trees, and fast-growing tree species for domestic and farm-wood requirements as well as indigenous slow-growing trees for soil and water conservation. The project aims to meet local wood demand and hence minimize damage to indigenous forest species. It also aims to increase fruit production.

This paper describes how this community-based initiative evolved, and outlines its achievements and constraints. It also explains the significance of the 'bottom-up' approach to wetland management and explores the potential use of the Lake Ol Bolossat community project as a model for the conservation of wetlands in other developing countries.

INTRODUCTION

Many African countries have recently begun to rethink environmental issues in the broader context of sustainable development. Many governments are developing national environment policies that aim to promote protection of threatened ecosystems and sustainable use of natural resources (ANONYMOUS, 1994a). The primary responsibility for reducing environmental damage and managing natural resources on a more sustainable basis, however, still rests with the community at a local level.

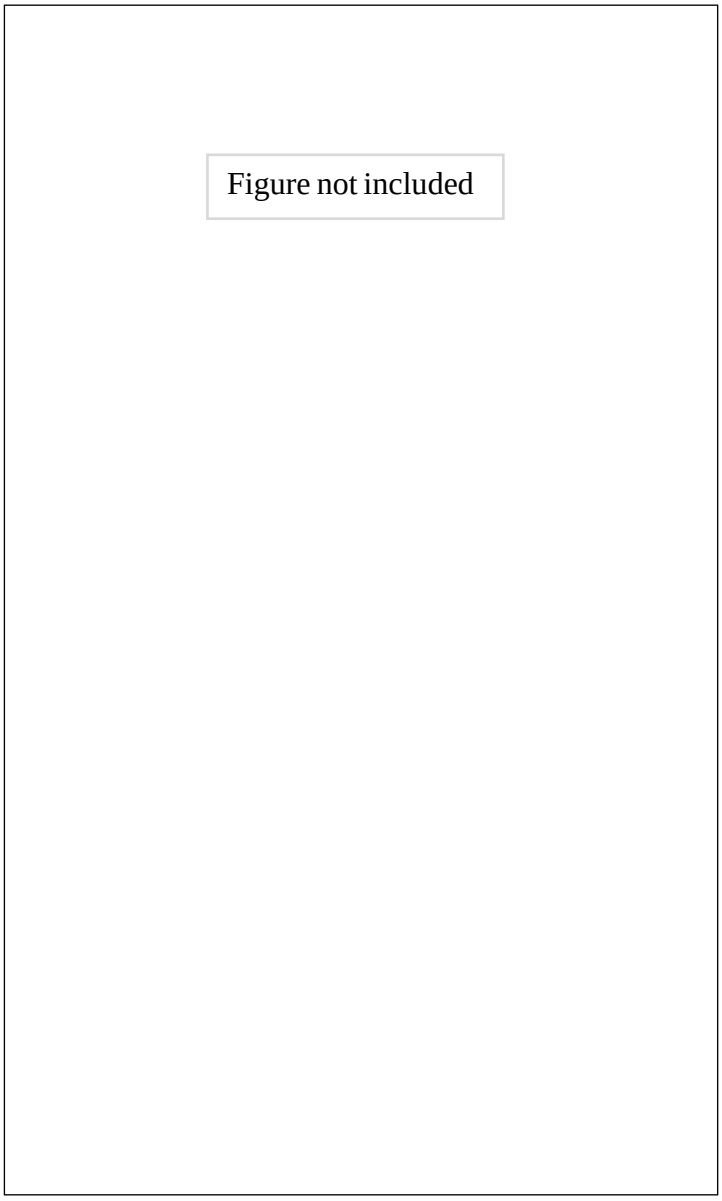

Figure 1 Lake Ol Bolossat and its immediate environs, Kenya

Areas with open water have a wide range of floating and submergent macrophytes. Water lilies *Nymphaea caeruleae* and floating grass species cover the open water in some places. In the north, where water is abundant and permanent, notorious aquatic weeds, i.e. *Salvinia molesta* and *Pistia stratiotes*, have invaded the lake (NJUGUNA, 1992). Submergent macrophytes such as *Najas pectincta* and *Ceratophylum demersum* occur in areas of the lake with clear water.

MAJOR ECONOMIC ACTIVITIES IN THE LAKE OL BOLOSSAT BASIN

The main economic activities that take place in the lake basin are founded on the existing basic natural resources: land, water, plants and animals (GICHUKI, 1996). The local community mines sand on the dry parts of the lake bed and clay soil for making pots. The most important economic activities, however, are:

Agriculture

Lake Ol Bolossat is located in a fertile agricultural area of Kenya's central highlands. The local farmers grow maize, wheat, pyrethrum, potatoes and a wide range of vegetables for domestic consumption and for the market. Most of the agriculture is rainfed but there are a few irrigated fields planted with wheat, vegetables and livestock food crops at the mouth of River Ewaso Narok and on the Sattima escarpment.

The lake basin is important for livestock grazing; approximately 8000 head of cattle, 2000 sheep, 600 goats and 400 donkeys are grazed there. The livestock belongs to farmers who own land around the lake. This wetland, therefore, serves as a common grazing ground.

Wildlife Conservation

The Lake Ol Bolossat basin holds Hippopotamus *Hippopotamus amphibius*, Grant's Gazelle *Gazella granti*, Spotted Hyena *Crocuta crocuta*, Silver-backed Jackal *Canis mesomelas* and Rock Hyrax *Procavia capensis*. The African Buffalo *Syncerus caffer* and Leopard *Panthera pardus* occur on the Sattima escarpment. In addition, 185 species of bird have been recorded; thousands of Palearctic and African waders and waterfowl inhabit the lake. Because of its high potential for wildlife conservation, the lake has been recommended by the local government for protection as a game reserve. At present, however, it has no legal protection as a conservation area.

Tourism

The diversity of birds and the beautiful scenery of Lake Ol Bolossat are the main attractions for visitors. There is considerable local and international tourism, with Thomson's Falls, on the northern part of the lake, being the most popular site. Tourists visiting the lake often proceed to the nearby Aberdare National Park.

community initiatives to manage the lake for the common good were developed.
The existing and impending threats to the lake and its watershed are associated primarily with human activities. The specific threats to this important wetland are:

i) deforestation of the surrounding water catchment areas;

ii) siltation of the wetland due to soil erosion on surrounding farmland;pollution of water due to poor sanitation, sewage and industrial waste, especially near Nyahururu;

iii) high grazing pressure, which destroys suitable breeding and wintering habitat for birds. Grazing livestock trample on eggs and chicks of ground nesting birds (e.g. Common Snipe);

iv) introduction of new species of plants and animals, especially the floating aquatic fern *Salvinia molesta* and the aquatic rodent Coypu Rat *Myocastor coypus*;

v) risks of lead poisoning of birds and invertebrate fauna. The lead in the lake bed is buried under sediment, polluting the environment;

vi) burning of swampy or grass margins. Fires originating from the farms in the basin burn suitable habitat for birds and also cause unfavourable ecological successions.

The magnitude of these threats and their effects on the Lake Ol Bolossat ecosystem are likely to increase as human encroachment on the wetland increases. The capacity of the lake to support water birds and other forms of biological diversity is gradually diminishing.

RECENT WETLAND MANAGEMENT INITIATIVES

Initiatives by Local and Central Government

The need to protect Lake Ol Bolossat and its watershed has been recognised by both local and central governments in Kenya. Nyandarua County Council has resolved to develop the lake as a wildlife reserve so as to generate revenue from tourist activities and conserve wildlife. The Kenya Wildlife Service has already surveyed the area and marked the boundaries of the proposed wildlife reserve. The River Ewaso Ngiro Development Authority has also initiated afforestation projects to protect the lake as an important catchment area of the river. In spite of those positive steps, however, little progress has been made to stop environmental damage.

The main problem that has hindered progress in environmental protection at the lake has been land disputes. The lake basin serves as a common grazing ground for the local people and the status of land ownership is not clear. The local community has been opposed to land sub-division and allocation to new settlers by the Central Government before their own needs are met. Lack of adequate information on the lake's biological resources, funding constraints and lack of political goodwill have also been given as reasons for lack of progress in the conservation of this wetland (GICHUKI, 1996).

Income Generation

The income-generating activities that the community groups had initiated at Lake Ol Bolossat were varied, the main ones being:

i) *Rearing and sale of livestock*
Four women's groups and two youth groups purchased and reared young animals, especially cattle, sheep, rabbits and chicken. The animals were reared to maturity and then sold in the local market. Poultry was kept for the production and sale of eggs. The income generated was used to support other income-generating activities while profits made were occasionally shared between group members. Lake Ol Bolossat offered a free grazing ground for cattle and sheep.

ii) *Wild honey production*
Three youth groups were involved in wild honey production. Eleven traditional and six modern (Top-bar) bee-hives were placed in the woodland thicket on the Sattima escarpment, along the stream valleys and close to springs. The honey was harvested twice a year, in February and September. It was refined in local kitchens by girls and boys, and then bottled for sale in the local markets. The income thus generated was used to buy new bee-hives and improve the process of refining honey. The profits were occasionally shared between group members.

iii) *Production of tree and fruit seedlings*
Twelve community groups were engaged in the production of tree and fruit seedlings for sale (the exceptions were the cultural and one of the religious groups). Each of the groups sold, on average, 6000 tree seedlings and 700 fruit seedlings per year. About half of the annual production of the popular agroforestry tree seedlings was given free to schools and churches.

iv) *Weaving of garments and other handicrafts*
Three women's groups had started weaving to make marketable garments. Using wool bought locally or obtained from their own sheep, the women made carpets, blankets and wall hangings. Natural dyes were extracted from indigenous plants. Synthetic fibre and cotton threads were also used to make mats and tablecloths. The products made by the women were sold in the local markets and in other towns outside the basin. The income generated was used to initiate other development activities for the group and to help individual members to purchase household goods (e.g. kitchen utensils and roofing materials).

v) *Production of marketable goods from wetlands*
One youth group was using aquatic plants, in particular *Typha arudinacea* and *Cyperus papyrus*, to produce mats for sleeping on, partitioning rooms and chicken houses as well for use as ceiling material for bedrooms. Most of the products were sold locally but some were sold in other parts of central Kenya.

iii) *Wetland Conservation*
Patches of marshes around natural and man-made dams were protected against over-grazing by the erection of fences. Channels draining water from the farmland into the lake were opened by removing silt deposits and woody vegetation. These activities were carried out by the youth groups in the study area.

LESSONS LEARNED FROM THE COMMUNITY INITIATIVE

In Kenya, and elsewhere in Africa, the government is rethinking environmental issues. National development policies and plans are now aimed at pointing the nation towards an environmentally sustainable future. The responsibility for using natural resources sustainably, however, remains largely with the rural communities who depend on those resources for their livelihood and development.

The majority of African society is based in rural areas; land is therefore the most valuable resource. The demands on the available land are many, and in most cases create serious pressure and conflicts. Sustainable land-use planning is therefore crucial because it enables individuals and communities to optimise benefits from land resources and minimise negative impacts on the environment.

Communities, whether rural or urban, must participate in the planning, implementation, monitoring and evaluation of land-use plans. Without adequate community awareness of environmental issues and participation in the development of policies, plans and projects, management of biological resources and threatened ecosystems is unlikely to be sustainable in Africa.

The objectives of community participation in natural resource and wetland management in Africa should be to impart techniques for identifying environmental problems at a local level, prioritising those problems and opportunities, evaluating and implementing strategies for conservation of wetland ecosystems and the biodiversity that they represent. Indigenous knowledge of local resources and the technology developed by the community over time should serve as a basis for the development of management strategies.

Community participation should not only identify and prioritise people's needs but should also recognise and strengthen the roles played by various community groups, such as men's, women's and youth groups. The contribution made by women to agricultural production and management of biological resources in Africa is enormous. Women should therefore be encouraged and their groups provided with training and funding so as to enable them integrate wetland conservation and economic activities effectively. The participation of community groups at village level is likely to remain the principal strategy for achieving sustainable resource management in Africa for many years to come.

CASE STUDY NO. 4

APPROACHES TO LOCAL COMMUNITY PARTICIPATION IN THE CONSERVATION OF WETLAND RESOURCES

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Key words wetland, household, climate impacts, community development, Zambia, government

In the past, local communities were the custodians of all wildlife and ecosystems. Modernisation and modern government have tended to marginalise the local population in the management and conservation of local resources, among which are those of wetlands. After 50-60 years of excluding these populations, it has become necessary to involve them again, as their numbers increase and as they begin to encroach on conservation areas. The starting point for winning them into participating in conserving the local environment is to sensitize them and persuade them that they are an integral part of the ecosystem that is being conserved. There has to be a way of making them play a central role in conserving the wetlands, rather than depending only on government machinery.

This paper presents a case study of women in Ntalasha village, Zambia. Environmental Education and participatory rural approach are being used to enlist women's support for conservation.

INTRODUCTION

In Ntalasha village a demonstration initiative has been started by a women's club. The club has decided to plant trees and to grow vegetables as a way of meeting some of their nutritional needs. The small project is a demonstration of the utilization of natural resources (soil, water). The women's club is found in Ntalasha village - Headman Ntalasha, Chief Shakumbila - in Mumbwa area, a buffer zone to the Blue Lagoon National Park and the Mumbwa Game Management Area.

In Ntalasha, neither men nor women are engaged in gainful employment. It is envisaged that men and children will join in the project and produce food, which will detract them from poaching. They will also be linked to Administrative Management Design (ADMADE), a scheme involving local communities in the wise exploitation of wildlife to improve livelihoods.

Currently, and as a result of the severe drought in which there has been abysmal crop failure, there is hunger, and the local communities have resorted to poaching - not only for the pot but also for cash to buy other foods or goods.

The Zambia Environmental Education Programme (ZEEP) is attempting to help the women understand the causes of the drought and assist them to develop coping strategies which link them to wetland conservation.

BACKGROUND

Ntalasha village is in Munkolo area in Mumbwa District; it comprises households occupying large pieces of land, and is well spaced. The social structure of the village is based on the Tonga of the Southern Province of Zambia. The Tonga have a distinct language of Bantu origin, and are organised around large families that are the result of polygamous marriages. In the history of the Tonga, this has been the strength of a clan, although with changing circumstances this is also changing. For example, a teacher in a local school currently has three wives. Because of his profession, he is not able to support all his wives and their children on a small income. Also, as a teacher, he is subject to transfers arising from upward mobility or from staff turnover. This means that he is not a permanent resident and is, therefore, not able to keep cattle or own the vast area of land necessary for food production for a large family. Tonga people who have settled in urban centres rarely marry several women.

Ntalasha village is on the periphery of a Wetland and Game Management Area; the World Wide Fund For Nature (WWF) has a wetlands project working in the area. The first meeting of ZEEP, a project of WWF with Ntalasha village women, took place in 1992. The meeting was organised by the Education Officer on the wetlands project and the purpose of the meeting was to assist the women's club, formed under the auspices of the WWF Wetlands Project, understand the importance of conservation. It has to be noted that local people's participation in wildlife conservation and conservation of major ecosystems has been lacking. Plans, rules and regulations for wildlife management have often left out people's participation. Involving a women's club in activities that fit into their basic need - the search for food - was a strategy to bring the women and their community into the conservation of nature and natural resources. The outcome of the meeting was a request to ZEEP to assist them raise funds to help them carry out some of the activities they had begun working on. Among the club's activities were pottery, making of reed mats, baking scones for sale, knitting and sewing. The first monetary input came as a loan from the wetlands project. This was repaid, but the club did not make a profit to enable the women carry on their activities.

In following up the women's request, ZEEP had to find out precisely what the women needed. They listed their needs as sewing machines, a bicycle for the chairperson, cloth, needles and thread and wool and knitting needles.

ZEEP did not have the money to help the women to buy the things they wanted. The request was made because many people in Zambia have become conditioned to receive help rather than to

work to help themselves. Therefore, using participatory methods for decision making, the following questions were asked:

i) What should we do to get the things that the club needs from our local resources?

ii) How can we use our skills to harness resources to get the things we need for the club?

iii) What activities should we embark on which will contribute to improving our livelihood?

ZEEP has had to raise funds to enable the women acquire skills in orchard development and vegetable gardening. Funding has enabled the women to pay for gardening equipment and the sinking of well to provide water for their fruit trees. Skills of planning and accounting are being taught to the women through this small endeavour. Skills acquired at the club will be applied in the management of their homesteads. It is envisaged that the orchard and gardening returns will enable the women to purchase the items they need for the club.

In discussions with the women, it turned out that, although they needed the things mentioned above, they also had one problem in common, which was a general lack of nutritious food, vegetables, fruit, meat etc, for their families. To get meat, their husbands poach, rather than slaughter any of their cows for food. However, through the participatory methods, baseline studies revealed issues that have to be addressed.

ISSUES

Population: Family Planning: Health-Nutrition and Education

In all attempts at national development, and in the alleviation of poverty in particular, it is recognised that unsustainable population growth will have to be controlled throughout Zambia.

As mentioned above, the families are built around polygamous relationships. A man is culturally empowered to marry as many women as he wishes. In the polygamous households of Ntalasha village, average numbers of children are:

10 children in a home with one wife,

15 children in a home of two wives,

25 children in a home of three wives.

Where a polygamous family has a large number of wives, there are also more children. The women in such marriages compete for one man and, to appease the man, they have to bear as many children as possible. This cultural state of affairs makes it difficult for women to plan their families. However, what is also notable is that the women of Ntalasha village do not have a family-planning scheme.

A gender-balanced approach will have to be used in this endeavour, as both men and women are involved in population growth. Uncontrolled population growth in a buffer zone to a National Park means that there will be a great deal of pressure to harvest wildlife resources illegally and to clear land for settlements. Encroachment on the Game Management Area and the National Park will be inevitable.

In terms of health, the village does not have any clinic or hospital, however, a clinic for children under five is conducted under a tree. The scales for weighing the children are hung on what looks like a goalpost made from logs. Ntalasha village has several primary schools built on a self-help basis and manned largely by untrained teachers and trained headmasters; the quality of education is very low. ZEEP has provided some educational materials for the schools, and some teachers in the schools in the buffer zone have been trained in Environmental Education. Special workshops for Headmen, as leaders of the communities, have also been conducted. What underlies Environmental Education for wetlands is to change the people's attitude towards wetland resources. People have to be seen as major stakeholders and partners in conservation.

THE CLIMATIC CONTEXT OF CONSERVATION: THE DROUGHT

The drought, marked by inadequate rain, has persisted since 1992. It has been difficult to predict so that commercial, peasant and subsistence farmers are prepared to change patterns of planting crops in order to make use of the little rain.

Wetlands, by their nature, are havens of water. The wetlands of the Blue Lagoon are unique for their flora and fauna. These are severely threatened by the drought as the area becomes drier and drier. Many wild animals have died during the drought, not only from lack of food and water, but also from disease, which is contracted from drinking from the few wells. There have been extensive fires in the dry wetlands area, lit by poachers when stalking animals.

The water levels of the wetlands have receded so much that fish are concentrated in small pockets of water, and this allows for overfishing, especially by fishmongers from the urban areas. During the drought, Zambia and the Southern Africa Region are suffering a great loss of biodiversity.

The impacts of the drought are felt in both rural and urban areas, which experience shortages of water. However, for the rural population, coping strategies in drought conditions have included hunting for food, and collecting roots and wild vegetables for sustenance. Rural populations have also chosen to migrate to places where they can find rain for their agricultural activities.

Ntalasha village has been no exception to this. The activities of the women's club have been affected by the drought, which has forced some families to move to places where they can get water and grow food. In Zambia in general, there have been severe outbreaks of epidemics (diarrhoea, malaria) and many people have died in drought years. In Ntalasha village these deaths have been associated with wizardry, and this is causing the community to disintegrate.

When a drought occurs, the whole living environment is affected and this often affects human behaviour and activities. It affects the cultural values of the people, some of which are lost in the course of developing coping or survival techniques. For example, one typical value which seems to be lost is that of hospitality, which has traditionally translated into offering food or water to any visitor. Because of a lack of or little food or water, people are not able to share; if anything, they even hide what they have.

Scientific explanations of the causes of the drought, such as climatic changes or El Niño effects, are not understood by local communities. In the context of villages, the occurrence of a drought is the result of the bad or evil deeds that people have committed. For example, it is believed that killing of pythons leads to the loss of rain. Other explanations to drought point to the fact that the spirits of the dead are unhappy with the people, therefore prayer petitions and sacrifices should be offered to them.

The drought has affected the women's club in that the women are not able to make clay pots for sale because, if they can get water, they do not use it on clay but for drinking and cooking. The clay itself is so dry that it can not be moulded or worked to make pots; when the village had adequate rain, the clay was wet and malleable. The women are not able to make the reed mats because the reeds did not grow well in the previous rainy season, when there was inadequate precipitation for plant growth. Women's activities which depend on the utilization of natural resources have been hampered by the drought. This has meant a loss of income from the sales of the products.

APPROACHES

One approach to gain the support of local people for conservation has been community development. This has often meant the provision of health centres, building of roads and schools, and the provision of water and transport. When these facilities begin falling to pieces, the people are not able to repair them, and often such provision has not been seen by the local communities as means to conservation efforts. Conservation should provide a sustainable base to enable people to maintain the infrastructure.

Other approaches to conservation have been influenced by the species approach, which concentrates on protecting threatened species of animals, especially megafauna such as rhinos or elephants.

Biocentric or ecocentric approaches rarely include the importance and role of people in conservation. It is for this reason that Environmental Education has to use approaches that serve the interests of the people. Conservation has to take account not only of community interests but of the individual interests of the people in the community. These interests will directly resolve some issues mentioned above.

ZEEP's approaches are:

i) linking the women to the school so that they can receive basic literacy lessons;

ii) exploring ways of introducing a family-planning scheme for the village; this will involve other non-governmental organisations working in family planning;

iii) helping women get expert advice on how to grow drought-resistant crops, especially those that people do not habitually eat in the Munkolo area (such as cassava);

iv) introducing agroforestry trees to improve the soil and as fodder for livestock;

v) developing women's leadership potential to build a centre for their meetings and for use as a clinic;

vi) explaining simple concepts of conservation and development;

vii) looking at indigenous knowledge to use for management and conservation of wetlands and including that knowledge in the school curriculum;

viii) explaining the rules and laws for conservation through workshops and village meetings so that women can participate in the formulation of policy on wetlands;

ix) exploring techniques for community vigilance to curtail poaching and giving support to government efforts on conservation;

x) developing techniques of lobbying government for harvesting wildlife resources for village economic development.

CONCLUSION

Conservation of wetlands requires a multi-disciplinary approach. The role of Environmental Education is to get to the interests of the communities and individuals in order to achieve conservation. The paper attempts to show how the rural participatory approach has identified issues from which approaches for conservation have been teased.

CASE STUDY NO. 5

COMMUNITY-BASED PARTICIPATION IN WETLAND CONSERVATION: ACTIVITIES AND CHALLENGES OF THE DANAU SENTARUM WILDLIFE RESERVE CONSERVATION PROJECT, DANAU SENTARUM WILDLIFE RESERVE, WEST KALIMANTAN, INDONESIA

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Key words wetland, community, participation, consultation, income generation, co-management, ICDP, rattan, honey, basketware, leather, hukum adat, Kalimantan, Indonesia, government, NGO

The Danau Sentarum Wildlife Reserve (DSWR) encompasses an area of some 125,000 ha of lakes and temporarily and permanently flooded lowland forest in the north central region of West Kalimantan. For about nine months of the year, the lake system is relatively full, though water levels fluctuate considerably. During the June to August period, however, the waters retreat and the lakes and connecting rivers often dry out completely. The influence of this annual cycle dominates the natural and socio-economic systems of the reserve.

While the reserve's primary significance are its diverse flora and fauna, unique habitats, and the hydrological function it contributes to the Kapuas River watershed, it is also home for roughly 3500 people living in some 40 permanent and seasonal villages. Both Melayu fishers and Dayak forest dwellers live within the reserve and derive their daily sustenance and economic livelihood from its aquatic and terrestrial resources.

In 1992 the DSWR Conservation Project began biological, ecological, socio-economic and cultural research in both Melayu and Dayak communities. Since late 1994 it has been consolidating the results of this research into the development of a participatory strategy for the sustainable utilization and protection of the reserve's resources.

The emerging community-based conservation strategy for DSWR focuses on three main areas:

i) Improvement of existing, and development of new, income generating opportunities with local communities;
ii) Improvement of existing, and development of new, resource management techniques and strategies to enhance and protect the reserve's resources; and,
iii) Promotion and strengthening of existing, and the facilitation, training and implementation of new, institutional structures to improve the sustainable utilization, management and conservation of natural resources in DSWR.

This paper provides an overview of the major activities developed over the last year which are emerging as the basis for the community-based conservation strategy for DSWR. Elements of these activities are examined in detail to highlight what we hope to achieve with them, and why they are fundamental to conservation in DSWR. Some of the practical challenges are discussed as reminders to conservation agencies and development practitioners who are considering community-based participatory approaches in wetland conservation.

INTRODUCTION

The Danau Sentarum Wildlife Reserve (DSWR) covers an area of about 125,000 ha in the floodplain of the upper Kapuas River in West Kalimantan, Republic of Indonesia. The reserve was gazetted in 1982 and came under the jurisdiction of SB-KSDA (Sub Balai Konservasi Sumber Daya Alam) the provincial division of the Forestry Department's Directorate-General of Forest Protection and Nature Conservation PHPA (Perlindungan Hutan dan Pelestarian Alam). KSDA staff have had a presence in the reserve since 1992. In April of 1994, in recognition of its international significance as a unique wetland, Danau Sentarum was declared Indonesia's second Ramsar site.

The freshwater lakes and flooded forests of this remote area are 700 km upstream from the Kapuas estuary at Pontianak (Figure 1). DSWR lies just north of the equator, and is relatively flat with the exception of a few scattered hills in the perimeter of the reserve reaching up to 500 m. Soils are generally of low quality. Some 40,000 ha of the reserve are taken up by seasonal lakes, while the remainder is temporary or permanent flooded lowland forest and hill forest.

The DSWR lake system receives about 3600 mm rainfall per year and is dominated by significant fluctuating water levels. For about nine months of the year (October to June) the lake system is relatively full, though levels may fall and rise some 8-14 m during an average year. During the July to September period, the waters retreat, and some of the lakes dry out entirely.[1] This annual cycle dominates the ecosystem and all of its components including plants, fish, animals and people.

Within the area covered by the DSWR live two distinct cultural/ethnic groups: the Melayu, who live along the edges of the lakes and rivers of the reserve, and whose livelihoods are primarily dependent on fishing, and the Dayak, who live in the forests at the north, east and western extremes of the reserve, whose lifestyle is largely derived from forest resources.

Of the two cultures, the Melayu make up the greater portion (approximately 80%) of the people in living the reserve. They live in 'amphibious' communities (ranging in size from 3-155 families) comprised of houseboats and floating and stilted houses. Many fishing families come to the area from larger centres the outside reserve during the peak fishing season. However, the majority of Melayu live in permanent villages on a year-round basis. Lake and river fish combined with caged fisheries (i.e. aquaculture) are the mainstay of their economy. Virtually no agriculture is practised, but some livestock is raised including cows (on floating platforms), chicken, ducks etc. Many of the Melayu communities are quite extensive and have schools, medical clinics, mosques and police stations.

[1] While this retreat is an annual phenomenon, one which the communities depend upon to facilitate the best fishing and the largest portion of their annual income, this year (1995) the waters have not receded, and as of September were hovering around the 13 m mark.

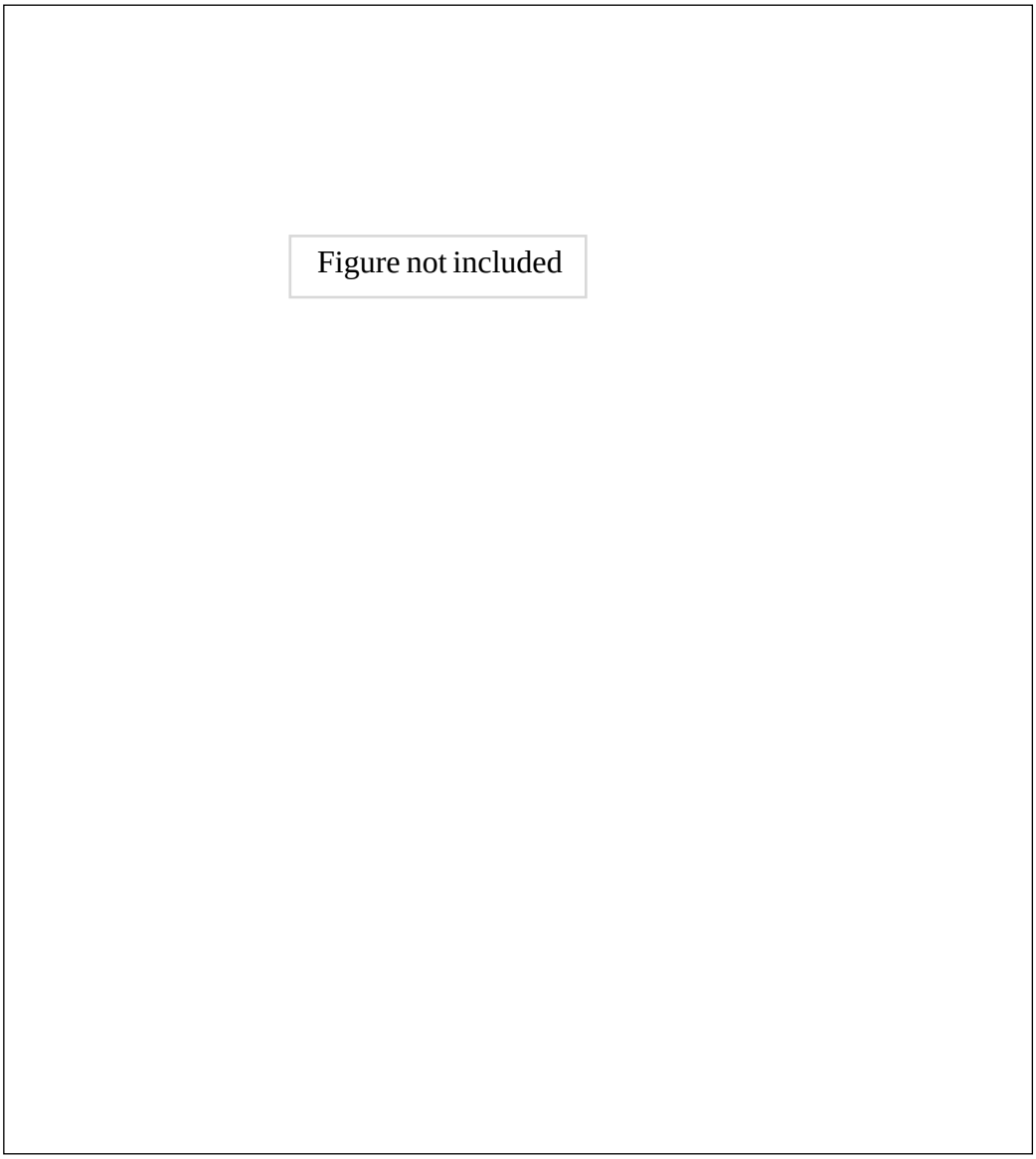

Figure 1 Map of Danau Sentarum Wildlife Reserve, West Kalimantan

The Dayak people living in the Upper Kapuas floodplain and adjacent areas belong primarily to one of three clans: Iban, Kantuk or Embaloh. The majority of Dayaks in the reserve are Iban, and live in smaller communal longhouse communities ranging in size from 9-30 families. They practise swidden agriculture (ladang), with dryland rice being the primary crop, and corn and cassava the secondary. Numerous native fruit trees are cultivated close to villages in gardens known as tembawang (PADOCH and PETERS, 1993), and rubber trees are cultivated to supplement people's incomes. The Iban also hunt birds and small game using shotguns, snares and traps. Fishing and caged fisheries are also practised, though to a lesser degree than in the Melayu communities. All villages also raise chickens and pigs.

