



# Application of the Ecosystem Approach to Wetlands in Vietnam

Hanoi, January 9 -11, 2008



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Dr. Gill Shepherd and Mr. Ly Minh Dang

Hanoi

January 9 - 11, 2008

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As part of this work, two Mekong-based workshops to assess the value of the Ecosystem Approach in a range of protected areas in the Mekong Delta were jointly organised by the Vietnam Environmental Protection Agency, now the Vietnam Environmental Administration (VEA) in Hanoi, IUCN, MWBP, and Can Tho University under the guidance of Dr. Duong Van Ni.

It was clear that a series of national level issues needed debate, and in due course funds were raised in Hanoi by VEA, and in London from the UK's Department of Environment, Food and Rural Affairs (DEFRA), and the UK's Joint Nature Conservancy Committee (JNCC). IUCN Vietnam also contributed funds to this end.

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# Acronyms

<b>CBD:</b>	Convention on Biological Diversity
<b>CBM:</b>	Community-based management
<b>CS:</b>	Case Study
<b>DARD:</b>	Department of Agriculture and Rural Development
<b>DEFRA:</b>	UK's Department of Environment, Food and Rural Affairs
<b>DONRE:</b>	Department of Natural Resources and Environment
<b>EA:</b>	Ecosystem Approach
<b>EIA:</b>	Environmental Impact Assessment
<b>FAO:</b>	Food and Agriculture Organisation (of the United Nations)
<b>FAT:</b>	Field Assistant Teams
<b>FPD:</b>	Forest Protection Department
<b>FSSP:</b>	Forestry Sector Support Program
<b>GIS:</b>	Geographical Information System
<b>ICF:</b>	International Crane Foundation
<b>IUCN:</b>	International Union for Conservation of Nature
<b>IUCN CEM:</b>	IUCN Commission on Ecosystem Management
<b>JNCC:</b>	UK's Joint Nature Conservancy Committee
<b>MARD:</b>	Ministry of Agriculture and Rural Department
<b>MONRE:</b>	Ministry of Natural Resources and Environment
<b>MWBP:</b>	Mekong Wetlands Biodiversity Programme
<b>NGO:</b>	Non-Government Organisation
<b>NP:</b>	National Park
<b>NR:</b>	Nature Reserve
<b>PA:</b>	Protected Areas
<b>PPC:</b>	Provincial People's Committee
<b>SUF:</b>	Special Use Forest
<b>VEPA:</b>	Vietnam Environmental Protection Agency
<b>WRI:</b>	World Resources Institute

# Chapter 1: Background and workshop methodology

In 2006, a pair of field-level workshops on the application of the ecosystem approach (EA) in wetlands management was jointly organised by IUCN Commission on Ecosystem Management (IUCN CEM), by the Vietnam Environmental Protection Agency (VEPA) in Hanoi and by the Vietnam component of the previous IUCN Mekong Wetlands Biodiversity Programme (MWBP).

These workshops were held in the Mekong Delta and were mainly for managers of wetland protected areas. They discussed a range of local management problems, and it became clear that if the ecosystem approach were to have practical application at this level, then higher level policy issues also needed to be addressed.

The workshop held in Hanoi on January 9-11, 2008, was funded by the Vietnam Environmental Protection Agency (VEPA), IUCN Vietnam, the UK Department of Environment, Food and Rural Affairs (DEFRA), and the UK Joint Nature Conservancy Committee (JNCC). In particular it was built on:

- *The CBD's Ecosystem Approach, and IUCN CEM's work on piloting and analysing its practical applications in Vietnam and elsewhere, as a way of considering biodiversity and socioeconomic problems and solutions in an integrated manner;*
- *The findings of the two workshops held in Vietnam in early- and mid-2006 as part of the Mekong Wetlands and Biodiversity Programme. Extensive consultations with local people, local authorities, university researchers and others had already taken place, including a training workshop on the Ecosystem Approach and Protected Area management in the Mekong Delta implemented by IUCN jointly with Can Tho University.*

The Hanoi workshop comprised two separate events, with largely different participants at each. They were arranged on Days 1 and 3 of the overall workshop, with a day between them in which the organisers could take the outcomes of Workshop 1 on Day 1, and prepare them for Workshop 2 on Day 3.

## Application of Ecosystem Approach to Wetlands in Viet Nam, January 9-11, 2008, Hanoi, Vietnam

**9/1 Workshop 1:**  
Practitioners, managers, scientists, experts

**10/1 Planning:**  
Organisers distill main findings, and their importance and applicability from Day 1. Prepare for Day 3.

**11/1 Workshop 2:**  
Policy makers and decision makers presented with summary of findings from Day 1, and begin to formulate policy recommendations and possible next steps.

**Workshop 1 on Day 1** brought together 60-70 directors/managers of national parks and local and international scientists and experts working in ecosystems management related areas. At this workshop, a short review of the main features of the ecosystem management approach was made by Gill Shepherd, IUCN Commission on Ecosystem Management (see Annex 3). This was followed by three formal case study presentations:

- *Towards wetlands ecosystem management: a case-study review in Vietnam by Truong Van Tuyen, Hue University of Agriculture and Forestry. The paper is reproduced in this volume.*
- *Fire and water management in Tram Chim National Park and the application of the ecosystem approach by Nguyen Huu Thien, Can Tho University<sup>1</sup>.*
- *Reviewing forest management in Vietnam in the context of the ecosystem management approach: Lessons from forest management in Vietnam in the last decade which can be applied to wetlands by Nguyen Thi Thu Thuy, Forest Protection Department (MARD/FPD). The paper is reproduced in this volume.*

Issues raised by the papers, and by participants' own experiences, were discussed in breakout groups. The outputs from these groups, and the summary prepared from them may be found in the Overview paper, Chapter 2.

**Workshop 2 on Day 3** was a much smaller meeting, which discussed possible solutions with high-level Government decision makers. Useful comments were made on the Day 1 summary, together with some corrections. Recommendations and suggestions for next steps were also compiled. These may also be found at the end of the Overview paper.

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<sup>1</sup> This has been published by IUCN elsewhere in two closely similar forms, and is not reproduced again in this volume. Substantially the same paper can be read in these two locations, from where it can be downloaded. Van Der Schans, M.L. (2006). *An ecosystem approach to fire and water management in Tram Chim National Park, Vietnam. Mekong Wetlands Biodiversity Project Vientiane, Lao PDR.* ([www.mekongwetlands.org](http://www.mekongwetlands.org)) and Van der Schans, M.L. and Nguyen Huu Thien (2008) *Mekong Delta: Tram Chim National Park* in 'The Ecosystem Approach: learning from experience' ed. G Shepherd, IUCN, Gland, Switzerland. (<http://data.iucn.org/dbtw-wpd/edocs/CEM-005.pdf>)

## Chapter 2: The Application of the Ecosystem Approach to Wetlands in Vietnam: An Overview

*Gill Shepherd, IUCN Commission for Ecosystem Management*

### 1. Introduction

The workshop papers in this report all include attempts to apply the Ecosystem Approach (EA) to actual wetland or forest locations in Vietnam. The EA is applied in the sense that its insights are used to examine problems and progress in the management of the sites concerned. In the two linked workshops on which this document reports, the analyses the papers offered were used to shape preliminary discussion of the policy changes that seem now to be needed for Vietnam's wetlands. The initial discussions took place in Workshop 1 between practitioners, managers, scientists and other experts.

Findings were synthesised and formed the basis for Workshop 2, a much smaller high-level meeting of policy and decision makers.

### 2. The Ecosystem Approach: What Is New About It

The EA to management is a new way of approaching the management of landscapes and seascapes, which sets them in their broader context. The old «core and buffer zone» approach to protected area management has not worked well, and the aim is that «islands of biodiversity excellence» should not be managed in ways which isolate them completely from their surroundings, but should form part of an interacting mosaic with other land uses around them. This isolation has come about partly because too little attention was paid to the social and economic landscape within which protected areas are situated. But it is also because there has been far too little collaboration between the institutions that manage protected areas and those that manage the rest of the landscape.

The EA, as promoted by the CBD, lists 12 guiding principles to be born in mind in the implementation of the approach. These principles often look confusing, but their overall message is simple, and can be summed up in a few points.

#### 2.1 Ecosystems are not isolated

They overlap, interlock and interact with one another. The approach requires the recognition that the any particular ecosystem is influenced heavily by surrounding system(s) and that all land/water/sea is to be found inside one ecosystem or another. Ecosystems are not islands of excellence in an otherwise second-rate landscape, but a patchwork of different types of land and land-use within an overall framework.

#### 2.2 It is never enough just to consider protected areas, when planning conservation

Other adjacent areas need to be taken into account and not just the buffer zone. The sustainable interaction of people and biodiversity can only be developed in a larger ecosystem area, and the EA encourages both a larger vision on the ground, and the exploration of inter-linkages.

### 2.3 Human beings are ecosystem components

The EA values the active role of humans in achieving sustainable ecosystem management. Under most scenarios, ordinary poor people have to be responsible for many of the everyday decisions that collectively determine the sustainability of vast areas of the world. People and their livelihoods should thus always be considered alongside conservation measures.

### 2.4 Adaptive management is essential

Full information for the successful management of a particular area is never available, and it will always be necessary to adapt management as more is learned. Ecosystems are dynamic in space and time and they have multiple potential futures that are uncertain. Thus management has to be flexible, even while the long term goal of resilience is kept in sight.

### 2.5 Institutions will also adapt

In a learning environment, old institutions develop new links and new capacities, and new institutions come into existence. The EA implies flexibility, expects to learn by doing, and is incremental. In that way it is very different from integrated management in the past, where there was an attempt to achieve integration from the start of the process.

## 3. The Ecosystem Approach: Challenges

### 3.1 Stakeholders and scale

The opportunities for making land-use trade-offs at the local level are often relatively limited when compared to broader geographical areas. More sustainable outcomes may be found by developing approaches that enable decision making on ecosystem services and economic systems at broader landscape scales. However, at those scales the involvement of stakeholders in decision-making becomes increasingly complicated and transaction costs rise accordingly. Scaling up is best fostered by first making sure that there is clarity about local-level rights to manage, take decisions and make choices. New institutions will be needed (or existing ones given new tasks) so that local capacity can work with other levels to address broader issues.

### 3.2 Management and the institutions to deliver good quality management

All the examples show that management goals have to emerge through the exchange of stakeholder perceptions, and to be agreed by them, if the right institutions are to be strengthened or to be developed. The tasks best devolved to lower administrative or implementation levels, and those that need the muscle of higher levels to be effective, need to be identified, initially on a case-by-case basis, and through adaptive management.

### 3.3 Economics in the Ecosystem

It is very important to understand that the physical ecosystem sits within a broader socio-economic 'ecosystem'. The people who live in the ecosystem have to derive their cash and non-cash income from its components and every effort needs to be made to help them to do so more effectively. The more that local people are involved in helping to design and implement the management of trade-offs between conservation and livelihoods, the more just and sustainable outcomes are likely to be.

### 3.4 Adaptive management

Both the overview papers that follow on forests and on wetlands in Vietnam contain many illuminating examples of adaptation as the issues above begin to be addressed. They are considered in more detail below.

## 4. Learning From Forest Protected Area Examples

The forest overview paper presented at the workshop (and contained in this report)<sup>2</sup> shows how intensive efforts have been made in the last decade or so to change the assumptions under which forests are managed.

The chief focus of forest activity has been to find ways of including stakeholders to a greater extent in the management of forest protected areas, especially Special Use Forests (SUFs). To this end more integrated approaches have been sought, there has been a greater commitment to livelihood improvement in SUF areas, more participatory styles of working with local people have been tried and environmental education has been widely offered.

Forestry projects, often internationally funded, have provided space in which new ideas could be tried, and normal legal constraints be set aside temporarily. Out of all these efforts some modest policy changes have already come about at one or two sites and there is a further wide field of solid experience that has not yet been translated into policy change.

The SUF sites reported on here have gained extensive experience in working with communities and in beginning to understand some of the economic drivers of their livelihoods. We pick out a few key lessons here.

### 4.1 The integrated approach

All the sites now apply information–planning/decision-making/monitoring linkages to enhance the systematic management of SUFs. They have done a great deal of training of protected area (PA) staff and relevant government authorities in working effectively with local communities, and have clarified roles not only between government and local communities, but also between various government agencies.

Cuc Phuong National Park and Pu Luong Nature Reserve have adapted by creating new institutions: developing a joint inter-provincial forum and coordination mechanism since they are located close to one another.

Phong Dien Nature Reserve has a network of Field Assistant Teams in all buffer zone communes. This case shows that successful implementation of natural resource management is based on the support and interest of local authorities (district, commune and village), and on direct and active participation of communities in every project process from activity planning, to implementation, monitoring and evaluation. Training activities and exchange visits have improved knowledge, understanding, and management skills for Field Assistant Teams, local government staff and the staff of Phong Dien itself. Here existing staff have been given new skills.

Na Hang, Ba Be and Yok Don National Parks, which are located not far from one another, have developed higher landscape-level conservation strategies to improve conservation efficiency and build in flexibility. In adopting a landscape-level approach, the three SUFs have developed an overall conservation strategy as a tool to link resource-use planning, and investment and recurrent budgets. These sites show how developing higher level linkages and encouraging new or improved institutional arrangements can create better outcomes.

### 4.2 Taking responsibility for livelihood improvements and working through participatory approaches

The link between development benefits and conservation necessities has been established at all levels with all activities in the seven sites. Within the overall landscape, the SUFs have demonstrated that

<sup>2</sup>Lessons from forest management in Vietnam in the last decade which can be applied to wetlands by Nguyen Thi Thu Thuy, MARD/FPD.

local communities can develop and take charge of their own land management strategies that can incorporate conservation as well as development goals.

Improvements of the economic status of households have been made with agricultural interventions aimed at intensifying and diversifying agricultural production through the introduction of higher productivity crops, animal husbandry, fish ponds, tree-planting and so on. However, there have been criticisms in some areas that too few households and too few communes have been offered benefits of this kind. Ba Be, Yok Don and Na Hang's approach has perhaps been more effective. People are trained, demonstration plots set up, and extension work undertaken so that outreach is considerably wider. At Phong Dien community tourism has also been tried.

There is also interest in the potential in Ba Be and Na Hang for raising rare, high value agricultural, medicinal, and horticultural NTFPs that fetch good prices in trade markets. However, the marketing and agricultural research remains to be undertaken in this case.

Young staff/rangers in all SUFs have been mobilised to participate actively in project planning and implementation, as well as to develop their capacity in biodiversity conservation and community development.

Some SUFs have called on the assistance of an outside community development agency (such as Hue Agro-forestry University, extension centres and tourism departments), while others such as Phong Dien have worked for closer collaboration between local communities, forest rangers and other concerned parties. Here communities participated in planning processes, and these therefore included indigenous knowledge and local experience in the conservation and development plans drawn up. Communities have benefited from the forests allocated to them for management, mainly through income from community tourism activities.

Ba Be, Na Hang, and Yok Don have engaged local communities as partners in developing new co-managed protected areas, as well as in developing sustainable use strategies for areas previously zoned as totally protected.

At Na Hang, participatory resource use planning assisted in fixing the boundaries of the nature reserve that were acceptable to both the nature reserve authority and the local communities. Boundaries of enclaves were also arrived at through a participatory process, which aimed to limit expansion and adverse effects of in-reserve villages, ensure that uses of forest areas were sustainable, and engage households in participatory conservation programmes.

At Ba Be, a Lake Management Cooperative was established as a mechanism for cooperation between the national park authorities and the six communities living at the edge of Ba Be Lake. As a result, activities detrimental to conservation including dynamite and electric fishing have been eradicated and are self-policed. As part of the cooperative management agreement, it has been proposed that the cooperative also assumes responsibility for managing and monitoring tourist attractions on the lake, and would obtain a percentage of tourism revenues as an incentive.

At Yok Don, the potential for co-management of freshwater resources is being explored, partly to compensate for prohibiting hunting in key areas of the national park. Villages with user rights over stretches of the Srepok River have these rights recognised and gain exclusive access to stretches of productive water within the park. In return, the households assist the national park authorities in excluding commercial fishermen who come from urban centres.

Capacity building is very important, not only to improve stakeholders' ability to participate in PA management but also to enhance PA staff's competence to work effectively with those communities. Educational and

training programmes have been developed to meet the wide range of needs of those people directly involved with nature conservation as well as for supporting personnel and policy-makers. The skills required to develop projects in buffer zones for the sustainable use of PA resources and for rehabilitation activities inside PAs should be improved to reach both conservation and sustainable development goals.

### **4.3 Key policy changes and challenges for successful local-level adaptive management**

Community co-management within protected areas remains problematic under the law, but legal revisions are being undertaken and SUFs planning approaches and field interventions provide useful experience for adoption in other protected areas.

It is clear that in very remote areas, incentives to manage protected areas are inadequate: costs are high and benefits limited. Further thinking is required in such areas.

However, the allocation of natural forest land to communities is a very positive policy change. Demands from communities in Phong Dien spurred the change. Community capacity strengthening in natural forest management has supported sustainable forest management through training, inventory of forest resources, village forest protection and management, forest restoration and enrichment, and technical transfer on forest nurseries and plantations.

Participatory resource use planning (PRUP) in Ba Be, Na Hang, and Yok Don has promoted local-level consultations and sound environmental and social impact assessments. Bottom-up planning and negotiation of competing interests in local resources has improved the natural resource base and supported the poor.

Community participation in SUF management has been recognised recently as an integral part of nature conservation and sustainable development. But the achievements in the chosen protected areas have only been possible because internationally funded projects have been able to put in place special conditions which allow co-management – though only for the duration of the projects concerned.

Beyond these special contexts, there is still only weak legislative support for the co-management of protected areas, and too few opportunities to try it out. This is an area where good experience on the ground ought to inform policy change in due course.



## 5. Learning From Wetland Protected Area And Open Access Examples

### 5.1 Wetland area Management objectives

The management objectives of the wetlands areas are a response to problems at the sites and to the need for conservation of natural resources for long-term local socio-economic development. The common management objective of all sites is not only to conserve wetland resources but also to improve the livelihoods of local communities. This highlights the livelihood importance of wetland ecosystems in Vietnam. The improvement of wetland environments and functions is also emphasised in reviews of all the sites.

The legal status of Xuan Thuy National Park and Can Gio Biosphere Reserve means that management objectives must stress protection above all. The non-protected area status of Tam Giang Lagoon, Nai Lagoon and Xuan Dai Bay allows the management objectives to focus more actively on sustaining and rehabilitating natural resources and ecosystem functions.

The important roles of all the wetlands go well beyond the direct exploitation of natural resources for people's livelihoods. From an ecological point of view, the most important functions of these wetlands are as water bodies to dissolve waste and discharge from agriculture, aquaculture, industry, residences and other human activities. Maintaining spawning and nursery habitats for aquatic species is another important role that provides a resource base for local livelihoods. The protection function of wetlands is also of enormous importance.

However, human activities have been undermining all these wetland ecosystem functions. Problems of over-exploitation, pollution, destructive and illegal fishing, and land reclamation are all interlinked and are found at all sites.

### 5.2 Stakeholders

Many types of stakeholders are affected by the management of wetland ecosystems in Vietnam.

Primary stakeholders are the direct users of wetland resources for livelihoods. They include traditional fishers, aquaculture farmers, crop plant farmers, seasonal resource users, and natural resource based service providers. In protected wetlands (such as Can Gio and Xuan Thuy) access and use are regulated in the core and buffer zones and law enforcement is the major concern.

However there are also "open access" wetland areas (such as Tam Giang, Nai and Xuan Dai), and here the concern is not only law enforcement but also the rights regime. Traditional resource users (fishers and rice farmers) have customary rights in these places which are accepted by the local community, but not by local government. These users may find their customary access being blocked by the allocation of use rights to incoming investors.

The secondary stakeholders are the organisations or groups that have management responsibility for the wetland ecosystem. Since most wetland ecosystems extend well beyond protected area boundaries, secondary stakeholders are varied and numerous. They include line agencies at commune, district and provincial levels, people's organisations, NGOs, and research institutions, all with their varying interests.

In the case of wetland protected areas such as Can Gio and Xuan Thuy, governance is in the hands of Management Boards. However, their responsibilities extend only as far as the core and/or buffer zones of the wetland ecosystem. Local government takes the major management role outside the protected area boundary. But its interests in those areas mainly concern socio-economic development.

By contrast, the management of "open use" wetland ecosystems is undertaken by the commune government. It is a much more direct management body, acting in line with guidelines from line agencies at district and provincial levels. It is most interested in resource efficiency including livelihood development and the roles of wetland in local socio-economic development.

Tertiary stakeholders are organisations and groups that can influence wetland management through policy development and strategic support. These include line agencies at ministry levels and international research and development organisations and donors. The tertiary stakeholders are much concerned with resource conservation and possibly also with socio-economic development and poverty reduction.

In general, the ultimate decision making on management of a specific wetland ecosystem is undertaken by the local government - the province government. Therefore all relevant sector departments or line agencies are more or less involved and have certain responsibilities. In the two protected wetlands, (Xuan Thuy National Park and Can Gio Mangrove Biosphere Reserve) DARD has a major role and management responsibility. In the "open wetlands" DOFI has the primary management role. In specific wetland areas, the key management line agencies or provincial departments commonly work with relevant institutions to develop management practices.

Among problems raised most frequently are issues of role allocation among management bodies, and unclear user-rights and management regimes. This is partly because the legal framework for wetland management is underdeveloped. In many examples such as different sub-areas of Tam Giang Lagoon, the Land and/or Fishing laws, which primarily deal with terrestrial and marine ecosystems, govern wetland management by default.

### 5.3 Economic issues

One fifth of Vietnam's population depends directly or indirectly on exploitation of wetland resources for livelihoods. Hence the sustainable use of wetlands is fundamental to food security, health, and agricultural and industrial development of the whole nation. That context requires a holistic approach to wetland ecosystem management.