Resource Seasonality and Resource-People Conflicts

The majority of the people in the reserve obtain the major part of their income during the dry season, when low water levels make fishing considerably easier. The seasonally high income period for most communities (Figure 2) is inversely proportional to the low-water July to September period. The estimated gross economic value of all major resources extracted from the reserve amount to almost US 2.6 million per year (Table 1).

The wide variation in daily family income during the year often forces people to undertake unsustainable and/or illegal resource harvesting practices to meet daily subsistence needs. In years, like this (1995), when the lake waters do not recede, the impact and frequency of such practices on the resources of DSWR are even more pronounced. While this has an obvious negative impact on

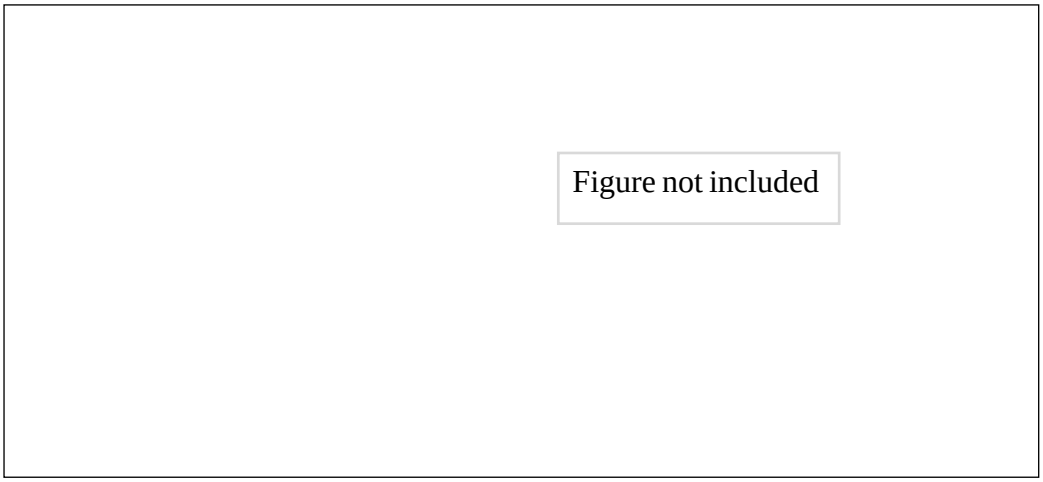

Figure 2 Monthly variation of daily family income from natural resources in DSWR

Table 1 Annual gross benefits of resources harvested from DSWR

Natural Resource	Rupiah	US$
Lake and River Fish	2,905,800,000	1,285,752
Caged Fish	1,800,000,000	796,460
Ornamental Fish	505,000,000	223,451
Timber	356,085,000	157,560
Swiftlet Nests	136,900,000	60,575
Turtles and Tortoises	56,000,000	24,779
Rattan	54,800,000	24,248
Honey	50,000,000	22,124
TOTAL	**Rp5,864,585,000**	**US$2,594,949**

From: AGLIONBY (1996).

the resources of the reserve, it also often leads to conflicts among the communities of DSWR as some of the examples below suggest:

- Forest fires have been set to improve habitat for the highly valued (but protected under CITES) ornamental Asian Arowana *Scleropagus formosus* or siluk fish.
- Chemical poisoning (to harvest large quantities of fish rapidly) have depleted wild stocks, and in some villages, devastated years of effort and financial investment in caged fisheries.
- Smaller mesh-size fishing nets are more frequently used, as are techniques that effectively block off rivers. This has caused breeding stocks to decline and has also lead to conflicts among up-river villages who experience the impacts of this decline directly.
- Over-exploitation of rattan by some villages has lead to the theft of rattan resources from other villages which still have a good supply.

DSWR Conservation Project

The DSWR Conservation Project is jointly implemented by KSDA and the Wetlands International - Indonesia Programme (WI-IP). The project is the result of cooperation between the Indonesian Ministry of Forestry and the Overseas Development Administration (ODA) of the United Kingdom. The project began in 1992 and is expected to continue until mid-1997.

Two of the project's goals of particular relevance to the DSWR community-based conservation activities focus on:

i) Piloting and modelling: Developing a model approach to conservation management in conservation areas and production forests; and

ii) Participatory approaches: Increasing awareness of how socio-economic needs and community involvement can be accommodated within the context of natural resource management (PHPA and AWB, 1993).

Trying to find solutions to some of these community-resource conflicts while still conserving and enhancing the unique biological and ecological resources of DSWR is the focus of the DSWR Conservation Project.

During the 1992-1994 period, project work undertaken by staff mainly concentrated on botanical, fish, biological, ecological, socio-economic and cultural studies to provide the necessary background for the development of a conservation management plan. With a change in project team staff in late 1994, however, a strategy streamlining previous activities with new participatory community initiatives for an integrated strategy for Community-Based Conservation in DSWR began to emerge. The community conservation activities described below began in January 1995 and have been implemented by two full-time AWB-I staff with periodic assistance from three additional AWB-I staff and four KSDA wardens. All activities remain on-going, and some have yet to be undertaken as planned due to the unseasonable high water levels this year.

The objectives and assumptions of the three main components of this strategy are outlined briefly below. Following that, specific details of the individual activities which make up these three components are described in more detail. In the final section of the paper, some of the challenges faced and lessons learned to date are discussed.

STRATEGY FOR COMMUNITY-BASED CONSERVATION MANAGEMENT IN DSWR

Objectives and Assumptions of the Community-based Strategy

There are three main component areas to the Community-Based Conservation Management Strategy for DSWR. These include: income generation, resource management and institutional arrangements and resource regulation. These are briefly summarized in Table 2 and the objectives, assumptions and a description of these activities are expanded upon below.

Area 1: Income-generating Activities

The objective of these activities is to supplement people's daily and seasonal incomes with activities, and the exploitation of resources, that are consistent with the principles of conservation in general,

Table 2 Components of the community-based conservation strategy at DSWR

Component area	General objective	Examples of activities
1. Income Generation	• To supplement and increase people's incomes through improved market access for local natural resources and new products	• Honey marketing • Beeswax products and market development • Rattan baskets/mats and market development • Belida fish skin production
2. Resource Management and Enhancement	• To enhance the quality and quantity of over-exploited and/or degraded natural resources	• Rattan Plantation Plot • Rattan Demonstration Nursery • Rattan Rotation Management Strategy • Tembesu Silviculture Treatment
3. Institutional Arrangements and Resource Regulation	• To promote and enhance indigenous capacities and external linkages to improve the sustainable use and conservation of natural resources	• Head Fishermen Meetings (Kelompok Nelayan) • Customary Law (Hukum Adat) • Support for Local Enforcement of Hukum Adat (Surat Tugas) • Links with non-Forestry agencies

and a wildlife reserve in Indonesia in particular.[2] It is assumed that successful provision of assistance to improve the marketing of existing, and the development of new market opportunities for value-added products will:

- Decrease the over-exploitation of certain resources;
- Instill greater community conservation practices and awareness of the economic value of these resources; and
- Provide new supplementary income opportunities that will illegal or unsustainable resource harvesting practices.[3]

Area 2: Resource Management and Enhancement Activities

The objective of these activities is to improve the quantity and quality of some of the most critical, over-exploited and under-managed natural resources in DSWR.

[2] A sub-objective of our income generating activities is to gain entry into the community (by helping to develop and market new products) to, hopefully, enhance community interest, trust and support for future resource management and conservation-oriented activities.

[3] Some of the economic rationale for the development of many of these projects is described in AGLIONBY (1994).

It is assumed that, through providing communities with some small-scale pilot examples and resource management techniques and training, they will:

- Become more pro-active in their harvest, regeneration, management and protection of some of the most utilitarian and, hence, heavily exploited resources used in DSWR.

Area 3: Institutional Arrangements and Resource Regulation Activities

The objective of these activities is to promote and enhance indigenous capacities, and facilitate linkages between local people and outside agencies to enhance the protection and regulation of local natural resources. It is assumed that facilitating people to meet together to discuss issues of common concern, supporting and strengthening indigenous systems of regulation and enforcement, and facilitating linkages with agencies external to KSDA (the main government authority in the reserve) will:

- Encourage local people to take more responsibility to manage their resources sustainably;
- Benefit local people socially, economically and legally; and
- Benefit KSDA's implementation and enforcement of local and national regulations to manage and protect the reserve.

COMPONENTS OF THE COMMUNITY-BASED CONSERVATION STRATEGY AT DSWR

Income-generating Activities

The first component of activities in our community-based conservation strategy involves 'community-entry' income generating projects designed to supplement and enhance people's incomes. This work has involved developing new, and improving upon existing, income generating opportunities for communities living in DSWR. To date these activities have included the exploration and development of markets for honey, beeswax, woven rattan products and fish skin leather. We are also exploring the possibility of making hand-made paper and weaving fabric from many of the plant fibres growing in abundance in the reserve (i.e. water hyacinth, bamboo, rice etc.)[4]

Marketing Bottled Honey

Wild honey has been harvested in DSWR for hundreds of years using a traditional 'honey-board' collection technique known locally as tikung (COLFER *et al*., 1993; ROUQUETTE, 1995). While accurate figures are difficult to come by, it is estimated that the entire reserve produces an annual

[4] Until now the research and development of markets for community livelihood products has not included community members. The main reason for this has been that there was considerable scepticism that any markets could be found for community products. Now that markets have been established, community members are likely to be involved in all aspects of the management and marketing process.

average of 20-25 tons (ROUQUETTE, 1995), which contributes an annual income of US$22,000 to the residents of DSWR (AGLIONBY, 1997).

Until 1995, residents have sold their bulk honey to a series of traders who sell it either to local communities along the Kapuas River, or in Pontianak. A small amount is also sold to traders across the boarder in Sarawak. In a year with low production honey-harvesters may receive between Rp1,100 and Rp2,500 per kg (US$0.45 to US$1.05); whereas in other years, when there is an oversupply of honey, traders may pay only the kilogram-equivalent of sugar in direct trade (i.e. for one kilogram of honey producers receive one kilogram of sugar). In Pontianak, however, end-market consumer prices charged for bottled honey in grocery or concession stores range from Rp6,000 to Rp15,000 per kg. A notable increase in profit is available to honey producers if they can sell their product more directly to the consumer.

In January 1995, for the first time in the reserve, a series of participatory planning meetings were held with community members in the village of Nanga Leboyan to market a product (see ROUQUETTE (1995) for a description of the approach and techniques used). These meetings resulted in a community developed plan and budget to bottle, label and transport 450 bottles of honey to Pontianak for sale. Each bottle's label described that profits from the sale of the product would provide supplementary income to communities and support conservation in Danau Sentarum.[5] By marketing this product as a 'conservation' or 'green' product, we hope to attract a portion of the domestic and international tourist market in Pontianak interested in supporting conservation through their purchasing power. In addition, early next year we will test both the domestic and expatriate market in Jakarta and Singapore.

Honey producers were paid an initial Rp2,400 per 800 ml bottle (Rp3,000 per kg.) After covering expenses of Rp550,000, we plan to return to each honey producer an additional Rp2,250 per bottle. This means that producers will receive approximately Rp4,000 per kg more through the bottling project than they normally receive selling it through established local traders.[6]

We have recently began negotiations with a private beverage bottling firm in Pontianak who have their own bottling-filling facilities. In addition to helping to improve the efficiency of our honey-filling operations, they are also interested in helping us to broaden the distribution of our honey.

Beeswax Product Development and Marketing

While initial attention last year focused on the sale of pure honey, we are now turning our attention to the development of an outside market for beeswax. Traditionally, after extracting honey from

[5] Depending on whether the bottle was packaged in a rattan or leaf-fibre basket, the selling price of an 800-ml bottle of honey ranged from Rp6,000 to Rp10,000.

[6] None of the approximately 20 people, who logged approximately 155 person-hours in this activity, was paid a wage for this work.

the hives, most honey producers in DSWR save the wax, melt it into 3-4 kg cakes and sell it to local traders for between Rp1,800 and Rp2,100 per kg (US$0.80 to 0.90). In addition, some producers take the wax across the boarder to Sarawak and sell it for the equivalent of 3.50 Malaysian Ringgit (Rp3,150 or US$1.40).

We have been in recent contact with a number of handicraft wholesale outlets and retail stores in Jakarta and Singapore to pursue the development of various value-added beeswax products such as natural-dyed, hand-rolled beeswax candles, wood and furniture polishes, cosmetic bases, and homeotherapy massage compounds. The most promising of these products appears to be the beeswax candles, and at present we continue to undertake local experiments on the development of this product, and have plans to provide training in candle-making to a few communities early next year.

As with the honey pilot-project, the main objective of this activity is to provide supplementary income from an existing harvested non-timber forest resource where no or limited external-market access exists. In this case, through a combination of facilitating both the development of local capacity to create new products **that are in demand** by outside markets, and making and maintaining outside market contacts, we hope to make DSWR beeswax more valuable to its collectors. If communities recognize the broader financial benefits of these products, it is our long-tern hope that this will also result in greater awareness of the need to protect forests from fires or other unsustainable exploitation (that might disturb the bees' nest sites and pollen sources), and a willingness to participate in the development of a community-based forest management strategy.

Rattan Product Market Development

Rattan is the most important non-timber forest resource harvested in DSWR. The canes of these spiny climbing palms play a prominent role in the subsistence activities of local fishers and are mainly used to make fishing traps (known locally as bubu). Moreover, rattan is also collected and sold to timber companies (working outside the reserve) who use it to tie saw-logs together into rafts (or rakit) which are transported down-river to mills in Pontianak. While harvesting rattan and selling it to timber companies is technically illegal, it remains a significant supplementary income source for many communities in the reserve, especially when fishing is poor (Table 1).

According to PETERS's (1995a) calculations on the utilization and management of rattan in DSWR, communities in the reserve consume up to 4,000 km of rattan cane every year to meet their bubu needs. Furthermore, if timber companies' use of rattan from the reserve is also taken in consideration, a conservative estimate of 200 rakit per year would more than double the annual quantity of rattan harvested from the reserve (i.e. 8,000 km of cane). Such levels of local use and commercial exploitation outstrip the forest's capacity to produce them, and remains the greatest threat to rattan in DSWR (PETERS, 1995a).[7]

[7] See sections on Rattan Plantation Demonstration Plot, Rattan Nursery and Ratten Rotation Management Strategy for a description of some specific activities designed to curb this threat from the supply management side.

On average, rattan harvesters (mostly women and children) work all day to harvest 150 rattan canes (each 6-m long) for direct sale to a timber company, and receive approximately Rp9,000 (US$4.00) for their efforts. However, depending on the diameter of the cane, the same quantity of rattan can be made into 150 to 300 baskets. At an average value of Rp3,000 per basket, weavers can expect to make between Rp450,000 and Rp900,000 using the same quantity of rattan. This 50- to 100-fold increase in the value of rattan would not only provide a significant supplementary income, but could also markedly reduce the uncontrolled (and unsustainable) commercial harvest of thousands of kilometres of rattan per year. People are aware of this, and have requested project assistance to establish a market for their baskets.

Initial community interest in the development of a rattan basket and handicraft industry in DSWR has been encouraging, and the quality of the prototype baskets we have received have been excellent. A photographic catalogue complete with price list for over 80 different types and sizes of baskets and woven mats has been developed and distributed to exclusive home decoration, souvenir and natural cosmetic retail stores and handicraft wholesale outlets in Jakarta and Singapore. Clients of these wholesale distributors include hotels, resorts, and retail shops throughout Southeast Asia, and 'fair-trade' stores and catalogue sales in Europe, North America and Australia. Our current first-quarterly order of over 2,000 baskets from seven clients suggest there is a significant market demand for these products. For the six communities engaged in this enterprise, this order has a value of over Rp7,000,000 (US$3,100). If successful, this enterprise has a good potential to encourage rattan harvesters to move away from the over-exploitation and sale of rattan to timber companies, and add significantly to their local economies.

Ikan Belida Notoperus borneensis Fish Skin Leather

Economically, fish are the most important resource harvested in the reserve with current estimated value for lake and river fish exceeding US$1.2 million, caged fish $800,000, and ornamental fish $223,000 for a gross annual value over US$2.3 million (Table 1).

While markets in various types of fish (dried, salted, smoked and live) are well established, and amount to almost 90% of the gross annual economic value of the resources harvested in the reserve, there remain additional income opportunities using fish and fish products which currently remain under- or unexploited. The skin of the fish known locally as ikan belida is one such example.

While ikan belida meat is very popular locally, in particular for making fish crackers, its small-scaled, eel-like skin is an ideal leather for tanning and making into such products as wallets, belts and handbags etc. Currently, however, during the low water season (when ikan belida are most frequently and easily caught), once the meat is removed, the skin is discarded as a waste product. Only recently have people become aware that a market for the skin exists which has the potential to double the value of the fish.[8]

[8] Depending on the size and quality of each skin, people in DSWR can anticipate receiving between Rp2,800 and Rp4,000 per skin.

With the help of the local office of the Department of Industry (Departemen Perindustrian) we have established a relationship with a Yogyakarta-based appropriate technology NGO (Dian Mandala) which specializes in the tanning, design, production and marketing or marine 'waste' leather products. As the tanning and dying processes will be carried out at their factory in Yogyakarta, no additional inputs are required (a consideration for working in a wildlife reserve). The fish need only be skinned, salt-preserved and sun-dried using techniques that are familiar to all fishers in the reserve. Dian Mandala have placed an initial order of skins to test the acceptance of ikan belida leather products in the market place. If successful we can anticipate shipping hundreds of skins out of the reserve per year. Of course, in order to avoid over-exploitation of ikan belida stocks, minimum sized restrictions will be established and closely monitored.

While this activity remains at an early stage, with a small amount of assistance to link people of DSWR with the leather product manufacturer in Java, and assistance with shipment and communications, we hope to establish a new income source for a product which has traditionally been harvested, but discarded as waste because people were unaware of its potential utilitarian and commercial value.

Resource Management Activities

Parallel to our community-based supplementary income generating activities, the second component of activities in our conservation work involves activities concentrating on the enhancement of the quality and quantity of some of the most critically threatened, yet utilitarian resources in the reserve. To date these have involved management activities for three species of rattan known locally as duri antu *Calamus schistoacanthus*, duri pelanduk *Korthalsia* sp. and duri tapah *Calamus* sp., as well as the local iron-wood tree species known locally as tembesu *Fagraea fragans* Roxb. The rattan-based activities involve the establishment of a plantation, a seedling nursery and the development of a harvesting regime. The main activity planned for tembesu involves silviculture management.

Rattan Plantation Demonstration Plot

As discussed above, rattan resources in the reserve are under significant pressure both for local use and by illegal commercial harvesters. One way to reduce the harvesting pressure on rattan populations is by establishing small community-level plantation. These plantations could be used to supplement existing supplies of rattan, or as an alternative cane source while natural populations are given time to rehabilitate. For many villages, plantation establishment may offer the only long-term solution for providing a continual source of rattan to meet domestic needs (PETERS, 1995a).

In October 1994 while a consultant was carrying out field surveys on the utilization and management of rattan in DSWR (PETERS, 1995a), one village's concern about the decline of their rattan

resources resulted in a request for assistance on improving their degraded rattan stands. While no community in DSWR had ever undertaken such a project before, with some project assistance men, women and children from the village of Nanga Sumpak transplanted 82 duri antu and 48 duri tapah seedlings from sites with an abundance of seedlings to sites which had become degraded.

While survey results of the sites one month later showed a mortality rate of over 25% (largely the result of damaged root systems and poor planting), as pointed out by PETERS (1995a), this activity was about more than simply planting rattan: **The real importance has to do with village initiative** and consciously choosing not to ignore resource depletion, and taking a concrete step toward forest management and sustainable resource use. This is by far the most promising participatory initiative involving 'self-mobilisation' that the project has witnessed.

Fortunately, this activity did not go unnoticed by other villages in the reserve. Soon after this initiative, representatives from ten villages expressed an interest in rehabilitating their rattan stocks, and some have become actively involved in the nursery activities described below. Because water-levels at the plantation sites did not recede this year, it has been impossible to re-survey the seedlings over the past year to verify the survival rate of these plants. We will have to wait another year to determine whether this activity is worth repeating. In the meantime, we have also initiated the development of a plot demonstration nursery.

Rattan Demonstration Nursery

While transplanting rattan from productive areas to enrich a degraded area is a laudable community initiative, realistically this level of planting will not keep pace with the current levels of exploitation in most villages. Hence, in April this year the project facilitated four communities to develop a first rattan nursery in DSWR. This included the construction of raised seed-bed and poly-bag platforms, and the planting of 10,000 duri tapah seeds.

While germination rates have been slow and somewhat disappointing (approximately 10% due to too much shade) in this pilot trial, after the seedlings reached a height of 6-8 cm, community members transplanted them into polythene bags to grow to appropriate sizes for transplanting *in situ* in their respective community wilayah kerja (or working areas) - probably during the low-water season next year.

Next year, we plan to build additional nurseries in three separate regions of the reserve (probably in villages involved in the basket making activities). Our objective is eventually to provide an annual supply of 1,000 rattan seedlings to each village. If annual village seedling production reaches these levels, and an appropriate harvest rotation management strategy (see next section) is adopted and conscientiously followed, it is feasible that the over-exploitation of rattan described by PETERS (1995a) could soon be a concern of the past.

Rattan Rotation Management Strategy

While high-density, natural populations of rattan exist in some parts of the reserve, these populations are actively harvested both by local-use and commercial collectors. Furthermore, as mentioned previously, some of the communities with dense rattan stands are experiencing increased incidents of illegal harvesting by harvesters who have depleted the rattan in their own wilayah kerja.

In addition to the rattan plantation and nursery seedling production activities described above, we have helped facilitate villagers to establish greater control over the rattan resources in their work areas by emphasizing the value of local customary laws (or hukum adat). While some villages have established new regulations and fines in an attempt to eliminate commercial harvesting, others have put up signs along the boundary of their rattan stands as another means to discourage illegal harvesters from entering their rattan stands.

Again, due to the unseasonably high water levels this year, one initiative we have had to postpone is based on a strategy suggested by PETERS (1995a). It involves using village work-area maps to develop a rotational rattan management programme. Using these maps, the community will be encouraged to demarcate rattan populations into ten individual Rattan Management Units (RMU) on the basis of age and quality of the stand.

These RMUs will provide a convenient basis to determine which rattan should be harvested each year as only one unit would be harvested in any one year. The remaining nine units would be left untouched to regenerate and grow. The RMU selected for harvest each year would rotate on a sequential basis so that every unit is allowed a nine year rest period between harvests. After working with a number of communities to develop their own RMU, we anticipate that appropriate local people, with some assistance from the project, could help to train other communities to develop and manage their own RMUs.

Tembesu Fagraea fragans Roxb. Silviculture Treatment

Tembesu produces the strongest and most durable timber of any tree species growing in the swamp forests of DSWR (PETERS, 1995b). Both Melayu and Iban rely on tembesu wood to build their homes, carve their tikung honey-boards, and construct the network of boardwalks that link the houses in their villages. In a report examining current harvesting dynamics, demand and growth rates of tembesu, PETERS (1995b) reported that, even though tembesu logging had decreased in recent years, the tree is exhibiting the classic signs of resource depletion. This is forcing people to go further afield to find suitable sawlogs to build and repair their homes and communities.

PETERS (1995b) recommends a simple silviculture strategy for nearby dense pole-sized stands of tembesu, which are generally neglected, but which, if managed properly, could supply a significant portion of local timber needs. The strategy involves three steps:

i) The first involves removing poorly formed, stunted or broken tembesu trees (i.e. Class III) that occupy growing space yet are of limited utilitarian value; and selectively thinning trees (i.e. Class II) in direct competition with the best trees to provide more space for the Class I (i.e. straight, single stem) trees.

ii) The second step involves a more careful selection of when trees are harvested. Tembesu pole logs (i.e. for small construction and stilts etc.) should only be cut from Class II trees, and Class I trees should be left to grow into full-sized, mature sawlogs.

iii) Lastly, by applying coloured paint to Class I and II trees, it should be easy to identify these separate classes and would make it easy to control and verify that the correct class of tree was felled and used for its intended purpose.

These silviculture activities have already been undertaken *in situ* in the village of Kenelang, and many other villages have expressed interest in managing their tembesu stands in a similar manner. With project assistance, the head fisherman from Kenelang has agreed to act in the capacity of a 'travelling-trainer-of-trainers' to share these techniques with other villagers in the reserve. Currently, again, the unseasonable water levels have forced us to postpone undertaking these activities this year.

Institutional Arrangements and Resource Regulation Activities

The third component of our community-based approach to conservation in DSWR involves developing new and facilitating the improved use of existing/indigenous systems to enhance conservation. In addition we are creating institutional linkages with government and non-government agencies typically unassociated with conservation and wildlife management (i.e. departments outside Forestry). By facilitating such work, we hope to make the best use of existing governmental and non-governmental resources both within and outside the reserve, and ensure that all agencies, individuals and departments undertaking activities in the reserve are aware of the necessary restrictions of working in a wildlife reserve to ensure the enhancement of conservation objectives.

Rapat Kelompok Ketua Nelayan (Head Fishermen's Group Meetings)

One of the core institutional activities of this work has involved separating the reserve into six Community Management Areas[9] or Kelompok (groups). Each of these groups is comprised of between four and 11 villages, and is represented by the Head Fisherman/Village Leader. They meet bi-annually to discuss and resolve resource and/or village issues of common concern.

While the frequency of holding these meetings remains problematic, they have slowly evolved from occasions where KSDA wardens typically provided information, to occasions where they are

[9] The theoretical basis of this Community Management Area strategy was first described in DESCHAMPS (1994). However, the strategy has evolved considerably since then.

now trying to keep the main agenda open, and seek the opinions and priorities of villagers to resolve natural resource and socio-economic issues at the village level[10]. Some of the issues discussed at the Kelompok Nelayan meetings to date are detailed in Table 3.

One of the major limiting factors facing the project in trying to conduct participatory community-based conservation has been the lack of KSDA staff trained in participatory community facilitation techniques[11].

Hukum Adat (Customary Law)

Customary rules and regulations (hukum adat) influencing resource use, and fines for breaching them, have existed in DSWR communities for centuries. It is the project's belief that, where hukum adat supports conservation objectives and are consistent with national legislation, they should be used as an integral component of a community-based conservation strategy. As such, one of our tasks has been to collect and document hukum adat which enhance the protection and sustainable utilization of resources, and to share these results among the villagers of DSWR.

Considering the limited staff and resources available to KSDA to enforce national regulations in the reserve, such local laws and sanctions provide the foundation for a participatory system of community self-regulation. It is the project's belief that this self-regulation is likely to achieve

Table 3 Resource and socio-economic issues from head fishermen's meetings, DSWR

Natural Resource Issues	Socio-Economic Issues
• Fishing regulations*	• Credit assistance*
• Forest fires*	• Handicraft development assistance*
• Fish poisoning*	• Provision of primary school teachers*
• Hunting	• Agriculture and livestock assistance
• Forest cutting	• Provision of health clinic staff*
• Timber company log rafts	
• Village work area boundaries*	
• Rattan planting*	* Denotes which activities/requests have been followed up.

From: HERI (1995a)

[10] However, one of the major disadvantages of these Groups is that they have never included women, even though women are involved in the use and management of more resources than are the men. Experience shows that men rarely impart information gained in or decisions made at the Groups to the women.

[11] No staff were trained in participatory management skills (including RRA and PRA) during the first four years of the project.

much broader community acceptance and enforceability, as it avoids importing new or outside systems of regulation which may have the same objective, but are perhaps locally inappropriate. Furthermore, outside systems rarely encourage the community to participate or take responsibility for the management of the resources they directly depend upon for their livelihoods.

For example, research on local hukum adat pertaining to natural resources in DSWR by HERI (1995b) shows 17 different resources regulated by customary law (Table 4)[12]. Fines for contravening regulations prohibiting, for example, fishing with poisons or an electrical charge range up to Rp500,000 (US$210). In other cases, fines include the confiscation of illegally captured/harvested resources and/or the equipment used. In other cases, reports are directly filed with local police or KSDA officials for prosecution under national legislation.

The project has been actively documenting these laws and sanctions and sharing them among all villages to promote and strengthen local laws, and encourage other villages to update and/or adopt regulations to make them appropriate to current needs and conditions in DSWR.

In addition, because the specifics of hukum adat may vary from one village to another, by sharing these documents among villagers, we hope to avoid some of the inter-village conflict that can arise from a lack of awareness and/or observance of the hukum adat regulating other villages' wilayah kerja.

Letter Supporting Local Enforcement of Hukum Adat (Surat Tugas)

For 18 months the project has been promoting discussions with individuals at various levels in PHPA and KSDA to issue a surat tugas. Such a letter would give selected head fishermen in DSWR the responsibility to enforce hukum adat regulations effecting natural resources. Not surprisingly, this suggestion has been met with both enthusiasm and caution on the part of PHPA and KSDA

Table 4 Various resources regulated by customary law, DSWR

Forest Resources Regulations	Fishing Equipment Regulations	Selected Fish Regulations
• Honey	• Fish nets (types/size)	• Jelawat (*Leptobarus hoeveni*)
• Rattan	• Fish traps (types/size)	• Betutuk (*Oxyeleotris marmorata*)
• Hunting	• Other fish equipment	• Siluk (*Scleropages formosus*)
• Forest fires	• Fishing with electricity	• Toman (*Ophicephalus micropeltes*)
• Logging	• Fishing with poisons	

From: HERI (1995b)

[12] Continuing research has now covered over 40 villages and has identified some 30 different natural resources which are subject to some form of traditional law.

officials. Currently, discussions continue and no surat tugas has yet been issued. While some officials recognize the benefit of providing some conservation 'enforcement authority' to the village level, others are concerned by the potential legal precedents it may set. For example, because people are legally not allowed to live in the Wildlife Reserve, there is concern that such a document could be viewed as legal authority to let people live in the reserve permanently. Furthermore, others fear that the appointment of a selected individual might imply he is a KSDA staff member. Neither of these possibilities is are acceptable, and hence the wording of the surat tugas needs to be very explicit to avoid potential misinterpretation.

Meanwhile, project staff at all levels continue to facilitate the dissemination and promotion of this idea as a means to broaden local participation and responsibility for the conservation and sustainable utilization of reserve resources. Whether the Indonesian system is flexible enough to agree to experiment with such a technique, remains to be seen.

Linkages with Non-Forestry Departments

Recognising that successful community-based conservation not only requires the active participation of agencies commonly associated with natural resource management, but in addition, close cooperation with agencies involved in socio-economic development and the private sector, the project has concentrated efforts on establishing linkages with a broad cross-section of agencies working various 'non-conservation-based' sectors.

Our objectives here are threefold:

i) To ensure government and non-government agencies are aware of the specific technical considerations and limitations associated with working in a wildlife reserve;

ii) To minimize potential conflicting inter-jurisdictional objectives by ensuring the coordinated use of government and non-government resources and expertise to implement mutually beneficial programmes in DSWR; and

iii) To link natural resource management and community socio-economic needs within the reserve to appropriate outside public and private agencies and resources.

Examples of recent community benefits gained from this approach in DSWR include:

- Expanded staffing of health clinics and schools in the reserve (Departments of Health and Education);
- Technical extension and training (Departments of Industry);
- Development of new savings and loans programmes (Department of Cooperatives);
- Discussions regarding reserve policy on natural resource management and development in DSWR (Departments of Forestry, Fisheries, Public Works, Environment, Regional Planning and Tourism); and

- The development of contacts with domestic and international NGOs and private companies to help facilitate the development, training, production, marketing and sales of new products from the reserve.

DISCUSSION - CHALLENGES AND LESSONS LEARNED

The above description of activities involving income generation, resource management and institutional linkages in the DSWR Conservation Project have taken place over the past year. We have tried to undertake all of these activities in a financially feasible, ecologically sustainable, culturally sensitive and participatory manner. This has required us to plan and implement our activities in a multi-disciplinary fashion by combining the skills and approaches of entrepreneurs, ecologists, ethnographers and community development specialists. Implementing such a multi-disciplinary strategy for community-based conservation has been, and continues to be, a great challenge. It has also provided us with many lessons. Some of these are highlighted below.

Selling vs. Marketing Products

Successfully establishing long-term and financially sustainable linkages with the marketplace is not measured by how many products you can make and sell. Rather, I believe, success is in knowing what the market is willing to purchase and meeting that demand. Local people may produce many different handicrafts and/or food items, but if they are not of interest to consumers, or if the market is already saturated with similar items, the chance of developing a long-term and sustainable market for the products is extremely limited.

In most cases, therefore, success will require a market analysis to ensure that potential clients are interested in what you have to sell. In other cases, success will require re-designing or creating new products from the materials and skills people have at hand that directly meet a market niche; and, in still other cases, both new materials and skills have to be brought in from outside, and communities need to be trained in order to produce a product that has market appeal. Obviously it is much easier to take the products that people already make and sell them directly to the market, but, given that market taste rarely remains static, and are diverse, this simplistic approach is rarely successful.

In essence, one must be of a 'creator and marketer' of products that consumers want to buy rather than a 'seller' of what people are able make and are used to making. To be successful, therefore, one has to be imaginative about what products have a market appeal, and create alliances with designers, marketers, wholesalers and business people, and use their knowledge and skills to access the appropriate market.

Resource Management and Time Management

The development of good resource management strategies requires accurate and long-term investigations into resource densities, growth yields, spatial distribution, and temporal availability.

Without these types of information, successfully developing and sustainably implementing new or improved resource management techniques with local people are almost impossible. Fortunately for the project, work of this type for rattan and tembesu has been started (PETERS, 1995a and 1995b).

Unfortunately, in the case of following-up on PETERS's (1995a and 1995b) initial work, we have been restricted by the influence of the unseasonable water-levels. In addition, I have found that villagers' interest in undertaking improved resource management comes about mainly when improvements have been made in their economic situation, or only when they recognise that it is in their best (mostly financial) interests to consider undertaking activities to ensure the long-term sustainability of the resources that provide their day-to-day needs.

For these and other reasons, the resource management enhancement portion of the project's work has not advanced as quickly as we would ideally have hoped at this stage of the project. The important lesson here is that this type of work needs to begin as early as possible in order to be successful. Clearly, seasonable delays are unavoidable, and it take time to develop community interest in, and confidence with, the project's conservation objectives. However, such delays can be anticipated to avoid being in the position where poor time management influences success in resource management.

Institutions, Regulations and Culture

The institutional and regulation activities that the project has been facilitating and promoting have good potential to advance local people's knowledge of, and participation in, the conservation and protection of the resources of DSWR. However, in order to achieve a long-lasting and self-sustaining impact on the day-to-day management and protection of the reserve's resources, this requires a greater investment in training and human resource development than has so far been the case with the project.

Part of this difficulty is the result of a lack of trained personnel who are sufficiently familiar with the theoretical and practical aspects of working with communities in a participatory manner. Most of the KSDA staff have been trained in 'traditional' aspects of conservation management, but unfortunately lack the knowledge, experience and confidence to work with people in creative and new ways that promote partnerships among government agencies and people for the benefit of nature conservation and community development[13].

[13] It may be relevant here that none of the four KSDA field staff in the Reserve comes from the local area. In fact, only one is from Kalimantan. The others are from North Sumatra (2) and West Java. The difference in background, especially in a country as culturally diverse as Indonesia, may have some bearing on their ability to relate easily to the local community.

Furthermore, given that Indonesian culture is generally based on hierarchical principles and a deference to those of higher status or authority, it is difficult to instill in staff new ideas and approaches which appear to challenge these principles, especially if their professional advancement depends on their superiors' approval of their field activities. Unfortunately, this cultural atmosphere rarely encourages people to try new, or suggest different, approaches. Rather, it tends to reinforce the status-quo prescription of standardized solutions to extremely complex natural resource conservation-community development issues[14].

There is potential merit in many of the project's community-based institutional arrangements and resource regulation activities to promote improved conservation in DSWR. If, however, for cultural and institutional reasons, these activities are not accepted and promoted by Indonesian staff as their own, they will never become part of an overall strategy to promote community-based conservation in DSWR[15]. It is our hope that by remaining aware of the cultural and institutional limitations to change, and continuing to focus efforts on staff who show the greatest potential, the majority of the community-based activities described here will continue long after the conclusion of the project.

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The statements and opinions contained in this paper are my own and do not necessarily represent the position of the DSWR Conservation Project, Wetlands International or the Overseas Development Administration of the United Kingdom.

[14] Unfortunately, despite the relatively long time span for this project, KSDA staff, including those above the field level, do not appear to have absorbed the participatory ethos sufficiently well for it to have become one of their standard approaches to resource management issues. In part this is due to the strong top-down character of Indonesian culture, but in part it stems from the lack of detailed involvement in the participatory management process.

[15] The fact that government agency staff attached to the project seem not to have a sense of ownership of the project may relate to their lack of understanding of its overall goals and objectives. Because they cannot see how their individual tasks fit into this broader picture the staff tend to see their roles as an endless assortment of tasks.

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CASE STUDY NO. 6

PILOT PROJECT: PARTICIPATORY MANAGEMENT OF SEGUWANTHIVE MANGROVE HABITAT IN PUTTLAM DISTRICT, SRI LANKA

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Key words wetland, mangrove, economics, participation, management plan, Sri Lanka, government, NGO

Exploitation of the Sri Lankan mangrove resources has been taking place for the last few decades but has become significantly higher in the last few years with the rapid expansion of prawn farming. Fishermen in lagoon areas did not protest against prawn farming when it began, but, with its unplanned and non-scientific approach, prawn farming has caused severe pollution in the lagoons, thus reducing the fish population.

The Forest Department began the national mangrove conservation project in 1992 with NORAD funding, and 23 of the largest and least disturbed habitats were selected for conservation management. The 560 ha Seguwanthive mangrove area was included in the project. The fishermen in the Seguwanthive area expressed their desire to assist the Forest Department in conservation management, as long as it did not reduce the benefits they derived from the habitat. They were as concerned as the scientists and foresters about the mangroves, and collected fuelwood, poles and bark for tanning only in a sustainable manner.

A pilot project was designed, on the participatory management basis, to conserve mangrove habitat at Seguwanthive, taking into consideration the dependence of the people on the habitat, particularly for lagoon fishing. A mangrove conservation society was formed as an initial step. Basic information was collected through a socio-economic survey and ecological studies, and a management plan was developed with the participation of fishermen and local authorities.

This participatory management plan, details of which are given in the paper, has been implemented by the Forest Department for the last two years with fullest cooperation of the fishermen, and has been highly successful. After a review of the 3-year pilot project at the end of 1995, a detailed 5-year plan will be developed.

INTRODUCTION

The term 'mangrove' is commonly used to identify the forest communities in intertidal areas of lagoons, estuaries, river mouths and other coastal water bodies that connect with the ocean throughout the year or during high tides. The mangrove ecosystem is a sensitive plant community and a highly productive ecosystem; its uses are multiple.

The Importance of Mangroves

The economic role of mangroves cannot be fully realized without taking into consideration its ecological aspects, or the ecosystem may be irreversibly damaged. Commercial and traditional uses of mangroves are diverse: the products obtained from mangroves include fish, timber, fuel-wood, thatching materials, fodder, foods, tannin and other minor products. A significant proportion of the total population around each mangrove habitat is totally dependent on its resources, such as fish, crabs and prawns, while many are engaged in the collection of fuel-wood, fishing and collecting food items as part-time employment to earn extra income.

Most of the people are aware of the direct benefits such as timber, fuel-wood etc. that mangroves provide, but they are not aware of the other, indirect benefits. The value of the indirect benefits of mangrove ecosystems are much higher than those of the direct benefits. The importance of mangroves in the reduction of coastal and river bank erosion, the reduction of floods, the prevention of salt intrusion, the reduction of pollution, the production of organic materials for the marine biota, the provision of spawning and nursery areas for much marine fauna and as a favourable habitat for many species of wildlife is well known. Mangroves are becoming an important resource in eco-tourism in many countries.

Mangroves in Sri Lanka

Sri Lanka is an island situated between 5°55'-9°51'N and 79°41'-81°51'E, between the Tropic of Cancer and the Equator. The total land area of the country is about 6.56 million ha and present forest cover is about 30% or 1.968 million ha, including mangrove habitats. Sri Lanka has a 1585 km long coastline. The coastal zone consists of a diversity of shore-line and near-shore habitats occurring as lagoons and estuaries, and small islets in the lagoons and mouths of rivers and streams. In most areas of Sri Lanka the coastal zone occurs only as a narrow belt as there is a low tidal range, which rarely exceeds 75 cm. The total extent of mangroves in Sri Lanka is estimated at 12,000 ha.

Sri Lanka today is plagued by a host of environmental problems, the majority of which are in some way triggered by the dire consequences of ill-conceived strategies for achieving rapid progress and development. One such malady is the wanton interference in, modification, reclamation, over-exploitation, pollution and destruction of mangrove ecosystems. Exploitation of the Sri Lankan mangrove resources has occurred for the past few decades but has grown significantly in the last few years with the rapid expansion of prawn farming. Although fishermen in lagoon areas did not object to prawn farming when it began, the unplanned and non-scientific approach to prawn farming has caused severe pollution in the lagoons, thus reducing the fish population. With this scenario the fishermen started to protest. Although mangroves do not play a major role in the national economy of Sri Lanka, their importance as natural ecosystems is enormous. The size of the mangrove

habitat varies from a fraction of a hectare to several hundred hectares, and their fragmented nature and small size add to the difficulty of their management, however there are several large mangrove habitats that could be managed scientifically for conservation and sustainable use.

The National Mangrove Conservation Project

A National Mangrove Committee was set up in 1990, and appointed the Forestry Department (FD) as a suitable agency to manage and administer the mangrove habitats in Sri Lanka. A National Mangrove Conservation Project was started in 1992 by the FD, with financial assistance from NORAD. Under this project, 28 larger habitats have so far been selected for conservation management. Seguwanthive, in Puttlam district, is one such habitat. To carry out a management plan, there must be sufficient data and information available, and conservation must become a national concern. Data are being collected on distribution of mangrove habitats, species' composition, traditional and potential utilization, and the socio-economic structure of the people dependent upon the mangroves. There is very limited understanding of the values and functions of mangroves in Sri Lanka: they are often regarded as degraded and worthless areas which need to be utilized for other, more-productive uses such as prawn farming or reclamation. In this context, the following strategies have been adopted for the conservation management of mangrove habitats:

i) Protection of biodiversity in the mangrove habitats;

ii) Protection of environmentally sensitive areas;

iii) Protection of mangrove habitats from projects or practices that have a detrimental effect on the mangrove ecosystem;

iv) Protection of the interests of both the people and fauna that depend on the mangrove habitats for their sustenance; and

v) Management of mangroves on a sustainable-use basis.

Recognizing the importance of the mangrove ecosystem, distinct policies and measures were formulated in an action plan:

i) Establishment of a suitable protected area network to protect the total biodiversity of the mangrove ecosystem;

ii) Formulation of appropriate government policies;

iii) Research and studies to develop an adequate information base;

iv) Rehabilitation of degraded habitats;

v) Changes in detrimental aquaculture practices;

vi) Control over illegal logging and encroachment;

vii) Cooperation and coordination among government and non-government agencies;

viii) Public awareness and training and

ix) Sustainable uses whenever possible and applicable.

Seguwanthive Mangrove Habitat

Seguwanthive mangrove habitat is located 130 km north of Colombo in Puttlam district; it extends to about 500 ha. The total extent of mangrove in Puttlam district was estimated by the Coast Conservation Department as 3650 ha in 1983, but according to FD estimates was only about 2000 ha in 1994. This illustrates the fate of mangroves at present: within a few years more than 1500 ha of mangroves have been cleared, mainly for prawn farming. With the frequent floods in Puttlam district in the past two years, authorities and communities have understood the importance of mangrove habitats. A considerable amount of land in Seguwanthive was inundated in the NE monsoon, but other climatic and edaphic factors limit the development of mangroves. Mangroves are limited to 2-10 m belt on either side of streams and form discrete communities. The species diversity of this habitat is high: *Rhizophora mucronata* dominates the vegetation with *Lumnitzera racemosa, Ceriops tagal, Excoecaria agallocha, Heritiera littoralis, Avicennia marina* and *Aegiceras corniculatum* occurring frequently. In the high tide areas, which are inundated for longer periods in the rainy season, *Avicennia officinalis* forms almost pure stands. However, higher saline edaphic conditions and dry winds in some parts of the habitat create unfavourable conditions for the growth of mangroves, and salt-tolerant plants, e.g. *Suaeda* spp., are prominent in landward sites.

The social structure and population profile of the villages adjoining Seguwanthive are very heterogeneous and dependency on the mangroves is comparatively high. This information is given in Table 1.

CONSERVATION OF SEGUWANTHIVE MANGROVE HABITAT

Fishermen in the Seguwanthive area were happy about the mangrove conservation project and expressed their desire to assist the FD in conservation management, if this did not reduce the benefits they obtained from the habitat. It was also found that they were as concerned about the mangroves as the scientists/foresters and collect fuel-wood, poles and bark for tanning only in a sustainable manner. Due to the high interest and response from villagers and their high dependency on mangroves, it was decided to manage this habitat using a participatory approach.

Several reconnaissance field programmes were carried out before embarking on the management plan process. Informal discussions were held with the villagers around the lagoon. Seguwanthive

Table 1 Social structure and population profile in the villages adjoining Seguwanthive mangroves

1a. *Population*

-	Number of families in the village	=	96
-	Total population	=	384
	Number of families sampled	=	22

1b. *Age groups*

Age Group (years)	Householder %	Wife %	Other members %
Under 10	-	-	42.0
11-20	-	-	42.0
21-30	26.0	31.0	16.0
31-40	51.0	50.0	-
41-50	13.0	13.0	-
Over 50	10.0	7.0	-

1c. *Occupation*

Percentage of families primarily dependent on mangroves = 92%

Type of occupation	Percentage	Average monthly income (US$)
1. Lagoon & estuary fishing	64.0	125.0
2. Selling mangrove fuel-wood/poles	12.0	80.0
3. Collecting	6.0	80.0
4. Drying fish	11.0	40.0
5. Fishing-related trades	7.0	25.0

1d. *Secondary Occupation (Part-Time Occupation)*

Type	Percentage	Average monthly income (US$)
1. Selling coconut products	25.0	10.0
2. Labour	68.0	20.0
3. Others	7.0	8.0

1e. *Significance of Mangroves to the Community*

Uses	**Percentage of dependency on mangrove**			
	A	B	C	D
1. Protein source	67.0	23.0	10.0	-
2. Fuel-wood source	17.0	27.0	54.0	12.0
3. Wood for fishing activities	44.0	36.0	15.0	5.0
4. Alternative lands	85.0	13.0	2.0	-
5. Recreation	56.0	18.0	4.0	22.0

A = Only source C = Secondary source
B = Major source D = Supplementary source

village was selected on the basis of dependency, multiple usage and interest of the villagers in conservation. A Mangrove Conservation Society (MCS) was formed as an initial step to ensure the people's participation from the beginning. Members of the MCS were involved in each activity: data collection, identification of objectives, development of management strategies, planning and implementation. A systematic random sampling system was adopted to evaluate the biological aspects. Participatory Rapid Appraisal (PRA) was adopted to collect ethno-botanical information. Socio-economic information was collected through a detailed socio-economic survey. There is very limited understanding of the values and functions of mangroves among the other government agencies and neighbouring communities: they are often regarded as degraded and worthless areas which need to be utilized for other, more productive uses. This perception may be common to other areas of the country. At the initial discussion, members of the MCS pointed this out and it was decided to undertake valuations to point out the importance of the habitat to other agencies and communities. The habitat's characteristics and benefits were the main types of information used in this valuation. The characteristics considered were extent, species' composition, vegetative structure, natural processes, etc. The benefits considered were biodiversity conservation, habitat for fauna, biological production. The benefits comprise attributes, functions, and uses. Attributes used in the valuation system were floral diversity, faunal diversity, scenic/landscape beauty, scientific value and uniqueness. Habitat functions used in the valuation system were water quantity and quality regulation, and habitat for fish and wildlife. Uses of the habitats considered in valuation were plant, animal and mineral production, water storage or supply, tourism/recreation and water disposal characteristics.

The following valuation system and scale were used to quantify the importance of the habitat.

1. High - highly significant at the national level.
2. Medium - important at regional level and provides benefits at the local level.

3. Low - low importance as a conservation area.

4. Insignificant - insignificant importance as a conservation area.

Based on the above, a valuation table was developed (Table 2).

Table 2 Value of Seguwanthive Mangrove Habitat

2a. *Attributes (non-use values)*

	1	2	3	4
Mangrove species diversity	*			
Occurrence of rare species	*			
Occurrence of unique species				*
Scenic/landscape value		*		

2b. *Functional (indirect-use values)*

	1	2	3	4
Water quantity regulation	*			
Water quality regulation		*		
Habitat for fish	*			
Habitat for wildlife	*			

2c. *Uses (direct-use values)*

	1	2	3	4
Mangrove plant production			*	
Fish production (except prawn)	*			
Prawn production	*			
Coconut fibre/cadjan industry			*	
Fuel-wood/timber source			*	
Mineral production				*
Water supply			*	
Tourism/recreation				*
Research/education			*	
Waste disposal				*

Three groups consisting of villagers and FD officers were established to study the conservation of mangrove habitats, lagoon fishery and home garden development in the buffer-zone villages. A draft plan was developed with the participation of village groups and local authorities, and presented to the three village groups for their comments. After the necessary amendments, the final draft of the management plan was presented to the general membership of the MCS and government and non-government agencies, and the role to be played by each agency and group was explained. Most of the villagers participated actively in this discussion by raising questions and making suggestions.

The participatory management plan was designed taking into consideration the important attributes, functions and uses of the mangroves. Zonation was considered to be a main strategy for management, and habitat was divided into five zones: protection zone, multiple-use zone, rehabilitation zone, reforestation zone and buffer zone. General and specific interventions were developed for each zone, with participatory management as the key strategy in the multiple-use and reforestation zones. Fishermen were allowed to reforest 1-2 ha land with mangrove species, mainly *Avicennia*, and the necessary incentives were given by the FD. In the multiple-use zone, over-exploitation of fuel-wood and poles was controlled through mutual understanding, and exploitation was allowed in a more sustainable manner. Specific interventions in the rehabilitation zone were gap planting and enrichment planting with people's participation. The cost of reforestation and replanting was repaid to the conservation society by the FD. Exact boundaries of buffer zones were not defined but were limited to the area between the outer boundary the habitat and the adjoining villages. Several interventions were selected for the buffer zone including the introduction and development of bee-keeping, home garden development, supply of free fuel-saving stoves and establishment of community blocks.

The participatory management plan has been implemented by the FD for the last two years with fullest cooperation of the fishermen, and has been highly successful. After the review of the 3-year pilot project at the end of 1995, a detailed 5-year plan will be developed.

CONCLUSION

Today, conservation of mangrove habitats is becoming very difficult due to development projects that have detrimental effects on the mangroves. The most important aspect of the mangrove habitat that needs to be understood by the authorities and the public is that, 'They do not only provide essential products, but also render valuable services such as the protection of the coastal zone from sea erosion and strong winds'. The public is becoming increasingly aware that mangroves,

which were once an important source of many resources such as fish, are rapidly being destroyed, particularly in the Puttlam district, due to unscientific prawn farming. The coastal inhabitants have had to face many problems including floods, the depletion of fish stocks in lagoons, coastal erosion, and lagoon and marine pollution due to the destruction of mangroves. The present trends in mangrove management and the development of relevant policies, and increased public awareness regarding the importance of this ecosystem, present overall a positive picture of the future of mangroves in Sri Lanka.

CASE STUDY NO. 7

TURNING A THREAT INTO AN ASSET: AN INCOME GENERATING SCHEME FOR COMMUNITY DEVELOPMENT AND EXOTIC SPECIES CONTROL IN WASUR NATIONAL PARK, IRIAN JAYA, INDONESIA

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Key words exotic species control, indigenous people, income generation, land tenure, legislation

In Wasur National Park, southeast Irian Jaya, Indonesia, the Rusa Deer *Cervus timorensis* is a recent and potentially destructive new arrival in the park's floodplains savannas. Wasur contains the largest expanses of savanna grasslands and woodlands in Indonesia and is nominated to become Indonesia's fourth Ramsar wetland. The park is located in the monsoon climate belt of southern New Guinea and supports large populations of migratory and resident waterfowl and waders. The environmental conditions also favour a large population of the deer, which are considered to contribute towards large-scale habitat change in the park, mainly in favour of woody scrub, which is developing at the expense of the grasslands so important to the waterfowl and waders.

Indigenous people living within the park's boundaries have learnt to hunt the deer as a valuable and easily available source of protein. Deer are also the favoured quarry of illegal hunters from Merauke, who obtain a good price for the meat in local markets. In the recent past the park's indigenous people could not compete with hunters from the town, who have access to motorised transport and firearms. World Wide Fund for Nature Indonesia Programme (WWF/IP), in conjunction with Direktorat Jenderal Perlindungan Hutan dan Pelestarian Alam (PHPA), is experimenting with ways of increasing the income of the indigenous people by encouraging the marketing of dried and fresh deer meat through local cooperatives and a system of licensed deer-meat buyers. From a conservation perspective this scheme will contribute towards keeping the deer population at a level which minimises its negative impact on the park's native flora and fauna. From a human and community development perspective, the involvement of the park's communities in a management activity which also brings them economic benefits provides a direct incentive for them to become involved in the protection of the park and its resources. The success of this scheme relies on the assurance that the communities' traditional rights to the land and its resources are acknowledged. Complex and contradictory legislation currently complicates efforts to secure effective conservation and community development. PHPA needs to provide conducive legislation and security of land tenure for stakeholders, as well as institutional reorientation that facilitates the full participation of communities in the management of the park. There are promising signs in Wasur that this will be the case.

THE RUSA DEER AND ITS IMPACT ON THE VEGETATION OF WASUR NATIONAL PARK (ADAPTED FROM STRONACH, 1995)

Wasur National Park is situated in the extreme southeast of Irian Jaya, in the monsoon climate belt of southern New Guinea. It is located between the town of Merauke (only a few kilometres to the

west of its western boundary) and the international border with Papua New Guinea. Its flora and fauna are similar to those of northern Australia while also having representatives of the endemic New Guinea biota. This is the only part of Indonesia in which this is the case. The role of Wasur National Park is to protect a representative sample of this interesting biome. Of particular interest within Wasur National Park are extensive seasonally inundated grasslands and freshwater swamps that support large populations of waterfowl, waders and other specialised wetland wildlife. On the basis of this significant wetland interest, Wasur National Park was nominated at the Asia Regional Ramsar meeting in April 1995 to become Indonesia's fourth Ramsar site.

Wasur National Park is also notable for the fact that it is the traditional homeland of four tribal groups: the Marind, Yei, Marori and Kanum people live in 12 villages within the park's boundaries. These people have been officially recognised by the park's managing authority, PHPA, as assets to the park and in mid-1991 the government agreed that park residents should remain in the park and be integrated into its planning and management. The indigenous people have maintained a traditional hunter-gatherer lifestyle and their cultural beliefs and practices remain strong. This paper is concerned with the three villages of Rawa Biru, Tomerau and Kondo, which are inhabited mainly by Kanum people. Their traditional lands are in the southeast corner of the park, bordering the main areas of swamp and savanna grasslands which are the park's main wetlands.

The Rusa Deer *Cervus timorensis* is not indigenous to Irian Jaya, its natural range encompassing much of the Indonesian archipelago to the west. It was introduced to Irian Jaya by the Dutch at Merauke in 1928, from where it has spread to most of the southern coastal lowlands of Irian Jaya and neighbouring Papua New Guinea. Within Irian Jaya, further introductions to Manokwari and Jayapura have given Rusa Deer access to most of the potentially suitable habitat in the province.

The deer were well suited to their new environment in Wasur. Not only was there an abundance of palatable grasses, but the swamp grasses were not heavily grazed by wallabies, the only large terrestrial grazing mammals indigenous to the park. The deer can graze out into swamps even in moderate depths of water, giving them access to the abundant swamp grasses. Conversely, wallaby populations are constrained by the availability of dry land when water levels are high. With the availability of so much food, the deer bred successfully; there were few natural predators capable of killing them and those few predators were unable to control deer numbers. Initially, the indigenous human inhabitants were not familiar with the deer and did not consider them to be an important food source. Under those circumstances the deer population grew rapidly and is still expanding its range.

The problems which arise from the introduction of alien animals to new environments is well documented. Australasia, of which Irian Jaya is biogeographically a part, has a long and disastrous history of such introductions. It is now acknowledged that introduced herbivores have adversely affected the ecology of large parts of Australia. Introductions of several species of deer to New Zealand have also had regrettable ecological consequences. Within an ecological and biodiversity conservation context, the introduction of Rusa Deer to Irian Jaya must be viewed similarly.

According to the indigenous communities of Wasur National Park, the vegetation of the park has changed greatly since the deer were introduced. Three major habitat changes have been reported by the local people in Wasur, all of which appear to have taken place since the arrival of the deer. The main change has been a reduction in the tall swamp grasses, especially *Hymenachne*, which were once a major feature of the area. These formed a mat which floated on the water, reducing the extent of seasonal drying of the swamps and providing essential habitat for many wetland species. However, most species of swamp grass were not resistant to heavy grazing such as the deer were able to exert. Consequently, the vegetation has greatly altered. The swamps are now considerably more seasonal in nature than formerly, reducing the habitat of crocodiles and nesting waterfowl. According to the local people, breeding of such species as the Australian Pelican *Pelecanus conspicillatus* has ceased, and of the Magpie Goose *Anseranas semipalmata* has declined in the park.

A second major change concerns the reduced extent of formerly abundant stands of *Phragmites*. This species is vulnerable to overgrazing by deer, which are thought to be responsible for the reduced extent and vigour of the stands. The reed beds are also an important refuge for the deer and other animals. At the height of the commercial hunting phase in Wasur, the reed beds were regularly burnt by the hunters to ease motorcycle access and prevent the deer from taking refuge. The resulting green flush of new growth following burning quickly attracted the deer and also wallabies, and this is likely to have further accelerated the reed's decline. The presence of dense stands of *Phragmites* over much of the area would have slowed down the flow of water in the wet season considerably. The area would most probably have remained flooded for much longer, and the reduced cover of *Phragmites* today may explain why the swamps are neither as permanent nor as extensive as they once were. The truth is that almost nothing is known in detail about the effects that the deer have had on the flora and fauna, though we know that these effects must be substantial.

Some of the changes outlined above, concerning the direct effects of deer on the vegetation, could be considered short-term and might be reversed if the deer population were to be reduced sufficiently (total removal of deer is not feasible, even if it were required). A third, more fundamental vegetation change in Wasur, which is likely to be due at least in part to the effects of grazing by deer, concerns the spread of trees (mostly species of *Melaleuca*) onto the open grasslands. The indigenous inhabitants of the area report that considerable areas of former grassland are now covered by *Melaleuca* forest or woodland. This process is continuing, as witnessed by the large area of *Melaleuca* forest which has grown up within the past two or three decades. It is likely that the vegetation changes caused by the deer have provided *Melaleuca* with ideal conditions for regeneration.

This is an extremely complex series of processes, and one which we are not close to understanding in all its aspects. It may even be part of a slow, natural process that began many thousands of years ago. It is clear that these changes have accelerated since the introduction of the deer and key habitats are now threatened as a result.

An Historical Perspective on Deer Hunting in Wasur National Park

Following the initial novelty of deer in their environment, the indigenous people were able to adapt hunting techniques to enable them to take advantage of the new prey. The deer were docile and easy to hunt, in comparison to the dangerous and unpredictable wild pig, and a hunter was rewarded with more meat per catch than from the other main traditional quarry of wallaby. However, the traditions of eating pig and wallaby meat were hard to break and these were still the most sought-after animals. It has only been in recent years that deer meat has become an addition to local diet. The human population density in the area of the floodplains savannas that are the subject of this paper has never been high. There are only three villages in the vicinity, Rawa Biru, Tomerau and Kondo (the last formerly located at Kulkari) and, as of 1992, the population totalled only 104 families (RUMAWAK, 1992) (see Figure 1). It is unlikely that the traditional hunting techniques employed (bow and arrow plus hunting dogs) by such a few families would have had much of a controlling effect on the deer population, especially since the deer at this time were hunted mainly for local consumption and not for sale. Given the lack of major checking factors on the deer population, numbers probably reached a maximum in the late 1970s or early 1980s before the advent of large-scale commercial hunting in Wasur National Park. Numerous estimates have been given for the deer population. A UNDP study undertaken in Merauke in 1988 by J. Frazer-Stewart estimated a potential deer population for the 1150 km² of floodplains (swamp) grassland and savanna grassland, which are the subject of this paper, at 70,800 animals (FRAZER-STEWART, 1988). Frazer-Stewart concedes that these estimates are speculative, since they are based on extrapolations from adjacent grasslands in PNG. However they illustrate the general picture of a large population of exotic deer, which not only had the potential for creating serious environmental damage but also enormous potential for economic exploitation and regrettable social consequences for the local indigenous inhabitants of the park.

During the late 1970's and early 1980's Merauke was undergoing considerable economic development, mainly due to the large flow of funds into the region supporting large-scale transmigration projects to the north of the town. At this time, motorcycles first became commonly available and the proximity of a large supply of deer meat in the park to feed the ever increasing town was realised. Town-based opportunists started to exploit the deer population vigorously and commercial-scale hunting quickly developed. Frazer-Stewart estimates from surveys made in 1988 that the town consumed over 300 tonnes of venison each year (i.e. 8.5 kg per head of population, or six times the current local beef production). This figure also represents some 80% of the meat protein for the town coming from poached deer, mainly from within the park (FRAZER-STEWART, 1988). Economically this represented a local value of around Rp412 million (US$187,272 at 1995 exchange rates). It should be pointed out that most of the deer harvest was taken by only a small number of commercial hunters. The indigenous communities within the park, who perceive the land and the resources to be theirs, derived very little benefit in economic terms from these activities.