From an economic point of view, agricultural areas are wetland ecosystems' most important elements, and interest is on the space and water quality appropriate for a variety of aquaculture patterns. Local authorities and communities around wetlands have settled on aquaculture development as a major strategy for socio-economic and livelihood development.

Owing to high market demand mainly for export, shrimp culture provided high initial economic returns that have been important incentives for investment. Most local authorities, the direct managers of wetland ecosystems, supported aquaculture development without necessarily taking into account the negative impacts of this development. Major problems have occurred as a result in some areas.

Fishery resources are also important economic sources for local communities around wetland areas, including protected and "open use" wetland sites. The increasing market demand for aquatic foods and local needs for income, especially in traditional fishing communities, has increased the fishing intensity in wetlands. The problems of over-fishing and/or over-exploitation are found generally in all wetlands areas. Illegal and destructive fishing, e.g. electric fishing and fine mesh nets are practiced in most wetlands.

In dealing with those problems the management institutions in Tam Giang and Xuan Thuy have taken a participatory approach by supporting a fishery co-management system that primarily helps local fishing communities to take on more management responsibility. The activities are initiated under policy and legal support from the provincial governments and MoFI.

<sup>3</sup> *Towards Wetland Ecosystem Management: A Case Study Review in Vietnam by Truong Van Tuyen.*

The expansion of aquaculture provides opportunities for socio-economic development and livelihoods for traditional fishing communities. However, participation in and benefit from aquaculture is very challenging for poor fisher families because they lack capital and technical know-how. Livelihood alternatives for communities that rely on natural resources in wetland areas are still a major concern.

#### 5.4 Adaptive management in the wetlands of Vietnam

The key negative experience in nearly all wetland areas from the 1990s onwards has been the rapid expansion of shrimp farming. It has created critical threats to wetland biodiversity and reduced both the environmental services and the functions of wetland ecosystems. It has also brought in very high risk and high technology dependence for resource users.

The key positive example of adaptive management over the same time period, found in all wetland sites, is the promotion of local participation in management. There are numerous examples to highlight the value of this. Community-based management has been applied on a pilot scale in all wetland areas as a step towards co-management and the future legalisation of a community role. Such interventions have also highlighted the need to strengthen resource user and community organisations.

In Nai Lagoon, the shrimp farmers' organisation set up a self-management mechanism to regulate irrigation supply and discharge based on community regulations. Attention was given for the first time to the need for customary access rights to wetland areas for local users. The local community began to develop its own monitoring regime for wetland resources.

In 2004, after several years of experimentation, the provincial government approved the overall planning for fishery management in Tam Giang Lagoon. It defined lagoon water areas for the purposes of fishery management: as (1) highly sensitive areas that were designated as future protected areas; (2) areas of modest threat that were designated for natural fishing with specific restrictions, or (3) normal areas for open access fishing.

Adaptive management has been slower in protected areas than in these non-protected areas. Both Xuan Thuy and Can Gio are managed by specialised management boards, sectorally constrained at both district and provincial level. Both protected areas are classified only as SUFs, with no legal recognition of the wetland nature of the ecosystems. Regulations thus constrain efforts to build institutional consensus on planning and managing the ecosystems as a whole. Broadening the definition of these protected areas would enable managers to encourage human intervention and use the protected area as a whole ecosystem.

#### 5.5 Key policy changes and challenges

Wetland ecosystems are complex and their management involves an overlap of issues drawn from natural and social sciences. However, current management practices in the study review of wetland areas are based on sector planning and strategy. The legal framework and management institutions of the protected wetlands are mainly for SUFs under the guidance of DARD. This implies that wetland ecosystem management needs an improved legal base for clearer definition of boundaries and key components to enable the management body, e.g. the management board or local government to have a holistic view on the management unit as an ecosystem.

The quality of planning was found to be the most critical issue for ecosystem management in all the studied wetland areas. In Xuan Thuy and Can Gio the planning process did not take account of current access and customary use rights. Stakeholder participation was low, especially among the primary groups who rely on wetland resources for their livelihoods. In the "open use" wetland areas, planning is either of very low quality or incapable of implementation. At all study sites, unplanned expansion of aquaculture created the most critical threats to the wetland boundaries and whole ecosystems.

However, initiatives on community-based management and co-management of natural resources have been carried out at pilot scales in the wetland sites. They have brought in participatory planning and a framework for a scaling-up of the application of participatory management methods. As a result, the participation of local communities in local planning for resource governance has taken place in Tam Giang Lagoon. Participatory planning has helped not only to improve the quality of planning, based on the people's own decision making, but also defined the new roles of stakeholders and management partners in resource management itself.

## 6. Pointers From Both The Forest And The Wetland Overview Papers

The forest sector in Vietnam now has quite a long history of working with local people in and around forest areas to encourage them to protect forests in return for a variety of livelihood improvements offered. In some ways wetlands start from a slightly different position, in that it has always been accepted that millions of poor Vietnamese depend directly on wetlands and cannot possibly be stopped from doing so.

In attempting to find accommodations between conservation and livelihood development, both sectors have moved gradually towards not only offering benefits to local people, but also towards involving them in planning, protection and management of resources.

It would seem that the further these processes have gone, the more successfully such resources can be often be managed. However, until now, and especially in the case of the forest sector, experimentation has been easiest in the context of donor-funded projects, where permission could be obtained for temporarily freezing existing laws while something new was tried. As happens everywhere in the world, field experience runs ahead of current policy. But policy change can come, in due course, from such experience. There is now a real need in both the forest and the wetland sectors for the option of co-management in protected areas to be legalised.

In many situations, much benefit will flow from the willingness of local people to manage resources more sustainably once they are given more responsibility and treated as more equal partners. However, co-management is not a solution everywhere and there is a need, too, for more understanding of when and where co-management is likely to succeed, and for the development of guidelines to this end. In Tram Chim National Park, for instance, the resource is very small and the number of people who live around it very large. In this case the costs of co-management for local people far outweigh the benefits to them.

But in principle, and where population density is lower and the protected area in question larger, many of Vietnam's natural resource problems would be greatly simplified through more involvement of local people.

Political institutions for more participatory approaches to natural resource management need a chance to evolve and to be helped into existence (there are several good examples of this in the forest and wetland chapters that follow). Both sectors currently show how complex – and often ill-adapted – the multiplicity of oversight institutions are, especially at provincial level.

Problems are thrown into particularly sharp relief when they are viewed through an ecosystem lens. Land and water areas are always spread across non-protected and protected area categories; and protected area management institutions and ordinary provincial sectoral institutions often lack a collaborative framework in which they might make management decisions together at times. A few sites (such as Tam Giang Lagoon) have attempted to match the need for a diversity of types of land and water-use with a patchwork of appropriately diverse management regimes under an overall institutional umbrella, but these examples are still very rare.

## 7. Workshop Discussions On The Basis Of Presented Papers

We now turn to the outcomes from the workshops where these issues were presented and discussed. In Workshop 1, a variety of proposals were made within three breakout groups. These are summarised in the table covering the next three pages.

### Summary from workshop breakout groups

Issues	Proposed solutions	Realistic	Important	Comments
Lack of Relevant Policies and Legislation or Gaps and Overlaps	Reviewing current policies and legislative documents at central, ministry and sector level related to management of forest/wetlands ecosystems through which to identify those that need to be revised, supplemented, adjusted	Yes	Important	Relevant but quite ambitious.
	There needs to be consistency between sectors and regulations (laws, decree, circular etc...)	Yes	Important	
	Be more specific about legislation: which laws need to be revised/adjusted? Where do gaps exist?	Yes	Quite important	
	Joint circulars between sectors/ministries	Yes	Quite important	Using the NWSP as the departure point
	Promulgating an interministerial circular for implementation of Decree 109 for management, conservation and sustainable use of wetlands.	Yes	Important	MONRE may revise Decree 109 to be consistent with new situations (Biodiversity law, environment law and new structures of MONRE and MARD)
	Adjustment/revision of national policies: wise-use of wetlands and natural resources, "restricted" uses, specific definition of wetlands	Yes	Important	Relevant and realistic – further elaborate and supplement the current policies. Can be a part of the inter-ministerial circular
	Learning experiences from developed countries and from countries in region.	Yes	Quite important	
Incorporate the concept of "ecosystem" in legislation documents.	Yes	Quite important		

Issues	Proposed solutions	Realistic	Important	Comments
Lack of Relevant Policies and Legislation or Gaps and Overlaps	Plans for coordination between ministries and sectors	Some difficulties	Important	
	Policies for inter-sectoral planning at national and provincial levels	Some difficulties	Important	Relevant but ambitious.
	Especially, to develop new instruments as per the need of management practices such as basin management	Some difficulties	Quite important	Need to collaborate with MONRE/MARD.
	Develop and implement national policies and strategies for management, conservation and development of wetlands.	Some difficulties	Quite important	The national action plan on wetland conservation period 2004-2010 is still valid and being reviewed. There is a plan for more action 2008-2010 and this should be the guiding strategy. Develop recommendations from proposed Review.
	There should be a consistent system for the management of all protected areas (forest, wetlands, marine...)	Challenging	Important	Develop a recommendation from the Review
Policy Development still top-down - little or no stakeholder consultation	Participation of stakeholders during process of law/policy development.	Yes	Important	
	Need for better quality public consultation in law / policy development, and clearer uptake pathways for their inputs	Yes	Important	
Need for new institutional arrangements	Establish national wetlands committee	Yes	Quite important	Nationally, the wetland Committee will be included in the proposed Biodiversity Committee
	Establish regional/provincial wetlands committees	Some difficulties	Quite important	How will the national and regional committees be linked?
	Specific mandates/responsibilities for central, sector ministry and provincial levels	Yes	Important	
	Unification of management and dissemination of information, data of protected areas system (forest, wetlands, marine)	Yes	Important	This will be the national PA database

Issues	Proposed solutions	Realistic	Important	Comments
Policies and Regulations have not so far empowered Local Authorities or Communities	Need for policies or mechanisms to directly empower local authorities and national park / protected areas management boards to manage wetlands. To give them more responsibility through decentralisation	Yes	Important	
	Strengthen capacity for management board and managers at all levels	Yes	Important	
	Legalisation of community participation in wetlands conservation	Yes	Important	
	Need for legal adjustments to facilitate community participation in wetlands management and sustainable use. E.g. Policies and specific guidelines for co-management mechanisms	Yes	Important	
Need for education and communication programmes on policies	Wetlands assessment (quantity and quality)	Yes	Quite important	
	Education, outreach activities on application of ecosystem approach	Yes	Quite important	
Research Priorities	Policies for wise use of wetlands	Yes	Important	
	Institutionalisation of information sharing between ministries and sectors	Yes	Important	
	Develop conservation strategies further (with criteria and priorities)	Some difficulties	Important	The current conservation strategy is until 2010
	Wetlands Inventory and assessment to better understand wetlands for planning and develop solutions	Yes	Important	
	Development and approval of the national wetlands classification system (with attention on wetlands planning)	Yes	Important	Highly relevant, but there are currently several systems (MARD, MWBP, HNU, VEPA) These should be reviewed
	Establish wetlands databases (easy to update and access)	Yes	Important	
	Defining "hot" areas: wetlands between Vietnam - Laos - Cambodia have not yet been given due attention develop priority strategies for them	Yes	Quite important	

Issues	Proposed solutions	Realistic	Important	Comments
Publicising the ecosystem approach	Develop and publish guide-book/materials on ecosystem management	Yes	Important	Highly relevant and important
	Policies to require application of ecosystem approach	Yes	Quite important	
	Strengthen capacity through in- training and study tours. For example: training on ecosystem management methodologies	Yes	Quite important	

## 8. Key Issues Prepared For Day 3 From Day 1 Discussions And Responses To Them

The main outputs from Workshop 1 were condensed from this summary into a series of key issues ready for discussion at Workshop 2. The responses made to each of these issues by senior officials on Day 3 are summarised in a box below each topic.

### 8.1 National Level: Institutional issues

- *A review of current policies and laws related to the management of forest/wetland ecosystems. Identify those which need to be revised, supplemented or adjusted. Issue guidelines where there is any overlap in implementation responsibility between MONRE and MARD - as there is in the case of wetlands and river basin management.*

#### Responses:

The formal roles of MONRE and MARD are clear, but it is true that there is an overlap in the implementation of duties and responsibilities that needs to be reviewed. After all, even coordination within each ministry does not run entirely smoothly.

There is also a lack of guidance for decision making and implementation processes. Where overlaps exist MARD requests that they be specifically documented and the information passed to the Ministry for immediate consideration.

- *A National Wetlands Steering committee was active under the MWBP and can be "inherited" by the Dutch-supported National Wetlands Support Programme (NWSP). It is in any case required by the Ramsar Convention that a National Wetlands Committee be established.*

#### Response:

While a committee is required, it should be borne in mind that such a committee may not necessarily solve the perceived problems easily. Committee members are always high-level individuals with very busy agendas and membership of many other committees. More clarification of the resources and mandates of all these committees would often be useful.

### 8.2 National Level: Policy

A joint circular on wetlands management, produced by MONRE and MARD, awaits approval. Future implementation and enforcement need further efforts.

#### Responses:

It should be made clearer that this is actually a project output (from the National Wetlands Support Programme, NWSP). So, it is in fact – not yet an inter-ministerial circular but a product arising solely from MONRE. MARD was unaware of its existence until this workshop. MARD supports the idea of

using this project output as a foundation for further development as a joint circular, but there should be consultation with MARD first.

The Government should indeed enact a decision on the management and conservation of wetlands (under Decree 109). And it should also develop a system similar to ISO for wetlands management. Finally, IUCN and other NGOs should assist the Government in developing wetlands management guidelines for the important wetlands of Vietnam.

There is a need to revise SUF regulations to support wetlands more effectively. (For example: fire and water regulations need revision such that they distinguish between the needs of the different main types of forest ecosystem such as upland forest, peat and non-peat wetlands. Undifferentiated universal regulations have caused many of the difficulties flagged up in the Mekong study presented in this workshop)

#### Responses:

SUF regulations are already comprehensive. Rather, technical guidelines are needed to guide management and build staff capacity. It would be useful to conduct a survey to identify the specific areas where such managers lack capacity, especially those working in at national parks and nature reserves.

If SUF regulations are to be revised, there needs to be a detailed schedule and process, since revising a policy is not a simple matter. However, since Forest Law will be reviewed in 2009, IUCN should follow-up with MARD on this.

### 8.3 Lower Level Policy Issues: Devolution

Greater coherence and clarity in the allocation of responsibility between the different government stakeholders (and others) responsible for natural resource management is badly needed, with:

- *Strategic decisions made at the national and provincial level,*
- *Coordination decisions made at the provincial level and*
- *Day-to-day management decisions taken by field managers and district authorities.*

There is a need for more guidance on how an effective system can be developed which streamlines the links between the national and provincial levels, and the links between provincial-district-commune- and protected area levels. Issues include:

- *How to enhance the technical competence of staff at lower levels such as the protected area and commune level)*
- *The need for supervision, monitoring, follow-up and adaptive management*

#### Response:

Management responsibility is in principle already strongly decentralised to lower levels, but there is a real lack of tools to support the process. Management plans are an essential tool, for instance, but they have yet to be legalised

#### 8.4 Lower Level Policy Issues: Co-management

A more active commitment, mandated from the national level, is needed for more benefit-sharing and co-management for local stakeholders reliant on natural resources. There is currently a range of experiments going on in natural resource co-management in Vietnam in both forest and wetlands contexts, as detailed in the case studies. No one model can be selected and it may never be right to select only one. What is needed is an enabling national legal/policy framework which allows such experimentation, and encourages learning and adaptation from good experiences.

##### Response:

The concept of co-management needs to be more clearly defined, as a prelude to the legalisation of co-management guidelines. One model may not fit the whole country and all types of location, but within a particular region or area a standard set of inputs and evaluation indicators is needed.

It should be remembered as well that the delegation of responsibility needs always to go together with some benefit sharing, since it will not work otherwise.

#### 8.5 Lower Level Policy Issues: Taking the broader landscape into account in planning

- *Wetlands that are not protected areas are not being managed properly because of the lack of coordination between agencies responsible for protected areas and those responsible for non-protected areas.*
- *Consider establishing "Provincial Wetlands Committees" to bring agencies together.*
- *Look at wetlands in a broader landscape, considering at the same time issues affecting wetlands and adjacent non-wetland areas.*

##### Responses:

IUCN and NGOs ought officially to send a message to the Prime Minister about the need to have a decision on the use and management of wetlands that are not under the protected area system.

Develop wetlands Master Plans for three key broader areas: the Red River, the Mekong River, and coastal wetlands. Incorporate the broader features required and demonstrate how master plans for wetlands need to be more comprehensive than other master plans.

## 9. Next Steps

The responses made on Day 3 to each of the key policy issues raised above make interesting reading. Decision-makers and policy-makers responded helpfully to them all.

### At the National Level

It was agreed that there is certainly a need to act to protect wetlands further, under Decree 109, though there was some doubt that the National Wetlands Steering Committee was necessarily the institution that would drive this change.

Rather, synergies between MONRE and MARD should be positively pursued. Partners such as IUCN and other NGOs were invited to report gaps and overlaps in the work of these Ministries as they became aware of them. And a draft document on wetlands produced by MONRE in collaboration with the National Wetlands Support Programme (NWSP) should be further developed as a joint inter-ministerial circular, in consultation with MARD

Policy makers made various suggestions as to how NGOs, such as IUCN, could help both national level ministries and provincial level institutions better carry out their tasks

Firstly they proposed that IUCN and others should assist the Government in developing management guidelines for the important wetlands of Vietnam.

Secondly they said Special Use Forest regulations are comprehensive (if general), and that changing them would be a slow and complex matter. Rather, better application of SUF regulations could be achieved through developing technical guidelines to guide management and build staff capacity. The need is to identify the specific areas where Park and Nature Reserve managers lack capacity, and to develop guidelines to help them make better decisions.

Finally, there seems to be an increasingly overwhelming case, as the breakout groups stressed, for an integrated protected area system, which would encompass all bio-geographical types, including terrestrial, wetland and marine areas. The argument for such a system has been made for many years but there has been little progress to date. The policy change would not only be to facilitate consistent management of protected areas, but also to integrate conservation and development in each different ecological landscape type. Such a policy would need to set clear goals, specify objectives, establish methods and approaches, and put forward feasible solutions for developing, organising and managing a sustainable system of protected areas governed by a coherent overarching set of policies.

### At Lower Levels

At lower levels, too, the intention to manage in a more devolved way is there, but needs support in terms of effective tools for devolved management, such as Management Plans. Both the form these tools should take, and a clarification of their legal status, will need more work.

While the evidence of the effectiveness of co-management in many contexts was acknowledged, it is seen as an issue to approach more cautiously. It is understood that one model will not fit all situations in the country, but the assumption is apparently that regional or area models might be the way forward. Support from NGOs and others who have good experience in working with co-management as a tool will be of great value as co-management guidelines are slowly developed and legalised.

Although the point was well-taken that there is often a problem where protected and non-protected area wetlands lie adjacent to one another, proposed solutions defaulted into the familiar. Senior officials suggested initially that IUCN and NGOs send a message to the Prime Minister about the need

to have a decision on the use and management of wetlands that are not under the protected area system, and seemed inclined to extend protected area status more broadly as a solution.

Those at Workshop 2 seemed not to take up the points made by speakers about the need for better synergy between agencies responsible for protected areas and those responsible for non-protected areas; about the need to understand and manage wetlands in a broader landscape, considering issues affecting wetlands and adjacent non-wetland areas at the same time; and working perhaps through “Provincial Wetlands Committees.” However, they did propose the development of Master Plans for three enormous wetland areas: the Red River; the Mekong River; and all coastal wetlands, and proposed that plans should be developed in such a way as to demonstrate how they would be more comprehensive than other master plans.

There are opportunities for dialogue and more learning from research here.

It is to be hoped that the progress made in these linked workshops may go some way towards advancing debate and action in all the main topic areas summarised in this final section.

## Chapter 3: Toward Wetland Ecosystem Management: A Case Study Review in Vietnam

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### 1. Introduction

Vietnam is a geographically large and disparate country at 330,000 sq km. Approximately 83 percent of the total population, which was estimated 84 million in July 2005, are living within 100km of its 3,500 km coastline (WRI 2003). The extensive and diverse wetland areas play critical roles in livelihoods of local people and development of the country. Inland wetlands are defined as an area submerged in fresh or brackish water located in-land or near coastal zones, including ecosystems such as “rivers, streams, canals, ditches, special-use water surface, lakes and ponds”<sup>4</sup>. NEA and IUCN (1999-2000) identified 68 wetlands of national or international importance and considered 39 wetlands types in Vietnam. Several wetlands sites have been developed or upgraded to protected areas, national parks or biospheres such as Xuan Thuy wetland nature reserves (upgraded to National park from 2003), Dam Doi bird reserve, Dat Mui special forest (upgraded to National Park from 2004), U Minh Thuong nature reserves (upgraded to National Park from 2005), Lang Sen wetland, Tram Chim wetland etc. With this book, wetlands management has moved to a new period<sup>5</sup>. There are still a number of challenges in wetland management that involve technical, social, economic and institutional issues. The transition to open market economics under the doi moi policy reforms achieved a high level of economic growth averaging from 7 to 8 percent in the first five years of the 2000s, at the same time as the growth of the private sector and major changes in property rights. Vietnam simultaneously faces significant environmental challenges as a consequence of overexploitation, mismanagement of resources and pressures from entering the global market (Adger et al 2002). The social, ecological, economic and institutional changes make livelihood systems in general and wetland-dependent activities in particular more complex and vulnerable.