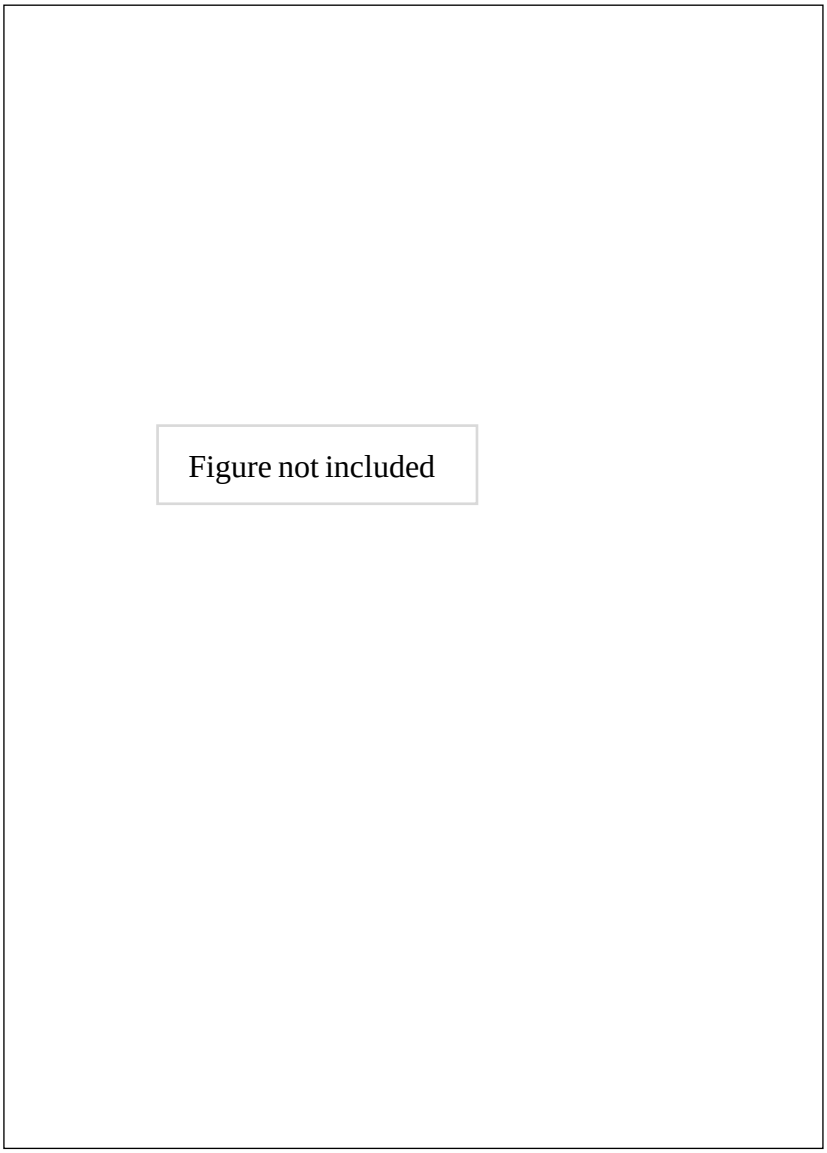

Figure 1 Location and habitat map of Wasur National Park

Environmental Impacts of Commercial Deer Hunting

In the light of the argument that large numbers of deer are a destructive element on the ecology of Wasur National Park, it might be considered that large-scale commercial exploitation of the resource would have its benefits. However there a number of ecological and social consequences that outweigh the benefits of this particular deer population control mechanism. During the dry season, Wasur National Park is the most easily accessible protected area within Indonesia. The flat terrain and open aspect make it easy for motorcycles and jeeps to travel throughout the park, especially in the southeast area of grasslands and wetlands that are the favoured habitat of the deer. During the months of July through December, a vast network of bush tracks were created each year by hunters searching for deer. The use of firearms was common and few areas of the park were free from the sound of gunfire, jeeps and motorcycles, or from spotlights and other negative impacts. Such activity inevitably created much disturbance and other wildlife, especially the native Agile Wallaby *Macropus agilis*, became increasingly scarce in some areas of the park. With such an onslaught of hunting, some of the areas closest to town quickly became depleted of deer and, rather than return home empty handed, hunters would hunt the native wallaby. In addition to these disturbances, damage to fragile swamps by motorbikes and jeeps in the early dry season and constant, uncontrolled burning by hunters to encourage new grass growth were other undesirable side effects.

Sociological Impacts of Commercial Deer Hunting

As mentioned above, the local indigenous inhabitants of Wasur National Park derived little economic benefit from the commercial exploitation of the deer resource. At best the local people could be employed as guides and general helpers for the hunting groups, rarely deriving more than a few thousand rupiah and gifts of coffee or sugar for a night's work. The villagers were unable to take advantage of the opportunities afforded by commercial hunting and were out-competed by the professional hunters for many reasons. In the three villages pertinent to this discussion only one villager had access to motorised transport. Others had to rely on horses or bicycles as their only means of transport and were unable to transport fresh meat to town. They also did not have access to contacts in town for selling the meat on the black market and were easily intimidated by security forces, who backed the commercial operators by providing firearms. This limited opening into the market and lack of business skills meant that the park's indigenous people were marginalised from resources that they perceived to be theirs, and felt powerless to intervene. An ever widening gap between contemporary Merauke society and the conditions in the indigenous communities caused despondency in the people, who felt that they had no recourse to a legal system firmly on the side of the town-based hunters.

More tangible sociological impacts included increasing difficulty in obtaining fresh meat by traditional hunting means, since deer stocks closest to the villages were the first to be depleted.

Villagers were having to travel further to catch deer and wallaby and the animals were shy and wary following aggressive disturbance by the motorised hunters. Increased and uncontrolled burning frequently led to fires in villagers' sweet potato gardens and sago areas. A more subtle and iniquitous impact was that on the villagers' whole social system of land ownership and beliefs in the custodianship of resources. The introduction of modern economy and development, via the aggressive commerciality of the deer hunters, was harsh. Traditionally the indigenous people's way of life is a complex amalgam of physical and spiritual bonds to the land. Land means security and social standing and life revolves around the careful use of natural resources, in a way which ensures that these are never depleted to an extent such that generations to come cannot live as their ancestors did. Younger members of the communities were tempted by offers of money and gifts if they acted as guides to the best hunting areas. The aggressive hunting techniques employed, which included killing pregnant female deer and taking only the best meat from carcasses, leaving the remains to rot, meant that traditional values could quickly be eroded.

THE PHPA/WWF WASUR MANAGEMENT PROJECT

The local office of the Conservation of Natural Resources Department (KSDA), which is responsible for the management of the park, had very few staff or funds to have much of an impact in terms of enforcement within the park. This, combined with numerous other problems, led PHPA to prioritise Wasur, which was considered to be the most threatened protected area in the province, and WWF was asked to help design a management strategy for the park. The project started in March 1991 and for the first two years looked mainly at the social aspects of park management to design strategies for involving the park's 12 communities in park planning and implementation. The main focus was on developing culturally compatible economic incentives for the indigenous people based, at least in part, on the sustainable use of the park's resources, particularly the deer.

In 1991 the project employed Dr A. Franzmann, a member of the IUCN deer specialist group, as a consultant to conduct surveys within the park to determine the current deer population, devise a system for managing the deer as a resource and design appropriate monitoring techniques. The initial survey, using ground counting sites and aerial surveys over the park's grasslands, demonstrated that the deer population had sustained a severe crash from its previous population of many tens of thousands to an estimated 7500 animals in 1991. Field observations of nightly poaching and surveys conducted with the villagers also showed that current levels of hunting in terms of catch per year were estimated to be around 5000 animals, (greater than the annual recruitment of young into the herd). The consultancy report outlined several possible strategies for managing the deer herd (FRANZMANN, 1991). In the light of concerns that the communities living within the park should share in the revenue generated by any deer management strategy, it was decided to adopt a system of community-based traditional hunting coupled with a system of transportation of meat to the town. A monitoring system was proposed that would enable checks

on the level of offtake in terms of the traditional hunting and annual monitoring using ground survey counts and a series of aerial surveys to provide population estimates. Each year a hunting quota would be set, based on the fluctuations in the deer population. By this means it was intended that the population would remain stable. An inherent weakness in this system was the decision concerning what size of deer herd would be acceptable, given its unwelcome status as an exotic and its intrinsic value as a source of revenue for the local people. A research programme aimed at determining, more quantitatively, the effects of the deer on the native vegetation and wildlife was proposed to address these questions. This research programme is currently ongoing.

International Cooperation with Papua New Guinea

Contiguous with Wasur National Park on the Papua New Guinea side of the border is Tonda Wildlife Management Area (WMA). The WMA contains more than 5000 km² of similar habitats to Wasur and the deer are present throughout the area. In Tonda the environmental problems that have developed as a result of the deer are, if anything, more acute than those in Wasur. Ironically this is because there is very little hunting of deer here and there has been no history of large-scale poaching. In the 1980-81 dry season Fraser-Stewart estimated the population of the deer in the 441 km² of swamp grassland and savanna grasslands immediately adjacent to the boundary with Wasur at 19,517 animals, with a minimal hunting pressure of around 200 animals per year (FRAZER-STEWART, 1988). The deer do not respect international boundaries, and given the high population densities in Tonda and available habitat in Wasur with very much lower population densities, it is likely that there is a constant migration of the deer from Tonda to Wasur. There has been no research to substantiate this theory and Tonda currently lacks the resources for a large-scale management programme to implement control measures. Obviously, for control measures in Wasur to have any lasting effect there needs to be a similar initiative in Tonda. WWF is currently discussing with the Indonesian and PNG Governments the concept of a Wasur-Tonda Transfrontier Conservation Area, which will look at cooperative management of the whole area and propose a conservation project in Tonda to strengthen management. Deer management would be a priority joint management activity.

The Deer Marketing Scheme as an Income Generating Scheme for Local People

No strategy for management of the deer herd could be implemented successfully whilst there was still large-scale, unmonitored hunting. Of primary immediate concern was the control of illegal poaching of the deer and the attendant environmental problems outlined above. With police and army assistance and widespread media coverage, KSDA virtually halted motorised hunting by 1992. This stage was seen as crucial for developing a sense of trust and commitment with the local communities. Community participation in the scheme was hoped for but hard to achieve without first providing concrete evidence of WWF and KSDA commitment to solving fundamental problems affecting the communities and that the National Park would really benefit the residents. Given the

success of the early enforcement efforts, and that the communities were allowed to continue hunting, a sense of stakeholder interest on the part of the villagers was quickly established. The direct link between an increased economic return for themselves and an active involvement in enforcement work by reporting infringements was perceived by the communities. One night's disturbance by gun fire and motorbikes would be likely to reduce their own catch significantly.

Given this support from the communities for the control of illegal hunting, the project worked with the people of Rawa Biru, Tomerau and Kondo to develop a marketing system for the deer meat. In view of the current legislative framework concerning national park management within Indonesia, (see below) it was necessary to obtain the approval of PHPA for trials of traditional hunting in Wasur National Park. This was given in writing at a large planning seminar held in Merauke in 1992 (WWF, 1992).

The main factor limiting the communities in direct marketing of the deer meat is the lack of means to transport the meat quickly to town. Although communities were able to hunt using traditional means, they could only sell the meat in villages and not in town. This was why the first trial system was not successful: it required the villagers to report their catch at one of the guard posts in order to receive a permit to take into town to use when selling the meat. The permit stated that the person was from one of the park villages and the meat was obtained by traditional hunting. Although the amount of revenue for some of the villagers increased considerably, this system did not benefit many people. For the people from Rawa Biru, with relatively easy access to town via the Trans-Irian highway, it was possible to transport the meat fairly quickly. However the people from Kondo and Tomerau hunted the deer at a distance of anything up to 15 km from the villages, and then had to travel 60 - 70 km into town. Unless the hunter happened to get a lift, it simply was not possible to transport the meat to town quickly enough. It was obviously necessary to determine a second stage for the marketing system, involving a 'middle-man' to transport the meat from the village to town. The project decided to involve the hunters who had been put out of business following the clamp-down on poaching as the next link in the marketing chain. These people had the transport, knowledge of the park and the marketing connections in Merauke. The rationale behind this was that if the poachers could still derive financial benefit from the deer, in controlled way, they would more likely support the conservation efforts and not continue to poach. The ex-hunters acting as the middle-men would receive a permit from KSDA to buy the meat from the villagers and transport it. Explicit in the permit was the fact that motorbikes could enter park only as far as the villages, in order to avoid disturbance. The traditional hunters would transport the meat from the hunting areas to the village by horse or bicycle. A monitoring system for the number of carcasses taken out of the park was established at the two guard posts of Wasur and Ndalir, at the park boundaries. The middle-men transporting meat out of the park would report the number of deer carcasses they were carrying to KSDA guards, who recorded the information. If they abused the system, their permits would be revoked.

DISCUSSION OF RESULTS AND PROBLEMS

This system very quickly had a major impact on the amount of revenue going into the communities, with over Rp7,500,000 being generated in the first three months of activities in Tomerau and Kondo. Initially the price of meat per kilo was not fixed so that it could follow market fluctuations. However, lacking the business acumen of the ex-hunters, the villagers were frequently exploited and it was felt necessary to set the price at Rp1,500 per kilo (US$0.75), following an investigation of the current market prices. The average lean meat yield per carcass is around 22.5 kg, which means that for just one deer kill, a villager could derive around Rp33,750 (US$15.34). Problems occurred with middle-men wanting only to give a price per carcass, roughly depending on its size, and very often the villagers were swindled into receiving as little as Rp10,000 per carcass, since they had little experience of estimating weight. To help solve this problem, the project provided weighing scales for the villages and trained the villagers to use them.

Initially, the number of permits given to the middle-men was small: only two each per village. However the number of ex-hunters wanting to join the scheme was high and KSDA started to issue more permits once the scheme was running fairly smoothly. Problems started to occur when middle-men found they had to wait in a village for meat as the villagers could not keep up with the demand. Rather than go back to town empty handed, the middle-men themselves resorted to hunting, taking the motorbikes into the park to poach. After the initial concerted effort, enforcement was sometimes not efficient and, whilst illegal hunting was better controlled than before, infringements still occurred. A further difficulty often arose when the middle-men went to meet villagers at their campgrounds to collect the meat. The villagers themselves welcomed this, since it meant that they could stay for several days in one place without having to transport the meat directly to the village. Thus they did not report this infringement, although they still reported poaching.

The areas with the most abundant deer and best wetland habitat in the park are in the northeast part of the grasslands, close to the border with Papua New Guinea. This area is the furthest from any village and to control the deer population here required further thought since the villagers could not hunt here and transport fresh meat back to the village satisfactorily. The project proposed marketing dried deer meat (dendeng). This also fetched a good price in town although the middle-men involved in marketing fresh meat were not interested in transporting it since it is bulkier than the fresh product and a jeep is necessary to carry the volume required to make it financially worthwhile. At this time the project was helping to establish a locally based NGO which could carry on community development work within the park after the conclusion of the WWF project. This NGO helped with the marketing of both dried deer- and pig meat, transporting the meat by sea in a small boat. The use of a boat also helped solve the problem of seasonality of the marketing scheme, since motor bikes could only access the park in the dry season, whilst sea access was possible all year round. With WWF's help, the NGO also developed small community-run shops

in the villages of Tomerau and Kondo, which sold basic commodities at reasonable prices. The villagers could sell the dried meat at the shops and then buy their basic needs with the proceeds, which further refined the scheme from a community development perspective.

The major weakness of the whole venture has been in documentation and monitoring. Frequently, guard posts were unmanned for several days at a time due to staff shortages, and the guards forgot or would not bother to record the number of deer carcasses. The meat is boned in the villages and bought per kilo, so that the guards could not actually count carcasses. Although this problem could have been solved by simply reweighing the meat and dividing this figure by the average lean meat weight per carcass to obtain an average, inefficiency at the posts meant that the numbers of deer being killed was not recorded accurately. The unmanned posts also encouraged poaching, so that the amount of deer being harvested was under-recorded. This meant that it was difficult to monitor whether quotas were being attained or surpassed. Another facet of this problem is that it has been difficult to quantify the success of the venture from an economic perspective. Unless we can obtain adequate data from the guard posts it is not possible to determine the harvest and its economic return to the communities. The NGO keeps good records of the dried meat being sold through the community shops but, as the weight is recorded per dried kilogram it is only possible to quantify roughly the number of deer that this represents. Notwithstanding the lack of reliable quantitative data, the scheme is exceptionally well supported by the communities of the three villages involved. The scheme has resulted in tangible support for the park and its management, and villagers are an asset in enforcement work. The most reliable data on poaching come from the communities themselves, and several villagers have been employed as park guards.

A most unwelcome development, occurring in late 1994, has been the establishment of army posts in the villages of Kondo and Tomerau. Poaching has again increased dramatically due to the support given to illegal hunters by army personnel hiring out their rifles. KSDA staff are not confident enough to arrest army personnel caught hunting, and are also afraid of arresting other poachers because of possible repercussions from the military. This is exceptionally unfortunate at this juncture, given the success of the trials of the scheme to date. The Wasur Management Plan (CRAVEN and BOWE, 1992) is currently under review for imminent ratification and it is hoped that the deer marketing scheme as a community development activity for the park will be formally included in the ratified plan. If poaching levels remain high, PHPA, which has not yet fully accepted the theory that the deer are a destructive element in the Wasur environment (see below), could well ban hunting altogether in the park. It is therefore imperative that the poaching becomes a priority concern for KSDA.

Current Legislative Framework

Due to the scarcity of the Rusa Deer in its native range it was gazetted as a protected species in Indonesia in 1931, (Besluit van de Gouveneur General Staatsblad van Nederlands Indie 1931 No.266). This regulation is still enforced today under Indonesian legislation. This means that the

Rusa Deer is protected *throughout* Indonesia, even in Irian Jaya where it is a destructive exotic. Although the regulation stemmed from concern about the status of the deer in its native range, in 1931 the deer had only very recently been introduced in Irian Jaya and the total population could not have been great at that time. It was not possible to predict that the deer, for reasons outlined in the first part of this discussion, would adapt so well to the conditions in Irian Jaya, such that it would become a destructive element in the environment, especially in Wasur.

Furthermore, regulations governing management of national parks do not specifically allow for hunting within such reserve areas. There is considerable flexibility in the regulations which could allow for traditional-use zones, for example, where hunting of the deer could take place using traditional methods. However there are complications in Wasur National Park, in that the majority of the deer population occurs in the areas of seasonally inundated grasslands which are designated to become part of the park's Core Zone. Act of the Republic of Indonesia No. 5 of 1990, concerning *Conservation of Living Resources and their Ecosystems* states in Article 32 that "A National Park is managed through a zoning system which may consist of Core Zone, Utilization Zone, and other zones depending on necessity". Article 33 (1) goes on to explain that "Any and all persons are prohibited to do activities which may modify the natural integrity of the Natural Park's Core Zone". In most parks this is interpreted to mean that activity within a core zone is limited to scientific research and management activities carried out by the government agency responsible for park management. As legislation currently stands, this does not allow for hunting of a protected species within the area most critical for biodiversity conservation in the park. There is a very common perception amongst many PHPA staff that the deer have become an accepted element of the Wasur fauna and need to be conserved along with the indigenous fauna. There is a lack of general understanding about the negative effects of the deer. This may well be due in part to the fact that the Indonesian protected area system focuses largely on tropical forests and that the management of wetlands and savannas (Wasur is the only savanna park) is currently in its infancy. It is hoped that the ongoing scientific programme in Wasur will be able to answer some of the more pressing questions regarding the role of the deer in the general habitat changes that are occurring in Wasur. In addition to this, as we have seen, there are a number of communities living in the park who depend to a large extent on its resources for their livelihood. The deer management scheme outlined in this paper helps considerably to increase community participation in park management, increases support for the park and is an important tool which contributes towards exotic species' control. The current legislative framework is, however, contradictory in the Wasur context, and complicates efforts to secure effective conservation of the area.

CONCLUSIONS

The correct management of the Rusa Deer population in Wasur National Park is crucial to the success of biodiversity conservation there. On the one hand, the deer is an exotic species and

inimical to biodiversity conservation; on the other, it is also an important resource to the indigenous hunting communities of the park, to a range of other businessmen involved in the trade in deer meat and to many of Merauke town's inhabitants, who are the market for deer meat. It is a key component of the draft Wasur National Park Management Plan and the continued exploitation of the deer as a source of meat for Merauke town is crucial, in the near future, to the success of the National Park.

Of the greatest importance is for park management, through the good offices of PHPA, to maintain a flexible approach to Rusa Deer management in Wasur. The biggest constraint on this at the moment is the current legislative framework, which does not readily accept situations that differ from the national norm. Whilst PHPA has constantly supported the community development initiatives started in Wasur, there needs to be further recognition of the potential of communities in the active management process. As the primary stakeholders, the indigenous people of Wasur are an ideal choice as the implementors of any deer control program. They not only receive a direct income from the control measures taken, but they also have an important role to play in enforcement, since there is a direct link between the infringements that occur and their livelihood. The support generated for the park as a result of the successes of the deer marketing scheme is unprecedented and this should not be viewed lightly. This support was only possible because the indigenous people still strongly believe that the land and resources are theirs. The preference given to them for the marketing of deer meat over the commercial hunters, in the early phase of the project, was an important step in acknowledging this. If PHPA recognizes the park's indigenous inhabitants as legitimate co-managers of the park, especially in respect of deer management, it would be an argument for continued hunting in the core zone, where it is stated that, "Any and all persons are prohibited to do activities which may modify the natural integrity of the Natural Park's Core Zone". In Wasur, *not* controlling the deer in the core zone area will most likely contribute significantly towards the degradation of the habitats that we most want to conserve. Notwithstanding the situation in Wasur, the current status of the deer as being protected in Irian Jaya is inappropriate. There needs to be flexibility in national legislation to be able to adopt modifications to policy and rules where the local situation requires it.

PHPA finds itself in a difficult position, in which the conservation value of Rusa Deer in Irian Jaya is quite different from that in its indigenous range further west. At this stage, the current scientific programme for Wasur National Park is crucial in that it may produce important new insights into how best to deal with these problems. Until the effects of the deer on the vegetation are more fully understood, it will be necessary to maintain a flexible approach with regard to deer management there. Management schedules established to reflect current conditions can be quite inappropriate in subsequent years. Under these circumstances the most appropriate approach would be one of 'adaptive management', in which such key aspects as hunting quotas for the traditional people could be changed opportunistically in the light of experience. The only constancy in the equation should be the continual active participation of the park's communities in park planning and management.

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The opinions expressed in this paper are those of the author and do not necessarily reflect the views of PHPA.

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CASE STUDY NO. 8

TRADITIONAL AND MODERN APPROACHES TO COMMUNITY WETLAND MANAGEMENT IN ZAMBIA

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Key words Zambia, community strategies, wetland management, Barotse, Lozi, Kafue

This paper examines the part that can be played by local people in increasing their participation in the planning of wetland management. Zambia has vast wetland areas and two of these are of vital importance as far as local communities are concerned. These are the Zambezi floodplain in Western Province and the Bangweulu swamp in Luapula Province.

In Western Province, due to strong and longstanding traditional practices, a structure was established through the royal establishment to safeguard natural resources. Each natural resource - fisheries, land, water, forests, wildlife, etc. - had a specific person to supervise it. These people were called 'Idunas', meaning a representative of the chief.

There was no poaching of animals as we know it today. There was a specific hunting time and everybody in the community benefited. There was a specific time for fishing and all the lagoons belonged to the Indunas; people had to get permission to fish. The same applied to grazing: the carrying capacity of a piece of grazing land was controlled, and environmental problems such as soil erosion were avoided.

This paper also examines traditional practices in relation to the utilisation of wetland resources in Luapula Province. Here tradition is weaker than in Western Province. Eco-tourism has been established with little resistance from the local people, as they are pleased with employment opportunities. The same does not apply in Western Province, where any effort to introduce eco-tourism has met with much resistance because of the local people's suspicion of government interference. Almost all the powers of the Indunas to control natural resources have been stripped by the government. This has been exacerbated by the government's refusal to acknowledge the province's desire for independence.

The paper therefore examines how local input to planning can be enhanced, how traditional people's practices can be restored without coming into conflict with government policies and how eco-tourism can be introduced in places such as Western Province for the benefit of all the local people. It has been realised that this can be done most effectively through education and public awareness programmes.

The paper ends by examining how these goals can be achieved in an amicable way and by making recommendations for their achievement.

INTRODUCTION

Zambia and its Wetlands

Zambia is a land-locked country in Southern Africa that lies on the Central African plateau, bordering the Great Rift Valley (Figure 1). Average elevations range from 900-1500 m, and a number of lakes

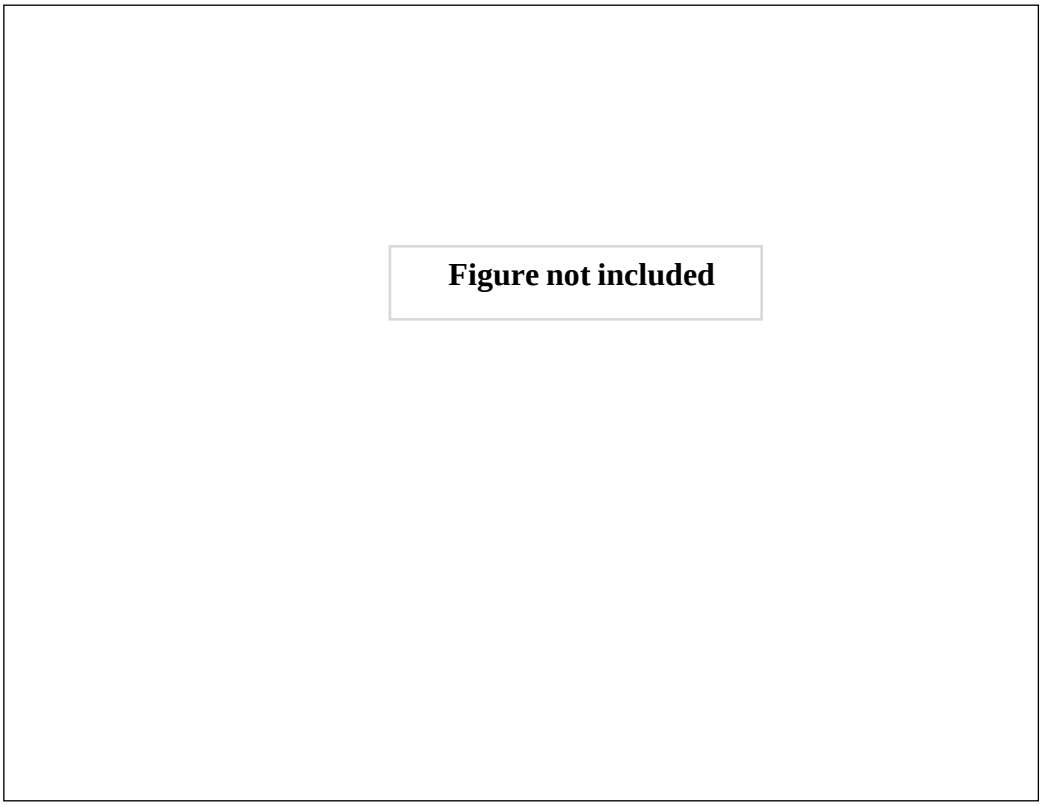

Figure 1 Wetlands of Zambia

and swamps such as Lake Bangweulu and the Kafue Flats cover large areas of the plateau surface. The country has a sub-humid tropical climate with an average rainfall of 1024 mm, characterised by distinct wet and dry seasons. Plateau soils are mostly either highly leached and shallow, or deep, loose Kalahari sands of low productivity.

The most fertile soils are the upper valley soils found mainly in the lower Kafue Basin and the lake basin soils of the north-east, which support a dense agricultural-based population. Much of Zambia is covered by a woodland-savanna mosaic, and swamp vegetation characterises a number of areas in the Bangweulu Basin and the upper basins of the Zambezi and Kafue rivers. Consequently, large-scale cultivation is not easy over much of the country, and pastoral farming predominates in most areas. Zambia has a population of 8 million (1990 census), with an annual growth rate of 3.2%. The population is unevenly distributed, 45% living along the 'Line of Rail', a central line

running from the industrial Copperbelt Region in the north to the border with Zimbabwe in the south; much of the country is only moderately to sparsely populated or even virtually uninhabited.

Zambia has riverine, lacustrine and palustrine wetlands covering more than 6% of the country's surface area, but this figure increases to around 13% when dambos (waterlogged depressions in the headwaters of rivers and streams) are taken into account (CHABWELA, 1992; CHIDUMAYO, 1992). This makes Zambia one of the most important countries in the region for wetlands. The riverine system is the most dominant, and comprises flood plains, swamps and marshes, especially on the Zambezi, Kafue and Luapula rivers. Most lakes occur in topographic depressions or as a result of dammed river channels. The major natural lakes are Bangweulu, Mweru, Mweru Wantipa and Tanganyika; large reservoirs have also resulted from a number of dams, the most prominent being at Kariba on the Zambezi and Itezhi-Tezhi on the Kafue. The palustrine system includes dambos, which occur mainly in the Kalahari sands of Western Province and in the Northern Province, where they are largely perennial and where, because of prolonged wetness, they have developed swamp features. The status of wetlands in Zambia is variable: local people depend upon them for a wide variety of products and services, including reeds for construction and weaving, fish and wildlife for much required protein, cattle grazing, the use of wetland peripheries for agriculture, and transport. However, in many areas wetlands are being increasingly exploited for a much wider market, and the high levels of fish exploitation in some areas are of particular concern.

The Western Province and the Kafue Flats

At 130,000 km², Zambia's Western Province (formerly Barotseland) covers one sixth of the country's surface area. The Zambezi River bisects the province into west and east, and the width of the Barotse Floodplain varies between 15 and 45 km, with a length of nearly 160 km. The river overflows its banks in a normal year in December and again between February and March, when the plain resembles a vast lake dotted with islands. After May the floods slowly recede. The two main land systems are the lowlands or wetlands (10%) and the uplands or dry plains (90%), with the difference in level between them ranging from just a few to 50 m. The area is part of the uplifted Kalahari Okavango Basin, with a height above sea level ranging from 900 m in the south to 1350 m in the northeast. Kalahari sands (locally known as Barotse sands) are the dominant type of soil and are pure, loose and coarse due to low fertility and low moisture holding capacity. The uplands have a woodland savannah type of vegetation (GILS, 1988).

The Kafue Flats comprise a series of lakes, swamps and plains on a wide floodplain of the Kafue River, with an average gradient of only 3 cm/km over a 425-km course. The flats are extremely productive and include important fish breeding lagoons and grass plains which support a rich wildlife resource and high livestock load. The endemic antelope, Kafue Lechwe *Kobus leche kafuensis*, is very important in the ecology of the flats, and its habit of following the edge of

receding flood waters serves to distribute its soil-enriching faeces over the area (PERERA, 1980). Nowadays dams at either end of the flats (built for provision of hydro-electric power) impose an artificial regime on the natural flooding cycle. A large sugar production area also exists, abstracting water from the river for irrigation.