There are many horizontal and vertical overlaps identified in each government agency’s area of function, power and responsibility in governing natural resources. That situation causes conflicts within and between institutions claiming jurisdiction over the same area and management at each level is not consistent with that at other levels. In practice, management responsibilities for wetlands are scattered across various line ministries and provincial authorities. For this reason, management objectives for wetlands are often in conflict.

This is a report on case study review of wetland ecosystem management in Vietnam. The purpose of the review study is to analyse wetland management experience to date, and to suggest a set of next steps towards the application of the ecosystem management approach. The selection of wetland sites for review (Figure 1) focused on the coastal areas, partly due to the accessibility of available documents and the experience of the author. However, it can be considered as an appropriate response to poverty density (Figure 2) in the coastal areas.

<sup>4</sup>Circular No. 18/2004/TT-BTNMT guiding the implementation of the Government’s Decree No. 109/2003/ND-CP on Conservation and Sustainable Development of Submerged Areas

<sup>5</sup>NEA and IUCN, 1999-2000 “Wetland sites with biodiversity and environment values in Vietnam’ as part of program report on ‘Towards a Vietnam Wetlands Conservation and Management Programme’

The sites selected illustrate different aspects as follows.

- *The types of wetland ecosystems include: river estuary and coastal wetland (Xuan Thuy), mangrove forest (Can Gio), brackish and fresh water body (Tam Giang and Nai lagoon), and (4) coastal marine water body (Xuan Day bay).*
- *Management objectives include protected wetland areas (Xuan Thuy and Can Gio) and “open use” wetlands (Tam Giang lagoon, Nai lagoon and Xuan Dai bay)*

The review analysis was carried out based on the site-specific management of five wetlands areas representing different management objectives. This took account of the following aspects<sup>6</sup>: (1) wetland size and stakeholders, (2) structure and function of the wetland ecosystem, (3) the management practices, (4) economic issues affecting the ecosystem, and (5) adaptive management over space and time. Secondary data sources and available documents informed the analysis. Additional communication through phone and emails with some local key informants, management officers in charge and on site researchers was conducted for updating and verifying relevant information.

The report organisation includes an introduction of the study review followed by briefs on five wetland areas selected for the review. The main part of the report is a review of the management of wetland areas within an ecosystem management framework. The conclusion and comparative analysis tables are at the end of paper.

## 2. Introduction of The Reviewed Wetland Areas

### 2.1 Xuan Thuy National Park

Xuan Thuy National Park in Nam Dinh province was upgraded in 2003 from two current protected wetland areas: the Xuan Thuy Natural Wetland protected area and Xuan Thuy Ramsar site. The park is a delta and estuary islands supporting the coastal mangrove and mudflat ecosystems in the Red River Delta; the area includes land enclosed by sea dikes, with fringing marshes.



- Xuan Thuy National Park, Nam Dinh Province
- Tam Giang Lagoon Thua Thien Hue Province
- Xuan Dai Bay, Phu Yen Province
- Nai Lagoon, Ninh Thuan Province
- Can Gio Mangrove Biosphere Reserve Ho Chi Minh City

<sup>6</sup>Following the IUCN CEM ‘Five Steps’ procedure. See Annex 3.

This is a critically important area for migratory water birds and shorebirds, regularly supporting several globally threatened species. Human uses include fishing and aquaculture yielding up to 10,300 tons per year, rice production of 40,000 tons per year, duck rearing, bird hunting, and reed harvesting. In 2004, the local income from the park was estimated at 100 billion Vietnam Dong, indicating a very high intensity of resource exploitation. Mangrove forests are of considerable importance in maintaining fisheries, as a source of timber and fuelwood, and in protecting coastal settlements from typhoons.

Xuan Thuy National Park was established for natural wetland resource conservation and other uses such as environmental education, eco-tourism and socioeconomic development. Natural fishing and aquaculture is still intensive in the protected area and brings in important livelihood sources for local communities. However those activities produce numerous negative impacts on environment and wetland natural resources. Among the most critical practice is mangrove deforestation for shrimp and clam culture. The clearance of mangrove forests seriously damages habitats for migratory birds. Aquaculture waste also pollutes water sources in the park. The reduction of water quality leads to decrease of stock of wild animals and birds

The Xuan Thuy National Park Management board is responsible for overall management of conservation and resource utilisation in the park. The board reports to the Nam Ding provincial government through the Department of Agriculture and Rural Development. Many other local stakeholders are also involved in management. These include the Forest Protection Department, commune and district government, and people’s organisations such as the farmers’ union, women’s union, and youth union. They help to manage both the park and the areas beyond the designated zones, but role definition and allocation among the institutions and stakeholders is still a challenge. The planning and building management regulations achieved initial steps at the park establishment. All these are in process of further development, upgrade, legalisation and establishment

### 2.2 Tam Giang-Cau Hai Lagoon

Tam Giang-Cau Hai Lagoon in Thua Thien Hue Province is considered very important. The area of the whole lagoon system is 22,000 hectares with an approximate length of 70 km along the coast. The lagoon is an important nursery area for inshore and offshore fish species, and thus indirectly supports the livelihoods of people living along the coastal area in the central part of Vietnam. Of approximately 300,000 people living on and around the lagoon, one third depend on fishery and aquaculture for their livelihoods. There are also an estimated 1,500 households living on boats in the lagoon. The human and ecological significance of the lagoon goes beyond those people immediately involved in fishing and aquaculture. The lagoon’s ecological conditions and its capacity to support human development are threatened by various activities that include fishing, aquaculture, agriculture, and transport and industry development.

Before 1990 (when aquaculture had yet to be introduced) lagoon resource users mainly were from traditional fishing communities and practiced natural fishing. The number of lagoon users and exploitation diversity was not very high. After the adoption of aquaculture in the 1990s, number of lagoon resource users and types of activities increased with new comers and technologies. In the 1990s, aquaculture was expanding rapidly when as lagoon areas were claimed by individual households without clear regulations from local government. In this practice the local people who had traditional access rights to the lagoon for fishing, e.g., the fish-trap corral owners, have enclosed lagoon areas with nets. This had led to the marginalisation of mobile gear fishermen, who were already disadvantaged. The wave of privatisation has reduced the common lagoon areas.

**Photo 1.** Wetland in Tam Giang Lagoon under pressure from human use.



**Source:** *Truong Van Tuyen*

Meanwhile, the local government still maintains its support for shrimp pond aquaculture, though this was identified as the main source of lagoon pollution. The commune government with agreement from district government developed planning of the lagoon areas. It then allocated land to individual households or enterprises for pond aquaculture through land use contracts. The upper aquaculture ponds were converted from agriculture lands around the lagoon. The owners of these lands were awarded red books under the land law of 2003. The current institutional arrangements in the lagoon system do not support sustainable access to the lagoon resources by the traditional fishing families.

After 2000, planning for lagoon management was paid more attention as a response to the above situation. Overall planning for fishery management was developed in 2004 that defined sensitive areas, restricted for fishing and spawn area, for future protected areas. The government also made an effort to enforce open waterways in the lagoon. This enforcement has had to be repeated at regular intervals to maintain the waterways, because users re-claimed the newly opened areas. Problems arose also after enforcing opening of the waterways regarding the use rights governing the opened common water areas, which generated conflicts between the mobile gear fishers and net-enclosure owners.

### 2.3 Xuan Dai Bay

Xuan Dai Bay belongs to Song Cau District, Phu Yen Province. Its area is about 9,000 ha. The bay surrounding with four coastal communes: Xuan Tho 1, Xuan Tho 2, Xuan Phuong, and Song Cau Town. The resource management at this site was generally overlooked until lobster culture expanded rapidly in late 1990s. There is a wide range of resource exploitation in the bay. Natural fishing includes inshore fish capture and collection of spiny lobsters for culture. Aquaculture includes lobsters in cages in the bay and shrimp ponds along the bay edge. Lobster culture development has created critical issues. The rapid increase in the number of cultured lobster cages has led to serious indications of lower water quality. Intensive culture has resulted in environmental problems and conflicts as the farmers look for good places for cages.

In 1999, community-based lobster culture area management was initiated. As a result the perceptions of local communities regarding natural resource exploitation and protection have been improved. In this line the solutions for maintaining their sustainable livelihoods have been raised and practiced. Community organisations have been established to involve resource users in learning activities, which helped resolve conflicts among lobster culture farmers and among the spiny lobster fishers. The lobster culture farmers have a better understanding of environmental protection and implement it better. Community actions on resource management for sustainable livelihoods were developed, through the release of adult lobsters to improve the availability of lobster eggs and sperm in the bay. Currently bay-wide planning is still under-developed. However, the district government and department of fisheries at province level provide direct guidelines on resource management.

### 2.4 Nai lagoon

Nai lagoon in Ninh Thuan Province is located in the Northern-East of Phan Rang City. It is a coastal bay that spreads inland in the shape of a shallow hexagonal pan. The area of Nai lagoon is about 700 ha. The maximum depth is about 2.5 m depending on the tide. Nai lagoon is rather sloping and connects with the sea by a narrow canal. It provides aquatic resources that are important for the livelihood development of most people living around the lagoon. Lagoon water consists of marine water (exchanging with Phan Rang bay) and fresh water from trenches flowing into the lagoon. Water exchange between Nai lagoon and Phan Rang bay used to be through a canal of 2 km length, 3 to 5 m depth and from 100 to 400 m width. The condition of the lagoon ecosystem depended on this process of water exchange. However, since the long canal between the lagoon and Phan Rang bay has begun to be blocked by sediment, water exchange has decreased. This in turn has been the main cause of sedimentation in the lagoon.

There are five communes located around Nai lagoon. The total population is 64,365. Population density is high compared to the district population density (215 people/km<sup>2</sup>). The livelihood activities of most local people are mainly based on resources of Nai lagoon such as shrimp culture, aquatic resources exploitation, and salt production. Nai lagoon is largest area of aquaculture in Ninh Thuan Province with the pond area of 900 ha.

Aquaculture at Nai Lagoon was started in 1980 mainly with extensive systems. The main products were marine fish and sand-shrimp (*Metapenaeus* sp.). After 1995, culture techniques became more intensive with large investments in fish eggs, shrimp feed, equipment and the application of technological advances. Year 2000 was the best year of shrimp culture activities of Nai lagoon in terms of productivity and economic performance. After this, the area of shrimp culture in the region continuously increased, and the total area of shrimp culture in the region reached 900 ha. Shrimp farming was high-risk, so snail and finfish have also been introduced as lower-risk activities at the lagoon. This unplanned expansion, took the lagoon across the sustainability threshold, and the system was no longer able to eliminate all the waste produced. The discharge of waste-water resulted in pollution of the lagoon water taken back into the ponds, and has seriously reduced the environmental quality of the ponds. As a result, many ponds could no longer be stocked because of shrimp diseases. Farmers wanted to go back to rice culture, but unfortunately, this was not possible either financially or agronomically.

## 2.5 Can Gio mangrove biosphere reserve

Can Gio mangrove biosphere reserve in Ho Chi Minh City is a model in the area. It plays a critical role as a paradigm for forest protection and management in Vietnam. After 23 years of efforts in reforestation, more than 30,000 ha have recovered from the ravages of over-harvesting and chemical warfare. Today, the Can Gio mangrove forest covers an area of about 38,664 ha. The management of Can Gio mangroves took several stages. Between 1978 and 1987 the Duyen Hai Forest Plantation and the Ho Chi Minh Forestry Service were responsible for taking care of and reforesting the forest. The Duyen Hai District Forest Ranger is responsible for implementing legislation, monitoring and punishing illegal activities within the protected forest area.

In 1999, Ho Chi Minh City People's Committee granted authority over the Can Gio mangrove areas to Can Gio District People's Committee, and the Management Board for Can Gio Protected Forest directly managed this mangrove. In December 2001, the project «Can Gio Mangrove Nature Reserve» was approved by Ho Chi Minh City People's Committee and Can Gio protected forest formally became a Nature Reserve. The management goals of Can Gio Mangrove Biosphere Reserve are: (1) Conservation of diversity of landscapes, ecosystem, species and genes, (2) Stimulating economic development based on sustainable environment and culture, and (3) Enabling research, monitoring, training and education about sustainable conservation and development at local, national, regional and international levels. The total area of Can Gio Mangrove Biosphere Reserve is 75,740 ha. The planning designed three zones that complement to each other:

The Core zone (4,721 ha) is established with the long-term purpose and aim of preserving the landscapes, ecosystems and species diversity that are found in the area.

Buffer zone (37,339 ha) surrounds the core zone. Activities here are managed to fulfill the purpose of the core area. This zone provides ideal places for education, training, tourism and relaxation.

The Transition zone (29,310 ha) is the outermost surrounding area that is maintained for agriculture, residential areas and other activities. This area has important role in maintaining socio-economic activities that promote local development.

## 3. Towards Management of Wetland Ecosystems

### 3.1 Wetland area and Management objectives

Common threats to wetland boundaries are mainly from land area reclamation and/or illegal water area claims for various uses (Table 1 – p39). The most critical threat is construction or conversion of lands into aquaculture ponds. This took place through land and water allocation in a wetland privatisation process to facilitate the expansion of aquaculture, mainly for shrimp culture. This was partly due to increasing population density in combination with changes in land and or water area use. Those activities reduced the mangrove forest area and produced negative effects on the environment with aquatic pollution. Severe deforestation was the main consequence at Xuan Thuy Ramsar and Can Gio protected area.

Other problems are illegal and high-intensity wetland resource exploitation that produces negative affects on biodiversity. The poverty of local resource users who rely on natural resources for their livelihoods is considered the main pressure. This is also the result of ineffective management and protection, even after the establishment of the wetland protected areas Xuan Thuy Ramsar and National Can Gio forest.

The management objectives of these wetlands areas are a response to problems at the sites concerning the conservation of natural resources for long-term local socio-economic development. The common management objective of all sites is not only to conserve wetland resources but also to improve the

livelihoods of local communities (Table 1): a profound recognition of the livelihood importance of wetland ecosystems in Vietnam. The improvement of environment and functions of wetland is also emphasized in all the review sites. However, in Xuan Thuy national park and Can Gio mangrove biosphere the overall management objective is protection, while at Tam Giang lagoon, Nai lagoon and Xuan Dai bay it is to sustain and rehabilitate natural resources and ecosystem functions. In the case of Tam Giang lagoon, sensitive areas such as O Lau river estuary, and the spawning areas in Sam Chuon are in the process of being defined as protected zones within the lagoon systems.

### 3.2 Stakeholders and their interests in wetland ecosystems

There is a wide range of stakeholders who are interested and affected by the management of wetland ecosystems. For this study the stakeholders can be categorised into three levels (Table 2, pp. 40-41). The primary stakeholders are the direct resource users who more or less rely on the wetland resources for their livelihoods. These include traditional fishers, aquaculture farmers, crop plant farmers, seasonal resource users, and natural resource based service providers. Naturally, they are interested in the resource availability that is important for their livelihoods. Their interests are also related to accessibility and resource quality. This involves institutional arrangements and the use right regime set up by management. In the protected wetland areas (Can Gio biosphere reserve and Xuan Thuy national park) the use right regime is clearly defined (through regulation) in the core and buffer zones to regulate the access and use. The capacity of law enforcement is a major concern. However, in the “open use” wetland areas (Tam Giang lagoon, Nai lagoon and Xuan Dai bay) use right allocation is also underway. The concern is not only the law enforcement capacity but also rights regime. This is of major interest to the primary stakeholders because it affects their livelihoods most. However, the traditional resource users e.g. fishers and rice farmers may not have formal use rights allocated: their access to fishing grounds and water resources is based customary practices commonly accepted by the community, but “illegal” according to the perception of local government.

**Photo 2.** Women collecting macrophytes for fish feed.



**Source:** Truong Van Tuyen.

Secondary stakeholders are the organisations or groups that have direct roles or directly undertake the management responsibility and/or carry out the interventions for wetland ecosystem management.

It is necessary to note that the management of wetland ecosystems is largely beyond the boundary designated as the protected area. Therefore the determination of the secondary stakeholders is also complex. These include not only those who are interested in the nature of resources, and their quantity and quality, but also those who are interested in the way that the resource is protected, conserved, and used.

The issues of local livelihood development, technology development, social economic development, law enforcement, and user rights allocation are also interesting for the secondary stakeholders. A quite long list of secondary stakeholders has been identified. The management boards are special for the protected areas (Management Board for Can Gio protected Forest and Xuan Thuy National Park Management Board). The local government and line agencies at commune, district and provincial levels, people's organisations, NGOs, and research institutes and universities are interested and also take on certain roles in wetland ecosystem management. At the protected wetland areas the specialised management boards are established under local government to undertake overall management responsibility. Protection and conservation is the key mandate of the management board. It is also worth noting that the interests of the specialised management boards may easily be limited to the core and/or buffer zones of the wetland ecosystem.

Meanwhile, the management of the "open use" wetland ecosystems is undertaken by the commune government. It is the most direct management body that may act in line with guidelines from line agencies at district and provincial levels. Therefore, it is most interested in resource efficiency including livelihood development and the role of wetlands in local socio-economic development. In the protected areas, the local government takes major management roles outside the protected area boundary. Therefore it largely has interests in these areas, but mainly as they affect socio-economic development.

Tertiary stakeholders in this study are organisations and groups that can influence the wetland management through policy development and support to strategic approach application. These include line agencies at ministry levels and international research and development organisations and donors. The tertiary stakeholders are interested most in the successes and failures of the strategic management approach to wetlands. They are also much concerned with the resource conservation and overall socio-economic development and poverty reduction.

### 3.3 The structure and functions of wetland ecosystems

The important roles of all the wetland ecosystems under review go well beyond the direct exploitation of natural resources for people's livelihoods (Table 3 – p42.). From an ecological point of view, the most important functions of these wetlands are as water bodies to dissolve waste and discharge from agriculture, aquaculture, industry, residences and other human activities. Maintaining spawning and nursery habitats for aquatic species is another important role that provides a resource base for local livelihoods. Their protection function is critical, e.g. protected forests and flood control is a key role of the Can Gio Mangrove Biosphere Reserve and the lagoons in Central Vietnam. As mentioned earlier, wetland ecosystems are very rich in biodiversity. All sites reviewed provide a long list of fauna and flora species including rare and almost extinct species.

However, the significant functions of the wetland ecosystems are undermined by human activities. Problems of over-exploitation, pollution, destructive and illegal fishing, and land reclamation are all interlinked and are found at all sites. Moreover, mangrove deforestation was previously deliberately practiced for aquaculture development and other needs. This still goes on even after reforestation in the case of Xuan Thuy National Park and Can Gio Mangrove Biosphere Reserve. These pressures are due in part to increasing human population and migration so that the number of resource users in Can Gio increases.

The poverty of local communities as indicated in the early part of this report creates high pressure on the natural resources including the wetlands. While upland communities have a very high poverty incidence, the density of poor people is very high in the coastal communities. Part of over-exploitation is also down to weak management that has allowed excessive exploitation intensity. Tam Giang lagoon situation gives a good example illustrating how human communities create pressures on the ecosystem. The poverty of traditional fishing communities is very critical. Most of them were from the sampan groups (who live in boats) and just settled on land recently. The fishing activities in the lagoon are still based on an "open access" regime with customary rights. Meanwhile the fixed-gear fishers took advantage of policies supporting aquaculture and customary rights and enclosed their fishing ground to claim exclusive rights. This created a "boom" in aquaculture in the late 1990s, starting a process of lagoon privatisation that produced not only threats to the boundaries but also to its ecological functions.

### 3.4 The management of wetland ecosystems

Relevant legislation at the national level influences the management of wetlands in many ways. These include (1) Law on Water Resources, 1998 (No.8/1998/QH10), (2) Fisheries Law, 2003 (No. 17/2003/QH 11), (3) Land Law, 2003 (No 13/ 2003/ QH11), (4) Government Decree No. 109/2003/ND-CP, together with several Decrees, Circulars and other implementing legislative documents. These laws provide definitions of wetlands, the boundaries for their management, and the rights and obligations for communities living in and using those areas. This is also important to enable management agencies to perform their management responsibilities. The legal definitions drawn from these laws are as follows:

- *The inland wetlands are defined as areas submerged in fresh or brackish water, including rivers, streams, canals, ditches, special-use water surface, lakes and ponds.*
- *Water source is a form of accumulation of natural or artificial water.*
- *Surface water is water existing on the ground of continental land; land with inland water surface.*
- *Special use areas include forests, inter-tidal areas, non-agricultural land groups, and aquaculture lands.*

A wide range of institutions takes responsibility for the management of wetland ecosystems (Table 4, p.33 and Table 5, p. 43). In the protected wetland sites (Can Gio Mangrove Biosphere Reserve and Xuan Thuy National Park) the Management board is established to take direct and overall management responsibility. However, the roles of the management boards may be limited to the designated core and buffer zones of the protected areas, which are only part of the whole wetland ecosystem. Their capacity to influence events is thus also mainly within the boundary of the protected areas. The management boards report directly to the district government (Can Gio District) and provincial government (Nam Dinh Province) through the Department of Agriculture and Rural Development. They hardly treat the direct resource users as primary stakeholders. Local government at different levels undertakes responsibility for the direct management of the areas adjacent to the protected areas and so are an important influence on the whole wetland ecosystem.

Photo 3. Sea demarcation in Tam Giang Lagoon.



Source: Truong Van Tuyen

In the “open use” wetland areas, the commune government undertakes overall and direct management responsibility. The commune government implements activities for livelihoods, socio-economic development, and resource protection. It also implements the management guidelines, regulations and policies that issued by the high levels e.g. district, province and national government. In the study wetland sites, the commune government have management jurisdiction over its territory, which included components outside the protected areas. Therefore the separate capacity of either commune government or the management boards to influence the whole ecosystem is limited. This implies that the role of higher government e.g. district and province government is crucial. The influence of district and province government is carried out through line agencies, e.g., DoFI, DONRE, and DARD. The local government at a certain level represents most stakeholders. However, management decisions may not take account of most stakeholders’ interests and concerns, due to low capacity and the prevailing conventional top- down approach.

Table 4. Key institutions undertaking major roles in wetland ecosystem management

Management role	Protected wetland areas: Can Gio MBR, Xuan Thuy NP	“Open use” wetland areas: Tam Giang, Nai Lagoon, Xuan Dai Bay
Direct management and executive of resource conservation and use.	Protected area management board and commune government	Commune government
Detail planning and local livelihood development	Protected area management board and commune government	Commune government
Development of management guideline, regulations, and use right allocation	Management board, line agencies (DARD), district and province government	Line agencies (DoFI) and district government
Planning approval and management decision	Province and national government	District and province government
Develop laws and management legislations	Province government, MONRE and MARD	Province government and MoFI
Community-based and Co-management	DARD and mass people organizations	DoFI & social-professional organisation

In general, the ultimate decision making on management of a specific wetland ecosystem is undertaken by the local government - the province government. Therefore all relevant sector departments or line agencies are more or less involved and have certain responsibilities. In the protected areas (Xuan Thuy National Park and Can Gio Mangrove Biosphere Reserve) DARD undertakes a major role and management responsibility. In the “open wetlands” DOFI has more management roles compared to other departments. In specific wetland areas, the key management line agencies or provincial departments are commonly working with relevant institutions towards good management practices.

The people and community organisations also have important roles in management. These organizations are representative of the primary stakeholders and can be categorised as follows. (1) Community-based organisations without a sound formal legal base e.g. interest groups or self-management for natural resource management. (2) Government-based social and political organisations e.g. Farmer’s Unions, Women’s Union etc. and (3) Social and professional organizations e.g. Fishing Associations supported to take central roles in community-based co-management to be set up in Tam Giang lagoon. Such organisations take an increasing responsibility in organising activities at grassroots levels for livelihood development and resource utilisation and protection. In the case of Tam Giang lagoon, the community organisation has important roles in local participatory planning and community-based management of lagoon resources. The Fishing Association under the Vietnam Fishery Society (VINA FIS) is legally supported by the province government to become a partner in a co-management arrangement.

Among problems raised most frequently are the issues of role allocation among the management bodies, and unclear user-rights and management regime. This is partly because the legal framework for wetland management is underdeveloped. In many examples such as different sub areas of Tam Giang lagoon, Land and/or Fishing laws, which primarily deal with terrestrial and marine ecosystems, also governed wetlands by default.

### 3.5 The economic issues and incentives affecting the ecosystems

#### Livelihood roles of the wetland resources

One-fifth of Vietnam's population<sup>7</sup> depends directly or indirectly on exploitation of wetland resources for the livelihoods. Hence the sustainable use of wetlands is fundamental to the food security, health, and agricultural and industrial development of the whole nation. Such a context requires a holistic approach to wetland management.

Demographic poverty mapping indicates that poverty incidence is most prevalent in mountainous areas. However, the poverty density was much higher in coastal areas, where the population is high. In lowland floodplains and coastal wetland areas, poverty is often closely linked to wetland dependence. Poverty in wetlands may be briefly summarised as resulting from:

- *Over-exploitation of local resources*
- *Water pollution caused by agricultural chemicals, domestic and industrial pollution and, in some cases, uptake of dioxin residues*
- *Landlessness and land grabbing (for aquaculture)*
- *Lack of clear tenure arrangements*
- *Limited pro-poor inter-sector planning*
- *Unsustainable exploitation of fisheries and aquatic resources*
- *Conversion of wetlands for agriculture, aquaculture, construction and tourism*
- *Increasing demand for fish and other aquatic resources (including wood products)*
- *Climate change associated changes in sea level, storm frequency and intensity, etc.*

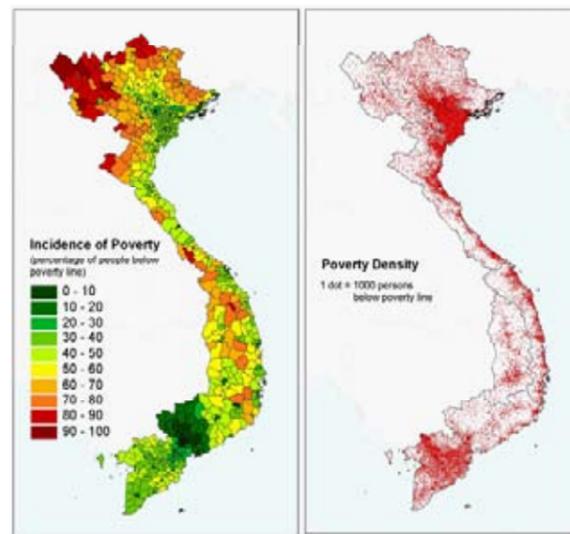


Figure 2 Poverty Incidence and Density, MOLISA, 2004

#### Aquaculture development

From an economic point of view, agricultural areas are wetland ecosystems' most important elements, and interest is on the space and water quality appropriate for a variety of aquaculture patterns. Local authorities and communities around wetlands have settled on aquaculture development as a major strategy for socio-economic and livelihood development.

From the economic point of view the most important element of the wetland ecosystem is the aquaculture areas including the space and water quality appropriate for a variety of aquaculture patterns (Table 6, p. 44). This is because local authorities and communities around the wetland areas considered aquaculture development as a major strategy for socio-economic and livelihood development.

Authorities at most of the study sites developed aquaculture plans and supported the expansion of pond areas and increasing aquaculture intensity e.g. intensive shrimp farming. The aquaculture area increased rapidly in buffer zones and surrounding the protected areas and in all the wetland areas where the protected areas are under-defined. This practice had major negative impacts on wetland ecosystems. Among the most critical threats to the wetlands are (1) restriction of wetland and water

boundaries that resulted from land reclamation and conversion into shrimp ponds, (2) clearance of mangrove forests resulting in damage to biodiversity and of habitats of aquatic spawning and birds, (3) pollution from aquaculture waste reducing water quality, (4) increasing sediment from preventing water flows that reduce waste dissolving capacity.

Due to high market demand mainly for export, shrimp culture provided high initial economic returns that have been important incentives for investment. As a result shrimp culture areas expanded rapidly in the 1990s as a "boom" in the use of brackish water environments in coastal areas occurred throughout the country. Unplanned aquaculture development e.g. in the Tam Giang lagoon and Nai lagoon, not only damaged wetland ecosystems with threats to boundaries and pollution, but also introduced frequent risks to the shrimp farmers. Many farmers got more and more into debt without the possibility of repayment of aquaculture loans. Moreover, they cannot reconvert aquaculture ponds back to traditional rice production. Many shrimp ponds around Nai lagoon that were converted from lagoon water areas and rice fields are now abandoned. This problem is also reported in other wetland areas in this study review.

The root cause of the situation is complex and multifaceted. Ultimately the poverty of local communities puts pressure on wetland use for income improvement. Local people most frequently complain of poor planning and ineffective law enforcement. Management institutions need clear definitions of roles and responsibilities and to clarify the user rights regime. Most stakeholders seemed quite unaware of the requirements of sustainable wetland ecosystem management. Most local authorities, the direct managers or wetland ecosystems, supported aquaculture development without necessarily taking any account of the negative impacts of such developments.

It is reported in the case of Tam Giang and Nai Lagoon that seaweed culture (*Kappaphicus alvarezii*) is a more or less sustainable form of aquaculture. To a certain extent this activity provides a good option for resource rehabilitation of polluted water bodies. Seaweed beds are aquatic spawning habitats and should be considered in planning for integrating sustainable use and conservation purposes.

#### Natural fishing

Fishery resources are also important economic sources for local communities around wetland areas including protected and "open use" sites. Aquatic capture includes commercial products (fish, shrimp, crab, clam, lobsters...) and aquaculture spawn (for spiny lobsters, crab, local fish...) traded in the local markets and exported.

The increasing market demand for aquatic foods and local need for income, especially in traditional fishing communities, had increased the fishing intensity in wetlands. The problems of over fishing and/or overexploitation are found in all wetlands areas. Illegal and destructive fishing e.g. electric fishing and fine mesh nets are practiced in most wetlands. Much effort goes into banning destructive and illegal fishing, but effective follow-up is impossible because the institutions in charge - the aquatic resource protection division, commune government, and the protected area management board - do not have the appropriate capacity and methods to address those problems.

Destructive and illegal fishing are common practices in the core zones of protected areas such as in the Xuan Thuy National Park. That is mainly due to the poverty of local resource users. As a result, fishery resources in the wetlands have declined. As the number of fishers has increased, the average fish catch of the traditional fishing families has lessened. People are eager to enter the aquaculture trade, adding to pressure on wetland ecosystems.

<sup>7</sup>National Environmental Protection Agency (2006), National Wetland Support Programme 2007-2010

Photo 4. Mending nets in Tram Chim National Park



Source: Nguyen Huu Thien

In dealing with these problems the management institutions in Tam Giang Lagoon and Xuan Thuy national park took a participatory approach by supporting a fishery co-management system which primarily helps local fishing communities to take on more management responsibility. The activities are initiated under policy and legal support from province government and MoFI. Some international agencies such as FAO provide technical and financial support to this initiative in the Tam Giang Lagoon.

The expansion of aquaculture provides opportunities for socio-economic development and livelihoods for traditional fishing communities. However, it also increases the pressure on fishing areas and fishery resources from competition for the wetland water areas. In the Tam Giang Lagoon and Xuan Dai Bay these families rely mainly on natural fishing - catching fish and spiny lobsters for their livelihoods. Their lives become more difficult with restriction of fishing grounds and declines in fishery resources. Risks and insecurities from natural disasters are more frequent. Participation in and benefit from aquaculture is very challenging for traditional poor fisher families because they lack capital and technical know-how. Moreover, they do not have capacity to access the land and/or water areas. Livelihood alternatives for the local communities who rely on natural resources in wetland areas are still a major concern.

### Tourism development

Tourism development is reported as having high potential in all wetland areas. All stakeholders and management institutions are interested in the industry because it helps carry out at the same time the wetland management objectives on conservation and livelihood development. Tourism activities depend on the recreation values of mangrove forests, biodiversity, wild animals, coral reefs, coastal and bay landscapes. Ecological tourism development at Can Gio Mangrove Biosphere Reserve and at Xuan Thuy National Park provides many incentives for protecting wetland forests and biodiversity. Tourism development at the other wetland sites is in the initial stages. The challenge is not only the planning but also local capacity building. That involves a wide range of activities, such as awareness raising, alternative livelihood development for the poor resource user groups and human and other capital resource mobilisation.

The impact of tourism on local economies and community well-being is positive, especially at Can Gio Mangrove Biosphere Reserve. Improved infrastructure not only meets a need for tourism development but is also indicative of achievement. Local community members around Xuan Thuy National Park and from Can Gio district are able to participate and benefit from tourist programs based on the recreational value of mangrove forests and other natural resources. A segment of the local population gets employment from the main tourist companies and other related businesses. Some communities are able to set up community-based ecological tourism.

In the case of Can Gio, there is some concern about negative impacts on the environment. Too high a number of visitors creates pollution and conflicts. Management of tourism activities is also a complex issue. In Can Gio, there are many service providers that create problems regarding management and integration with the wetland management. P.N. Hong et.al (2002) reported a long list of tourism operators, including two big companies based in Ho Chi Minh City, the district's trading company and numerous private enterprises that run restaurants, guest houses, private car parks, motorcycles, buses, the ferry, and shops. At least 100 local families operate seafood shops, souvenir shops, drink stands, and chair rentals. The management board for Can Gio protected mangrove forests, some forestry plantations, and the district's organisations in Can Gio are planning tourism services of various types.

### 3.6 Lessons and responses for adaptive management

The key negative experience in all wetland areas in this study review is related to support for shrimp culture development (Table 7, p.45). Shrimp culture development in the 1990s created critical threats to the wetland boundaries and biodiversity. Therefore it reduced the environmental services and functions of the wetland ecosystems. It also brought in very high risks and high technology dependence for the direct resource users of wetlands. Common management problems regarding shrimp culture development included:

- *Planning for wetland ecosystem management is neither developed nor appropriate*
- *Wetland management institutions lack capacity for law and/or regulation enforcement*
- *Lack of management methods appropriate to wetland management*
- *Local policy is biased towards economic development*
- *High density of poor people who rely on wetland resources for livelihoods*
- *Unclear roles and responsibilities in wetland ecosystem management*
- *Unclear user's rights regime for the land and water areas*

A positive experience found in all wetland sites is the promotion of local participation in management. There are numerous examples to highlight the values of people's participation and application of participatory approaches in wetland management. The Can Gio Mangrove Biosphere Reserve has

been rehabilitated successfully with a land and forest allocation in which the mangrove stewards were able to integrate livelihood development and forest protection. Community-based management (CBM) has been applied in pilot scales in all wetland areas as an early stage of co-management that supports legalisation of community roles and responsibility in natural resource management. In the Tam Giang Lagoon system, the application of CBM involved participatory planning and improved local planning quality at the commune and village levels. The application of local participatory planning at commune and village levels also revealed a need for strengthening resource user's and/or community organisations.

In Nai Lagoon and Xuan Dai Bay, the strengthening of resource user's organisations facilitated awareness building on national resources and environment management. The fishing communities in Xuan Dai were able to promote villager contributions by giving adult lobsters to release into the bay as part of a resource conservation initiative. In Nai Lagoon the shrimp farmer's organisation undertook awareness raising and environmental education and set up a self-management mechanism that developed regulations on irrigation supply and discharges in the aquaculture areas. The self-management scheme was more able to enforce regulations which had been developed by the community itself.

CBM in Xuan Thuy National Park has been promoted in many activities for wetland resource conservation and livelihood development. In 2004, a community-based approach was employed for project development on sustainable management and utilisation of fishery resources in the park. The CBM approach helped develop legal mechanisms for cooperation among stakeholders regarding benefits and responsibilities for management, especially for aspects that lack of coverage under the current legal framework. The co-management set-up accounted for appropriate local needs for livelihoods and recognised local people's customary access to the wetland areas. It also helped the local community to develop regulations and participate in monitoring wetland resource protection.

Planning and institutional arrangements to develop protected areas can be seen as important efforts for effective conservation of the wetland ecosystems and sustainable use of natural resources. The application of protected area strategy is a response to damage and degradation of wetland resources. In all studies of wetland areas, the local government has identified potential and made proposals for wetland protected areas. Currently, Can Gio and Xuan Thuy are protected areas. Other areas are developing differently. The Can Gio mangrove forests, rehabilitated after the war, received a great deal of management attention. . In 1999, the Ho Chi Minh City People's Committee granted authority over the Can Gio mangrove areas to the Management Board of Can Gio Protected Forest under Can Gio District People's Committee, to manage this mangrove. In 2000 MAB/UNESCO Committee recognised as an International Mangrove Biosphere Reserve, the first biosphere reserve in Viet Nam. In 2001 Ho Chi Minh City People's Committee approved the project "Can Gio Mangrove Nature Reserve." With this institutional arrangement the Can Gio protected forest became a Nature Reserve.

Xuan Thuy National Park was established quite recently (2003). The development of this protected area has been taken through different steps. It took advantage of the establishment of the Xuan Thuy natural protected area in 1994 (7,100 hectares) and the Ramsar site in 1989 (12,000 hectares). The combination of Xuan Thuy natural protected area and the Ramsar site in the current Xuan Thuy National park is a part of the overall planning for the Red River Delta and coastal Biosphere. That plan considered Xuan Thuy National Park as the core zone (UNESCO, 2004).

The planning and development of protected areas has been the subject of much effort in Tam Giang Lagoon. The proposal of O Lau estuary, part of the lagoon, as a Ramsar site has been made and is in the process of being recognised. In 2003 an overall plan for aquaculture was developed by Department of Fisheries and approved by the province people's committee. The aquaculture plan includes a low tide shrimp culture area, which is a submerged area, permanent or temporary, along the lagoon coast. High tide shrimp culture areas are non-submerged areas on the lagoon coast – such as the area

on the lagoon coast inside the saline prevention dam, or the area on the lagoon dunes, or the coast sand soil area. These choices can be seen as efforts to move towards more sustainable aquaculture development, by controlling rapid expansion of aquaculture in the productive lagoon areas. In 2004 the province government approved the overall plan for fishery management in Tam Giang Lagoon. It defined the lagoon water areas into three categories for purposes of fishery management: (1) highly sensitive areas were designated as future protected areas; (2) areas of modest threat were designated for natural fishing with specific restrictions, and (3) normal areas are for open access natural fishing.

However, the protected area approach takes place at the policy level. The establishment of the protected areas emphasises the conservation of natural resources, especially mangrove forests. Under the current legal framework the 'protected area' in this context may be perceived as 'special-use forest' (SUFs). SUFs are defined as 'forests mainly planned for forest development aiming at conservation of natural, standard specimens of the national forest ecosystem, forest botanical and animal gene resources, scientific research, protection of historical/cultural relics and landscapes, and tourism'<sup>8</sup>.

Under current institutional arrangements, both Xuan Thuy National Park and Can Gio Mangrove Biosphere Reserve are managed by specialised management boards, which were established as parts of the local government through the Department of Agriculture and Rural Development. Therefore protected area management responsibilities with respect to socioeconomic management are with sector emphasis e.g. in the field of agriculture and rural development at district and provincial levels. The institutional responsibilities and regulations for SUFs seem to extend only to the terrestrial forestry component of wetland ecosystems with respect to legal framework. This constrains efforts to build ecosystem-based institutional consensus on planning and management of the wetland ecosystem as a whole. Broadening the range of protected areas beyond the sector emphasis would enable protected area managers to encourage human intervention and use the protected area as a whole ecosystem.

## 4. Conclusions

Wetland ecosystems are complex. Their management involves interface issues between natural and social sciences. However, current management practices in the study review of wetland areas are based on sector planning and strategy. The legal framework and management institutions of the protected areas e.g. the Xuan Thuy National Park and Can Gio Biosphere Reserve is mainly for "special use forests" under the guidance of the Department of Agriculture and Rural Development. This implies that wetland ecosystem management needs an improved legal base for clearer definition of boundaries and key components to enable the management body, e.g. the management board or local government, to have a holistic view on the management unit as an ecosystem.

The quality of planning is found to be the most critical issue for ecosystem management in all the studied wetland areas. In Xuan Thuy National Park and Can Gio Biosphere Reserve the planning was developed without taking account of current access and customary use rights. It has not yet not much involved the participation of wetland stakeholders, especially the primary groups who rely on the wetland resources for their livelihoods. In the "open use" wetland areas the planning is either of very low quality or incapable of implementation. At all study sites the unplanned expansion of aquaculture created most critical threats to the wetland boundaries and whole ecosystems.

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<sup>8</sup>Article 31 of the Forest Protection and Development Law

Eco-tourism development based on wetland ecosystem landscapes seemed to be the most viable economic and sustainable use of natural resources. That development provides incentives for wetland ecosystem management and improvement of local livelihoods. All study wetland areas indicate high potential in coastal landscapes for eco-tourism. There eco-tourism development provides great opportunity for alternative livelihood development at the wetland ecosystem that is aimed at reducing pressure on natural resource exploitation.

Initiatives on community-based management and co-management of natural resources have been carried out at pilot scales in the wetland sites e.g. in Tam Giang Lagoon and Xuan Thuy National Park. Those projects brought in participatory planning and a framework for a scaling-up of the application of participatory management methods. As a result, the participation of local communities in local planning for resource governance has taken place in Tam Giang Lagoon.

Those initiatives helped not only to improve the quality of planning, based on the people's own decision making, but also defined the new roles of stakeholders and management partners in resource management.