A Wetland Policy for Zambia and the Designation of Ramsar Sites

In the 1980s a new approach to conservation was developed in Zambia under the National Parks and Wildlife Service (NPWS) in which local residents of protected wildlife areas participated in the management of wildlife (MWENYA *et al.*, 1990). This Administrative Management Design (ADMADE) programme became established in Game Management Areas.

Results have been encouraging, but success has essentially been limited to those areas where well-supported projects have backed the initiative. However, it has been a significant step for Zambia, and will be of great relevance in the development of a wetland policy. Zambia has had no specific policy for wetlands since independence in 1964. The concern for the conservation of wetlands resulted in the presentation of a wetlands conservation project proposal to the Southern African Development Cooperation Conference (SADCC) in 1983. This led to a project in which member states were urged to establish national wetlands conservation programmes. When the Environmental Council of Zambia (ECZ) was formed in 1992, it was given the mandate to formulate a national wetlands policy for the country. Since then, the ECZ has held two wetland workshops, and the recommendations from these are now being studied by a group of experts for translation into a draft national policy to be submitted to cabinet for approval.

Two of Zambia's wetlands are Ramsar sites: Kafue Flats: Lochinvar and Blue Lagoon (83,000 ha), and Bangweulu Swamps: Chikuni (250,000 ha), both designated in 1991. Other areas have been proposed for designation, including the Lukanga Swamps and the Barotse Floodplain, both of which still maintain partially natural ecosystems.

TRADITIONAL METHODS OF WETLAND MANAGEMENT AND THEIR DISRUPTION IN THE 20TH CENTURY

The Lozi Kingdom of Western Province

The Lozi tribe occupies the fertile upper Zambezi (Barotse) floodplain, and, by the late 18th century, was a powerful kingdom encompassing the Western Province and parts of the North-Western and Southern Provinces and Angola. The Lozi Kingdom was centralised to a remarkable degree with graded officialdom and councils, an extensive tributary system and corvee labour for public works. The floodplain was the economic centre of the region, where the Lozi developed an intensive agricultural system. This increasingly depended on forced labour for the digging of drainage

networks and the maintenance of canals, though in 1906 slavery and labour enforcement were largely outlawed.

The arrival of the Europeans and the gradual incorporation of the Lozi economy into their economic system led to competition for labour within the Kingdom. In 1890 Barotseland became a British Protectorate and enjoyed substantially more autonomy under colonial rule than did other regions after becoming part of Northern Rhodesia in 1911. In 1964 the Lozi Paramount Chief, the 'Litunga', agreed to renounce the special treaty relationship with the British Crown and accepted integration into the new State of Zambia.

During the pre-colonial era, the Lozi implemented policies and legislation that encouraged sound management of the natural resources of the floodplain. This included management of the waters of the Zambezi and its catchment area. Unique traditional methods of wetland cultivation, fishing, grazing and hunting were developed to ensure the sustainable use of wetland resources. The Lozis practised a traditional annual transhumance (which still continues), marked by the Kuomboka Ceremony when, towards the height of the flood, the Litunga shifts from his dry season capital of Lealui for a few months to his wet season capital of Limulunga, built above the flood line on the edge of the floodplain. He and many of his 'subjects' remain in this area until the fall of the waters in winter enables them to return.

The traditional Lozi Kingdom's agricultural system depended on crop cultivation and livestock rearing on the floodplain (CHIUTA, 1995). For crop cultivation the flood plain was divided into different zones:

litema gardens: shifting cultivation, with burning to enrich the soil;
matongo: seepage zones at the plain edge with ridges to combat soil erosion;
litapa gardens: naturally fertile areas where women grew early maize;
sishonjo: permanently wet land cultivated with hoes;
maluzu gardens: ridged land planted with late maize.

Wells provided domestic water, and drainage canals allowed rice and finger millet to be grown. However, livestock played perhaps the most important role in Lozi culture, and both the floodplains and uplands were grazed extensively, with controlled burning to improve grazing managed by the Litunga through his 'indunas' (headmen).

In the Lozi Royal Establishment there were strict rules regarding the conservation of wildlife resources. These rules were obeyed almost without question. Hunting was carried out with the use of dogs, spears, bows and arrows and trapping. All wildlife belonged to the Litunga, and it was forbidden to hunt certain species which were considered sacred. The Crowned Crane *Balearica regulorum*, for example, was regarded as a royal bird and could not be hunted. Similarly, the

Hippopotamus *Hippopotamus amphibius* was respected for its symbolism of the Lozi way of life, and it was also known to deepen canals. Vultures and other scavengers were valued for their role in cleaning the environment. It was largely inconceivable to kill large mammals such as African Elephant *Loxodonta africana* by using the simple methods of hunting that were allowed. Antelopes such as Red Lechwe *K.l. leche* and Reedbuck *Redunca arundinum* were valued partly because their high concentrations provided enough food for lions, thus helping to protect cattle (CHIUTA, 1995). Overall, wildlife was largely well respected for its usefulness, and most populations were not seriously exploited.

Laws were strictly monitored: if a hunter killed an Eland *Taurotragus oryx*, for example, the village headman would have to report the incident to the local chief, who in turn had to take the animal's tail to the Litunga. The hides of Leopard *Panthera pardus* and Spotted Hyaena *Crocuta crocuta* were given to the Litunga and were used for making royal blankets. Such reporting and gift-bearing were cumbersome, potentially involving several days' journey, and this also served to reduce the depletion of wildlife through hunting. The control of particular wildlife groups was put under the charge of appointed indunas, or ndaleti. For instance the bird ndaleti monitored bird habitats, the arrival of migratory species, and the breeding success of certain species, for which no hunting was allowed until chicks had fledged. Other ndaleti were in charge of scouts who reported incidents of illegal hunting, especially in protected areas (areas earmarked by the Litunga exclusively for building up wildlife stock). The fine for indiscriminate hunting was two head of cattle.

Fishing methods were confined to the use of spears, basket nets, home-made mashandi nets and the draining of small ponds. Net mesh sizes were wide so that only large fish could be caught. Fishing was restricted to set times of the year and to certain areas. The management of fisheries activities was vested in the Royal Establishment. Fishing lagoons belonged to different indunas who implemented set policies in their respective lagoons. Each type of fishing had its set policies, particularly for season and equipment (CHIUTA, 1995). For example: milungu fishing occurred only when rivers began to overflow; during major floods, tutamba fishing was carried out near the villages using baskets; makuto fishing was carried out by men in the dry season; and when the plains were dry, pools were fished by kukakwata, using spears and bare hands. A fishing induna was appointed to control overfishing. A penalty of one cow was charged to those who contravened fishing regulations.

The Lozi Kingdom protected its forests by a number of measures, including the control of bush fires and of tree-cutting, especially fruit trees, timber trees (e.g. mukwa) and trees suitable for canoe-building or curving for making royal drums (e.g. mukusi). Only dead wood could be gathered for firewood. During the colonial days, the colonial administrators worked hand in hand with the indunas, rangers and kapasus (messengers) to control bush fires and the cutting of trees. Before the enactment of the Forest Act (1974) Barotse Forest Reserves were protected under customary

law of 1939. Under the 1974 Act logging and firewood collection are licensed and controlled by the Forest Department. This has not worked well, and the resentment of the rules by the local community has continued to result in massive forest destruction.

There are two national parks in Western Province, Liuwa National Park and Sioma Ngwezi National Park. These parks were established in 1970. Liuwa falls under special regulations, which permits residents to remain in the park and have their gardens, cattle and fuel-wood. However, much damage has occurred in these protected areas since the government took over their control. The local communities feel that they should not protect a resource that they will not benefit from. Tourism has not developed here, and local people have frustrated governmental efforts to introduce game safaris, fearing that poachers will move in under the guide of tourists. All in all, the indigenous way of looking after wildlife has broken down and in recent years wildlife poaching has taken place on a large scale. A number of poaching outfits have recently been arrested, with incidents of ivory smuggling into Angola for international export, though commercial hunting for meat remains the greatest means of exploitation.

The Kafue Flats

The Kafue Flats have traditionally been occupied by the Tonga tribe, who have valued the area particularly for cattle grazing and hunting. Fishing has largely been carried out by immigrant ethnic groups. As the Tongas have not had a traditional paramount chief with the same sort of status as the Litunga of Western Province, individual chiefs have had direct authority over their land. In the past, a number of systems existed which exerted control over the most important resources, especially hunting, grazing areas and fishing from smaller rivers and pools. These systems also allowed for some division of the resources between neighbouring chiefdoms of the flats.

Most hunting took place during the traditional spear and dog communal hunts, or chilas. These periodic hunts took place on designated days selected by one of the chiefs, who received a portion of the resulting trophies. Whilst this system probably served fairly effectively to control natural resources prior to the 20th century, there was little central management. Thus when ranchers moved in to central areas of the flats and more modern weapons became more readily available, the system soon broke down. It was eventually banned by the government in the 1950s amidst closely related bitter boundary disputes between neighbouring chiefdoms (MULONGO, 1981). Many large mammal species rapidly became depleted or exterminated on the flats around this period. This was partly due to the gradual breakdown of the limited but still significant control afforded by chila, and the hunting of mammals, especially predators, by ranch owners. Illegal hunting of wildlife still continues, with an alarming proportion conducted by large-scale operators using firearms. The fairly close proximity of the Kafue Flats to Lusaka and Zambia's rail line makes the area especially attractive for hunting and exploitation.

The areas established as private ranches occupied prime wildlife habitat either side of the Kafue River. Both ranches belonged to Europeans and had been operating for over 50 years by the time Zambia gained independence. Both now exist as National Parks, Lochinvar and Blue Lagoon, set up primarily to protect the endemic Kafue Lechwe and birdlife.

However, management has been very difficult, especially due to the long and bitter episodes of conflict that have persisted in the area all century. At Lochinvar, the ranch owners were frequently exasperated by the Tonga grazing their cattle in and hunting on their land. A series of direct conflicts, court sessions and the drawing up of local cattle-trekking routes took place; similar conflicts still persist today. Hunting now is carried out by official licence only, and all licences must be purchased at the NPWS national headquarters near Lusaka.

Control of the important fisheries is also in a complicated state. The use of illegal fishing methods is blatantly rife, and the main fishing harbour exists inside the national park. Most fish is sold directly to commercial traders, who arrive with trucks and ice blocks in order to take the fresh product directly to the main towns. Local people without direct involvement in fishing thus receive no benefits from the industry. There is wide abuse of the national resource protection laws, and little incentive for communities to respect them when most resources are exported from the region.

MODERN PERCEPTIONS, RECENT INITIATIVES AND PRELIMINARY RESULTS

The Barotse Floodplain

Before the central government took control of Western Province, there was abundant wildlife in the area; now the situation is quite different. People feel that the government has imposed rules and regulations on wetland and wildlife conservation without consulting them. This feeling of alienation has resulted in the destruction of natural resources, and many people do not see the benefit of preserving them for the future, when they are unlikely to benefit personally. However, the wetland resource itself is relatively resistant to the current methods and rate of natural resource exploitation (though the extraction of timber from woodland is unsustainable). Local people feel the government should recognise the fact that there was a traditional way of natural resource management in the past, which was eroded when the government established its authority over natural resources. Over the years, the government has introduced a number of systems of natural resource management in the floodplain, which have largely not worked, as local communities have been ignored in the implementation. Indunas and government officials have always been at loggerheads and have very different perspectives of conservation, which work against each other. Unless a compromise is reached, natural resource destruction is more than likely to continue.

Mechanisms for the incorporation of indigenous knowledge systems into present management strategies are currently being investigated so that future generations do not lose this knowledge, which is vital to the conservation and management of the floodplain. A number of activities have begun and progress has relied initially on high-level negotiations between the ECZ (and other agencies) and the Litunga. These have been followed up with workshops, including one organised by the IUCN Regional Social Studies Programme to investigate the Lozi's indigenous knowledge systems for natural resource management. A survey team has also been operating, and a project programme has been developed which aims, amongst other things, to develop a multi-sectoral management plan for the area.

The Kafue Flats

In an attempt to bring some sort of reversal to the rampant lack of resource control a programme was developed in the late 1980s to bring local people back into the management of the natural resources of the area (JEFFERY and CHOOYE, 1989). After a series of meetings, local authorities were established and mechanisms developed for sharing the costs and benefits of sustainable conservation and management between local communities and the government (WWF-ZAMBIA WETLANDS PROJECT, 1992). Of particular and most immediate concern were the tangible revenues realised from commercial hunting operations in the area. The World Wide Fund for Nature (WWF) launched the Zambia Wetlands Project in 1987 and supported it significantly until 1995, with a programme of research, logistical support, community development and training. However, many project activities have now come to an end, with either a lack of funds or willpower to keep them going. The project aimed to involve local people from the beginning, but progress was slow and difficult, and lasting strategies were never really developed which would enable local communities to actively take part in the management of their resources.

However, it has been a pioneering project with some sound ideas, based on a philosophy of the sensible and fair sharing of the costs and benefits of natural resources. Local chiefs voluntarily became involved in the project, and willingly took part in major workshops that addressed a wide range of resource issues. Women's clubs and other local groups also became involved in training programmes aimed at sharing ideas and developing capacity (DODMAN, 1996). At one workshop, chiefs and others even explored different mechanisms of financial management within the authorities, but it was clear that a much longer time-scale to such training initiatives was needed before they could become effectively involved in such planning. A local service also began at a community development and conservation training centre established by the project, whereby extension agents offered competitive rates for local services such as borehole repair, planting fruit trees and making furniture and tools.

Basic and real community everyday needs must be fully addressed in the development of lasting resource management strategies in the Kafue Flats. This remains a challenge for the future of the flats; failure is guaranteed unless local communities are brought more closely into the equation.

DISCUSSION: INTEGRATION OF COMMUNITIES IN WETLAND MANAGEMENT

Wetlands are under ever-increasing pressure due largely to widespread poverty forcing people to seek new opportunities. In a country where drought conditions are now persistently being recorded, wetlands are seen as oases of opportunity. They are prone to heavy immigration, and incomers do not always respect traditional local values. It is vital now that communities become more closely involved in wetland management. But how can this be achieved?

The Zambia Wetlands Project has produced an excellent case study which will greatly help in the design of future programmes[1]. One lesson learned from this and developments in the Barotse Floodplain is that progress is extremely slow. Community integration programmes need a long timescale, adaptable enough to mirror varying levels of local cooperation.

It is clear from the example of wetland management by the Lozi Royal Establishment that communities can manage their own resources, certainly with some measures of success. However, the Lozi Royal Establishment itself played a 'governmental' role in the past, and clearly old practices of forced labour and other unfair systems cannot simply be lifted into the 20th and 21st centuries. In most cases it will rarely be practicable now for governments to hand everything back to community control. To start with, the restoration of traditional methodologies would incur significant costs and would not necessarily meet with approval from all quarters. Somehow compromises need to be reached in which management costs and benefits are equally shared by government and community.

Strong traditional systems have rarely lasted so well as in the Barotse Floodplain, so the identification of a central community control body will not always be easy. Indeed, tribal conflicts have been bitter and deep-rooted in many areas and may even render community control mechanisms counterproductive. The key challenge will be to develop sound adaptable strategies that can be tailored to different situations and taken up or rejected as locally appropriate. In the design and implementation of Zambia's national wetland policy, full cooperation with local communities is vital in order to prescribe sustainable management options that will arrest impending wetland destruction. The review of customary and statutory law together should provide a good framework for the development of effective regulations and legislation to prevent environmental degradation in the future.

Active community participation in all stages of policy and strategy development must be sought. However, even pioneering projects usually begin with top-down mechanisms, whereby independent organisations such as conservation naos come up with initial proposals which they then take to

[1] For a detailed earlier account of the Zambia Wetlands Project see JEFFERY C.V. (1993). Wise use of floodplain wetlands in the Kafue Flats of Zambia. In: Towards the Wise Use of Wetlands: Report of the Ramsar Convention Wise Use Project. T. DAVIS, ed. Ramsar Convention Bureau, Gland: 145-152.

the communities. There are few cases where communities themselves have actively drawn up their own alternative plans of resource management without outside involvement. Communities are now rarely able to set their own agendas, as natural resources almost everywhere are subject to diverse and often very new forms of exploitation.

It is difficult for traditional values to be expressed in an ever-changing state of opportunity, technology and exploitation. In the Kafue Flats, for example, there are large, irrigated sugar estates, two national parks, a massive hydro-electric project, national and private mining concessions, an important fishery, hunting (both illegal and licensed), livestock grazing and tourism. There are also immigration, complex trading networks and delicate community problems, such as a high level of AIDS in the shifting fishing communities and the recent outbreak of debilitating cattle disease which has eroded the status of many Tonga families. All these activities, problems and opportunities are inter-related, and are all affected foremost by the sustainability and integrity of the wetland resource.

Communities must be more closely involved in the management of this resource and in developing lasting solutions, but they cannot step straight into this role when policies have ignored them for so long. New programmes cannot begin by building centres and providing vehicles, but by building trust and local capacity, by beginning to develop new approaches. It will take time, and in the meantime some resources may be lost. Lasting strategies cannot be developed quickly, but what they can offer is survival, and that is something to be valued very highly indeed.

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CASE STUDY NO. 9

TORTUGUERO: A CASE STUDY OF A COMMUNITY AND A PROTECTED AREA WITH TOURISM

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The Tortuguero Plains, located on the Caribbean coast of Costa Rica (Central America), contain a rich sample of lowland rainforest, with some 300 species of birds, as well as many endangered species of mammals, such as Baird's Tapir *Tapirus bairdii*, Giant Anteater *Myrmecophaga tridactyla* and Jaguar *Panthera onca*. Moreover, the sandy beach coast serves as one of the main nesting sites in the area for four species of sea turtles, Green Turtle *Chelonia mydas*, Hawksbill Turtle *Eretmochelys imbricata*, Loggerhead Turtle *Caretta caretta* and Leatherback Turtle *Dermochelys coriacea*. These conditions led to the creation in 1975 of Tortuguero National Park, with an area of 18,947 ha plus inshore waters.

The relationship between the park management and the local community of Tortuguero has evolved from one of open confrontation to total cooperation (and perhaps even interdependence), due largely to the development of tourism in the area and the consequent economic impact on the inhabitants.

A study was made of the real economic impacts in the area for the year 1990, and the results show low community participation in the total income generated by tourism (5.91%) and even lower participation for the park itself (0.18%). A short analysis of these results is provided.

Finally, an overview is provided of measures that have been taken since 1991 to correct this situation, as well as of other issues that have arisen in this period. One was the community's opposition to the construction of an access road from inland which, according to them, would bring more destruction of resources than benefits for Tortuguero's inhabitants; another is related to the impact that tourism is having, both on the protected area (forest and beach) and the local community.

INTRODUCTION

The Tortuguero Plains, located on the Caribbean coast of Costa Rica (Central America), contain a rich sample of lowland rainforest, with some 300 species of bird, as well as many endangered species of mammal, such as Baird's Tapir *Tapirus bairdii*, Giant Anteater *Myrmecophaga tridactyla* and Jaguar *Panthera onca*. Moreover, the sandy beach coast serves as one of the main nesting sites in the area for four species of sea turtle, Green Turtle *Chelonia mydas*, Hawksbill Turtle *Eretmochelys imbricata*, Loggerhead Turtle *Caretta caretta* and Leatherback Turtle *Dermochelys coriacea*.

BACKGROUND

These factors, together with the support of the Caribbean Conservation Corporation (CCC), led in 1975 to the creation of Tortuguero National Park, with a total area of 18,947 ha. However, the creation of this protected area did not take into account a major local player: the community of Tortuguero. This community started as a seasonal settlement for turtle catchers from Nicaragua and the Caribbean islands. In the decade from 1950-1960, a sawmill was established in the village, as logging was being carried out in the area using the existing network of canals (plus a few man-made ones) as the main means of transportation.

Later, the sawmill closed and the community of some 250 people survived on subsistence agriculture, gathering and hunting, until the park was created, when their activities were limited. Naturally, this caused animosity towards anything related to the park and its staff. The park headquarters were adjacent to the village but the rangers could not buy supplies there during the early days; they had to get them from outside[1]. During the 1970s, a 10-room fishing camp was built and a few sport fishermen flew in from San Jose during the 3-4 month season, to catch mainly Snook and Tarpon.

By the mid-1980s, a new type of visitor started to arrive, mainly by boat: people who wanted to see the turtles nesting on the beach. This was a seasonal activity limited to 3 months every year. In 1985, there were only two lodges: the fishing camp and a local guesthouse with a total capacity of 60 beds between the two facilities. Then, with the development of nature-oriented tourism, visitors started to come throughout the year to see not only the turtles but also the rainforest and its biodiversity, and this type of visitor displaced the sport-fishers. Nature tourists either flew in or came by boat; using flat-bottomed boats with outboard motors, they visited different parts of the park via the network of canals that exist there. In most cases, they went with a naturalist guide who accompanied them from San Jose, and a local boatman. In the evenings, if it was the appropriate season, they walked on the beach looking for nesting turtles.

INVESTIGATION AND RESULTS

By 1990, there were seven lodges (only one owned by a local) with a total capacity of 300 beds. An estimate was then made to discover the real economic impact that tourism was having in the community and the park. The results showed that, of a total annual income of US$4.5 million

[1] When the park was first established and rangers came to Tortuguero, the people of the village saw them as outsiders coming to take their land and traditional resources, so they were very aggressive towards them. This situation lasted a few months until the local people got to know the rangers.

generated by park activity in 1990, only 5.91% went to the community. Nevertheless, tourism had become the main economic activity of Tortuguero.

These results brought out some facts that were already obvious:

i) With the exception of one local lady entrepreneur who owned the one village guesthouse, everyone working in tourism had low-paid positions: waitresses, maids, gardeners, kitchen assistants and boatmen. The community of Tortuguero had been a passive observer of the development of tourism in its area.

ii) The park was also a passive actor in the process. Visitor-fee collection procedures were poor and inefficient, and the relationship between the lodges and tour operators was in many ways one of begging rather than one of demanding. Few actions were taken at the time to control visiting and its impact on both the beach and the rest of the park.

These results emerged at a time when both the community and the park management had started to change their roles in the area, and a series of actions was undertaken in the hope of correcting the situation:

i) A collaborative programme was established between the Caribbean Conservation Corporation, the park management and the community, to train local guides for the night visits to the beach to look for nesting turtles. If visitors wanted to go and look for nesting turtles, they would have to go with one of these certified guides. This served several purposes: it provided the community with a direct income from protection of the resource (in this case the turtles), it controlled the visiting and the visitors' behaviour on the beach during the night, since part of the guides' job was to limit the size of groups and their use of flashlights and camera flashes, as well as stopping any other activities that would disturb the nesting turtles. Lastly, visitors would receive accurate information about the natural history of the turtles and the nesting process.

ii) A second programme was set to train local guides in natural history and English. Some of the persons that received this training are now working as independent guides and some are working at the lodges, with a higher status than they had before.

iii) The park management has been more aggressive in its relationship towards the lodges and tour operators, developing an efficient visitor-fee collection procedure and improving, by coordination with lodges, tour operators and locals, the control of visiting and its impact[2].

[2] In some situations there has been some consultation and discussion before a final decision on controls was made, but in general the decision came entirely from park management.

iv) The community of Tortuguero has made an agreement with the lodges, so now a contribution of US$1 is made for every guest using the facilities. This contribution goes to a fund for community projects related to health and education[3].

During this time, there have been other impacts on the area:

i) A proposal was made to build an access road from inland to the community of Tortuguero. This produced an immediate negative reaction from both the community and the park management and, of course, from the lodges. The community development association replied to the proposal saying that the road would only bring destruction and garbage and, instead, they would prefer to have an improved public transportation service via the canals.

ii). Tortuguero has experienced immigration from inland, thus changing the traditional way of life of the village, in both positive and negative ways. The newcomers supported the construction of the access road, they have a more aggressive approach and they have played an important role in improving education and health conditions at the village. They have also established bars and shops, and some of them have invaded land, with the expectation of selling it to a conservation NGO for a good price.

iii) This increase in the village population has also brought problems of access to drinking water and garbage disposal.

iv) The area has attracted attention from well-meaning conservation groups abroad and a land purchase campaign was carried out in 1990-92 to increase the size of the protected area. As a result, the village and lodges are almost fully surrounded by protected land, thus leaving the people of Tortuguero fully dependent on one activity: tourism.

The community is aware of the high risk involved in a 'monoculture' situation like this and is working on a community strategic plan to seek a way to mitigate this situation[4]. At this moment, there are 12 lodges with some 600 beds and there may be more growth, but measures need to be taken so that the resource does not lose its attraction value.

[3] The $1 contribution was an initiative of the Community Development Association with support from the park administration. The people decided that the money should go to health and education as both subjects had repeatedly been identified as priorities by the community.

[4] The strategic planning process grew out of concerns expressed by the community at meetings organised by the Consolidation of the Tortuguero Conservation Area Project which was based at the park. The Project arranged for the plan to be produced with the assistance of a trained facilitator. However, the implementation of strategic plan decisions has proceeded much more slowly than the drafting of the plan. This is due to stresses within the community (and particularly within the Community Development Association) arising from the rapid changes which are occurring.

v) The area is still subject to strong pressures from inland, mainly due to heavy logging and banana plantations, resulting in clearing right to the edge of the park boundaries, and pollution and siltation of the river and canal system of Tortuguero.

CONCLUSION: WHAT LESSONS CAN WE LEARN FROM THIS?

i) Real participation in the decision-making and planning process should be given to communities in wetlands and other areas to be protected or managed.

ii) If the resource proves to be of value to its stakeholders, they will be willing to protect it.

iii) It is very difficult for anyone to control the social phenomena involved in the development of any human settlement. Immigration, changes in lifestyle, and social problems such as alcoholism and drug abuse are difficult, if not impossible, to control. However, these problems should not be overlooked.

The case of Tortuguero is not very different from that of many other areas where wetland protection, human development and tourism activities exist side by side. I hope this experience will give some insight in the search for a better approach to this relationship.

CASE STUDY NO. 10

COMMUNITY-BASED COASTAL RESOURCE MANAGEMENT (CBCRM): TAMBUYOG'S EXPERIENCE IN THE PHILIPPINES

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The Philippines' marine and avifaunal inventory is one of the most diverse in the world. However, as in most third-world countries, the Philippines' coastal environment is under stress. Data reveal an increasing trend in fishing effort and a decreasing trend in individual catches: the extraction rate is well below sustainable yield levels.

The chaotic or unsustainable use of coastal resources stems from their open access nature. Whoever has the capacity to exploit the resources does so to his maximum advantage without regard to sustainability or external costs. Complementing this chaos is the inability of the state to enforce laws, made worse by inefficiency or ineptness in the ranks of the local implementors.

To respond to the open access nature of coastal resources, TAMBUYOG is working for Community-Based Coastal Resource Management (CBCRM) schemes, the central objective of which is the endowment of the community, whether formally or informally, with common property rights over these resources. Tambuyog believes that once these rights are endowed, the problems of social and individual conflicts in resource use, and unsustainable use, can be corrected.

The paper discusses encouraging results of its work to empower local communities. The local people are establishing resource users' forums and management cooperatives; the aim is autonomous management of program sites to surmount the obstacles of government inaction and lack of interest.

INTRODUCTION

The coastal town of Prieto Diaz (13°03'N, 124°12'E) lies near the southern tip of Luzon, in the province of Sorsogon, facing the Pacific Ocean in the east of the Philippines. The town occupies a total land area of 4767 ha, exclusive of two uninhabited islets on the east coast, the Balumbon Islands, which total a further 13 ha. (Figure 1)

The ecological features of the area include a large seagrass-covered marine lagoon bounded by a fringing reef that serves as a protective barrier for the town during the northeast monsoon; the area

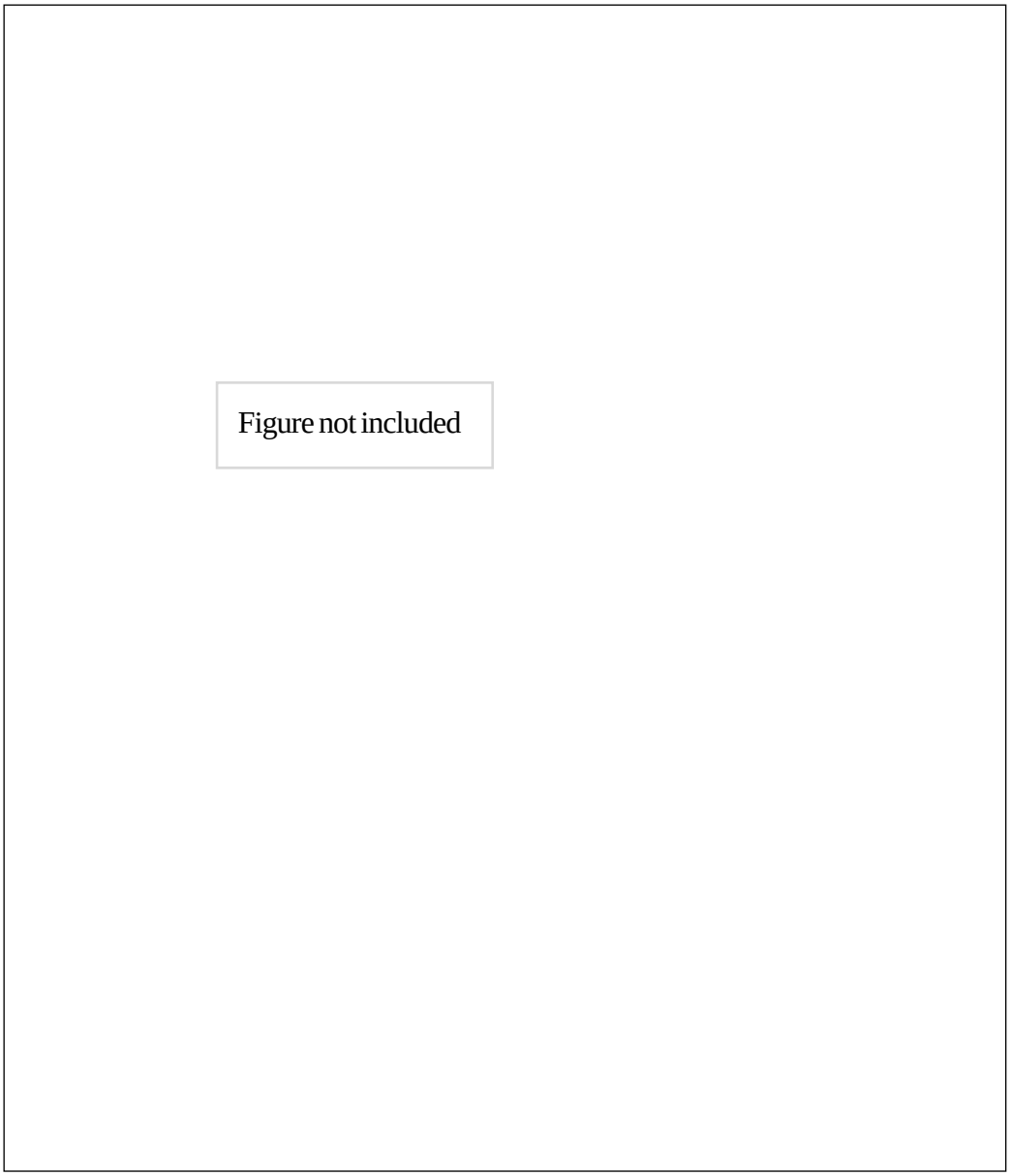

Figure 1 Prieto Diaz, Sorsogon Province, Philippines

includes a total of 550 ha of mangroves, 336 ha of seagrass and 200 ha of coral reefs. The presence of these three ecosystems in one location was one of the main reasons for the government's choosing it as a Coastal Environment Programme (CEP) site. CEP is the national government's model programme for the rehabilitation and protection of the coastal environment. The programme is being undertaken by the Department of Environment and Natural Resources (DENR) in 12 sites throughout the country.