**Table 1. Type of wetlands, management objectives and boundary threats**

Area/ management/ stakeholders	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
Type of wetland	Estuary, inter- tidal, mangrove, protected area	Mangrove forest protected area	Brackish-fresh lagoon "open use"	Brackish-fresh lagoon "open use"	Coastal-marine bay "open use"
Management experience	5 years	8 years	10 years	5 years	5 years
Management objectives	<ul style="list-style-type: none"> <li>▪ Protect mangrove &amp; biodiversity, birds and other wild animals</li> <li>▪ Research &amp; environmental education</li> <li>▪ Eco tourism</li> </ul>	<ul style="list-style-type: none"> <li>▪ Protect mangrove &amp; biodiversity</li> <li>▪ Against shore erosion</li> <li>▪ Conserve wild animals</li> <li>▪ Eco tourism</li> <li>▪ Livelihood development</li> </ul>	<ul style="list-style-type: none"> <li>▪ Improve environment &amp; aquatic habitat</li> <li>▪ Conserve biodiversity</li> <li>▪ Reduce use intensity</li> <li>▪ Improve livelihood</li> <li>▪ Enhance governance</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increase water body &amp; water quality</li> <li>▪ Improve livelihood</li> <li>▪ CBM of environment</li> </ul>	<ul style="list-style-type: none"> <li>▪ Protect environment</li> <li>▪ Conserve natural resources</li> <li>▪ Improve local livelihoods</li> </ul>
Boundary threats	<ul style="list-style-type: none"> <li>▪ Acquire areas for agriculture &amp; aquaculture</li> <li>▪ Deforestation</li> <li>▪ Illegal exploitation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Acquire areas for aquaculture</li> <li>▪ Illegal exploitation</li> <li>▪ Deforestation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aquaculture expansion</li> <li>▪ Lagoon privatisation</li> <li>▪ Sedimentation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aquaculture expansion</li> <li>▪ Sedimentation</li> <li>▪ Solid wastes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aquaculture expansion</li> </ul>

**Table 2. Stakeholders and their interests in wetland ecosystem management**

Type of stakeholder	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
<b>1 – Primary stakeholders and their interests</b>					
Traditional fishers	<ul style="list-style-type: none"> <li>Fishery resources: fish, crab, clam, catch</li> <li>Fishing areas</li> </ul>	<ul style="list-style-type: none"> <li>Fishery resources: fish, crab</li> <li>Fishing areas</li> </ul>	<ul style="list-style-type: none"> <li>Fishery resources</li> <li>Fishing area availability</li> <li>Fishing rights</li> </ul>	<ul style="list-style-type: none"> <li>Fishery resources</li> <li>Fishing rights</li> <li>Sustainable use</li> </ul>	<ul style="list-style-type: none"> <li>Fishery resource: lobster seed, squid, fish ...</li> </ul>
Aquaculture farmers	Aquaculture areas & environment	Aquaculture areas & environment	<ul style="list-style-type: none"> <li>Aquaculture areas &amp; environment</li> <li>Aquatic disease</li> </ul>	<ul style="list-style-type: none"> <li>Water and land areas</li> <li>Sea-water supply</li> <li>Water pollution</li> </ul>	<ul style="list-style-type: none"> <li>Lobster, fish and seaweed farming...</li> <li>environmental pollution</li> </ul>
Farmers and other local residence	<ul style="list-style-type: none"> <li>Aquaculture,</li> <li>Forestry production</li> <li>Aquatic products</li> <li>Forest products</li> <li>Water drainage</li> <li>Irrigation</li> </ul>	<ul style="list-style-type: none"> <li>Aquaculture, forestry production</li> <li>aquatic products</li> <li>forest products</li> <li>water drainage</li> </ul>	<ul style="list-style-type: none"> <li>Aquaculture, aquatic products</li> <li>water drainage</li> <li>irrigation</li> </ul>	<ul style="list-style-type: none"> <li>Aquaculture,</li> <li>Aquatic products</li> <li>Water drainage</li> <li>Irrigation</li> </ul>	<ul style="list-style-type: none"> <li>Aquaculture,</li> <li>Aquatic products</li> <li>Water drainage</li> </ul>
Seasonal resource users	Clam, crab collection	Fishery and forest resources, Landscape,	Fishery resource	Fishery resource	Nurse baby lobster
Destructive & illegal fishing	Fishery resource. Bird hunting. Wild animal hunting. Forest cutting	Fishery resource. Bird hunting. Wild animal hunting. Forest cutting	Law enforcement Fishery resource	Law enforcement Fishery resource	Law enforcement Fishery resource

Type of stakeholder	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
<b>2 – Secondary stakeholders</b>					
Management board	<ul style="list-style-type: none"> <li>Wetland resource in the core zones, buffer zones</li> <li>Conservation methods</li> <li>Planning and regulation</li> </ul>	<ul style="list-style-type: none"> <li>Wetland resource in the core zones, buffer zones</li> <li>Conservation methods</li> <li>Planning and regulation</li> </ul>	NA	NA	NA
Local government at different levels	<ul style="list-style-type: none"> <li>Law enforcement</li> <li>User rights over land and water areas</li> <li>Tourism development</li> <li>Socio-economic development</li> <li>Livelihood security</li> </ul>	<ul style="list-style-type: none"> <li>Law enforcement</li> <li>User rights over land and water areas</li> <li>Tourism development</li> <li>Socio-economic development</li> <li>Livelihood security</li> </ul>	<ul style="list-style-type: none"> <li>User rights over land and water areas</li> <li>Socio-economic development</li> <li>Planning &amp; regulation</li> <li>Law enforcement</li> <li>Resource protection</li> </ul>	<ul style="list-style-type: none"> <li>Law enforcement</li> <li>User rights over land and water areas</li> <li>Socio-economic development</li> <li>Livelihood security</li> <li>Resource protection</li> </ul>	<ul style="list-style-type: none"> <li>Law enforcement</li> <li>User rights over land and water areas</li> <li>Socio-economic development</li> <li>Livelihood security</li> <li>Resource protection</li> </ul>
Line agencies e.g. DARD (province) in the protected areas DoFI (province) in the open use areas	<ul style="list-style-type: none"> <li>Management guidelines</li> <li>Resource protection</li> <li>Planning</li> <li>Regulation development</li> <li>Legal development</li> </ul>	<ul style="list-style-type: none"> <li>Management guidelines</li> <li>Resource protection</li> <li>Planning</li> <li>Regulation development</li> <li>Legal development</li> </ul>	<ul style="list-style-type: none"> <li>Management guidelines</li> <li>Resource protection</li> <li>Planning</li> <li>Regulation development</li> <li>Legal development</li> </ul>	<ul style="list-style-type: none"> <li>Management guidelines</li> <li>Aquaculture development</li> </ul>	<ul style="list-style-type: none"> <li>Natural resource protection</li> <li>Aquaculture development</li> </ul>
Destructive & illegal fishing	Fishery resource. Bird hunting. Wild animal hunting. Forest cutting	Fishery resource. Bird hunting. Wild animal hunting. Forest cutting	Law enforcement Fishery resource	Law enforcement Fishery resource	Law enforcement Fishery resource

Type of stakeholder	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
<b>2 – Secondary stakeholders</b>					
People, community organizations,	<ul style="list-style-type: none"> <li>▪ Livelihood development</li> <li>▪ Equity in resource access</li> <li>▪ Resource conservation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Livelihood development</li> <li>▪ Equity in resource access</li> <li>▪ Resource conservation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Community-based management</li> <li>▪ Livelihood development</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environmental protection</li> <li>▪ Co-management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Community-based management</li> <li>▪ Livelihood development</li> </ul>
Research institutes and Universities	<ul style="list-style-type: none"> <li>▪ Management methods</li> <li>▪ Biodiversity conservation</li> <li>▪ Sustainable livelihoods</li> </ul>	<ul style="list-style-type: none"> <li>▪ Management methods</li> <li>▪ Biodiversity conservation</li> <li>▪ Sustainable livelihoods</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lagoon resource management</li> <li>▪ Co-management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Resource management</li> <li>▪ Livelihood development</li> </ul>	<ul style="list-style-type: none"> <li>▪ Resource management</li> <li>▪ Livelihood development</li> </ul>
NGO	<ul style="list-style-type: none"> <li>▪ Sustainable livelihoods</li> <li>▪ Eco-tourism</li> <li>▪ Resource management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Sustainable livelihoods</li> <li>▪ Eco-tourism</li> <li>▪ Resource management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Sustainable livelihoods</li> <li>▪ Resource management</li> </ul>		
<b>3 - Tertiary Stakeholders</b>					
3.1 Ministry of Fishery	<ul style="list-style-type: none"> <li>▪ Fishery management</li> <li>▪ Aquaculture development</li> </ul>	<ul style="list-style-type: none"> <li>▪ Fishery management</li> <li>▪ Aquaculture development</li> </ul>	<ul style="list-style-type: none"> <li>▪ Fishery management</li> <li>▪ Co-management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aquaculture development</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aquaculture development</li> </ul>
3.2 Ministry of natural resource & environment (MONRE)	<ul style="list-style-type: none"> <li>▪ Wetland resource management</li> <li>▪ Biodiversity conservation</li> <li>▪ Environment protection</li> </ul>	<ul style="list-style-type: none"> <li>▪ Wetland resource management</li> <li>▪ Biodiversity conservation</li> <li>▪ Environment protection</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lagoon resource management</li> <li>▪ Environment protection</li> </ul>		
3.3 Ministry of Agriculture and Rural development	<ul style="list-style-type: none"> <li>▪ Mangrove reforestation</li> <li>▪ Mangrove protection</li> <li>▪ Wildlife management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Mangrove reforestation</li> <li>▪ Mangrove protection</li> <li>▪ Wildlife management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Irrigation</li> <li>▪ Disaster management</li> </ul>		

**Table 3. Key structure and functions of wetland ecosystem**

Site/ Function	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
The most important ecosystem element	<ul style="list-style-type: none"> <li>▪ Water birds habitat</li> <li>▪ Aquatic biodiversity</li> <li>▪ Mangrove forest landscapes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aquatic habitats</li> <li>▪ Mangrove forest</li> <li>▪ Biosphere reserve</li> <li>▪ Landscapes</li> </ul>	<ul style="list-style-type: none"> <li>▪ Water body to dissolve waste</li> <li>▪ Habitat for aquatic spawn</li> <li>▪ Flood control</li> </ul>	<ul style="list-style-type: none"> <li>▪ Water body to dissolve waste spawning</li> <li>▪ Flood control</li> </ul>	<ul style="list-style-type: none"> <li>▪ Water body to dissolve waste</li> <li>▪ Habitats for aquatic animals</li> </ul>
The most critical pressure on the ecosystem	<ul style="list-style-type: none"> <li>▪ Mangrove deforestation</li> <li>▪ Environmental pollution</li> <li>▪ Sea encroachment</li> </ul>	<ul style="list-style-type: none"> <li>▪ Migration to occupy lands</li> <li>▪ Illegal and destructive exploitation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Overexploitation</li> <li>▪ Conversion of natural water body into aquaculture systems</li> </ul>	<ul style="list-style-type: none"> <li>▪ Overexploitation, environmental, pollution</li> </ul>	<ul style="list-style-type: none"> <li>▪ Overexploitation of lobster seed</li> <li>▪ Degradation of water quality</li> </ul>

**Table 5. Roles and responsibilities of institutions that manage the wetland ecosystems and their level of influence (+/++/+++)**

Management Institutions	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
Management board	Overall management and executive of conservation, resource utilization, +++	Overall management and executive of conservation, resource utilization, tourism +++	NA	NA	NA
Commune government	Law enforcement in other components of the wetland ecosystem +++	Law enforcement in other components of the wetland ecosystem ++	Resource Protection, Law/regulation enforcement Detail planning and management +++	<ul style="list-style-type: none"> <li>▪ Lagoon resource protection, +++</li> <li>▪ Law/regulation enforcement management +++</li> </ul>	Law/regulation enforcement +++

**Table 6. Economic issues and incentives affecting the wetland ecosystems**

Management Institutions	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
District government	Management guidelines Law enforcement Allocation of user rights District socio economic planning +++	Management guidelines Law enforcement Allocation of user rights District socio economic planning +++	Management guidelines User's right allocation Guide and legalize local detail planning Support law enforcement +++	User's right allocation Support law enforcement +++	User's right allocation Guide and legalize local detail planning +++
Provincial Government	Overall management policies, planning decision ++	Overall management policies ++	Overall policy on lagoon management +++	Overall policy on management +++	Establishing overall regulations, and policies for ecosystem at the bay ++
Community organizations	Livelihood, tourism development +	Livelihood, tourism development +	Co-management livelihood development ++	livelihood development +	livelihood development +
Universities/ research institutions	Research. Environmental education. Technology development +	Research. Technology development +	Supports to co-management ++	Supports to livelihood development +	Supports local livelihood development +
International organizations (donors)	Mangrove conservation Biodiversity conservation +	Mangrove conservation Biodiversity conservation +	co-management Natural resource conservation +	Community-based co-management NR conservation +	Supports sustainable livelihood development +

Economic factors	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
The most important elements for livelihoods	<ul style="list-style-type: none"> <li>Aquatic resources</li> <li>Aquaculture areas</li> <li>Biodiversity and landscape for ecological tourism</li> </ul>	<ul style="list-style-type: none"> <li>Timber and non timber products.</li> <li>Fishery resource</li> <li>Wild animals</li> <li>Tourist values</li> <li>Fixing mud;</li> </ul>	<ul style="list-style-type: none"> <li>Fishery resource</li> <li>Aquaculture areas</li> <li>Seaweeds</li> <li>Water plants</li> <li>Tourism</li> <li>Local navigation</li> </ul>	<ul style="list-style-type: none"> <li>Sea-water supply and space for aquaculture</li> <li>Aquatic organism as the lagoon resource</li> </ul>	<ul style="list-style-type: none"> <li>Valuable fish, squids, lobsters...</li> <li>Space for aquaculture</li> <li>Seaweed and coral reef.</li> <li>Local navigation</li> </ul>
Elements traded in markets	<ul style="list-style-type: none"> <li>Fishery resources</li> <li>Aquaculture products</li> <li>Timber product</li> <li>Wild animals</li> <li>Tourist services</li> </ul>	<ul style="list-style-type: none"> <li>Timber and non timber products.</li> <li>Fishery resource</li> <li>Wild animals</li> <li>Tourist services</li> </ul>	<ul style="list-style-type: none"> <li>Fishery resource</li> <li>Aquaculture products</li> <li>Seaweeds</li> </ul>	<ul style="list-style-type: none"> <li>Aquatic organisms</li> <li>Aquaculture products</li> </ul>	<ul style="list-style-type: none"> <li>Valuable fish, squids, lobsters...</li> <li>Aquaculture product</li> </ul>
Resources used more or less sustainable	<ul style="list-style-type: none"> <li>Agriculture farms,</li> </ul>	<ul style="list-style-type: none"> <li>Tourist and creation values</li> </ul>	<ul style="list-style-type: none"> <li>Water plants and seaweed</li> </ul>		
Resources under threats	<ul style="list-style-type: none"> <li>Timber</li> <li>Fishery resource</li> <li>Wild animals</li> <li>Aquaculture</li> </ul>	<ul style="list-style-type: none"> <li>Timber</li> <li>Fishery resource</li> <li>Wild animals</li> <li>Aquaculture</li> </ul>	<ul style="list-style-type: none"> <li>Fishery resource</li> <li>Environment for aquaculture</li> </ul>	<ul style="list-style-type: none"> <li>Lagoon water</li> <li>Mangrove forest</li> <li>Aquatic organisms as income source and biodiversity value</li> </ul>	<ul style="list-style-type: none"> <li>Lobsters</li> <li>Space for aquaculture</li> <li>Coral reef.</li> <li>Aquaculture environment</li> </ul>

Economic factors	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
Economic problems from local people point of view	<ul style="list-style-type: none"> <li>High risks in shrimp farming</li> <li>Low efficiency in clam and crab collection</li> <li>Lack of appropriate technology</li> </ul>	<ul style="list-style-type: none"> <li>Decline natural resource</li> <li>Lack of technology</li> <li>Decreased productivity of extensive aquaculture</li> <li>High risk</li> </ul>	<ul style="list-style-type: none"> <li>Low efficiency, High risk aquaculture</li> <li>Lack of technology for viable lagoon use</li> </ul>	<ul style="list-style-type: none"> <li>Low efficiency and high risks, lack of capacity for livelihood alternative</li> <li>Require high technology</li> </ul>	<ul style="list-style-type: none"> <li>High risks and lack of high technology</li> </ul>
People problems from point of view of the management institutions	<ul style="list-style-type: none"> <li>Lack of awareness and management capacity in resource management</li> </ul>	<ul style="list-style-type: none"> <li>Lack of qualified technical workers</li> <li>Low capacity in resource management</li> </ul>	<ul style="list-style-type: none"> <li>Lack of capacity for development of livelihood alternatives.</li> <li>Low awareness and capacity in resource management</li> </ul>	<ul style="list-style-type: none"> <li>Lack of knowledge and financial capital</li> <li>Lack of capacity for development of livelihood alternatives</li> </ul>	<ul style="list-style-type: none"> <li>Lack of capacity for development of livelihood alternatives.</li> <li>Low co-management capacity. Low education level.</li> </ul>

**Table 7. Adaptive management, changes over time and space**

Lesson/change	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
Negative experiences offer useful management lessons for the future	<ul style="list-style-type: none"> <li>The spontaneous development of shrimp aquaculture.</li> <li>Agriculture farms converted to ponds. Local government also promotes mangrove reforestation for the shrimp aquaculture and clam farming</li> </ul>	<ul style="list-style-type: none"> <li>Allocation of Land and forest land to state organizations, not to local people or individuals made frequent conflicts</li> </ul>	<ul style="list-style-type: none"> <li>Free access, unplanned expansion of aquaculture, encourage economic development without good management of scales, patterns, and its impacts on environment and on people livelihoods</li> </ul>	<ul style="list-style-type: none"> <li>Unplanned expansion of aquaculture, especially spontaneous development of shrimp culture due to poor management at basic level and overexploiting aquatic organisms</li> </ul>	<ul style="list-style-type: none"> <li>Unplanned expansion of lobster aquaculture, encourages economic development without good management of scale, models, + impact on environment and on people livelihoods</li> </ul>

Lesson/change	Xuan Thuy National Park	Can Gio biosphere reserve	Sam Chuon lagoon, Thua Thien Hue	Nai lagoon, Ninh Thuan	Xuan Dai bay, Phu Yen
Positive experiences offer useful management lessons for the future	<ul style="list-style-type: none"> <li>Community-based resource management</li> <li>A combination of national control, private ownership, and community-based management therefore appears to be the most suitable strategy to conserve mangrove resources.</li> </ul>	<ul style="list-style-type: none"> <li>Mangrove areas which were allocated to the stewards have been rehabilitated and developed very well</li> </ul>	<ul style="list-style-type: none"> <li>Participatory planning for lagoon community-based management.</li> <li>Participatory technology development for livelihood improvement.</li> <li>Community ban on electric fishing</li> <li>Develop fishing association to take on management role.</li> </ul>	<ul style="list-style-type: none"> <li>Developing resource user's organization to take management role.</li> <li>Improving irrigation system</li> <li>Planning and conducting polyculture to improve aquatic environment</li> <li>Replant mangrove fores</li> </ul>	<ul style="list-style-type: none"> <li>Community ban of electric fishing</li> <li>Develop resource user's organization (lobster farmers and fishermen, farmer association) to take roles of environmental management and technology development</li> </ul>
Attempts so far, as a result of experience, to solve some of the problems identified	<ul style="list-style-type: none"> <li>Community-based resource management in the core zones</li> <li>Increase participation of people organizations in livelihood development and resource management</li> </ul>	<ul style="list-style-type: none"> <li>Upgrade the protected area with planning and regulation development</li> <li>Tourism diversification &amp; management</li> </ul>	<ul style="list-style-type: none"> <li>Regulation on fishery management that support co-management.</li> <li>Participatory Planning for fishery management.</li> <li>Strengthen community capacity by supporting fishing association</li> </ul>	<ul style="list-style-type: none"> <li>Develop community-based management</li> <li>Regulation on fishery/aquaculture</li> <li>Establishing fishing/aquaculture associations</li> </ul>	<ul style="list-style-type: none"> <li>Raising local awareness in protecting ecosystem and natural resources.</li> <li>Sustainable lobster culture group and the self-management team was established.</li> </ul>
Identified changes to policy or law which would help to deal with these problems	<ul style="list-style-type: none"> <li>Empower local communities for resource management</li> </ul>	<ul style="list-style-type: none"> <li>Collect land and forest from state-owned enterprises and reallocate to households</li> </ul>	<ul style="list-style-type: none"> <li>Allocation of water areas and management responsibility to community in a co-management set up</li> </ul>	<ul style="list-style-type: none"> <li>Allocating lagoon area for sustainable use and decentralising mgt. responsibility to community to develop co-management model.</li> </ul>	<ul style="list-style-type: none"> <li>Support ecological aquaculture model</li> </ul>

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# Chapter 4: Lessons from forest management in Vietnam in the last decade which can be applied to wetlands

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## 1. Introduction

Vietnam's distinctive climate and geography have created a wide range of habitats and the country possesses a very high level of biodiversity, comprising more than 12,000 species of plants and 7,000 vertebrate animals. Many species are endemic to Vietnam (40% of plant species occur nowhere else) and new species are still being discovered regularly. The country is a global biological diversity hotspot, one of the 10 most ecologically diverse countries in the world.

In recognition of its valuable natural resources, the Government of Vietnam has set aside about 2.4 million hectares (7% of the country's land area) since 1962 for protection objectives: there are currently 128 natural protected areas already gazetted. The majority of these protected areas are terrestrial forest ecosystems classified as SUFs.

The purpose of the paper is to take stock of forest management experience to date in Vietnam, so that wetlands managers and policy makers can learn from the longer experience of forest managers in both protected areas and elsewhere. Experience presented here includes integrated approaches, participatory approaches, taking more responsibility for livelihood improvement, community communications and some key policy changes.

## 2. Studied Sites

This study focuses on Cuc Phuong, Ba Be, Yok Don and Cat Tien National Parks and Pu Luong, Na Hang and Phong Dien Nature Reserves. These seven forest sites have diverse landscapes and biodiversity that are significant for nature conservation nationally and internationally. They are managed by differing management levels (central and provincial levels). There are local communities living around and/or inside all of them. Ecological approaches have been piloted in many of them, although they are at different stages. Following lessons have been learnt from each site in the past 10 years:

### 2.1 Pu Luong Nature Reserve-Cuc Phuong National Park

The Pu Luong-Cuc Phuong (PL-CP) limestone mountain range is a globally important karst ecosystem and the only remaining large area of lowland and limestone forest in northern Vietnam. The PL-CP limestone landscape comprises a mountain range lying within Thanh Hoa, Hoa Binh and Ninh Binh provinces. It is characterised by extensive limestone karst areas. The Cuc Phuong plateau in the east and two ridges running south-east to north-west that taper towards one another before meeting the western end of Pu Luong Nature Reserve. The core area of the limestone range covers approximately 170,000 ha and forms part of a fragmented collection of limestone outcrops found throughout much of northern Vietnam, northern Laos and adjacent areas of China.

The topography of the limestone range is extreme, dominated by sheer rock outcrops and high dissected karst terrain, and contains extensive cave systems. The mountains support large areas of limestone forest, much of it in good condition, though degradation of the forests increases towards the eastern end. The forests are surrounded by heavily farmed lowlands. A number of important outlying karst outcrops occur to the east and north, including the popular tourist destinations of Van Long and Hoa Lu in Ninh Binh Province. The limestone range is higher in elevation towards the western end, reaching about 1,650 m.a.s.l at its highest point, and gradually becomes less mountainous towards the east.

PL-CP landscape forms part of Annamese Lowlands Endemic Bird area and encompasses a global centre of plant diversity (WWF and IUCN, 1994). It is perhaps most renowned for supporting the last populations of the endemic and critically-endangered Delacour's Langur, whose global population is believed to number less than 300 individuals (Nadler et al. 2003).

Pu Luong NR and Cuc Phuong NP participated in a pilot project which aimed at maintaining the ecological integrity and cultural character of the PL-CP limestone range by building capacity for ecosystem management to manage the wider karst ecosystem by promoting a regional approach to planning and supporting integrated conservation and rural development interventions and community-based natural resource management, which mitigate threats to the ecosystem. The following lessons have been learnt from the two protected areas:

#### An integrated approach

A participatory approach with the emphasis on the participation of local communities, forest rangers and concerned parties, as well as project feasibility and proper priorities is in place. A flexible implementation approach has been developed with unanimous agreement, which permits the protected areas to support any further activity requested by a partner that was not identified in the management plan, was established.

An inter-provincial forum and coordination unit (Hoa Binh, Thanh Hoa and Ninh Binh provinces) was developed to facilitate activities carried out in three different provinces. Close working relations and cooperation with local authorities (communes, districts, and provinces), other national parks and Protected Areas (PAs), other projects, and with the central government organisations of the Ministry of Agriculture and Rural Development (MARD) were established to promote joint actions among stakeholders.

#### Taking responsibility for livelihood improvement

Improvements of the economic status of households in the targeted villages have been made with agricultural interventions aimed at intensifying and diversifying agricultural production, thus leading to improved livelihoods and reducing pressure on forest and natural resources. While eco-tourism activities have generated some income for those involved, they have not really supported the conservation objectives of the PAs.

People in several selected communes have been taught new techniques to increase crop productivity and to make use of available natural resource potential and modest pilot investments in rice cultivation, pig production, fish keeping, bamboo production tree planting, bee keeping, winter maize, paravet activities, and ecotourism have been tried. Rice cultivation and buffalo/cattle/pigs are considered as the most meaningful community development activities leading to improved livelihoods.

PL-CP management objectives and activities are in line with the socio-economic development orientation of communes and districts in and surrounding the limestone range. They therefore contribute to the economic development plans of the districts in terms of crops, animals and planning processes, especially for Tan Lac District. However, development activities are still small in scale and beneficiaries too limited (one commune per district of six communes, only some villages per commune, and some households per village).

**Photo 5.** In CPNP a weaving loom was provided specifically to diversify local livelihood alternatives but the products have no outlet



**Source:** Nguyen Thi Thu Thuy

### Participatory approaches

Young staff/rangers of Pu Luong Nature Reserve have been mobilised to participate actively in project planning and implementation, as well as to develop their capacity in biodiversity conservation and community development.

Community development activities were developed through establishing close working collaboration and partnerships between a conservation organisation (FFI) and an experienced community development agency (DED). Farmer comments show that it is important to behave predictably when planning interventions. Sometimes community development activities have been planned, but are not implemented on the time-scale promised, so farmers have to wait longer than expected. Sometimes activities have been changed without consultation, so that the expected number of households to be included in particular activities changes after discussion and agreement with farmers has already been reached. Such failures disappoint and alienate farmers.

Successful forest protection and biodiversity conservation are not only achieved by law enforcement but also through changed relations with communities. Therefore, strengthening capacity for forest guards will improve cooperation, collaboration and good relations with local authorities and people in forest protection and biodiversity conservation.

### Community communications

Activities have been held to raise awareness of local people and communities in the core and surrounding areas of Pu Luong NR and Cuc Phuong NP on the biological value, environment and socio-economic values of PL-CL limestone ecosystems. Village meetings and community events have been held for schools, for local leaders and for poachers; community awareness-training materials, paintings, project brochures, ecotourism maps of Vietnam and television documentary broadcasts have been produced and study visits to other protected areas have been promoted. As a result, the awareness-raising activities carried out in the two areas can be replicated in similar sites.

One of the most important aspects of capacity building was about community elements of protected area management, including rangers' capacity in conflict reduction, dialogue and awareness raising. The research capacity of the rangers has improved through scientific activities. Forest guards received training and necessary field and office equipment, as well as study tours to Ba Be, Cat Ba and Pu Mat National Parks. As a result, forests are better protected; biodiversity is maintained, and the endemic species and habitats of Pu Luong-Cuc Phuong are conserved. The relationship between forest protection guards and local authorities and local communities has improved and been strengthened, reducing tension and strained relations between forest guards and local people.

The environmental awareness/education work of the two areas has had a significant impact on influencing the environmental behavior of people in surrounding areas. Conservation awareness/education through mass circulation of messages, including brochures, maps, pictures and collaboration with television stations has proven to be very effective in raising conservation awareness.

### Key policy changes made to adapt successfully to changes needed

Incentive policies (both finance and working condition in the remote and isolated areas of PL-CP limestone range) are recognised as inadequate and too weak to induce stakeholders to participate in the management of protected areas actively. A further mechanism is required to encourage partner/counterpart involvement.

A national policy priority of the Forestry Sector Support Program (FSSP) is to work towards more integrated planning and agreement on budgets for forest sector support projects and programmes. This activity would provide support for integrated budget/financial planning to ensure that future support for PL Nature Reserve and other protected areas in the PL-CP limestone range is planned in a coordinated manner, taking account of contributions from different sources of financial support, including GoV commitments through MARD, tourism and other revenues and international ODA support.

Key threats to forest and biodiversity and conservation were properly considered at the beginning of the management plan development process (such as logging, hunting, encroachment of agriculture land, trading, poverty, etc.). These threats have significantly reduced after five years of implementation in PL-CP.

### 2.2 Phong Dien NR

Phong Dien Protected Area is recognized as a high priority watershed forest for the Bo (Thua Thien Hue province) and My Chanh rivers (Quang Tri province). In 1998, following the rediscovery of Edwards's Pheasant (*Lophura edwardsi*) at the Protected Area, BirdLife International and the Forestry Inventory Planning Institute (FIPI) worked closely with Thua Thien Hue Forestry Protection Department to prepare a feasibility study for that area in August 1998. An Investment Plan for Phong Dien was written and approved by Thua Thien Hue PPC for establishing a Protected Area on 29 August 2003 (Decision 2470/2003/QD). A management board was established recently and has been in operation since June 2006.

The Reserve is located at 16017' - 16035'N and 107003' - 107020'E and belongs to Phong Dien and A Luoi districts with nine communes in the buffer zone (including Hong Thuy commune of A Luoi district). Phong Dien Protected Area is located at the middle-altitude mountain in A Luoi and at the lowland mountain in Phong Dien. The local population of 5,000 households and 27,000 people lives only in the buffer zone and not inside the protected area. The Protected Area with its core zone is 41,433 ha and its buffer zone is 43,600 ha. It borders Quang Tri Province to the north and west; and is contiguous with the recently established Dakrong NR in Quang Tri.

Phong Dien Nature Reserve is newly established, and co-management with indigenous and traditional communities in Thua Thien Hue Province is being tried right from the beginning. This is rare in Vietnam. The lessons learned from this experiment can be summarised as follows:

### **An integrated approach**

The reserve has established working relations and close cooperation and has mobilised the participation of relevant organisations from provincial to village level and communities in conservation works. Local authorities of districts and communes are interested in conservation and have created favorable conditions for the management of Phong Dien NR. The NR has established a network of Field Assistant Teams (FAT) in all buffer zone communes. The network is an information bridge to the NR and encourages the participation of communities in conservation activities. Communities have taken on more responsibility for the conservation of the NR in terms of planning and decision-making and have been able to select appropriate conservation activities in accordance with community demands and NR management objectives.

The development of a Phong Dien Protected Area 3D model and community communication house has attracted the involvement of the community in learning and providing information, and promoting the indigenous knowledge of the community in the service of conservation activities.

Successful implementation of models on natural resource management is based on the support and interest of local authorities (district, commune and village), direct and active participation of communities in every project process (from activity planning, implementation, monitoring and evaluation).

The reserve has been successful in mobilising the participation of forest rangers, especially rangers at lowest level – communes – in project planning, activity implementation, as well as in improving capacity and skills for forest rangers in biodiversity conservation, law enforcement and community development.

Phong Dien NR has been successful in recognising, analysing and acting upon the conservation issues (e.g. boundary demarcation and forest encroachment for agricultural production, hunting and unsustainable forest resource exploitation). A clearer boundary demarcation on the field, a close working cooperation, collaboration mechanisms among and between concerned departments, projects/programs operating in the buffer zone, has reduced confusion about state management in forestry and encroachment on the forested land.

Law enforcement is an essential part of PA management, and investment in training, equipping, exchange visiting, capacity building of patrolling staff, has improved the ability to enforce the legal framework. Moreover, the reserve has strengthened the capacity of forest guards to improve cooperation, collaboration and good relations with local authorities and local communities for forest protection and biodiversity conservation.

### **Taking responsibility for livelihood improvement**

A conservation cooperation mechanism has been established through tourism. This has created additional income for local people. Community tourism has attracted interest and support from local authorities and communities in forest resource management and conservation. Through community tourism activities, the

NR has supported the community to restore traditional aspects of their culture and its relationship to natural resources, which had been forgotten.

Forest rangers have been trained and equipped with basic facilities. Forest rangers have also participated in exchange visits and in project planning and implementation. As a result, the forest is better protected; and there is no forest encroachment for agricultural production. Cooperation and collaboration of forest guards and local people and concerned stakeholders has improved, since the ending of antagonistic relations between forest guards and local people.

Improvements of the economic status of households in the targeted villages have been made with agricultural interventions, which were aimed at intensifying and diversifying agricultural production. This has led to livelihood improvement and fewer pressures on forest and natural resources. The reserve has provided some communes with new techniques for increasing crop productivity, and for making better use of available natural resources. Communes have been trained and small investments made in home garden nurseries, chicken raising, eagle wood tree plantation, bamboo plantation for bamboo shoots, improved wooden stoves, fruit tree plantation, and community tourism.

The NR has got new methods for mobilising community contributions (e.g. establishment of forest protection fund, formulation of Nature Association for Life in Phong My Commune) in order to promote responsibility sharing practice/habit, independence from subsidies, and promoting community strengths.

At the village level, eco-tourism/community ecotourism has contributed not only to conservation but also to income generation for those villagers participating in tourism activities. Community tourism promotes traditional cultural values in a close integration with forest conservation of local communities.

### **Participatory approaches**

Phong Dien NR has used an appropriate participatory approach with an emphasis on the participation of local communities, forest rangers and concerned parties. Conservation activities are therefore appropriate for relevant parties. The NR management plan partially reflected the expectations of local people and other relevant stakeholders in forest resource management and development and biodiversity conservation, as well as being generally oriented to socio-economic development for buffer zone communes.

Training activities and exchange visits have improved knowledge, understanding, management skills and activity implementation organisation for FAT, local staff and staff of Phong Dien NR. Those activities also created good opportunities for local communities to learn about forest management and conservation from other locations.

Communities have participated in planning processes. Therefore, proposed activities have integrated indigenous knowledge and local experience in conservation and development. These planning processes also have contributed to meeting local needs in conservation and development.

The training approach was organised in such a way that learners (communities) are at the centre, trainers and NR staff facilitated and guided to help trainees understand easily and properly. That training approach promoted community participation in discussion and decision-making on issues of concern to them in their home village/community. Theoretical training was followed by field visits and practices to help communities to learn and share experiences.

Forest resource conservation and management was undertaken strictly when communities were directly involved in law enforcement and prevention of illegal harvest of forest resources through community forest patrolling groups. Moreover, communities benefit from forests being allocated to them for their management protection through organisation of community tourism activities.

Harmonisation of conservation and development activities has been achieved when close working collaboration and partnership between conservation organisations and experienced community development agencies (Hue Agro-forestry University, extension centres and tourism departments) was established.

### Community communications

A community communication house was built by using local materials and typical local style. Community house is a place for displaying and exhibiting natural and traditional culture and community products, training new generations on their home village traditions, as well as the place for village meetings, letters and arts performances, and organising village traditional events, and other social activities. Through these activities, conservation messages have been sent and delivered to many target groups in the community.

**Photo 6.** The Phong Dien community becomes involved in ecotourism through awareness-raising



**Source:** Thua Thien Hue Provincial Forest Protection Department

Community communication and tourism with promotion of community traditional cultural aspects have achieved domino and persuasive impacts and promoted indigenous knowledge in community forest management. Conservation activities with the participation of communities have created opportunities to resurrect the once-existing age-old forest protection behaviour of local people and to develop village regulations on forest protection developed by local people. The regulations are respected by local people and are appropriate to village conditions.

The 3D model has significantly contributed to raise awareness of communities, especially school pupils, in buffer zone communes on conservation through diverse activities. These have included 'green clubs', youth union clubs for activities, letter and arts performances, film shows, communication activities, the development of leaflets, posters, T-shirts, young experts, forest exhibitions, community culture events, and TV programs for on national and provincial TV channels. There have been exchange visits to community forest management sites within and outside the province and to other projects having the similar conservation activities. Communication activities are considered very successful and have the potential for expansion and replication for similar locations. Communication models are relevant and appropriate for many stakeholders, and have good dissemination among communities living surrounding the protected area.

The communication model has also emphasised many activities to integrate conservation and sustainable development, such as the formation of Phong My Nature Association for Life. This is a new model in conservation in Vietnam at the provincial level. The Phong My Nature Association for Life has been approved by Thua Thien Hue Provincial People's Committee (PPC). The association consists of community members who willingly participate in conservation and economic development activities at their home village for both nature conservation and improvement of community livelihoods.

### Key policy changes made to adapt successfully to changes needed

Allocation of natural forest to communities is one of the biggest policy changes made to meet the demand of communities for participation in forest management and development. Community capacity strengthening in natural forest management has supported sustainable forest management through training and re-inventory of forest resources, village forest protection and management, forest restoration and enrichment, and the technical transfer of forestry nursery and forest plantation skills. These interventions have supported communities in forest management and development, and have led to income generation and livelihood improvement for the communities participating in forest management.

The reserve has been flexible in applying policies on natural forest allocation to communities for management, in supporting village regulations on forest protection, in legal aspects and benefit sharing, and in clarifying the obligations and responsibilities of civil society in forest resource protection and management.

### 2.3 Ba Be National Park/Na Hang Nature Reserve/Yok Don National Park

Originally gazetted in 1977, Ba Be National Park in Bac Kan Province was established as a national park in 1992 with an area of 7,611 hectares. The dominant feature of the national park is the 500 ha Ba Be Lake, the largest natural freshwater mountain lake in Viet Nam and a popular tourist destination. The lake is surrounded by extensive forest on limestone mountains, giving the park a spectacular landscape. It hosts about 80 fish species, some of which are threatened. Other important biodiversity values of the national park include over 300 butterfly species and a small resident population of endangered Francois' Langurs. There are 15 villages in the national park, with about 3000 residents of Tay, Dao and H'Mong ethnicity, many of whom depend upon the lake's fisheries.

In 1992, the globally critically endangered Tonkin Snub-nosed Monkey was rediscovered in Na Hang District. This species was previously believed to be extinct and the discovery prompted Na Hang's designation as a 41,930 hectare nature reserve in 1994. Na Hang Nature Reserve is split by the Gam River into northern and southern sectors of roughly equal size, both holding populations of Tonkin Snub-nosed Monkeys and other endangered species.

Hunting and habitat fragmentation continue to threaten those species with local extinction. The most immediate threat has been the construction of a 120 metre high dam on the Gam River that began in 2002. Construction of the dam has led to habitat disturbance, pollution and other negative impacts to biodiversity. The reservoir that the dam will create will fragment the remaining forests of the reserve and affect the habitat of the largest population of Tonkin Snub-nosed Monkeys at Na Hang.

Yok Don National Park was established in 1991 in Buon Don District, Dak Lak Province, in order to protect 58,200 hectares of lowland dipterocarp forest. Scientific studies justified expanding the park to the north to include further areas of biological importance. As a result, in 2002, the boundary was redefined to include a total of 115,545 hectares, making Yok Don Viet Nam's largest national park.

The park occupies relatively flat land with two small mountains to the south of the Srepok River. It is mainly under natural forest, most of which is dry dipterocarp forest. Yok Don is the only national park in Viet Nam conserving this particular forest type. The national park is an important site for the

conservation of large mammals, particularly Gaur, Banteng and Black-shanked Douc Langur, and birds, particularly Green Peafowl, Giant Ibis and Sarus Crane.

Although only one village is located within the park, the forests and wildlife of Yok Don National Park are under threat from hunting, grazing and bush fires. Furthermore, pressure is increasing with population migration and infrastructure development in the immediate vicinity of the national park.

The three locations were under the same implementation mechanism of the Project for creating 'Protected Areas for Resource Conservation using Landscape Ecology' (PARC Project) which piloted a landscape ecology approach for conserving Viet Nam's diverse biological heritage. This approach integrates conservation and development by using resource-use planning as a basis for project activities. Thus the three have shared a common learning platform.

### **An integrated approach**

Operational planning and monitoring, linking investment and recurring funding to identify and fill gaps in conservation funding, and the prioritisation of conservation over infrastructure development are all important for wider application in Viet Nam's protected area network.

Development of landscape level conservation strategies through hotspot or similar analyses can maximise conservation efficiency and build in flexibility and adaptability to changing environmental pressures. Landscape level conservation management provides a basis for engaging local communities in co-operative management initiatives, or encouraging communities to develop their own conservation initiatives to tap into government funding programmes. This promotes the participation of local communities even though the legislative support for co-management of protected areas is currently weak.

Prioritising landscape units and key sites within protected areas, and defining feasible means of managing or co-managing these sites together with in-reserve communities, can be important steps in getting community support for conservation.

The institutional presence at the three sites has been strengthened by the construction of a number of ranger posts (brick and wood) and in Na Hang by three floating stations. All ranger stations, accommodating between three and twelve rangers, have been placed at strategic locations to provide a focus for ranger activities, maintain vigilance in and control access to key areas, and to coordinate community-based management activities. All ranger stations seen contained plastic wall maps of the whole park and of the jurisdictional area assigned to the ranger post, conservation regulations, and protocols for ranger patrols. Rangers' chief tasks remain those of a policing nature – forest protection, checking on illegal activities, patrolling, assessing, giving licences to farmer's forest gardens, and setting up forest protection action plan for communes. They have received training in, and been tasked with, monitoring biodiversity. Increased numbers of rangers, increased efficiency and activity of rangers, and increased morale, all of which have resulted from new facilities, equipment and training, have resulted in significantly reduced illegal activities in the protected areas.

A biodiversity monitoring programme has been established. Rangers have been trained in the identification of key plants and animals and have been provided with high quality field guides. In addition, a GIS database has been developed to record and map violations and species sightings. This system has been used effectively in the three SUFs to assist in management decisions.

The approach to community development where people are trained, demonstration plots set up, and then extension work undertaken has worked extremely well. The ranger training courses where a variety of skills (discipline, team work, navigation, first aid, etc.) were taught under field conditions not only imparted these skills to the rangers but helped to build a wider camaraderie and esprit de corps.

### **Taking responsibility for livelihood improvement**

The link between development benefits and conservation necessities has been established at all levels and with all activities. For example, a ranking system was devised to ensure that all development activities were targeted at those people and those conditions which would make the greatest difference to biodiversity conservation in a given area (e.g. a prototype rapid assessment tool to assist resource-use planners identify and decide conservation status; and the provision of Village Assistance Funds which were targeted at the poorest villages, and then made available to all those villages which had Village Development Plans, Action Plans, and conservation agreements according to increasing wealth of the village).

Shifting cultivation within the PAs has ceased as a result of the Community Development Programme activities although grazing within the forests still continues – goats were encountered grazing in the forest at Ba Be NP and cattle at Yok Don NP. A Lake Management Cooperative has been established at Ba Be as a mechanism for cooperation between the national park authorities and the six communities living at the edge of Ba Be Lake. As a result, activities detrimental to conservation including dynamite and electric fishing have been eradicated from the Lake. A gun exchange programme was operated at the northern sites, with 450 guns at Ba Be and 750 guns at Na Hang being exchanged for domestic animals or improved crop seeds between 2000 and 2002. Bac Kan Provincial Police have been following this up by collecting guns from communes around Ba Be National Park under Decree No. 47 (12/8/96) which outlaws all civilian guns in the country. Both Ba Be and Na Hang have continued to collect guns and Cho Don District has also adopted the measure. Another excellent initiative was the signing up of restaurants in the main local towns (Cho Don and Na Hang) to a code not to use wild animals. In both cases, all restaurants in both towns had signed up to the agreement.

Special emphasis has been laid on straightforward technologies which improve farming techniques in all areas from vegetable growing through improved rice varieties to introducing improved breeds for livestock. Agricultural improvements introduced by the SUFs have been made largely through conventional forms of farm modernisation such as the introduction of high-yielding rice varieties, improved livestock breeds, and intensified vegetable production. Excellent results have been achieved in individual cases at Ba Be/Na Hang by introducing bee-keeping and utilising the natural mountain stands of "shan tea" (*Camellia sinensis*) for tea production and improving its processing. The successes reduce local dependence on secondary forest products for survival.

More attention has been paid to the under-utilised potential from the domestication of endangered secondary forest products. The forest gardens near the limestone hills of Ba Be/Na Hang form suitable habitats for the creation of such schemes, which should be scientifically established during future support. These products are agricultural, medicinal, and horticultural species, often fetching high prices in trade markets. It would seem feasible, particularly to a biodiversity protection project, to pay extra attention to these species and develop products and forest-farming systems adapted to specific sites. Likewise, the rich agro-ecological resources have not been taken into consideration either for protection or for improved production. Among these are the rare tuber crops and traditional livestock breeds, which deserve protection under the Convention on Biodiversity. For such agro-biodiversity protection, the farmers can be seen as service providers to society and should be rewarded accordingly.