Prieto Diaz has a total of 23 barangays (villages), 19 of which are located along the coast. The total population was 15,464 in 1994, including a coastal population of 13,805 (90%). There were 2821 households, including 880 fishing households. Five hundred and fifty of the fishing households are engaged full time in fishing. Fishing, farming and shellcraft-making are the main sources of livelihood in the area. Ninety-eight percent of the fishers use non-motorized bancas, and the most common fishing methods are gillnet and hook and line. The peak fishing season is March-August while the lean season is September-February. Average fish catch during peak the season is 5 kg per fisher per day; this decreases to 1.375 kg in the lean season. In monetary terms, the catch translates as an income ranging from US$2-8 per day. Fishing income is still below the poverty threshold of US$10 per day.

Most women in Prieto Diaz are engaged in shellcraft-making for export; hanging decorations and necklaces of various designs and sizes are produced. Children help in the various stages of preparing and assembling the shells as a household chore.

Originally, all shells for shellcraft were extracted locally from the wide seagrass bed. By the mid-1980s, a significant increase in demand for the export market made it necessary to source shells outside Prieto Diaz. By this time, the supply of shells had also significantly dwindled. Shellcraft-makers also complain of the low selling price of their product, exploitation and usury. Due to their lack of capital, the shellcraft makers are provided with credit in the form of raw materials by the sole exporter-financier. Payment for the finished product is often advanced by the exporter-financier in the form of cash or basic commodities. The low selling price makes it impossible for the shellcraft makers to realize a surplus, thus holding them in perpetual credit to and dependence on the exporter-financier.

The major issues in the area are poverty and resource degradation. Poverty is most felt during the lean season, when fishers cannot go out to the open sea because of the large waves. At this time, the fishers can operate only from the marine lagoon area as far as the boundary of the fringing reef. Thus, the low catch during this season is also relates to the reduced size of the fishing ground. Complicating the problem is the more intensified use of a drag seine, locally called baling, in the marine lagoon during the lean season. The baling is a fine-mesh net gear which catches mostly juvenile fish. It is particularly destructive to the marine lagoon, a known spawning ground. Catches using the baling range from 50-300 kg of fish per day.

Poverty is likewise exacerbated by the lack of post-harvest facilities, which limits the markets of the fishers. They cannot, for instance, sell their produce to the capital town of Sorsogon, where prices are higher. Even highly-priced fish species such as groupers, blue marlin and sharks are sold to the entrepreneurs at very low prices.

Resource degradation is caused mainly by the conversion of mangroves into fishponds, and the use of cyanide, explosives and fine-mesh net. The present mangrove area is only half its 1960 size. As a result, fingerlings of wild Milkfish have disappeared and crustaceans such as Mud Crabs have declined.

Although a detailed stock assessment is not yet available, we have reason to believe that, in common with most coastal waters in the country, the area is already overfished. The fisher's catch today is only one tenth of what it was in the 1960s. Using Aoyama's (AOYAMA, 1973, cited by Marten and Polovina in PAULY and MURPHY, 1982) estimate for maximum sustainable yield in coralline ecosystems in the Philippines (MSY = 2.8 metric tons/km^2/yr), the MSY in the area would be around 367.5 metric tons per year. Data for 1993, however, recorded a catch of 1,281 metric tons, already indicating overfishing. Fishers' reports that many demersal species had already vanished from the marine lagoon also point to fish-stock degradation.

A fishers' organization of about 70 members exists in the area. In August 1994, Tambuyog went into partnership with this organization to establish a Community-based Coastal Management (CBCRM) scheme.

CBCRM AS A RESPONSE TO THE PROBLEMS IN THE COASTAL AREAS

Tambuyog's core programme is called Sustainable Coastal Area Development (SCAD). Its components include: a) Organizing and Capability Building, b) Environmental Rehabilitation and Protection, c) Environmentally-sound Socio-Economic Development, d) Basic Social Services Delivery, and e) Coastal Resource Management Research Development and Planning.

The SCAD programme is currently being implemented in three coastal areas in the country: Barili (Cebu), Taytay (Palawan) and Prieto Diaz (Sorsogon). The SCAD programme is Tambuyog's version of CBCRM.

The Essence of CBCRM (based on SCAD Programme Proposal)

Community-based resources management (CBRM) is defined as a "process by which people themselves are provided with the opportunity and responsibility to manage their resources, define their needs, goals and aspirations and make decisions affecting their well-being" (FELLIZAR, 1993). It is also considered to be a "strategy for achieving a people-centered development wherein

the locus of decision making with regards to the sustainable use of natural resources in an area lies with the people of the communities in that area".

Tambuyog's work for community-based **coastal** resource management (CBCRM) is rooted in the realization that the marginalization of the coastal communities is brought about by iniquitous power- and property relations, and reinforced by government policies that undermine and threaten the traditional forms of controlling and managing coastal resources. Although the coastal and marine resources belong to the state *de jure*, the inability of the government to ensure judicious and equitable use has resulted in a *de facto* open access situation. Worse, open access becomes in reality access limited to those who have the capital, technology, market channels or government instruments to exploit the coastal resources, resulting in the marginalization of coastal communities.

However, the marginalized communities, having the biggest stake in coastal resources, are potentially the best managers. Efforts towards the sustainable use of resources, ecological balance and poverty alleviation should, therefore, be grounded on the empowerment of coastal communities to have access and control over their resources. Indeed, the essence of CBCRM is the endowment of property rights over coastal resources to the community.

The Fundamental Components of CBCRM

The components of CBCRM are the 'bundle of rights' given to the community, and the statutory instruments for the exercise of those rights.

Use Rights

This component primarily responds to the problem of exclusivity of common property resources. By clearly defining use rights, competition and conflicts can eventually be addressed and the primary role of communities in resource utilization is given emphasis.

Exchange Rights

Resource rent is valued in the market. Thus, the community must likewise have command over marketing channels and processes. In addition, community control should be asserted not only in the actual production channels but also for input markets (e.g. fishing supplies). Cooperatives and other forms of collective efforts play a major role in the realization of market strength and control.

Distribution Entitlement

This recognizes that there are initial endowments in communities and that some communities may be better endowed than others. Efforts in CBCRM should be directed towards achieving equal

endowments of economic and political power. The allocation and distribution of benefits and values from resources must be equitable in nature.

Management and Authority Schemes

A community is composed of various classes and sectors. Thus, conflict resolution mechanisms must be identified and enforced so that compliance with community policies and programmes is guaranteed. There are no definite and clear-cut prescriptions for management and authority instruments. They would vary depending on a number of factors such as the 'organizational landscape,' cultural values, norms and codes of behaviour.

The Basic Principles of CBCRM[1]

The process by which CBCRM is put into practice is as important as its components. There are five basic principles that must be present in CBCRM, namely:

i) *Empowerment* The marginalization of coastal communities has led to the problems of poverty and resource degradation. Addressing marginalization would require empowerment or the actual transfer of economic and political power from a few to the impoverished majority. By transferring the access and control of resources from a few to the community at large, the community is gradually empowered in the economic realm. Simultaneously, political empowerment ensues as community management and control over the resource are effectively operationalized.

ii) *Equity* Linked with the principle of empowering coastal communities is the objective of promoting equity in the access to and control of resources. Equity means that a few people cannot appropriate a particular resource. Equity could be attained if coastal communities rather than a few individuals have access to the opportunities of coastal resources.

iii) *Sustainability* There is a need to ensure the sustainability of development through resource-extraction practices that consider the limits of the resources - their carrying and assimilative capacity. There is trust in the capacity of the community to manage its resources in a sustainable manner. Furthermore, intra-generational equity or equity between the present and future generations is aimed at through the sustainable use of coastal resources.

iv) *Systems orientation* This principle gives recognition to the dynamics of relations. The community is not set apart from other communities, just as their resources are ecologically linked to bigger ecosystems.

v) *Gender-fair* Women have always been taken for granted in development efforts and even in community management thinking. Yet a recognition of the role of women in the household and in

[1] Taken from the SCAD Program Proposal and RIVERA R. Approaching Coastal Resource Management Through Community Property Rights Arrangement, Tambuyog Development Center.

community management is crucial for development to succeed. Besides being a part of the community, women have distinct characteristics and needs. Development must address the practical and strategic needs of their being involved in the management and control of community resources.

THE SCAD PROGRAMME IN PRIETO DIAZ, BICOL

The programme in Prieto Diaz started as recently as July 1994. A Rapid Coastal Systems Appraisal-Participatory Rural Appraisal (RCSA-PRA) was conducted in November 1994. Presently, Tambuyog is concentrating on building community structures for CBCRM.

Research

Research provides the necessary database for the preparation of a community resource management plan and an area intervention plan by development NGOs like Tambuyog. For Tambuyog, the study areas include: resource status and utilization patterns, history, development initiatives, marketing, women and legal and institutional studies.

The research process is equally as important as the data and analyses that the research generates. In Tambuyog's initial entry into the Prieto Diaz community, the PRA approach was employed. The interactive nature of PRA made the activities not only data gathering processes but also rallying tools for the fishers to call for sustainable use of the resources. Additionally, the organizers were trained in analysis, which they continue to use in their organizational consultations. In this regard, research plays a significant role in community empowerment.

At present, research activities include feasibility studies of possible livelihood projects for the fishers' cooperative and an in-depth stakeholders' analysis in line with the development of a community resource management plan and the formation of a Resource Users' Forum.

Community Organizing and Capability Building

First and foremost, there have to be community institutions and organizations that will implement CBCRM. The strengthening of such organizations is the primary aim of organizing. Tambuyog places prime emphasis on the role of resource users in resource management. In other words, resource users have to be organized to spearhead resource management and become resource managers themselves.

Additionally, strong community organizations make a contribution towards a civil society that can serve both as an implementor of government programmes at the subsidiary levels and as counterbalance to the occasional excesses of the state.

The strengthening of people's organizations necessarily means the development of their skills in resource management. The courses programmed for Prieto Diaz include fishery resource valuation

and assessment, coastal resources management options, legal action and processes relating to the environment, organizing and advocacy skills training, and gender sensitivity.

A training innovation that Tambuyog is employing in Prieto Diaz is a programme for the exchange of organizers and leaders with organizations from other parts of the country. This is called the People's Organization's Leaders and Members Exchange (POLMEX). Through this mechanism, People's Organization (PO) leaders and members are given a chance to be directly exposed to different resource management options. Tambuyog also emphasizes the development of local leaders by having Local Volunteer Organizers (LVOs). The LVOs serve as an 'extension' to Tambuyog's organizers in the area.

Advocacy

Advocacy is the political struggle for the recognition of community property rights, both at local-community and national levels. At the local level, it involves a campaign directed at resource users and stakeholders, formal and informal organizations, and local seats of decision-making.

At the national level, it involves working towards a general movement of fisherfolk through networking of their organizations and, at the least, proposals and lobbying for drastic legislative amendments to the Fisheries Code of 1975; the maximal outcome would be a constitutional amendment to recognise community property rights other than official state regimes in coastal and marine resources.

In Prieto Diaz, advocacy now takes the form of ongoing consultations with the resource users to reverse the process of resource degradation, and dialogues with the municipal government to implement laws and issue new ordinances. The immediate aim of these consultations is the eradication of destructive practices, namely: use of the baling, and cyanide- and blast fishing. Consultations among the resource users also form the seeds of the Resource Users' Forum (see below).

Structures of CBCRM

A Resource Management Cooperative

The existing fishers' organization in Prieto Diaz is in the process of changing into a cooperative. This cooperative will spearhead resource management through initiative and leadership in the formulation of a resource management plan. The transformation from PO to cooperative is being made for very fundamental reasons.

Firstly, the cooperative will enable the fishers to accumulate and mobilize capital to enable them to find alternative markets for their catch and have access to credit services. It should be noted that part of the reason for the fishers' low income is their inability to sell their produce in the capital towns, where prices are higher.

Secondly, the cooperative will translate the fishers' interest in resource management into concrete economic or monetary stakes through their contribution to the share capital. This monetary stake strengthens the commitment of the members to the projects' advancement and continuity (i.e. resource management, livelihood projects). In other words, cooperatives strengthen the unity of the members by involving them in an economic enterprise.

Thirdly, cooperatives have simpler organizational structures than POs, hence are easier to manage (Figure 2). The organizational complexity arises from the fact that it is necessary to federate the POs in order to unite them in municipality-wide/ecosystem-wide resource management. (The boundaries of the critical ecosystems of Prieto Diaz, i.e. mangrove areas, coralline areas and fishing grounds, all fall within the political boundaries of the municipality; the users all reside in the municipality, so that organizing users does not impinge on neighbouring towns.) Each PO has its own organizational structure. More often than not, however, communication channels do not function well and the implementation of decisions agreed upon in the federation's General Assembly are not smoothly passed to the POs because the latter have a dynamism independent of the federation. This contrasts sharply with primary cooperatives, where the general assembly unites the whole membership in major decisions, and the board of directors implements the different programmes.

The Resource-Users' Forum

The Resource-Users' Forum is an assembly that functions as the wider venue to unite all the users in the resource management plan; it is also the venue in which to resolve resource use conflicts. In Prieto Diaz, this forum is evolving from the dialogues between the organized fishers and the other users, including the illegal fishers (baling operators, cyanide fishers). Informal groupings have also taken place between the organized fishers, other users (e.g. fishpond owners) and members of the barangay council in activities such as the government's consultation and feedback of the CEP, and the convening of the Municipal Development Council, a multi-sectoral consultative body that formally endorses the yearly municipal development plan for approval of the municipal council. These dialogues form the seeds of the RUF.

The fishers' cooperative will be the leading member of the RUF, i.e. the RUF is the forum through which other users will be enjoined to adopt the resource management agenda of the organized fishers (cooperative members). Upon maturity, the RUF is envisaged to evolve either as an independent, autonomous management body or as a leading member of an institutionalized, tripartite co-management body with the local government and NGO(s) in the area (see below).

A Women's Cooperative

The TDC Women's Programme is currently being designed. The design will, however, inevitably include gender awareness/sensitivity training for the women and the fishers, and the formation of

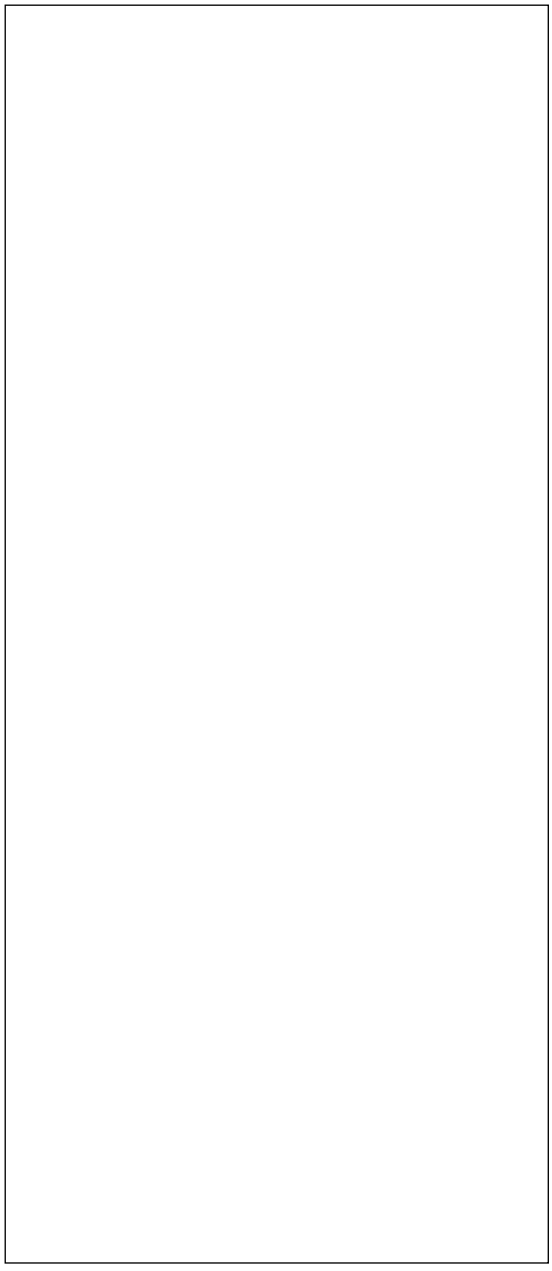

Figure 2 Differences in structure of primary cooperative and a federation of People's Organizations

a women's cooperative that will engage in alternative trading of shellcraft to break the exploitative relationship between the women and the financier-exporter, seek an alternative form of livelihood that will eventually replace shellcraft, and be directly involved in resource management (e.g. management of shell- and seagrass related concerns).

A Tripartite Coordinating Council

Simultaneous with the formation and strengthening of the RUF is the formation a tripartite (community organization, NGO, local government) body that is envisaged to mature into an overall coordinating and implementing body for resource management in the area. In Prieto Diaz, this is now taking form in a task force to draft the comprehensive resource management plan. On completion of the resource management plan, the formation of the coordinating body will be formalized.

Other Local Institutions

Resource management need not be implemented by a single centralized body. Even in a small town, there are subsidiary institutions that can implement resource management autonomously. In Prieto Diaz, for example, one barangay council is able to implement effectively the ban on the baling and commercial cutting of mangroves. Although the council has no police power, the regulation draws its strength from the closed, kinship-based sense of community, where the violator risks the danger of being ostracized.

The Municipal Development Council (MDC) also serves as a venue for the fishers to call for resource management. Traditionally, the council was convened year after year only to approve formally the development plan already prepared by the municipal government. At the instigation of the fishers, however, the MDC was reconvened to muster broad support for community- based resource management.

Other local government units in Prieto Diaz with particular roles in resource management are the Sangguniang Bayan (Municipal Council) for laws, regulations and their enforcement, and the local units of the Departments of Environment and Natural Resources and Agriculture for technical assistance.

CONCLUSION

In Prieto Diaz Tambuyog and its partner organization are creating a synthesis of co-management and autonomous management approaches. On one hand, co-management can be seen in the formation of the tripartite task force to draft the resource management plan and its eventual transformation into a coordinating and implementing body, the ongoing dialogues between and

among Tambuyog, the fishers' organization, the unorganized resource users and the municipal government for the eradication of illegal fishing and mangrove cutting practices, the implementation of existing laws, and the passing of new municipal ordinances.

The co-management approach is employed in Prieto Diaz in order to maximize the existing legal and institutional framework of local and national government and their technical resources. Furthermore, co-management is seen as a mechanism to address possible conflict and tension that might ensue between government and community organizations.

Autonomous management is demonstrated in the Resource Users' Forum, and in the fishers' and women's cooperatives. These community formations are planned to implement resource management at subsidiary levels (e.g. barangay, mangrove zones and coral zones).

Strong community organizations as expressions of autonomous management are needed as springboards for initiative and leadership in the management authority unit (coordinating council) that will be formed. Numerous experiences in resource management in the Philippines show that when the leadership is left to local executives, implementation of the management plan can be stopped, slowed down or modified to suit vested interests, political or otherwise.

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Tambuyog Development Center (TDC) is a non-government organisation undertaking initiatives towards the realization of CBCRM schemes. As well as direct community work, it also maintains a databank and a journal, *Lundayan.*

CASE STUDY NO. 11

EDUCATION AND PUBLIC AWARENESS: A CASE STUDY FOR THE UGANDAN WETLANDS PROGRAMME

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Key words wetland, education, awareness, community, Uganda, Africa, government, radio

The education and awareness programmes that form part of the Uganda National Wetland Conservation and Management Programme activities aim to alert the public to the values and functions of Uganda's wetlands and the need to protect them. The objectives include alerting the central government and district and local leaders to their responsibility for wetland management, alerting the wetland resource users to the values of wetlands and mobilising action and support for sustainable wetland utilisation, and education campaigns in schools.

In support of these programmes, seminars and workshops are organised at all levels and media campaigns are employed. Support materials are also distributed to the target groups. Such programmes have promoted an initial awareness of wetlands and raised concern for their conservation. This has been very instrumental in the drafting and approval of the wetland policy and setting the stage for future field-based activities. It is also clear that the attitudes of the people are changing, as some of them are now taking in upon themselves to protect the small wetlands in their locality and district authorities are enacting bye-laws to protect wetlands.

BACKGROUND

Uganda has a total area of some 236,000 km² and, with a population of 19 million people - one of the highest population densities in Africa, the pressure upon the country's natural resources is severe. In particular, as a result of many years of trying to increase the country's agricultural production, only a small fraction of the once-extensive forest remain, while the cleared hillsides are now subject to intensive cultivation of corn, wheat and other crops.

Over the past few years, as the need to maintain the remaining forest has become increasingly apparent, the pressures upon existing cultivated land have mounted, and the focus of agricultural development has begun to turn away from the uplands towards the remaining lowland areas. Much of this has focused upon Uganda's over 29,000 km² of swampland.

Uganda's wetland ecosystems constitute a resource of considerable value; productivity is high and there is potential for sustainable harvesting of agricultural crops, fodder for livestock, fish and

other products such as reeds for thatching and artisanal craftwork. In Uganda, the edges of wetlands have traditionally been used by subsistence farmers in times of drought or in years when their upland farms lie fallow.

By 1986, there was rising concern within central government, and among regional administrators and local communities, as to the long-term viability of wetland reclamation, the extent to which the rural poor benefit from utilisation, and the nature and consequences of the environmental impacts of swamp drainage.

Given the above considerations, the Ministry of Environment Protection, created in 1986, wished to develop and apply a policy for wetland protection and utilisation. It was recognised that, in order to develop the required long-term policy, one which lay the basis for environmentally-sound management and maximum sustainable productive use of wetland systems, such guidelines would have to be based upon a careful analysis of existing activities, and that assessment of the full range of functions and values provided by country's wetlands had to be made. In parallel with this work, there was a need to help build national support for the conservation and sustainable utilisation of the country's wetlands.

The National Wetlands Conservation and Management Programme, launched in 1989, had as one of its objectives: "to build government and public awareness and understanding of the importance of wetlands and of the economic and social benefits of their environmentally-sound management through appropriate seminars".

During the first 2-year phase of the project, public awareness was achieved through seminars, films, newspaper articles and, especially, through the work of the Inter-ministerial Committee, which brings together technical officers with policy-making responsibilities. At the local level, district-based seminars were organised, while at the national level, Uganda became party to the Ramsar Convention on 4th March 1988, showing a strong commitment to wetland conservation.

By the end of the first phase, data to support the information to be disseminated had been collected. The second phase was then designed to develop further a comprehensive public and government awareness campaign on the values of wetlands and wise use management practices.

THE EDUCATION AND AWARENESS PROGRAMME

The objectives of the education and awareness programme included:

- alerting the central government and District Development Committees to their responsibility for wetland management;
- sustainable wetland utilisation;

- educational campaigns in schools;
- production of materials to support the general awareness and to prepare for the promotion of the policy after cabinet approval.

In response to these objectives, the following are some of the activities that have been implemented.

District-based Seminars

District-based seminars were targeted at the District Development Committees, which include technical officers and local leaders. The aims of these seminars included encouraging sustainable use of wetlands through demonstration areas. Each district was encouraged to identify one wetland area where local people participate in wise-use management of wetlands. To date three wetlands have been set aside as demonstration sites: Kitanga in South Western Uganda, Kyojja in Central Uganda and Limoto in Eastern Uganda[1].

The programme hopes that such wise use will be duplicated elsewhere in the district and in the country at large.

Resource Users' Seminars

This is an outreach activity that allows sharing of information and gathering feedback at the resource user level. This activity brings together project staff, district technical officers, resource users and NGOs at grassroots level. This allows sharing of problems affecting wise use.

To date this programme has generated much enthusiasm amongst the farmers to learn more about the wetland resource. Some local leaders are taking the initiative to organise their own seminars, and turn to the programme only to seek support materials or resource persons, whilst others include wetland issues on the agenda of their monthly meetings.

Radio Programmes

Another method of communicating that has raised a great deal of enthusiasm is the 15-minute radio programmes that have been devised for schools and the general public. The project now receives requests for information and materials on wetlands.

[1] In late 1996 these demonstration sites are still regarded as being in their initial stages (about 2 years). They have been successful in bringing together the communities and the district technical officers. It is hoped that duplication will occur in the future.

Songs about wetland have been composed by one of the leading bands in Uganda, and by some primary schools, and some schools are maintaining nature ponds to further introduce the pupils to wetland issues.

Production of Materials

Support materials such as brochures, newsletters, posters and a video have been produced and distributed to a wide audience.

IMPACT OF THE PROGRAMMES

Although about 10% of Uganda's total land surface area is occupied by wetlands, these areas have previously been largely regarded as wastelands. Lind reported in 1956 that, "although they occupy such a large part of the Protectorate, these waterlogged areas have hitherto attracted little attention, being considered useless except to provide a few fish and building material in a country where good agricultural land was plentiful".

Since that time wetlands have been regarded as wastelands, with no policy to guide their utilisation. Through these education and awareness programmes Uganda has become the first country in Africa to develop a national wetland policy (GOVERNMENT OF UGANDA, 1995b). This policy has been developed together with the people of Uganda.

However, before the policy can be translated into law, districts are taking it upon themselves to enact bye-laws that protect wetlands in their areas.

For example the Kabale District Development Committee, in South Western Uganda, has proposed an environmental protection policy covering the following issues on wetlands:

- no more leasing of wetlands in the district;
- unclaimed and undeveloped wetlands to be left intact;
- unexecuted leases to be cancelled;
- the already reclaimed wetlands to be developed under guidance of experts in the field of wetlands.

At the community level, also, regulations have been made to protect wetlands[2]. A case in point is Nyamilyango Parish, in Kabale District in South Western Uganda, where regulations have been

[2] District Councils (the second tier of government, above the Local Councils) are able to make by-laws which are reviewed by the Ministry of Justice and the Ministry of Local Government at the national level. Regulations under national laws are made by the Minister.

developed to protect the remaining wetlands. These include preservation of wetlands for wetland products and prohibition of drainage (ECAAT, in press).

Still at the national level, the government has enacted an Environment Statute (GOVERNMENT OF UGANDA, 1995) that protects wetlands under clauses 37 and 38, and the draft constitution includes wetlands among the resources that would protected. Under Chapter 17, Clause 271 2b, "Government or local government by Parliament by law, shall hold in trust for the people and protect, natural lakes, rivers, wetlands, forest reserves, game reserves, national parks, and any land to be reserved for ecological and tourism purposes for the common good of all citizens" (GOVERNMENT OF UGANDA, in press).

The law cannot be developed without a change in people's attitudes; in Uganda all recent laws and policies have been developed together with the people. Unless people understand why the resource has to be protected, there is no way the idea will be endorsed.

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CASE STUDY NO. 12

A GLOBAL EDUCATION AND PUBLIC AWARENESS STRATEGY FOR WETLANDS: THE NEED AND WAY FORWARD

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Key words environmental education, public awareness, wetlands, global

The values of wetlands have not been communicated effectively to the public at large and many of the other target groups that, both potentially and in actuality, affect these fragile natural systems. Without this basic understanding, wetlands conservation based upon furtherance of the wise-use concept will be, at best, extremely difficult and, at worst, fail completely.

Wetlands awareness campaigns run to date have been limited in their goals and duration, and opinion is divided on how effective such campaigns proved to be.

The significance of the need for education and public awareness in support of wetland systems (EPAW) has been recognised in many fora including the Meetings of Contracting Parties to the Ramsar Convention. Most people involved in wetland conservation recognise the overriding need for a considerable programme of sustained education and awareness-raising.

However, little has been done to turn the ideals into reality, and it is right to ask whether education and public awareness goals are true aspirations (to be supported by real commitment) or are they characterised by an approach that can only be described as 'paying lip service'?

The formation of an IWRB (now Wetlands International) Group for Education and Public Awareness and the emergence of a number of other programmes provide opportunities to build upon the expertise that exists in the field to further the aim of 'education for sustainability through wetlands'.

The Wetlands International EPAW Group, responding to the challenge of the Kushiro recommendations, has devised a programme that requires true commitment at all levels. This paper outlines those proposals and, through discussion, attempts to suggest priority actions for the rest of the millennium. These include initiatives on training, resource development, campaigns and research/evaluation. There is an argument for the establishment of a global and regional coordinating structure that catalyses and supports national initiatives. There is also, inevitably, and to some, frighteningly, a call for the satisfaction of the major funding requirement inherent in a programme of this nature.

INTRODUCTION

Background

The values of wetlands have not been communicated effectively to the public at large including many people whose actions influence the fate of wetlands (e.g. 'stakeholders', government officers

and engineers). Without this basic understanding, wetlands conservation based upon furtherance of the wise-use concept will be, at best, extremely difficult and, at worst, fail completely. There is a clear need for a sustained programme of education and public awareness (hereafter shortened to EPAW) for wetlands at all levels and throughout the world.

The significance of EPAW for wetlands has been recognised in many fora, the latest being Resolutions 5.8 and 5.10 of the Kushiro meeting of the Contracting Parties to the Ramsar Convention (1993).

The formation of an IWRB (now Wetlands International) Group for Education and Public Awareness and the emergence of programmes such as Wetland Link International organised by The Wildfowl & Wetlands Trust, the Global Rivers Environmental Education Network - GREEN, Medwet and the Ramsar League of Educators provide opportunities to build upon the educational/awareness-raising expertise that exists within the wetland conservation field and to develop further links with other networks seeking to promote the concepts of sustainability and the conservation of biodiversity.

This proposal for an education and public awareness programme is the result of a number of meetings between key individuals representing organisations directly involved in wetland conservation. In early 1993, widespread support for a coordinated global programme of EPAW for wetlands was gained at a meeting held at Slimbridge, UK, to which IWRB, AWB, IUCN, Birdlife International and the Ramsar Bureau sent representatives.

The ideas were refined and developed at a 3-day workshop organised by the IWRB EPAW Specialist Group held at the offices of the Asian Wetland Bureau, 3rd - 5th April, 1995.

The final proposal does not seek to be comprehensive but rather it highlights a number of initiatives which could provide the first part of an extended period of activity.

The task ahead in implementing such a programme is enormous. There has been much lip service paid to the need for education and awareness activities - lots of talk with no action. We believe that the position of education and public awareness within the current conservation world can be likened to the status of research and monitoring during the 1950s and 60s. This situation must change and change rapidly given the pace of wetland loss and degradation across the world.

The resources needed for a programme of EPAW will be considerable - but they must be found, if we are to elicit the support required to save wetlands and conserve their wildlife.