Among the technologies provided to rural families to increase their income are improved rice varieties, intensified vegetable production and marketing, new breeds of pigs and chicken which grow faster and bigger, caging of livestock to reduce loss in the wild and increase growth increment and a number of fast-growing fruit and timber tree species which will provide yields in only a few years. The economic improvements triggered by the SUFs have more than offset the loss of opportunities caused by the stricter park protection and farmers are now much busier with their new farming and livestock operations, reducing the possibilities and necessity to go hunting and collecting in the protected forests.

### Participatory approaches

In adopting a landscape level approach, the three SUFs have used the development of an overall conservation strategy as a tool to link resource use planning in the buffer zone and operational planning of the core zone of a protected area. Community co-management within protected areas remains problematic under law, but legal revisions are being undertaken and the SUF's planning approaches and field interventions provide useful experience for adoption in other protected areas.

Within the overall landscape, the SUFs have demonstrated that local communities can develop and take charge of their own land management strategies, incorporating conservation as well as development goals. Local communities have been engaged as partners in developing new co-managed protected areas as well as in developing sustainable use strategies for areas previously zoned as totally protected.

**Photo 7.** *One of the village meetings*



**Source:** *Nguyen Thi Thu Thuy*

At Na Hang NR, participatory resource use planning assisted in fixing boundaries of the nature reserve that were acceptable to both the nature reserve authority and the local communities (legal boundaries between populated and protected areas of the involved communes were not previously defined). Boundaries of enclaves were also arrived at through a participatory process, which aimed to limit expansion and adverse effects of in-reserve villages, ensure that uses of forest areas were sustainable, and engage the households in participatory conservation programmes.

At Ba Be – Na Hang an Endangered Primate Recuperation and Management Programme has been implemented focusing on the conservation of two endangered primates, the Tonkin Snub-nosed Monkey (*Rhinopithecus avunculus*) and Francois' Langur (*Trachypithecus francoisi*), across the landscape. This has involved improved protection within existing protected areas, extension of protected areas into important additional habitats, creation of new co-managed protected areas and engagement of the local community and institutional stakeholders in active conservation programmes.

To the south of Ba Be NP, an upland area was identified as important for the survival of the Vietnamese Salamander, a locally distributed endemic species. A community-managed conservation programme was therefore developed, focusing on community-based reforestation and protection of the upland watershed that supports this species.

Also at Ba Be NP, the management of fisheries on Ba Be Lake has been handed over to a cooperative comprising representatives from local communities. Damaging fishing practices such as dynamiting and use of small mesh nets are prohibited and self-policed. As part of the cooperative management agreement, it has been proposed that the cooperative also assumes responsibility for managing and monitoring tourist attractions on the lake, and would obtain a percentage of tourism revenues as an incentive.

At Yok Don NP, the potential for co-management of freshwater resources is being explored, partly to compensate for prohibiting hunting in key areas of the national park. Villages with user rights over stretches of the Srepok River have these rights recognised and gain exclusive access to stretches of productive water within the park. In return, the households assist the national park authorities in excluding commercial fishermen who come from urban centres.

### Community communications and environmental education

Training has attempted to reach all parts of society at both formal and informal levels, and an overall awareness of the need to protect natural resources more consciously has been achieved. Training in 42 technical subjects ranging from law enforcement through agricultural technologies to teacher training has reached different target groups. Results of this strong educational drive can be seen throughout regenerating shifting cultivation plots; trees planted in villages, on roadsides, in school yards, and in mixed, intensive farming systems; destructive fishing methods have largely been abandoned and hunting is greatly reduced; public hygiene has improved.

Increased income and improved livelihoods have helped to mitigate the effects of social unrest that in other countries are known to arise from migration and relocation of local people and from the loss of opportunities from hunting, gathering, and shifting cultivation in forest land. Environmental education has contributed strongly to the peoples' acceptance of protection measures.

### Key policy changes made to adapt successfully to changes needed

Applications of nine environmental education courses for primary and secondary schools were piloted in the three SUFs. These were taught for one hour per month and have been accepted as a model for the GOV to mainstream environmental education into the national curriculum. All schools were equipped with educational material, and have participated in tree planting activities, regular waste cleaning, and excursions to the protected areas. The boundaries of the PAs were made known to all stakeholders from farmers to school children.

Gender has been considered in community development components to assure the equal participation of women and men. The actual number of women trained under the community development components was probably close to 50%. In addition, gender was an issue in targeting conservation actions. For example, women were given priority over men as recipients of Village Assistance Funds in the two wealthiest ranked groups of villages.

Relevant government agencies have worked hard to ensure that key successes in the three SUFs are replicable in other areas. Key amongst these are the wide range of agricultural improvements that have been piloted and embraced by villagers of diverse ethnicity and culture – the training-demonstration-extension cycle proving particularly successful – and fostered by the establishment of extension officers whose services are now widely sought and paid for by the farmers.

The three SUFs have developed and promoted a five-tier participatory planning process, adapted to the specific legislative conditions of Viet Nam, to achieve landscape level integrative conservation and development. The process is adaptive and can accommodate shifts in local or even national development policy without totally compromising conservation priorities.

Participatory resource use planning (PRUP) in the three SUFs promotes local-level consultations and sound environmental and social impact assessments. This approach pays sufficient attention to the interests of local communities and the conservation needs of protected areas. This system supplements government policies regarding the protection of natural resources and the environment, poverty alleviation, and strengthening grass-roots democracy and decision-making at local levels. More importantly, bottom-up planning and negotiation of competing interests in local resources improves the natural resource base, and positively supports both the poor, and the ethnic minority communities in and around the protected areas.

Participatory resource use planning at local level can play an important role in reconciling competing interests in local resources, while providing sufficient room for the resource use needs of local communities and the conservation requirements of protected areas. The process of carrying out PRUP also meets government requirements for socioeconomic data collection and complements current land-use planning processes. Promoting and mainstreaming participatory resource use planning can thus contribute to the conservation of Viet Nam's forests and support the national policy goal of sustainable economic development.

## 2.4 Cat Tien National Park

In administrative terms, Cat Tien National Park (CTNP) consists of three parts located in three provinces: Nam Cat Tien in Dong Nai Province, with an area of 38,302 ha; Tay Cat Tien in Binh Phuoc Province, with an area of 5,141 ha; and Cat Loc in Lam Dong Province, with an area of 30,435 ha. The Cat Loc Part is divided from The Nam Cat Tien and Tay Cat Tien by a belt of agricultural land, human habitation and the Dong Nai River. Therefore, in ecological terms, the Park consists of two blocks of contiguous forest. The total area of the National Park is currently 73,878 ha.

The park was firstly established in 1978, but its management board was not set up until 1992. CTNP supports variety of habitat types, including primary and secondary lowland evergreen forest. The flora of the park includes more than 1,300 species of vascular plants, among which 34 species are listed in the Red Data Book of Vietnam. There are 73 mammal species, 314 bird species, 69 reptile species, 30 amphibian species and 99 fish species at the national park. Of the large mammal populations at CTNP, the most significant one is that of Java Rhinoceros (*Rhinoceros sondaicus*). The park is also a nationally important site for primate conservation, supporting populations of several primates of conservation concern, including Black-shanked Douc Langur (*Pygathrix nigripes nigripes*), Pig-tailed Macaque (*Macaca nemestrina*) and Yellow-cheeked Crested Gibbon (*Hylobates gabriellae*).

**Photo 8.** Java Rhinoceros (*Rhinoceros sondaicus*)



**Source:** Cat Tien National Park

The forest of CTNP has an important role in protecting the watershed of the Tri An Reservoir, an important source of water for domestic and industrial use in Ho Chi Minh City. The national park and adjacent areas of natural forest also protect a substantial part of the watershed of the flood-prone Dong Nai River. The watershed protection functions of the forests of the park, particularly flood mitigation, are therefore likely to make an important contribution to local and regional economies.

CTNP receives a growing number of foreign and domestic tourists. The proximity of the National Park to Ho Chi Minh City and Da Lat City, the well-developed tourism infrastructure at the site and the ease with which wildlife can be seen relative to other sites in Vietnam, are all factors in favour of growth in the tourism sector. However, if not carefully managed and guided, mass tourism may pose a threat to the biodiversity of the park.

CTNP piloted interventions at wider landscape which encompasses the Southeast Ecological Zone of the Forest Sector Support Programme (FSSP). The lessons-learned from the national park about landscape-wide forest management can be summarised as follows:

### An integrated approach

The park has been successful in pioneering active habitat management. Invasive alien species have been eradicated, Siamese Crocodiles have been reintroduced and controlled burning is used as a measure to prevent forest fires and to support ungulate populations. Limited monitoring, however, does not allow the cost-effectiveness of the activities to be assessed. In particular the planting of trees to enrich biodiversity is believed not to be cost-effective.

The national park has developed and supported implementation of effective systems of forest protection. This activity gained significant achievements: (i) computerised data management of violations; and (ii) improved capacity of forest guards through short term training courses, working equipment and personal facility supports, as well as infrastructure development (new guard station construction). As a result, the forest is protected and restored; biodiversity is maintained (endemic species and habitats of CTNP are conserved). An illustration of this success is that CTNP received international recognition and became a UNESCO 'Man and the Biosphere' Reserve. The relationship between forest protection guards and local authorities has improved and has been strengthened, and tensions between forest guards and local people have been reduced.

Attention was paid and investments made in developing eco-tourism (building of information center for visitors/ICV, equipment and facilities for ICV and guest houses, tourist tours). The knowledge and understanding of eco-tourism staff improved through domestic and international study tours, short-term training, information exchange and consultation with visitors and scientist working in the park.

The project has achieved clear boundary re-demarcation with a high level of agreement and support from relevant stakeholders (especially local authorities and people) so that a more effective management of CTNP can be foreseen.

Integration of the park's biodiversity concerns in the wider landscape has been successful by engaging related stakeholders (FPDs, DARDs, SFEs) in conservation debate and by seeking financial commitment and support from central level and donors. For example, Dong Nai Province invited the Cat Tien Conservation Project to reform three SFEs into a new nature reserve and a growing support amongst FPDs in the region to address wildlife trade issues is observed.

#### **Taking responsibility for livelihood improvement**

The park has supported people in the buffer zone with some new techniques in order to increase crop productivity and make use of available natural resource potentials, including (i) paddy rice production technique (in 2000), (ii) pepper plantation model (in 2000), (iii) cow/chicken raising (in 2000), (iv) pig raising and Biogas model (in 2000), (v) restoration of village traditional handicraft, (vi) improved woodstoves (2002); (vii) Sloping Agricultural Land Technique (SALT model) (including forestry plantation on the top, industrial crop plantation in the middle: cashew/ pepper or fruit trees and goat raising); (viii) home garden establishment: fruit trees, cashew, pepper plantation; and (ix) scattered tree plantation and riverbank erosion control along Dong Nai River.

Improved woodstoves are considered to be a successful activity and have had an indirectly positive impact on the forest and environment protection: people especially recognise their economic benefits (e.g. a 50% saving of fuel wood, saving time and labour). However, only wealthier households can afford these stoves because they use a motor which is readily damaged and frequently breaks down. Investigation and discussion results show that most households in Gia Vien, Phuoc Cat 2 and Dang Ha communes do not use or rarely use improved woodstoves for that reason.

The national park has contributed to increasing incomes and enhanced livelihoods of some local people living in the buffer zone through investment in a small dam and irrigation channels (Van Ho Dam with 3,400m of channels) in Village 4 of Ta Lai Commune, which can irrigate 50 ha of paddy rice. Construction of the small dam and channels for irrigation is considered as one of the most meaningful community development activities which led to improved livelihoods.

#### **Participatory approaches**

Over the years the park has effectively addressed conservation issues within and outside the national park which were not originally foreseen. CTNP has established functional working relations

and cooperation with local authorities (communes, districts, provinces), surrounding state forest enterprise (SFEs), other National Parks and Protected Areas (PAs), projects (Forest Protection and Rural Development Project/FPRDP), and with the central government organizations of the MARD.

The national park has attracted and received the attention and support of many international organisations, especially international non-government organisations (INGOs). The Cat Tien Conservation Project has been successful in putting Cat Tien National Park on the map in the international conservation community and within Vietnam's Government.

The Management Board has been successful in recognising and acting upon the conservation issues facing Cat Tien National Park. Because of a large human population within park borders and a poorly demarcated boundary, the Board initiated a discussion and executed biodiversity and socio-economic research to rationalise the park's boundaries. That work led to a boundary re-demarcation plan which has been welcomed at all governmental levels. Although its implementation is slower than expected, demarcation of a clear and sensible boundary is one of the crucial items leading to more effective conservation management. The Management Board has achieved a clear boundary re-demarcation plan with a high level of agreement and supports from relevant stakeholders (especially local authorities and people) for more effective management of CTNP. Clear boundary demarcation has positively contributed to (i) stabilisation of society and their lives, (ii) more effective state management for local authorities because there is no confusion of land and forest management between the national park and the Communes and District, (iii) reduced land encroachment in the national park, and (iv) strengthened the role of Commune forestry officers on state management on forestry.

#### **Community communications**

The Management Board raises awareness of local people, communities and schools in the core and surrounding areas of CTNP as well as in the south-east region, of the biological, environment and socio-economic values of CTNP. Its methods include development, the production of a conservation education package for local leaders and violators, the design, printing and delivery of mass circulation educational material and notebooks amongst primary schools, a competition campaign on wildlife and environmental protection in school, and outreach activities through mass media (radio, TV, and newspapers).

The park has been successful in conveying conservation messages to communities in and around the park through its conservation education programme. The environmental education work of the national park has had a significant impact on influencing the curriculum of schools in the buffer zone associate with the park. Conservation education has taken place through the mass circulation of messages in notebooks and children's stories. Collaboration with television stations has proven to be very effective in raising conservation awareness. Conservation education activities have proved very effective awareness raising tools for biodiversity conservation and wildlife.

#### **Some key policy changes**

The park has initiated the process of conceptualising and operationalising the approach of landscape ecology within partner agencies, although limitations in personnel capacity and a short time frame have inhibited these concepts to be adequately communicated and applied in the landscape. The national park has been constrained by time from turning the large amount of information generated from consultants' reports and from field activities into knowledge that can be communicated effectively in order to advance the concepts of integrated conservation and development and landscape ecology regionally and nationally.

The management and coordination mechanism of the Park Management Board has been improved and more decentralised. The planning process has paid attention to the integration of different financial resources. However, the financial integration of internationally funded projects, government funds

and other budgets has been difficult. Monitoring and evaluation should take a more comprehensive approach, leading to results-based management and a means of keeping track of planning activities and their impact on conservation and development outcomes. An inappropriate balance between conservation and development activities inhibits conservation efficiency and habitat rehabilitation.

### 3. Comparative Analysis

The following comparative lessons emerge from the analysis of these seven protected areas: We consider five main themes.

#### 3.1 The integrated approach

##### i. Common points

All the sites integrated various stakeholders in their activities. They apply information-planning-decision making-monitoring linkages to enhance the systematic management of SUFs. Moreover, improvements of effectiveness are closely linked to capacity building both for PA staff, relevant government authorities and communities. In addition, a clearer boundary demarcation on the field, a close working cooperation, collaboration mechanisms among and between concerned departments, and the projects/programs operating in the PA buffer zones have reduced confusion about state management of forests and encroachment on forested land.

##### ii. Differences

However, each of the seven SUFs has its own separate initiatives in integrating stakeholders in their activities. Cuc Phuong NP and Pu Luong NR have an inter-provincial forum and coordination mechanism. However landscape-level planning between the two SUFs has failed because there were no funds for conservation activities in the green corridor connecting the two SUFs.

Phong Dien NR has a network of Field Assistant Teams (FATs) in all buffer zone communes and has developed a 3D model to integrate information, awareness raising and management objectives. This case shows that successful implementation of natural resource management is based on the support and interest of local authorities (district, commune and village), and on direct and active participation of communities in every project process from activity planning, to implementation, monitoring and evaluation. Training activities and exchange visits have improved knowledge, understanding, and management skills for FATs, local staff and the staff of Phong Dien NR. These activities also created good opportunities for local communities to learn about forest management and conservation experience from other locations.

Na Hang NR-Ba Be and Yok Don NPs have developed landscape level conservation strategies through hotspots, to improve conservation efficiency and build in flexibility and adaptability to changing environmental pressures. In adopting a landscape level approach, the three SUFs have used the development of an overall conservation strategy as a tool to link resource use planning in the buffer zone and operational planning of the core zone of a protected area. They link investment and recurrent budgets to identify and fill gaps in conservation funding. The improvements of physical facilities (building ranger posts), equipment and conservation skills through training have resulted in a significant reduction of illegal activities in the protected areas.

Cat Tien NP pioneers active habitat management. Invasive alien species have been eradicated, Siamese Crocodiles reintroduced and controlled burning is used as a measure to prevent forest fires and to support ungulate populations. The weakness here is limited monitoring, which does not allow the cost-effectiveness of the activities to be assessed. Effective systems of forest protection have been

implemented: (i) computerised data management of violations; and (ii) improved capacity of forest guards. As a result, CTNP has received international recognition and become a UNESCO Man and the Biosphere Reserve. The integration of the park's biodiversity concerns into the wider landscape has been successful by engaging related stakeholders (FPDs, DARDs, SFEs) in conservation debate, and by seeking financial commitment and support from central level and donors.

#### 3.2 Taking responsibility for livelihood improvements

##### i. Common points

The link between development benefits and conservation necessities has been established at all levels with all activities in the seven PAs. Within the overall landscape, the SUFs have demonstrated that local communities can develop and take charge of their own land management strategies, which can incorporate conservation as well as development goals.

Improvements of the economic status of households have been made with agricultural interventions aimed at intensifying and diversifying agricultural production in terms of crops and animal structure and planning processes, thus leading to improved livelihoods and reduced pressure on forest and natural resources. Cooperation and collaboration of forest guards and local people and concerned stakeholders has improved and has been strengthened through economic development activities. However, development activities are still on too small a scale.

A conservation cooperation mechanism has been established through tourism. Through community tourism activities, the NR has supported the community in the restoration of traditional aspects of their culture and its relationship to natural resources, which had been forgotten. That has generated additional income for people working in tourism.

##### ii. Differences

Pu Luong NR-Cuc Phuong NP have provided new techniques for some people in several selected communes to increase crop productivity and make use of available natural resource potential through training activities and small investment of piloting models on rice cultivation, pig production, fish keeping, bamboo production tree planting, bee keeping, winter maize, paravet, and ecotourism. Rice cultivation and buffalo/cattle/pigs are the main community development activities leading to improved livelihoods. PL-CP management objectives and activities are in line with the socio-economic development of commune, districts in/and surrounding the limestone range. It therefore contributes to economic development plans of the districts.

Phong Dien NR supports community tourism, which has attracted interest and support from local authorities and communities in forest resource management and conservation. The reserve has provided some communes with new techniques to increase crop productivity and make use of available natural resources through training activities and small investment of piloting models on home garden nurseries, chicken raising, eagle wood tree plantation, bamboo plantation for bamboo shoots, improved wood stoves, fruit tree plantation, and community tourism. In addition, the NR has developed new methods for mobilising community contributions (e.g. establishment of forest protection fund, formulation of Nature Association for Life in Phong My Commune) to promote responsibility-sharing, independence from subsidies, and community cohesion.

Ba Be and Yok Don NPs-Na Hang NR's approach to community development, where people are trained, and demonstration plots set up, and extension work undertaken, has worked extremely well. A ranking system was devised to ensure that all development activities were targeted at those people and those issues which would make the greatest difference to biodiversity conservation in a given area. Shifting cultivation within the PAs has ceased as a result of the Community Development Programme activities.

A Lake Management Cooperative has been established at Ba Be NP as a mechanism for cooperation between the national park authorities and the six communities living at the edge of Ba Be Lake. As a result, activities detrimental to conservation including dynamite and electric fishing have been eradicated from the lake. A gun exchange programme was operated at the northern sites for domestic animals or improved crop seeds. Another initiative was the signing up of restaurants in the main local towns (Cho Don and Na Hang) to a code not to use wild animals.

Special emphasis has been laid on straightforward technologies which improve farming techniques in all areas from vegetable growing through improved rice varieties to introducing improved breeds for livestock. Agricultural improvements introduced by the SUFs have been made largely through conventional types of farm modernisation such as the introduction of high-yielding rice varieties, improved livestock breeds, and intensified vegetable production. Excellent results have been achieved in individual cases at Ba Be/Na Hang by introducing bee-keeping and utilising the natural mountain stands of “shan tea” (*Camellia sinensis*) for tea production and improving its processing. The successes reduce local dependence on secondary forest products for survival.

More attention is paid to under-utilised potential from the domestication of endangered secondary forest products. The forest gardens near the limestone hills of Ba Be/Na Hang form suitable habitats for the creation of such schemes, which should be scientifically established during future support. These products are agricultural, medicinal, and horticultural species, often fetching high prices in trade markets. It would seem feasible, particularly to a biodiversity protection project, to pay extra attention to these species and develop products and forest-farming systems adapted to specific sites.

Cat Tien NP has supported new techniques to increase crop productivity and make use of available natural resource potentials: (i) paddy rice production techniques, (ii) pepper plantation, (iii) cow/chicken raising, (iv) pig raising and biogas production, (v) restoration of village traditional handicrafts, (vi) improved woodstoves; (vii) Sloping Agricultural Land Techniques (SALT model); (viii) home garden establishment; and (ix) scattered tree plantation and riverbank erosion control along Dong Nai River. Improved woodstoves make a modest positive impact on environmental protection, and people recognise their economic benefits. Moreover there are investments in small dam and irrigation channels in Village 4 of Ta Lai Commune, which can irrigate 50 ha of paddy rice.