Global 'Campaign' or 'Programme'?

Wetlands awareness campaigns that have been run to date have been limited in their goals and duration. The last major global campaign was organised by IUCN/WWF in 1985 as 'Life at the

Water's Edge' and had a limited lifespan. Awareness-raising and education are processes that require varying and, in many cases, considerable lengths of time before they become effective. In contrast, 'campaigns' tend to be short-lived. It is, therefore, proposed that an EPAW programme be devised within which a number of discrete campaigns might feature. Commitment to such a programme inevitably means commitment to medium to long-term planning cycles.

Taking a global approach confers certain benefits - but there are also significant limitations.

On the positive side a global approach:

- encourages communication of ideas and projects across geographical and cultural boundaries;
- enables local and national initiatives to have an international context;
- is a more efficient strategy as it encourages the pooling of resources and seeks to avoid unnecessary duplication of effort.

The major limitations are that:-

- effective EPAW is best developed and delivered locally; any initiative devised globally or regionally must also include mechanisms for local action;
- the priorities, particularly when devising programmes linked to specific target groups, will vary from country to country and region to region, and with the economic status of the nation (developed, developing and transitional); given this requirement for flexibility, it is extremely difficult to devise single-solution materials and projects.

Underpinning all activity is the basic fact that:-

- effective EPAW must begin 'where the learners are' and take note of cultural, social and political realities.

Given these benefits and limitations, the global dimension is best pursued as a coordinating mechanism for information exchange and general resource development in order to facilitate action at regional, national and, thence, local levels.

Goals

The following goals have been set for the programme. The first of these has been enshrined in the draft Ramsar Strategic Plan (1997-2002) as Objective 3. It is significant that this objective is prominently recognised within this Plan which is due to be discussed at the Sixth Meeting of the Contracting Parties to be held in Brisbane, Australia (18th-27th March, 1996).

i) To raise awareness of wetland values and functions throughout the world at all levels (5 billion people and rising ... fast!);

ii) To promote the conversion of awareness into actions that support the concept of 'wise use' of wetlands at all levels;

iii) To strengthen the capacity of organisations at all levels to undertake education and public awareness activities in support of wetland conservation.

Target Groups

"Everyone is a participant in the quest for a sustainable society. There is no 'audience' or campaign 'target'. Therefore, the campaign should encourage a two-way flow of information, enabling people to contribute as well as receive ideas and information."

IUCN, UNEP, WWF (1991) - *Caring for the Earth*

There is a need for everyone to understand the benefits and values of wetlands - no other natural system has such a profound effect upon our lives. In taking note of the need for the efficient targeting of resources and the basic educational principle that you must start where your learners are, there is a need to identify target groups and communicate with them in appropriate language.

A hierarchy of target groups for an EPAW programme can be identified with relative ease and is based upon the level of power to effect action for wetland conservation.

- decision makers (politicians, public servants, national and international development agencies, leaders of NGOs, etc.);
- opinion-formers and opinion-leaders (religious leaders, 'stars', writers, educators, media personnel *et al.*);
- landowners, industry and linked professionals with direct impact upon wetlands;
- communities and individuals having a direct relationship with and/or impact upon wetlands;
- communities and individuals with an indirect relationship with wetlands.

In drawing up target group priorities, it is clear that distinct differences exist between those designed to address 'developing', 'developed' and 'transitional' states. In general, the favoured approach for many developed nations involves the building of support upwards from the bottom-up - a more 'grass-roots'-based programme - whilst in most developing nations, an approach downwards from the top, which informs decision-makers, may be a more fruitful strategy.

The decision as to which strategy is adopted, nation by nation, cannot, and should not, be made at a global level - regional priorities may be identified, but real strategy can only begin to be developed at the national level. It is only at this level that political, cultural and developmental matters can be correlated and, in federated states in particular, the strategies would need to be modified further to

take into consideration provincial differences. In addition, levels of awareness of wetland values vary greatly between nations and between populations within nations.

There are various systems that can be tapped to deliver EPAW. The most obvious, and most used, are 'the media' (TV, radio, print and, increasingly, electronic networks), the formal education system (primary and secondary schools and tertiary establishments) and non-formal education systems (youth groups, scout/guide movement, etc). The use of these systems can create a climate within which grass roots action can develop. Other less obvious, but potentially more effective, communication systems should also be exploited, e.g. interpretation and exhibitory at leisure sites (zoos, botanic gardens, aquaria, museums, parks), developmental systems for health-care, literacy, etc., religious networks, oral traditions, etc.

Links with Other Initiatives

Opportunities exist, and others should be sought, to maximise the outputs of the programme beyond the promotion of the wise use of wetlands and awareness of wetland values.

The Convention on Biological Diversity, the World Heritage Convention, and the Commission on Sustainable Development and a number of other international agreements and conventions share aims and rationales for EPAW in common with the Ramsar Convention. The Bonn Convention (Conservation of Migratory Species of Wild Animals) also makes reference to education and public awareness activity. At regional level, the 'Agreement on the Conservation of African-Eurasian Migratory Waterbirds' under the Bonn Convention acknowledges the importance of EPAW activity to its success.

The relevance of each of these conventions to wetlands is plain - wetland systems are rich in species and habitat diversity; wetlands are probably the most exploited of all ecosystems by humans - a case being made by Ramsar for wise use (sustainable development); waterbirds and other wetland animals undertake considerable migratory journeys.

The programme proposed by the group could be used to support all of the education and awareness-related articles of each of the conventions - indeed the EPAW components could become key mechanisms for integrating the provisions of the conventions for those states that are signatories to two or more.

THE PROGRAMME (CONTENT, IMPLEMENTATION)

A Global Programme of Education and Public Awareness for Wetlands - Objectives

The programme should aim to provide a global overview and direction for EPAW and, where necessary, develop specific products that address common needs across the world. Through such a strategy, it is intended to increase the capacity of and provide a support mechanism for national

and local agencies, organisations and groups to develop their own programmes for EPAW. A useful and additional by-product of the programme will be a decrease in the amount of duplication of effort, particularly in the production of materials, that currently exists.

The following objectives could provide a framework for the work programme for the initial six years of operation (1996-2001):

i) to create a coordinating mechanism and structure for EPAW globally;

ii) to facilitate communications and information exchange between EPAW practitioners;

iii) to review and, if necessary, develop new training opportunities in EPAW;

iv) evaluate the effectiveness of existing EPAW programmes;

v) produce a range of resource materials aimed at various target groups in order to support national and local activity;

vi) evelop new initiatives and foci for EPAW activities in order to achieve the goals set out above.

Initiatives will be taken linked to '3 Ps', i.e.

- **People**/**practitioners**: Who catalyses activity and delivers EPAW? What are their needs?
- **Products**: What 'tools' (publications, resources, information, data, communication mechanisms, etc.) are needed to support the activity?
- **Places**: What types of activity can be encouraged on and around wetland sites (Ramsar, national and locally designated, etc.)?

These initiatives can be strengthened through the adoption of a campaign theme - called a 'programme organiser' below.

Specific Initiatives/Actions

The following is a list of possible actions that could be carried out as part of the programme. As mentioned above, this is not an exhaustive list, but care has been taken to develop interlinked ideas - each project relying upon the others.

People - Training and Communications

i) *Training for 'professionals'*
Undertake an EPAW training needs analysis, region by region. Analysis of EPAW components of current training programmes for wetland managers, rangers, wardens, etc. Develop courses in education and public awareness methods and techniques for delivery on a region by region basis. Develop courses on working with the media for wetland professionals.

ii) *Communications*
Instigate an electronic network ('WETNET' via Internet) with regional hubs for wetland educators. Develop a network of national coordinators and/or organisations linked to the hubs.

(It is unlikely that a discrete network of 'wetland educators' will be formed as envisaged with APWEN - the Asia-Pacific Wetlands Education Network. A more fruitful strategy is to encourage an emphasis on wetlands in existing environmental education networks. However, there will be a need for quick and efficient communications between coordinators - an electronic network can allow quick exchange and development, tele-conferencing, etc., and need not be exclusive.)

Products - Resources, Models

iii) *Database of existing resources*
The establishment of regional resource centres, probably based at existing institutions, housing a wide selection of materials already available for use in EPAW programmes; the logging of these resources, with descriptors, onto a central database accessed through 'WETNET'.

iv) *Modification of existing materials*
Following from Project (iii): Some existing materials have a limited distribution but their potential for wider usage is great, particularly when focusing upon tertiary education and decision-makers. *Wetland Benefits*, published by Wetlands International - Asia Pacific, is an example. Funding should be sought for wider distribution, translation, etc.

v) *The 'Wetlands Kit' - the global package of resources.*
Although a number of resources will be identified that deserve wider distribution, it will almost certainly be desirable to produce a new, all-purpose package of materials capable of adaptation for use with programmes targeted at a range of groups. It is proposed to design and produce a core suite of materials in a variety of media (e.g. booklets, posters, wallcharts, slides, video, CD-ROM, etc.) for use in awareness programmes.

vi) *Support manuals -information*
Educators need good, up-to-the-minute, accurate information when designing and implementing programmes. For the last global wetland campaign - 'Life at the Water's Edge' organised by WWF/IUCN in 1985 - a set of five ring-bound information manuals was produced, packed with current information in note-form. It is proposed to produce an updated version of these campaign packs, and make them available through 'WETNET' and in paper form.

Regular updates will be made on the network via the regional hubs. Newsworthy incidents and findings can be instantly relayed to the network and picked up by national and local coordinators for use in awareness raising activities.

vii) *Support manuals - models*

a) Campaigns and programmes: Research is needed into the success or failure of existing and past education and public awareness campaigns and programmes. This project will involve the production of reports of case studies from a range of awareness-raising initiatives, e.g. the Medwet project, GREEN, etc. From such studies, guidelines for good practice would be developed, e.g. working with schools, working with the media, community participation in wetland conservation, eco-tourism and wetlands, etc.

b) Centres: Wetland education centres have proven to be an effective means of increasing education and awareness. There is considerable demand for the development of models/'how to do it ... ?' manuals from all over the world (as experienced through Wetland Link International, a programme of The Wildfowl & Wetlands Trust). It is proposed to develop a series of manuals on a range of subjects, i.e. education on-site, interpretation, layout and exhibit design, visitor centre and hide design, outreach programmes, etc.

Places

viii) *Wetland education centres*
Centres (places for people to visit) with a remit to develop education for wetlands can become key mechanisms whereby EPAW and training for EPAW can be delivered. It would be necessary to consolidate the Wetland Link International programme, thence develop the provision of information exchange, knowledge and skills transfer (particularly north-south), personnel exchange and training, and centre advocacy. Work towards broadening remit to cover all education centres running wetland education programmes.

ix) *Ramsar League*
Development of a network of educators linked to Ramsar sites; development of curriculum-linked materials and schools-links for and between Ramsar sites and other internationally designated and potentially designated sites.

Programme Organisers

x) *World Wetland Week*
Each year for five years, a World Wetland Week would be held. Using the established networks of international waterbird counters, reserve managers, educators, etc. an opportunity would be generated for publicity/media coverage and dissemination. The changing themes could focus upon the five main values of wetlands, i.e. for biodiversity, food/products, water quality, water storage, flood/storm defence. Supportive campaign packs would be needed and would link into the development of the Wetlands Kit outlined above.

xi) *International Conference on Education and Public Awareness*
Timed to coincide with Ramsar 1999, and subsequent Meetings of the Contracting Parties (or the years previous to the Meeting); focus upon the needs and direction of the programme.

TIMING AND ORGANISATION

The timing of the programme is entirely dependent upon funding. The programme can be divided into two phases and it is hoped that some funding for all or part of the Phase 1 programme could be secured in 1996.

1996 marks the 25th anniversary of the Ramsar Convention, a fitting time to emphasise the importance of education and public awareness initiatives. It is envisaged that the programme will commence in late 1996/early 1997 and mark the beginning of a 6-year rolling programme as a minimum. The programme will be kept under constant review and adapted to changing circumstances and needs as they arise.

The phases of the programme would be as follows:

Phase 1 1996-98

i) Formation of steering and planning group (post-Ramsar 1996); establishment of programme co-ordination office.

ii) Identification of regional 'nodes': establishment of an electronic hub and provision of electronic communications between these and other users.

iii) Identification of national partners for the programme; connection to the electronic network.

iv) Regional workshops in order to identify specific regional needs and to develop action plans on training and resource development.

v) Consolidation of the Wetland Link International programme and formation of the Ramsar League of educators.

vi) Compilation of programme materials: (the production of the following begins during this period and rolls into Phase 2) .....

a) The Support Manuals - basic information for use by NGOs and other agencies joining the campaign (manuals bringing together the most up to date information on the threats to and values of wetlands, to include case studies of wise use in action);

b) The 'How to ...' Manuals
- case studies of various education and public awareness programmes run to date (successful and unsuccessful); identification of useful models for EPAW activities;
- the development of wetland centres (manuals on education on- site, interpretation, layout and exhibit design, visitor centre and hide design, outreach programmes, etc.);

c) The 'Wetlands Kit' - a range of resource materials for use in awareness programmes; includes brochures, wallcharts/posters, video, CD-ROM, instant exhibition, etc. Published in a number of languages (English, Spanish, French, German, Russian, Hindi, Malay, Arabic, Chinese, Portuguese, Japanese).

vii) Trials of World Wetland Week concept.

Phase 2 1999-2002

i) World Wetland Week - an annual event (different annual themes based upon the values of wetlands, i.e. for biodiversity, food/products, water quality, water storage, flood/storm defence).

ii) Launch of public campaign via a high profile international conference concurrent with Ramsar 1999 -

a) to include workshops on environmental education and awareness for sustainability via and for wetlands followed by the distribution of campaigns material (includes training on the use of materials);

b) publication of proceedings.

iii) Continuation of materials production from Phase 1 plus development of materials to support curriculum development in schools and colleges.

iv) Regional product development (following regional workshops in Phase 1).

The programme is ambitious, some would say too ambitious. Unless substantial funds can be secured, this programme will continue to be no more than 'words on paper'.

For it to succeed, dedicated staffing will be required and substantial resources would need to be fed into agencies in order to release the time of existing staff - this will require core funding. Other elements of the programme, particularly those with a concrete product such as a document, pack or event may well attract sponsorship or grant support, but this cannot be sought without staff.

A key source of such core funding could be an invigorated Wetlands Conservation Fund.

The inclusion of most of the actions outlined above within the draft Ramsar Strategic Plan (1997-2002) gives cause for optimism. Ramsar endorsement is a key tool in the development of this programme and the next step is to ensure the adoption of the draft plan, and particular Objective 3, *in toto.*

Most people agree that there is no need to develop a new agency to carry out the programme - there is a bewildering array of international NGOs and agencies already in existence. On balance, the new wetlands alliance formed from the merger of IWRB and AWB (including Wetlands for the Americas) is probably best placed to take the programme forward. However, on a purely practical level, there is little dedicated expertise on EPAW within the alliance and here, the role of the EPAW Group may be expanded to address this.

One possibility is to extend the partnership to include other NGOs with strong EPAW remits - The Wildfowl & Wetlands Trust being one such.

CASE STUDY NO. 13

WISE USE OF WETLAND RESOURCES: LESSONS DRAWN FROM SELECTED WETLAND SITES OF NEPAL'S TERAI REGION

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Key words floodplain, restoration, degradation, community, ecosystem, participation

Wetland resources are widely used by the communities of the Terai region in Nepal for their sustenance and economic well-being. However, because the wetland sites are diminishing rapidly, these resources have become rare and precious to the local communities; sustainable utilization and management of existing wetlands is the only way to conserve them. This paper discusses the major issues and problems related to the management and conservation of wetlands and their resources in five selected wetland sites in the Terai region. These wetland sites are considered to be the last remaining, and therefore critical, habitats for rare and endangered species of flora and fauna. It was found that over-use of resources is the major factor in the deterioration and degradation of wetlands and wetland resources. Siltation and sedimentation from the catchment areas has led to their decline. The vegetation succession in lake areas is enhanced by drainage from surrounding agricultural lands and livestock grazing on the shoreline. Lessons drawn from these case studies are highlighted and a management strategy based on people's participation and ecosystem approach is discussed. Finally, the paper provides an overview of the efforts made by IUCN in the conservation and wise use of wetlands and wetland resources in the Terai region of Nepal.

INTRODUCTION

Wetlands are considered to be the most productive ecosystems. Their importance in terms of biological resources and maintaining the natural equilibrium is well-established (DUGAN, 1990). The socio-economic attributes and social benefits that wetlands provide for humanity are vital for human sustenance, yet the conversion of wetlands to settlements and agricultural and industrial use is a common phenomenon. The situation in Nepal is no exception, especially in the Terai region.

Nepal's wetlands, which are distributed throughout the country, are undergoing subsidence, rapid vegetation succession, loss of vegetation, eutrophication, sedimentation, siltation, soil erosion, and diminution. If these phenomena continue, Nepal's wetlands will be completely destroyed and will disappear for ever. However, stopping and reversing the phenomena of wetland degradation is no easy task.

The Terai region, which comprises about 23% of Nepal's land area, ranges in altitude from 61 m in the south to 300 m in the north, and consists of a large number of wetlands (lakes, ponds, marshes, swamps, reservoirs, rice paddies and river floodplains).

Wetlands in the Terai region are eutrophic in nature (BHANDARI *et al.*, 1994), and are considered to be the most important source of livelihood for rural communities. In addition to the socio-economic values and benefits they provide for the communities, these wetlands are the last remaining habitats for many endangered and threatened species of flora and fauna. Many wetlands are vitally important as wintering and staging grounds for rare and migratory birds.

This paper discusses the threats and disturbances prevalent in five wetland sites of Nepal's Terai, and elicits lessons to develop a pragmatic management strategy for the conservation and wise use of their valuable assets - the wetland resources. Accordingly, the paper has been divided into five sections. Section I discusses current status and issues in the management and conservation of wetland resources in the Terai region. Section II identifies the major issues pertinent to sustainable utilization of wetland resources. Section III presents lessons learned from the selected case studies. Section IV suggests an outline of a management strategy for the integrated management and sustainable utilization of these resources in Nepal. Finally, the paper gives a brief account of IUCN's efforts in conserving and protecting wetlands and their resources in Nepal.

SELECTED CASE STUDIES FROM NEPAL'S TERAI REGION

Case Study 1: Beesh Hazar Tal

Situated 160 km southwest of Kathmandu in Chitwan District (27°37'N, 84°26'E) Beesh Hazar Tal is a beautiful lake rich in natural resources; it covers an area of about 30 ha. This tal (or lake) consists of a cluster of lakes linked by the Khageri Irrigation Canal. The lakes in the chain include Satra Hazar Tal, Kabra Tal, Choubish Hazar Tal, Kamuno Tal, Sano Ghol and Thulo Ghol. There is a permanent dam along the canal which feeds water to Beesh Hazar Tal when it is full during the rainy season. There is an outflow to the canal during the dry season.

The legal owner of the area is the Department of Forests. The lake, along with its forests, is being proposed by the government as a buffer zone to the Royal Chitwan National Park. The local communities are its main users, and tourists frequently visit the area. The tal is a sanctuary for resident as well as migratory birds, and is visited by Rhinoceros *Rhinoceros unicornis*. The tal is good habitat for Mugger Crocodile *Crocodylus palustris*, turtles *Kachuga* sp. and other aquatic animals. In 1994, five adult crocodiles were observed in the Beesh Hazar Tal during a night count (ANDREWS and McEACHERN, 1994).

The tal and its shore area are used for grazing animals, collecting fodder and fuel-wood, catching fish, and harvesting Water Chestnut *Trapa bispinosa*. These activities, which are not conducted in a sustainable manner, pose threats to the resources. Siltation, deforestation and eutrophication are common problems in the area; cutting and felling of trees also occurs. As a result, the habitat is degrading and deteriorating and the very existence of the tal is threatened.

The local people are keen to conserve and protect the resources from uncontrolled human encroachment and intervention. However, they lack the leadership to initiate conservation practices. Because of its situation near the highway, close to the town of Bharatpur and the Royal Chitwan National Park, the area has tremendous potential for generating income through ecotourism and other recreational activities. Any innovative idea to conserve the resources and empower local communities in the planning and management of these places would encourage their participation and involvement in the sustainable utilization of the tal and its resources.

Case Study 2: Ghodaghodi Tal

Ghodaghodi Tal (28°36'N, 80°45'E) is one of the ecologically most important and interesting lakes in Nepal. It is contiguous with seven other lakes: Nakhrode, Bainshawa, Ojuhawa, Ram Phal, Budi Nakhrode, Sun Pokhari and Bichki Tal.

The Ghodaghodi Tal area is biologically important because it is an ideal habitat for Mugger Crocodile, turtles, Common Otter *Lutra perspicillata*, and indigenous species of fish. The tal area also holds the endangered Monitor Lizard *Varanus flavescans* and Indian Python *Python* sp. Large species of tortoise *Kachuga* sp. are also reported to occur in the area.

About 140 species of bird, representing over 16% of the nation's avifauna, have been reported from the area. A few birds that breed in north Asia are also reported to occur here. However, birds are also threatened because of the destruction and deterioration of the surrounding forest area (BARAL, 1992).

The tal is widely used by local communities for fishing, grazing animals, harvesting lotus *Nymphaea alba*, and for collecting fuel-wood, fodder and timber. In addition, it is an area used for recreation and watering domestic animals.

The environment of the area is deteriorating mainly due to unplanned and uncontrolled human intervention, rampant harvesting of resources, felling of trees and overgrazing which, in turn, have added to the further deterioration of natural resources. Once the highway is completed, increased human pressure will cause the environment and ecosystem to deteriorate further, and this must be prevented. Very recently, people have started to build cottages and cattlesheds near the temple of

the Ghodaghodi deity, who is worshipped by local communities, to house the sacred cows that were offered to the deity on the auspicious occasion of the koti home (a Hindu ritual ceremony).

Case Study 3: Karnali River Floodplain

The floodplain of the Karnali River lies in western Nepal, at 28°26'N, 81°10'E, and covers an area of approximately 12,000 ha. The river is crossed by the Mahendra Highway at Chisapani in the Kailali District, and runs along the Royal Bardia National Park in Bardia. There is a barrage about 7 km south, in India, which stops the free movement of aquatic life in the river.

The Sunaha people are the main users of the river and floodplain resources. While Sunaha men are engaged in catching fish, the women pan for gold from motes found on the river bank.

The river is rich in aquatic life and resources, mainly the dolphin *Platanista gangetica*, turtles, fish, otters and birds, and the floodplain is a habitat for a large number of wetland-dependent animals such as rhinoceros, Swamp Deer *Cervus duvauceli* and birds. In October and November, waterfowl are plentiful in the area and are hunted using the gochhela, a 11-13 m long net.

The Karnali River carries tonnes of driftwood in the rainy season through the hills and mountains of the northern part of the country down to India, where it is collected to sell in the market. Driftwood collection is good business in India.

The Sunaha of the Bardia District generally use simal *Bombax ceiba* and haldi *Adina cordifolia* for making boats. These trees provide soft, light timber, which is excellent for making highly buoyant boats for the fast-running river and streams (IUCN NEPAL, 1995).

Deforestation due to human encroachment and reclamation of forest areas for agricultural purposes is a major problem in the floodplain area. Occasional flash floods and torrential monsoon rains have caused soil erosion, sedimentation and siltation in the river and have raised the water level. The river has formed numerous channels and islets, which are good for settlements and wildlife refuges.

Case Study 4: Halkhoria Daha

Halkhoria Daha is located 3 km north of the Mahendra Highway near the Pasad Khola in the dense forest of the Bara District (27°12'N, 85°04'E). This daha (lake) and its surrounding area fall under the Forest Management Plan prepared by the Department of Forests; it lies at an altitude of 164 m above sea level**.**

The daha is the only source of water for livestock and wildlife in the area. It is widely used as a source of drinking water and for fishing, collecting fodder, and grazing thousands of animals during the dry season. It is estimated that approximately 25,000 domestic cattle use the daha area for

grazing and watering purposes. Natural sedimentation and vegetation succession are occurring in the lake. Waterfowl are declining due to lack of food and open water. Fish populations are low and will continue to diminish as water is replaced by sediments. In order to conserve the daha and its resources, the first and most important step is to stop the practice of contract fishing, and ban the introduction of exotic species of fish. Pumping and draining through ditches are the main causes for the low water level in the daha (BHANDARI, 1994).

The daha is a religious site, and the Shahajnath Mahadev Temple of Kat Ghat at Kharia VDC (Village Development Committee) is of great significance in the central Terai region.

The Ratanpuri VDC proposed to develop the site as a resort area and decided to build a temple at Mahadev. However, work came to a halt because of a disagreement between the VDC and DDC (District Development Committee) over ownership of the lake. A similar dispute has arisen over the question of leasing the daha to fisherfolk on a contract basis. The practices used by the contractors, such as pumping out most of the water and the introduction of exotic fish species, has endangered biological resources.

Case Study Five: Restoration of Wetlands in Lumbini

As Lumbini was the birthplace of Buddha, it is a symbol of peace and compassion for the whole world. To date major development work in the area has focused on physical infrastructure, buildings and archaeological excavation as defined in the Master Plan. Considerable efforts have been made to 'green' the area, but no attempt has been made to restore the area with indigenous species of plants, animals and birds to reflect the environment that existed at the time of Buddha, about 500 BC. The site of the Lumbini Development Project, which covers an area of 9 km², is located at an altitude of 100 m near the city of Bhairahawa in Rupandehi District (27°28'N, 83°16'E). The area is mostly dry between October and May, but during the rainy season the area along the Harahawa River is inundated.

However, although the area is covered with green vegetation it is not rich in biodiversity. The planting of saplings has an artificial, arranged appearance. The surrounding areas are agricultural lands lacking natural vegetation. The local people are interested in planting trees on their lands so that they can meet their fuel-wood and timber needs. The information collected through the key informant interview suggests that local people are willing to cooperate with the Lumbini Development Trust in establishing an area with natural, biodiversity-rich vegetation. In order to achieve these goals, the area, particularly near the Harahawa River, needs to be replanted with the type of vegetation that existed at the time of Gautam Buddha. This should be done in such a way that it provides a refuge for birds, especially Sarus Crane *Grus antigone* and Blue Bull *Boselaphus tragocamelus*, both of which are found in the area. The locals complain that the Blue Bulls invade their fields and destroy grain and crops.

A summary status of these selected wetland sites is presented in Table 1. The table reveals that the legal owner of the wetlands lying outside the protected areas, including the area of the Lumbini Development Project, is the Department of Forests. However, there are many stakeholders in the utilization of resources, the most important being the local communities. Other users include government agencies and local level political organisations.

Table 1 Summary status of the selected wetland sites

Wetland sites	Owner	Area (in ha)	Stakeholders	Issues
Beesh Hazar Tal	DOF	30	DOF/VDC/ DDC/ Community/ FDD	Felling of trees Overgrazing Drainage Infilling Vegetation succession
Ghodaghodi Tal	DOF	138	DOF/VDC/ DDC/ Community/ FDD	Felling of trees Overgrazing Siltation Drainage Construction
Karanli Floodplain	DOF/ DNPWC	12,000	DOF/DNPWC/ MOWR/ Community	Human encroachment Deforestation
Halkhoria Daha	DOF	50	DOF/VDC/ DDC/FDD/ Community	Low water level Vegetation succession Grazing and watering Siltation Pumping
Lumbini	LDT	50	LDT	Water retention Lack of planting

Source: RAPID RECONNAISSANCE SURVEY (1993), IUCN Nepal.

Note: DDC = District Development Committee
LDT = Lumbini Development Trust
DOF = Department of Forests
DNPWC = Department of National Parks and Wildlife Conservation
FDD = Fisheries Development Division (Department of Agricultural Development)
MOWR = Ministry of Water Resources

MAJOR ISSUES

Some common issues identified from the case studies are described below:

i) Many institutions claim ownership rights over a single wetland site. For example, Ghodaghodi Tal falls under the jurisdiction of the Department of Forests. Its use is claimed by the Fisheries Development Division, the District Development Committee, local communities and the Village Development Committee. However, no institution actually takes responsibility for the management and conservation of the tal's resources. Because of this, its resources, both aquatic and terrestrial, have been over-exploited.

ii) The practice of pumping out water using high power pumps to harvest the maximum number of fish has lowered the water level in Halkhoria Daha, and is causing subsidence and allowing rapid vegetation succession (BHANDARI, 1994). Though draining the lake for fishing is common, excessive draining is disastrous for aquatic life. This has changed the land-use patterns in the area.

iii) Overgrazing of shore areas by domestic animals coupled with deforestation in all the case study sites has caused soil erosion in the catchment area and siltation in the lakes. This has threatened the very existence of the lakes.

iv) Infilling of the depressed areas to construct roads, culverts and irrigation canals is responsible for the disappearance of many marshy and swampy areas in the Beesh Hazar area of Chitwan District.

v) Easy accessibility to wetland sites through the development of infrastructure, coupled with the increasing population of the landless and near-landless, has exerted heavy pressures on limited community resources in catchment areas as well as in wetland sites.

All these factors have led to the gradual decline of lakes in the Terai. Without immediate intervention, it is likely that these wetlands will disappear entirely from Nepal. Thus, urgent measures are required to save these wetlands and their precious resources.

LESSONS DRAWN

Some of the lessons learnt from the case studies are presented below:

i) Since the primary cause for the loss and degradation of wetland resources are social and behavioral factors, socio-economic factors should be included in the management and conservation of wetland resources.

ii) The affected communities should be the target of any development project affecting the wetlands and their resources, and their main concerns should be incorporated into the project.

Means of alternative livelihood should be considered for those who will be directly affected by the project.

iii) All strata of local communities should be consulted and involved in all stages of project design, planning and implementation.

iv) The conservation and management of biological resources should recognize indigenous knowledge and technology, and strengthen the capability of the local people.

v) The practice of awarding fishing contracts in wetlands should be stopped immediately to avoid the loss of aquatic resources from the wetland areas.

vi) Heritage sites of local as well as national significance should be taken into account in the planning and management of wetland sites.

vii) The conservation of natural resources should not consist only of 'greening' the area, but should at the same time include planting for enriched biodiversity.

viii) The target of resource conservation should be well-defined, and the people affected should be identified.

SUGGESTED OUTLINE FOR A MANAGEMENT STRATEGY

Considering the issues identified above and lessons drawn from the five case studies, it can be concluded that a sound management strategy is needed to manage and conserve wetlands and wetland resources sustainably.

i) Any management of wetlands and wetland resources should be based on the ecosystem approach. According to SADAR *et al.* (1994), the ecosystem approach should:

   a) recognize and include the whole system, not just part of it;

   b) be based on natural geographic units such as watersheds or eco-regions, rather than political boundaries;

   c) focus on the interrelationships between the elements in the systems;

   d) understand that humans are part of the system, and not separate from it;

   e) recognize the importance of species other than humans;

   f) incorporate the concepts of carrying capacity and resilience, suggesting that there are limits to human activities.

ii) People should be the target of any conservation activity, and be involved in all phases of wetland conservation and management. Public participation requires building partnerships

between the public, the proponents, the government and other relevant organisations. SADAR *et al.* (1994) argue that a number of key elements must be present for these partnerships to work, such as:

a) Recognition that the **public** consists of a wide array of individuals and groups with different views, perspectives and interests;

b) Mutual trust and respect among all partners;

c) Good understanding of the diversity of values, goals and objectives of various segments of society;

e) Individual and collective responsible behaviour on the part of everyone;

f) Mutual recognition and acceptance of each others' rights, interests and aspirations;

g) Development and implementation of mutually agreed roles and procedures for conducting public meetings and consultations.

iii) Local skills and technology should be the basis for the conservation and sustainable utilization of resources in the area.

iv) A multi-disciplinary team should be involved in the management and conservation of resources.

IUCN NEPAL AND WETLANDS CONSERVATION

IUCN Nepal started its wetlands programme in 1992; its aim was the wise use and conservation of wetlands and wetland resources. Its first action was the formation of a multidisciplinary National Wetlands Group, representing 11 different agencies. Through this group, it has been successful in advancing the cause of wetlands and raising people's awareness in Nepal. With the help of participatory exercises, IUCN Nepal has developed a rapid reconnaissance survey form to collect data on wetlands and wetland resources. Using this survey form, data on 60 wetland sites have already been collected. A data sheet has also been developed and pre-tested for a detailed study of the wetland sites.

A National Workshop on Wetlands Management in Nepal was organised and the proceedings, *Safeguarding Wetlands in Nepal*, published. Limnological studies of many lakes in Nepal, including the Koshi Tappu Wildlife Reserve, the only Ramsar site in Nepal, have been conducted, and *Limnological Survey of Devi Tal Wetland* and *Crocodile Conservation in Nepal* have been published.

An Environmental Impact Assessment (EIA) of Halkhoria Daha was conducted by IUCN, which is also undertaking a study in the Karnali and Narayani River Basins to develop a management plan for the conservation and protection of their aquatic biodiversity.

IUCN Nepal's National Conservation Strategy Implementation Project has completed local-level planning of the environmentally fragile lakes of Pokhara - Phewa and Begnas Lakes - and has prepared management guidelines for conserving and managing them sustainably.

With a view to assessing the current status of wetlands and their resources, IUCN Nepal has already established a national wetland database system. The database includes bio-physical, limnological and socio-economic information, maps, images, sounds, etc.

IUCN Nepal is also collaborating with the Lumbini Development Trust to restore the wetlands in the Lumbini Development Project site in Rupandehi, and with the Department of Forests in developing a community-based management plan for the sustainable utilisation and conservation of natural resources in Beesh Hazar Tal in Chitwan. The main thrust of this collaborative work is to strengthen the capacity of organisations and empower local communities to manage these resources for their welfare and prosperity.

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CASE STUDY NO. 14

THE MANGROVE FOREST - AN IDEAL LOCATION FOR LEARNING BIOLOGICAL CONCEPTS

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Key words mangrove, biology, field trip, concept map

The mangrove forest is an ideal location for students to study biology. They can learn about botany from the classification of mangrove plants to the interesting adaptations of these plants to survive in this habitat. Mangrove plants have to overcome problems of physiological drought, the asphyxiatic condition of the soil, weak support and drowning of seeds. The large number of animals found here can enhance their knowledge of zoology; in ecology, concepts of colonization, succession, the food web, soil conditions, tidal changes, etc. become real. Students can expand their horizons by looking into the economics and usefulness of products derived from the mangrove forest. They can also investigate the environmental issues involved and appreciate the need for the conservation of this rich heritage of ours.

This habitat is commonly found along the coast of Malaysia. Apart from staff of schools in the very interior, teachers can organize day trips or camping outings to these easily accessible places. There are several advantages in using the mangrove forest as a place of study compared to other natural habitats. For most students, a visit here will add another dimension to fieldwork, which is usually restricted to areas around the school compound, like the school field. After visiting this unusual but interesting habitat, students will most probably become more enthusiastic about learning science, particularly biology.

INTRODUCTION

To many people, the image of the mangrove swamp is that of a creepy place full of mud and slime, with ugly creatures or fearsome monsters lurking in its midst. The majority would refuse to be coaxed or at once decline an invitation to visit such a site. Many would probably be glad to support any development plans to remove these unsightly and dirty locations. Cinema film and television programme producers should share some responsibility for this perception as they have helped fan this inner fear and revolting mental picture by portraying this habitat as far from friendly. In *Star Wars*, for example, the swamp where Luke Skywalker's airship sank had eerie creepers all over the tree branches. The story of the *Swamp Thing* revolves around a green, slimy monster that can suddenly appear and disappear into the murky waters. Contrary to this sensationalised make-believe, the mangrove forest actually represents one of the most interesting areas in which to study several concepts and relationships in biology. Biologists and environment enthusiasts think that

mangroves are fantastic and beautiful places - mud and all. For secondary-school students, a visit to a mangrove forest will demonstrate several terms found in the ecology chapter of their biology course. They will have an opportunity to relate what they have learnt from theory classes to the actual world.

The biology syllabus has often been accused of cramping too much factual knowledge together or being heavily theory-laden; it seems to include too many concepts. For example, in ecology, students need to understand terms such as colonization, succession, territorial behaviour, competition, etc. and discuss the adaptations of fauna and flora to various habitats. SHAYER and ADEY (1981) argued that the conceptual demands of the syllabuses of some science subjects are higher than the students' capabilities. This 'mismatch' would probably be much reduced if students were allowed to witness for themselves the various concepts occurring in nature.

ORGANIZATION OF FIELD TRIPS

In the teaching of biology, organization of field trips is encouraged. JENNINGS (1986) suggested that we should look seriously into the use of the locality as a teaching resource in science education. In Malaysia, we have many local resources that are suitable for field trips, one of which is the mangrove forest. Yet many teachers shy away from taking up the challenge. There are many reasons for this lack of enthusiasm.

Firstly, suitable time has to be allocated for these visits. Some teachers are unwilling to sacrifice part of their own time to organise and be with their students. Many put the blame on the cramped syllabus that they are required to complete. Week-ends and school or public holidays are suitable, but many teachers find it difficult to leave their family commitments at these times. Moreover, many teachers, especially biology teachers, are women who are expected to care for their families during their free time. Maybe a compromise can help solve this problem: they could make the field trip an outing for their families too.

Much effort is required to make the trip a success. Proper planning, the devising of student tasks, marking reports, etc. place demands on the already heavy workload of teachers. Bogged down with administrative work, many teachers hardly have the energy left to write letters, prepare indemnity forms, arrange transport, etc. All these constraints really put to the test the attitude and dedication of the teachers concerned.

Many are afraid of the risks involved. Should any accident occur, their whole career might be jeopardised. As student discipline continues to deteriorate, teachers find it more difficult to keep

an eye on each student. Objections from over-protective parents or lack of support from headmasters, many of whom are nearing retirement age, can kill the teacher's initiative. Some teachers have little knowledge of the habitat and are reluctant to refer to resource materials. Lack of funds can be another serious obstacle. Whatever the reasons, it is a great pity that teachers do not fully utilize this useful resource which might be located on their very doorstep. For those who are dedicated enough, the mangrove forest represents an ideal location to visit and study nature.

THE MANGROVE FOREST

Visiting the mangrove forest has several advantages over other locations: most are easily accessible by road, there is no need to venture onto forest trails to see tropical rain forests or climb a mountain to witness highland vegetation. Along the coasts of Malaysia, especially on the west coast, mangrove forests abound. Seldom do we encounter a school which is too far from a mangrove forest. There is no need to organize overnight trips. The number of species of flora and fauna found in the mangrove forest is not overwhelming but relatively small compared to the number to be found tropical rain forests. This makes identification a much easier task. Although low in the number, most of the species are found in abundance, so locating a particular species of tree or animal presents less of a problem. Much time is saved in looking for a certain species to study.

The location is comparatively safe for the students. There are no risks of slipping or falling down slopes, drowning, or getting lost in the forest or cave. Although it is a muddy place, proper attire such as rubber boots should solve the problem.

Apart from all these advantages, the mangrove is ideal for studying certain biological concepts. Colonization and succession can also be studied in a disused tin mine but the two processes are more obvious in the mangroves, where both the colonizers and the successors are found side by side. Students can see how, through silting, the *Avicennia* and *Sonneratia* species are gradually succeeded by *Rhizophora* and *Bruguiera* species, which in turn are replaced by other plants further inland. Line and belt transects can help to demonstrate the different zones. This zonation of the different species is difficult to demonstrate in disused tin mines.

The unique soil condition here presents an interesting aspect for study. Students can investigate or measure the pH, salinity, water content, size of soil particles and oxygen content of the soil and compare them with those of other types of soil.

Students can examine the various problems faced by plants living in this habitat and appreciate how each of these problems is overcome to enable the plants to survive. By right, the myriad

unfavourable living conditions in the mangrove forest should render it one of the most uninhabitable places on Earth. Indeed, how the mangrove plants adapt to the surrounding conditions is in itself a miracle. It is as if God had endowed these plants with special adaptations to not only survive but also to prosper in these unfriendly conditions. Firstly, the lack of support is obvious, due to the soft mud. Students can see how plant roots spread over large areas and how stilt and buttress roots help support by providing a larger base. Secondly, the cells in the roots face endo-osmosis and physiological drought. Water is abundant but, because of the high salinity, tends to be drawn from the cells rather than be absorbed into them. Salt in the surrounding water diffuses into the cells. One can marvel at how the plants maintain a highly concentrated cell sap, have exposed roots that are capable of quickly absorbing any rain water, and specialised cells on the under surfaces of leaves that excrete salt. Succulent leaves help to store water while the waxy cuticle on the upper surfaces of leaves prevents excessive loss of water through transpiration. Specialized roots like the stilt roots, erect breathing roots and knee-shaped pneumatophores present a solution to the flooding caused by high tides each day. These roots are equipped with numerous lenticels to facilitate gaseous exchange in order to overcome the asphyxiatic condition in the soil.

Among the most intriguing features of mangrove plants is the evidence of vivipary. Normal seeds would not survive here, as they would sink and drown in the mud. Plants like the *Rhizophora* species exhibit this feature, which is usually associated with mammals. The seeds germinate before separation from the mother plant. This gives rise to long radicles which, when freed, stab into the mud, keeping the seed above the mud or water level. If one is lucky and the timing is right, the actual process can be witnessed occurring in nature. In contrast, the seeds of *Avicennia* and *Sonneratia* species have fibrous coats to keep them afloat in the water. The tide brings them to a new place to colonize. A detailed description of the flora of mangroves is given by TOMLINSON (1986) in his book, *The botany of mangroves.* As well as the flora, the fauna in this habitat is equally startling.

Here, one can observe the basking mud-skippers and study their aggressive territorial behaviour. They have eyes on top of their heads for a larger angle of vision to detect the slightest threatening movement. The majestic King Crab and the oversized pincer of the male Fiddler Crab, *Uca* spp., used to attract the females, are fascinating. At least one location was found to be the haunt of fireflies, which present a fantastic view on the river banks at night, much like myriad illuminated Christmas trees. For bird-lovers, there are a variety of species of birds like the herons, *Ardea* sp., and bitterns, *Ixobrychus* sp., which live here. Many species of reptile and mammal can be found in this habitat. Crocodiles, *Crocodylus* sp., are known to roam the mangroves but have now been driven close to extinction by hunters interested in their skins. Long-tailed Macaques, *Macaca* sp.,

and the strange-looking Proboscis Monkey, *Nasalis* sp., dwell in Malaysian mangrove forests. Rather than looking into the various adaptations of these animals, one can choose instead to chart the food-webs associated with this habitat.

The mangrove flora and fauna also contribute many different products, some of which represent the livelihood of the indigenous people. These products can be categorized as direct and indirect products. The *Handbook for mangrove area management* edited by HAMILTON and SNEDEKER (1984, p.2) lists these various products in detail. The direct products include fuel, construction materials, fish traps, agricultural products, paper products, food, drugs, beverages, household items and products used in the textile and leather industries. Indirect products range from fish, crustaceans, molluscs as food, honey, wax, fur and skin of reptiles and mammals. The mangrove forest can also be a venue for recreational purposes like hunting, fishing or simply watching the wonders of nature found there.

For those interested in pollution problems, the mangrove forest offers an example of how industrial waste, sewage, agricultural run-off of soil, pesticides and fertilizers threaten the existence of this habitat. One can study how indiscriminate dumping affects the population of certain species which in turn affect others in the food-chain or food-web.

Others might like to investigate how development projects, old agricultural practices and fish or prawn farming can cause the eradication of these natural surroundings. Some of these areas are used as land-fills or rubbish dumps. Lastly those concerned with conservation can study how mangrove forests can be managed and their resources used wisely to ensure the sustainability of these forests. In addition to the various products and uses derived from the mangrove forest, one can examine how this habitat serves as a natural hatchery and nursery for many species of marine life. In fact, it has been estimated that more than half the commercial harvest of the oceans depends on coastal wetlands and estuaries at some stage of their life. The complex concepts and terms related to the mangroves can be condensed using a concept map. An example in shown in Figure 1. With this map, teachers and students alike can probably understand and remember better the various processes involved.

CONCLUSION

All these interesting concepts and the knowledge that we can acquire from mangrove forests indicate that this habitat is an invaluable place for students to visit and study. It is important that we expose children early to these concepts so that they will gain a firm understanding and be able to make

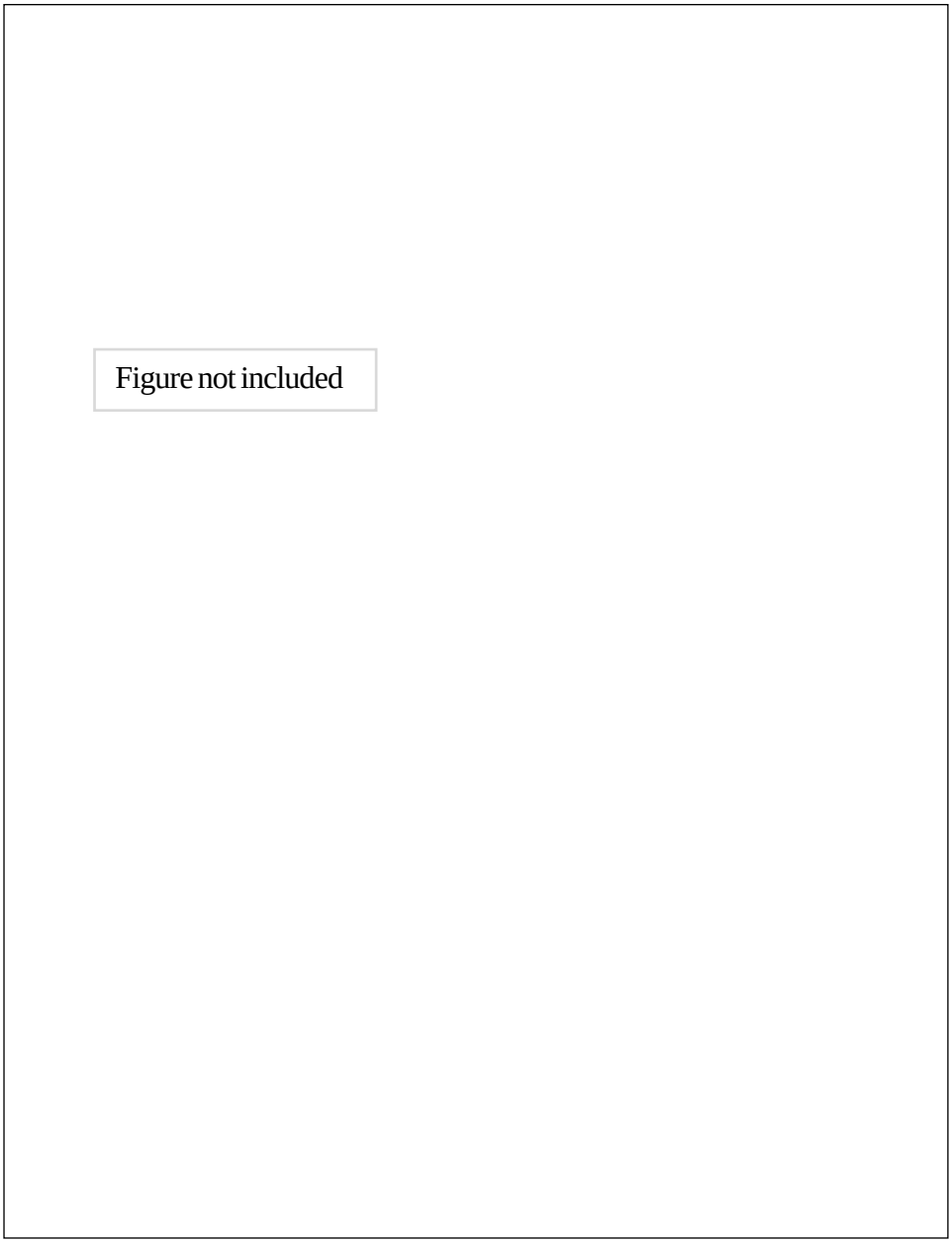

Figure 1. Concept map

sound decisions later in life. Educating adults presents many problems, one of which is the difficulty of getting them together because of their family commitments. An ideal place to start educating the population is at the secondary school level. Visits can be easily organized. Students are more receptive than adults as they do not have already-set ways of thinking. Interest in science and love for the environment can be instilled in students so that they see the importance of conserving and protecting this diminishing yet important golden triangle of our environment. It is our fervent hope that the wise management of these forests will ensure that these habitats can continue to be our heritage and areas of interest to be visited by students for many, many generations to come, if not forever.

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Appendix 1

INTERNATIONAL CONFERENCE ON WETLANDS AND DEVELOPMENT

9-13 October 1995

The Kuala Lumpur Statement on Wetlands and Development

An International Conference on Wetlands and Development held in Selangor, Malaysia, from 9-13 October 1995, was hosted by the Ministry of Science, Technology and the Environment, the Selangor State Government and the Institute of Advanced Studies, University of Malaya, and opened by the Prime Minister of Malaysia, YAB Dato' Seri Dr. Mahathir Mohamad. The Conference was organised by the Asian Wetland Bureau (AWB), the International Waterfowl & Wetlands Research Bureau (IWRB) and Wetlands for the Americas (WA), and supported by other organisations, with 278 participants drawn from 60 countries.

Commending the Government of Malaysia for hosting the Conference, promoting the wise use of wetlands internationally and more specifically in Malaysia, and for designating Tasek Bera as its first Ramsar site;

Welcoming the creation of Wetlands International through the linkage of the Asian Wetland Bureau, the International Waterfowl & Wetlands Research Bureau and Wetlands for the Americas;

Recognising that wetlands form an irreplaceable and essential component of the Earth's natural systems, and noting especially their support of local human populations and development, the maintenance of biodiversity, their hydrological and ecological functions and their critical role in the life cycle of many species;

Appreciating the critical importance of cultural heritage and local practices in the wise use of wetlands (defined at the Fourth Conference of the Contracting Parties to the Convention on Wetlands of International Importance especially as Waterfowl Habitat held in 1987 at Regina) and that local communities have an important role to play in the development process;

Concerned that there has been a significant loss and degradation of wetlands with the consequent reduction in global biodiversity, and that there are serious, on-going and impending threats to many remaining wetlands;

Recalling the provisions for wise use of wetlands, that the conservation of biological diversity is a common concern of humankind, and the philosophy of sustainable development;

Conscious of the urgent need to strengthen international cooperation and partnerships between governments, non-government organisations, local communities, the private sector and others;

Acknowledging that the private sector and the development assistance agencies are showing increased interest in accommodating sustainable use and sound environmental management principles in development plans;

Concerned further by the limited human and financial resources currently allocated to the conservation and wise use of wetlands;

Stressing the need to enhance cross-sectoral planning for wetland use within the framework of holistic environmental management;

Aware that there is an urgent need to increase understanding and share knowledge of wetland functions, values and management practices;

Determined to conserve and use wetlands sustainably for the benefit of present and future generations;

the Conference urges governments, intergovernmental organisations, regional economic integration organisations, local communities, non-governmental organisations, the private sector and others

TO WORK TOGETHER TO PREVENT FURTHER LOSS AND DEGRADATION OF WETLANDS, TO ENSURE THEIR WISE USE, AND TO MAINTAIN, RESTORE AND APPROPRIATELY ENHANCE WETLAND BIODIVERSITY AND FUNCTIONS.

The Conference recommended:

1 That governments develop policies and legislation to ensure the sustainable use of wetlands, recognising best, multi-sectoral practice, in both public and private sectors, and that planning for the conservation and development of wetlands should be undertaken at the appropriate international, national and local levels;

2 That the cooperative spirit of this Conference be further developed through partnership between the private sector, local communities, non-governmental organisations, government and development agencies to help establish specific mechanisms and methods for the wise use of wetlands which can be promoted and applied throughout the world;

3 That the planning of land-use, water management, economic development and conservation should be integrated at catchment scale, including coastal areas, taking into account hydrological, ecological and human interrelationships and needs;

4 That activities likely to affect wetlands should proceed only after consideration of environmental assessment and include appropriate review stages. Prior socio-economic and environmental impact analysis of individual project components should be carried out and taken into account during the implementation phase. Long-term and cumulative impacts, and the effectiveness of wetland management and restoration, should be monitored and fed back into reviews of these procedures;

5 That more resources should be provided in order to enhance understanding, knowledge and awareness of wetlands, to establish their true economic, social, cultural and ecological values, and to promote greater appreciation of their intrinsic worth;

6 That to build upon the environmental framework negotiated at the United Nations' Conference on Environment and Development in Rio de Janeiro in 1992, incremental cost analysis is recognised as a valuable tool for choosing between alternative development options, and should be given high priority to assist the wise use of wetlands and the conservation of their biodiversity;

7 That, recognising the importance of cultural heritage, local practices and indigenous knowledge, it is essential to identify ways in which the livelihood of local people in wetland areas can be maintained and improved while safeguarding the wetlands and their resources for the benefit of future generations. In order to ensure sustainable use of wetlands and avoid adverse impacts, local people should be integral to the planning process and involved from the outset in development;

8 That international cooperation should be enhanced to assist the exchange of information and expertise, to develop site networks, flyway management agreements and conservation strategies, such as the Asia-Pacific Waterbird Strategy, and to implement action plans to protect wetlands and their wildlife, especially waterbirds;

9 That improved programmes should be developed providing education, training, information materials and mechanisms to improve the level of awareness and capacity to implement wetland conservation and sustainable use, for example, the establishment of an annual World Wetlands Day to effect popular mobilisation. Particular attention should be given to those people living in and around wetlands, to other users of those wetlands, to decision makers and to wetland managers.

The Conference requested that Wetlands International should seek the support of the Government of Malaysia and convey this statement to the 6th Conference of the Contracting Parties to the Ramsar Convention to be held in Australia in March 1996. Further, the recipients of this statement, participants and conference organisers should strengthen their efforts and partnerships to help achieve the conservation and wise use of wetlands.

Appendix II

WORKSHOP 3: WETLANDS, LOCAL PEOPLE AND DEVELOPMENT

RECOMMENDATIONS AND CONCLUSIONS

INTRODUCTION

Workshop 3 considered the role of local people in the planning and management processes on and around wetland sites. It also considered the need for education and awareness raising on the values and benefits of wetlands amongst these and other target groups. The central focus for this workshop was people, and, as is often the case when considering our own species, the discussion resulted in an exchange of deeply held beliefs and times of high passion.

The three sub-themes - 'Local input into planning', 'Sustainable management by local people' and 'Increasing community awareness of wetland values' - are inter-related and there was considerable overlap in the conclusions.

THEME GROUP 1: LOCAL INPUT INTO PLANNING

Local communities and indigenous peoples have used, improved and maintained wetlands for securing livelihoods and maintaining cultural identity. In the process they evolved many community codes, rules and regulations that have been internalised in their belief systems and religious practices. Local institutions have been built to manage wetlands and other natural resources in a sustainable way. In turn, the wetlands provided the food, fodder, fibre and other basic and cultural needs of these communities for centuries.

But during the last few decades the pressure of development and the related political, social and economic changes have directly or indirectly undermined the role of communities in managing wetlands. Therefore the local communities and their knowledge systems are critically important to conserve and improve the wetlands in order to secure livelihoods for the millions of people who rely on them.

Local communities need to be involved in the planning of wetlands. National strategies, international conventions and donor agencies have to recognise and make appropriate changes in their policies to empower local communities.

Considerations in the planning process:

i) Overall considerations

- There is an increasing need to balance development and conservation.
- This means a shift from a project-based to a process-driven approach.

- It should be recognised that there is a wealth of experience and knowledge out there - this indigenous and local knowledge is a critical and often untapped resource available to aid the process of successful programme design.

ii) In designing and planning development programmes we should bear the following in mind and address the challenges accordingly:

- Preconceived programmes often exclude local people - they do not fully appreciate and take account of the feelings and needs of the local people.
- In order to address this a full understanding of the history and culture of local people is vital.
- Early local consultations are vital to the success of programmes.
- Agree on the agenda jointly and at all stages make process transparent.
- Recognise the importance of local organisation and promote its use in the process.
- We should be more humble and treat traditional knowledge and scientific evidence with equal respect.

iii) The process approach implies a total involvement by local people - it also implies that lessons are learnt and evaluative cycles are built in. In short....

- Local people should be seen as central actors in wetland conservation and management.
- We must learn from experience and build upon case studies.
- Implement local level pilot project as tests in the process of evolving the management plan.
- Do not impose but empower.

and in conclusion.....

- Share the benefits of successful management fairly with the local people.

THEME 2: SUSTAINABLE WETLAND MANAGEMENT BY LOCAL PEOPLE

In most situations, sustaining biodiversity will be best achieved by involving localcommunities in the management of those resources.

Experience so far from all regions shows that this is still an evolving approach, but the following issues have been recognized as critical:

i) The appropriateness and strategy of community management depends upon population socio-economic status, density and cohesiveness. In some instances a 'top-down' approach may be unavoidable; in others, a 'bottom-up' community approach will be highly desirable.

ii) It is important that appropriate social structures are present within the community.

iii) The sustainability of the wetland concerned will depend upon the values perceived by local communities, other users and government.

iv) The use of the resources must be economically viable and ecologically sustainable.

v) Sustainable use should be monitored by selecting key indicator species and observing trends (i.e. monitoring should be simplified as far as possible).

vi) Management plans should incorporate traditional values, knowledge and local laws that support sustainable natural resources utilization.

vii) The formulation and implementation of management plans must take place with the active involvement of local people and other relevant stakeholders.

viii) Management plans need to incorporate mechanisms to reduce conflict between stakeholders. Conflict often arises from lack of attention to equity and benefit allocation.

ix) Management plans need to incorporate limits for biodiversity change, not withstanding that development concerns may urge otherwise.

x) Community management cannot work within a vacuum, particularly where there is no supportive framework of policies, legislation, the judiciary and other functional links with government institutions. It is highly important that issues of land tenure, resource access and property rights and adjacent activities are addressed.

THEME 3: INCREASING COMMUNITY AWARENESS OF WETLAND VALUES

Integrated programmes of education and public awareness are needed to provide an understanding of and support for the sustainable management of wetlands. Focusing on the range of benefits provided by wetlands is an essential ingredient of such programmes and will be seen as of prime importance to the communities who live in and around wetlands. Increasing awareness can empower local people in their vital role in wetland management.

In addition to the population at large, people from a range of sectors having an indirect effect upon wetlands must be also be made aware of wetland benefits and of the need for their wise use. Most often it is the actions and attitudes of 'outsiders' that set the agenda that results in local degradation of ecosystems.

A number of strategies should be employed to achieve these ends.

Firstly they could be achieved through developing and implementing programmes that address the following needs:

- the need for information exchange - sharing information on models, both 'successful' and

'unsuccessful'. There is a need for an efficient means of networking those responsible for the development of these programmes to be found.
- the need to develop 'criteria for success' and mechanisms for evaluation.
- the overall development of relevant and effective approaches for a range of target groups.
- the need to become multi-disciplinary in approach i.e. learning from a range of disciplines that have proven success in influencing attitudes and behaviour e.g. marketing, public relations. There is also a need to extend training opportunities in communication skills, environmental education and awareness-raising techniques and a range of linked fields.

A global, coordinated approach may address some of these needs. A workshop held in Kuala Lumpur in March 1995 discussed a variety of proposals for such a coordinated effort - the results of this workshop have been formulated as Objective 3 in the Ramsar Convention's Strategic Plan (1996-2002).

Taking a global approach confers certain benefits - but there are also significant limitations.

On the positive side, a global approach:
- encourages communication of ideas and projects across geographical and cultural boundaries;
- enables local and national initiatives to have an international context;
- is a more efficient strategy as it encourages the pooling of resources and seeks to avoid unnecessary duplication of effort.

The major limitations are:
- that effective EPA is best developed and delivered locally; any initiative devised globally or regionally must also include mechanisms for local action;
- that the priorities, particularly when devising programmes linked to specific target groups, will vary from country to country and region to region, and with the economic status of the nation (developed, developing and transitional); given this requirement for flexibility, it is extremely difficult to devise single-solution materials and projects.

Underpinning all activity is the basic fact that:
- effective EPA must begin 'where the learners are' and take note of cultural, social and political realities;

Given these benefits and limitations, the global dimension is best pursued as a coordinating mechanism for information exchange and general resource development in order to facilitate action at regional, national, and thence local, levels.

The most effective action can only be taken at local level, addressing the needs of the local situation and local people. Targeted programmes at the local level require that a range of activities:

- Clearly identify the objectives and goals.
- Identify target groups: there is a range of targets groups for any education and public awareness activity - the relative importance in terms of priority will vary dependent upon the local situation, as will the mechanisms for identifying the most appropriate priorities; the following is a simple classification:
  - decision makers (politicians, public servants, national and international development agencies, leaders of NGOs, etc.);
  - opinion-formers and opinion-leaders (religious leaders, 'stars' writers, educators, media personnel *et al.*);
  - landowners, industry and linked professionals with direct impact upon wetlands;
  - communities and individuals having a direct relationship with and/or impact upon wetlands;
  - communities and individuals with an indirect relationship with wetlands.
  - In drawing up target-group priorities it is clear that distinct differences exist between those designed to address 'developing', 'developed' and 'transitional' states. In general the favoured approach for many developed nations involves the building of support from the bottom-up - a more 'grass-roots' based programme - whilst in most developing nations, a 'top down' approach that informs decision-makers may be a more fruitful strategy.

- Determine the most effective approaches: these will vary, again, due to social, economic, cultural and political differences however there are generic principles that should feature in the development of any local programme i.e.

  - ensure that the effects are sustainable and will survive well beyond the set-up phase
  - wherever possible have a multiplier effect

  and, most importantly,

  - create and maintain a sense of local 'ownership' (in terms of concept and implementation)

Implement and evaluate.

CONCLUSIONS

To ensure the sustainable utilisation and management of wetlands, it is essential that the planning process involve and empower local communities and indigenous people in ways that mean that their livelihoods can be improved whilst maintaining wetlands and their values for the benefit of present and future generations.

The major conclusions are outlined above, but an undercurrent of concern, resulting in a challenge, flowed throughout the workshop. This challenge is of particular concern to the newly formed Wetlands International and its regional licensees: it is to seek ways to strike a balance between an overtly research/

information-gathering mode of operation and concern (as at present) and one that is more community/awareness driven. It is hoped that Wetlands International and others will take up this challenge and redress the balance.