### 3.3 The participatory approach

#### i. Common points

Young staff/rangers in all the PAs have been mobilised to participate actively in project planning and implementation, as well as to develop their capacity in biodiversity conservation and community development. Successful forest protection and biodiversity conservation are not only achieved by enforcement of law but through changed relations with communities. Therefore, strengthening the capacity for forest guards to improve cooperation, collaboration and good relations with local authorities and people in forest protection and biodiversity conservation is essential.

The training approach was organised with learners (communities) at the centre, and trainers and NR staff facilitators helping trainees understand easily and properly. This training approach has promoted community participation in discussion and making decisions by themselves on their concerned issues at their home village/community. Theoretical trainings were followed by field visits and practices to help communities to learn and share experiences.

#### ii. Differences

PL-CP have developed community development activities through establishing a close working collaboration and partnership between conservation organisations and an experienced community development agency. In contrast, Phong Dien NR has used a participatory approach with an emphasis on the participation of local communities, forest rangers and concerned parties. The NR management plan reflected both the expectations of local people, and those of relevant stakeholders in forest resource management and biodiversity conservation, and was well-oriented in socio-economic development for buffer zone communes. Communities participated in planning processes. Therefore, proposed activities have integrated indigenous knowledge and local experience in conservation and development. This planning process has also contributed to meeting local needs in conservation and development.

Forest resource conservation and management has been carried out very conscientiously in Phong Dien NR once communities were directly involved in law enforcement and the prevention of illegal harvesting of forest resources through community forest patrolling groups. Communities also benefit from forests being allocated to them for their management, protection and the organisation of community tourism activities. Harmonisation of conservation and development activities was achieved when a close working collaboration and partnership between conservation organisations and experienced community development agencies (Hue Agro-forestry University, extension centres and tourism departments) was established.

Ba Be/Na Hang/Yok Don have engaged local communities as partners in developing new co-managed protected areas as well as in developing sustainable use strategies for areas previously zoned as totally protected.

At Na Hang NR, participatory resource use planning assisted in fixing the boundaries of the nature reserve that were acceptable to both the nature reserve authority and the local communities. Boundaries of enclaves were also arrived at through a participatory process, which aimed to limit expansion and adverse effects of in-reserve villages, ensure that uses of forest areas were sustainable, and engage the households in participatory conservation programmes.

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To the south of Ba Be NP, an upland area was identified as important for the survival of the Vietnamese Salamander, a locally distributed endemic species. A community-managed conservation programme was therefore developed, focusing on community-based reforestation and protection of the upland watershed that supports this species.

Also at Ba Be NP, the management of fisheries on Ba Be Lake has been handed over to a cooperative comprised of representatives from local communities. Damaging fishing practices such as dynamiting and use of small mesh nets are prohibited and self-policed. As part of the cooperative management agreement, it has been proposed that the cooperative also assumes responsibility for managing and monitoring tourist attractions on the lake, and would obtain a percentage of tourism revenues as an incentive.

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productive water within the park. In return, the households assist the national park authorities in excluding commercial fishermen who come from urban centres.

CTNP has established functional working relations and cooperation with local authorities, surrounding state forest enterprise, other National Parks and Protected Areas, projects and with the central government organisations of MARD. The national park has attracted and received the attention and support of many international organisations. The Cat Tien Conservation Project has been successful in putting Cat Tien National Park on the map in the international conservation community and within Vietnam's Government.

### **3.4 Community communications and environmental education**

#### **i. Common points**

All of the seven SUFs have promoted awareness raising of local people and communities, in the core and surrounding areas on the biological value, environment and socio-economic values of the SUFs through different modalities. As a result, awareness raising activities carried out in the SUFs could be considered as the most effective ones which can be replicated at similar sites. Community communication and tourism with promotion of community traditional cultural aspects have been conducted.

The environmental awareness/education work has had a significant impact on influencing the environmental behaviors of people in surrounding areas. Conservation awareness / education through mass circulation of messages, including brochures, maps, pictures and collaboration with television and/or radio stations has proved very effective in raising conservation awareness.

#### **ii. Differences**

Each of the PAs has its own deviations in enhancing community communications and environmental education. Awareness raising on the biological value, environment and socio-economic values of the PL-CP limestone range through different modalities (education activities, paintings, project brochures, ecotourism maps of Vietnam, television broadcasts of documentaries, village meetings, community events, delivery of community awareness-raising materials for schools, local leaders and violators, and study visits to other protected areas) has been carried out.

Capacity in conflict reduction, dialogue and awareness-raising for forest rangers has been developed. Research capacity of the rangers has improved through scientific activities. As a result, forests are protected; biodiversity is maintained (endemic species and habitats of Pu Luong-Cuc Phuong are conserved). The relationship between forest protection guards and local authorities and local communities was improved and strengthened, and tensions were reduced between forest guards and local people.

A community communication house was built using local materials and typical local style in Phong Dien NR. The community house is a place for displaying and exhibiting natural and traditional culture and community products, training new generation on their home village traditions, as well as the place for village meetings, arts performances, and organising village traditional events, and other social activities. Through these activities, conservation messages have been sent and delivered to many target groups in the community.

Community communication and tourism with promotion of community traditional cultural aspects have achieved diverse impacts and promoted indigenous knowledge in community forest management. Conservation activities with community participation have created opportunities to revive traditional forest protection regulations endorsed by local people. The regulations are therefore respected and fit well with village conditions.

The 3D model has significantly contributed to raise awareness of communities, especially school pupils in buffer zone communes. Diverse environmental education activities have taken place from the development of local clubs for youngsters through to the development of TV programs for broadcast on national and provincial TV channels, and have had great dissemination effect in communities living around the protected area.

The communication model has also emphasised many activities to integrate conservation and sustainable development, such as formulation of Phong My Nature Association for Life. This is a new model in conservation in Vietnam at provincial level. The Phong My Nature Association for Life has been approved by Thua Thien Hue Provincial People's Committee (PPC). The association consists of community members who are willing to participate in conservation and economic development activities at their home village for both nature conservation and improvement of community livelihoods.

Training attempted to reach all parts of society at both formal and informal levels, and an overall awareness of the need to protect natural resources more consciously has been achieved in Ba Be/Na Hang/Yok Don. Training in 42 technical subjects ranging from law enforcement through agricultural technologies to teacher training has reached different target groups. The results of this strong educational drive can be seen throughout regenerating shifting cultivation plots; trees planted in villages, on roadsides, in school yards, and in mixed, intensive farming systems; destructive fishing methods have largely been abandoned and hunting is greatly reduced; public hygiene has improved.

Increased income and improved livelihoods have helped to mitigate the effects of social unrest that in other countries is known to arise from migration and relocation of local people and from the loss of opportunities from hunting, gathering, and shifting cultivation in forest land. Environmental education has contributed strongly to the peoples' acceptance of protection measures.

The Management Board raises awareness of local people and communities, schools in the core and surrounding areas of CTNP as well as in the south-east region, on the biological, environment and socio-economic values of CTNP applying different modalities: development and producing a conservation education package for local leaders and violators, design and print and delivery of mass circulation educational material and notebooks amongst primary schools, a competition campaign on wildlife and environmental protection in schools, and outreach activities through mass media.

The park has conveyed conservation messages to communities in and around the park through its conservation education programme. The environmental education work of the national park has had a significant impact on influencing the curriculum of schools in the buffer zone associated with the park. Conservation education through mass circulation of messages through notebooks, stories for children and collaboration with television stations has proven to be very effective in raising conservation awareness.

### **3.5 Key policy changes needed for successful local-level adaptive management**

#### **i. Common points**

Community co-management within protected areas remains problematic under the law, but legal revisions are being undertaken and the SUFs planning approaches and field interventions provide useful experiences for adoption in other protected areas.

A national policy priority of the Forestry Sector Support Program is to work towards more integrated planning and agreement on budgets for forest sector support projects and programmes. That activity would provide support for integrated budget/financial planning to ensure that future support for SUFs is planned in a coordinated manner, taking account of contributions from different sources of financial support, including GoV commitments through MARD, tourism and other revenues and international ODA support.

## ii. Differences

Incentive policies (both financial and in terms of working conditions in the remote and isolated areas of PL-CP limestone range) are inadequate, and are not strong enough to make related responsible stakeholders participate in management of protected areas actively. Some further mechanism is required to engage them.

Key threats to forest and biodiversity and conservation were properly considered at the beginning of management plan development process (such as logging, hunting, encroachment of agriculture land, trading, poverty, etc.). These threats have been significantly reduced after five years of implementation in PL-CP.

The allocation of natural forest to communities is one of big policy changes of the government to meet the demands of communities participating in forest management and development in Phong Dien NR. Community capacity strengthening in natural forest management has supported sustainable forest management through training and re-inventory of forest resources, village forest protection and management, forest restoration and enrichment, technical transfer on forestry nursery gardens, and on forest plantation. Those interventions have supported communities in forest management and development, which has contributed to income generation and livelihood improvement for communities when participating in forest management.

The reserve has flexibly applied policies on natural forest allocation to communities for management, village regulations on forest protection, legal aspects and benefit sharing, obligations and responsibilities of civil societies in forest resource protection and management.

Applications of nine environmental education courses for primary and secondary schools were piloted in Na Hang/Ba Be/Yok Don. These were taught for one hour per month and have been accepted as a model for the GOV to mainstream environmental education into the national curriculum. All schools were equipped with educational material, and participated in tree planting activities, regular waste cleaning, and excursions to protected areas. The boundaries of the PAs were made known to all stakeholders from farmers to school children. Gender balance has been considered in community development components to assure equal participation of women and men.

Relevant government agencies have worked hard to ensure that key successes in the three SUFs are replicable in other areas. Key amongst these is the wide range of agricultural improvements that have been piloted and embraced by villagers of diverse ethnicity and culture. The training-demonstration-extension cycle proved particularly successful and was fostered by the establishment of extension officers whose services are now widely sought and paid for by the farmers.

The three SUFs have developed and promoted a five-tier participatory planning process, adapted to the specific legislative conditions of Viet Nam, to achieve landscape level integrated conservation and development. The process is adaptive and can accommodate shifts in local or even national development policy without compromising conservation priorities.

Participatory resource use planning (PRUP) in the three SUFs has promoted local-level consultations and sound environmental and social impact assessments. This system supplements government policies regarding the protection of natural resources and the environment, poverty alleviation, and strengthening grass-roots democracy and decision-making at local levels. More importantly, bottom-up planning and negotiation of competing interests in local resources has improved the natural resource base, and supported the poor.

Participatory resource use planning at the local level can play an important role in reconciling competing interests for local resources, while providing sufficient room for the resource use needs of local communities and the conservation requirements of protected areas.

Cat Tien NP has initiated the process of conceptualising and operationalising the approach of landscape ecology within partner agencies. The national park has been constrained by time from turning the large amount of information generated from consultant reports and from field activities into knowledge that can be communicated effectively to advance the concepts of integrated conservation and development and landscape ecology regionally and nationally.

The management and coordination mechanism of the Park Management Board has been improved and more decentralised. The planning process has paid attention to the integration of different financial resources and has tried to make monitoring and evaluation a more active tool for improvement.

## 4. Conclusions

Landscape level and ecological conservation management has been adopted and piloted in several SUFs in Vietnam and showed encouraging results. These approaches could be of value in the management of wetlands because sustainable/wise uses of wetlands are encouraged and current Vietnamese legislation prohibits any extraction of forest resources from the SUF system. Moreover, this is in line with the focus on the integration of development and conservation activities to sustain communities' livelihoods and biodiversity.

Community participation in SUF management has been recently recognised as an integral part in nature conservation and sustainable development. The achievements in the selected protected areas have come about thanks to special mechanisms that have been developed and practised in the areas with a boost from internationally funded projects in the SUFs. However, so far the current weak legislative support for co-management of protected areas makes participatory management of SUFs nominal.

Capacity building is very important, not only to improve stakeholders' ability to participate in PA management, but also to enhance PA staff competence to work effectively with those communities. Educational and training programmes have been developed to meet the wide range of needs of people directly involved with nature conservation, as well as for supporting personnel and policy-makers. Skills required to develop projects in buffer zones and other areas adjacent to PAs for the sustainable use of PA resources and for rehabilitation activities in PAs should be improved to reach both conservation and sustainable development goals.

Awareness-raising or social marketing and environmental education are crucial to increase communities' awareness and recognition of PA conservation, and to change social norms and behaviour related to the consumption of biological products from PAs. Policy changes are needed to make environmental education formal and compulsory at schools at all levels in a comprehensive package of knowledge and information provided for school children to facilitate their understanding of environmental values in general and of protected area values in particular.

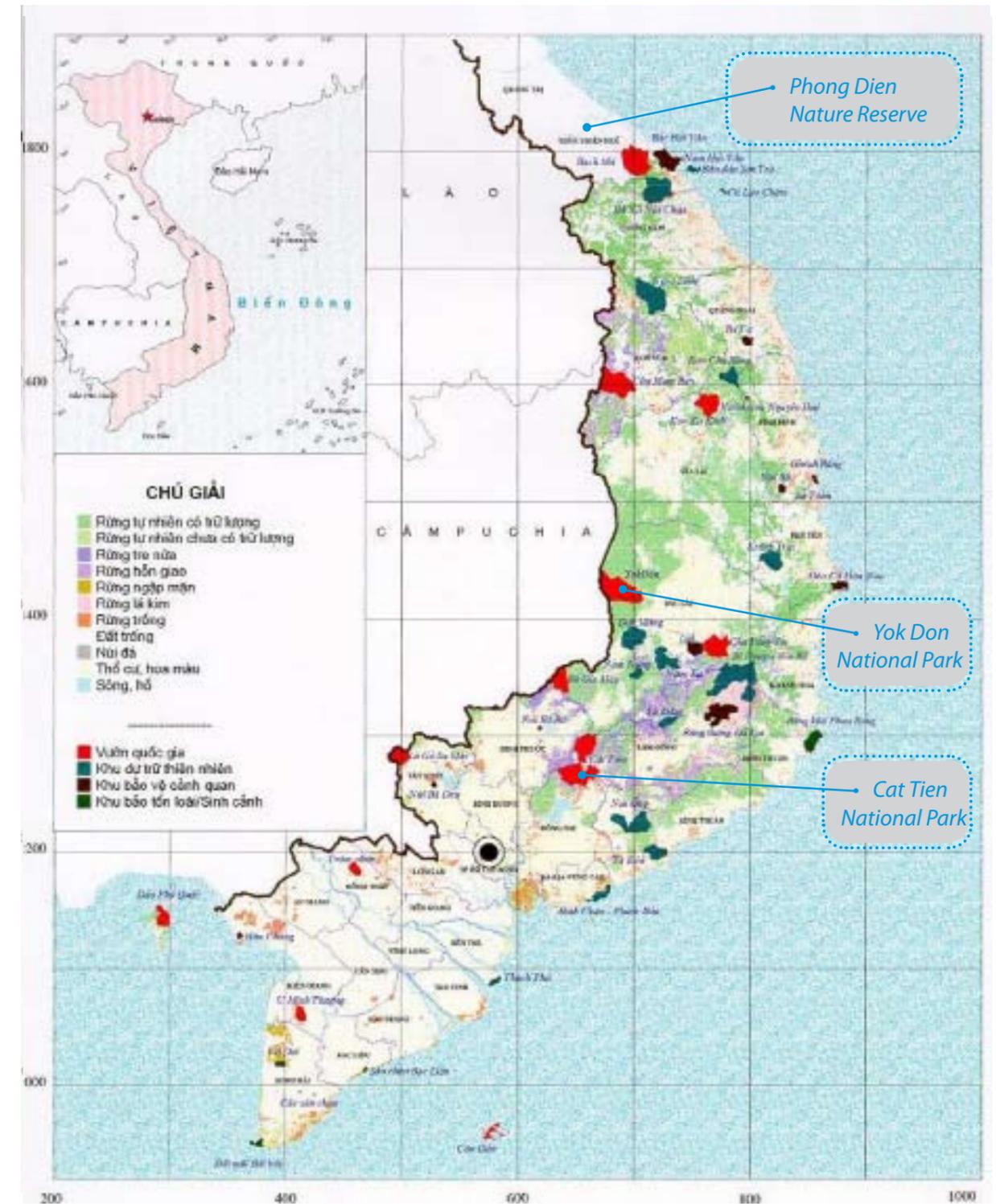
An integrated protected area system, encompassing all bio-geographical regions including terrestrial, wetland and marine areas, has been promoted for many years without success. That policy change would not only to facilitate consistent management of protected areas but also integrate conservation and development for each different ecological type. The policy needs to set clear goals, specify objectives, establish methods and approaches and put forward feasible solutions for developing, organising and managing a sustainable system of protected areas.

## Locations of study sites

### PROTECTED AREAS IN THE NORTH OF VIETNAM



### PROTECTED AREAS IN THE SOUTH OF VIETNAM



Source: Forest Protection Department of Vietnam

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## Annex 1. Programme

### Application of The Ecosystem Approach to Wetlands in Viet Nam 9 – 11 January 2008

#### Wednesday 09 January 2008 - PRACTITIONERS' ANALYSIS

Time	Activity	Person/organisation responsible
8:00 – 8:30	Registration	All participants
8:30 – 8:40	Opening	Dr. Vu Van Trieu, IUCN Viet Nam; Mr. Bernard O'Callaghan, IUCN Vietnam;
	Introduction of participants and agenda	Dr. Gill Shepherd, IUCN CEM.
8:40 – 8:50	Remarks from MARD, DEFRA, IUCN	Mr. Nguyen Huu Dzung, FPD MARD; DEFRA
8:50 – 9:00	Brief introduction of Ecosystem Management Approach	Dr. Gill Shepherd
9:00 – 9:30	Presentation of Case-study #1: "Reviewing the wetlands management in Vietnam in the context of ecosystem management approach"	Dr. Truong Van Tuyen, Hue University of Agriculture and Forestry
9:30 – 10:30	Group discussion (4 groups, each group: 30' for discussion, 5' mins for presentation)	All participants; Facilitators
10:30 – 10:45	Coffee break	All participants
10:45 – 11:15	Presentation of Case-study #2: «Fire and water management in Tram Chim National Park and the application of the ecosystem approach»	Mr. Nguyen Huu Thien, ex-MWBP Co-manager
11:15 – 12:15	Group discussion (4 groups, each group: 30' for discussion, 5' mins for presentation)	All participants; Facilitators
12:20 – 13:20	Lunch	All participants
13:30 – 13:45	Reviewing morning session	Dr. Gill Shepherd
13:45 – 14:15	Presentation of Case-study #3: "Lessons from forest management in Vietnam in the last decade which can be applied to wetlands"	Ms. Nguyen Thi Thu Thuy, Forest Protection Department (FPD), MARD
14:15 – 15:15	Group discussion (4 groups, each group: 30' for discussion, 5' mins for presentation)	All participants; Facilitators
15:15 – 15:30	Coffee break	All participants
16:00 – 17:00	Plenary discussion	All participants; Facilitators
17:00 – 17:30	Conclusion and wrap-up	Dr. Gill Shepherd, Dr. Duong Van Ni
18:30	Farewell dinner	All participants

**Thursday 10 January 2008 - PREPARATION FOR POLICY MAKERS' DAY**

Time	Activity	Person/organisation responsible
8:30 – 8:40	Registration	All participants (of Day 2)
8:40 – 8:50	Welcome and introduction of agenda and objective of the day	Dr. Gill Shepherd
8:50 – 11:30	Reviewing Day 1: key issues and conclusions	Dr. Gill Shepherd; Dr. Truong Van Tuyen, Mr. Nguyen Huu Thien, Ms. Nguyen Thi Thu Thuy, Dr. Duong Van Ni, Mr. Ly Minh Dang and all participants
	Analysis and discussion on policy recommendations for Day 3	
	Setting up scenarios for Day 3	
	Preparation of discussion paper and presentation for Day 3	
12:00 –	Team lunch	All participants
14:00 –	Finalisation of materials for Day 3	Dr. Gill Shepherd, Dr. Duong Van Ni and IUCN team

**Friday 11 January 2008 - SENIOR POLICY-MAKERS' DAY**

Time	Activity	Person/organisation responsible
8:00 – 8:30	Registration	All participants (of Day 3)
8:30 – 8:45	Opening	Dr. Vu Van Trieu, IUCN Viet Nam; Mr. Bernard O'Callaghan, IUCN Vietnam; Dr. Gill Shepherd, IUCN CEM.
	Introduction of participants and agenda	
8:45 – 9:15	Introduction of Ecosystem Management Approach	Dr. Gill Shepherd; Dr. Duong Van Ni
9:15 – 10:30	Presentation of discussion paper with key outputs from Day 1	Dr. Gill Shepherd
10:30 – 10:45	Coffee break	All participants
10:45 – 12:15	Preliminary Plenary discussion of key issues, as presented in the first half of the morning.	All participants; Facilitators
	Was the analysis correct?	
	Can we learn useful ways forward from the forest sector for the wetlands sector?	
	What are the key issues which now need to be addressed at the national level?	
12:15 – 13.30	Lunch	All participants
13:30 – 15:00	Summary points from the morning.	Dr. Gill Shepherd; Dr. Duong Van Ni; All participants
	What solutions and policy recommendations do participants see as ways forward?	
	What next steps should be taken? Agenda and road map	
	Conclusion, thanks and closing	Dr. Gill Shepherd; Mr. Bernard O'Callaghan; Dr. Vu Van Trieu

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## Annex 3: IUCN CEM's five steps for the application of the ecosystem approach

### Introduction

Because the 12 Ecosystem Approach Principles are in no particular order, and overlap with one another (they are listed in their original order at the end of this note), IUCN's Commission on Ecosystem Management clustered and reordered them to make their use easier, and to suggest how they can logically be used in a time sequence.

### STEP A: Area And Key Stakeholders

- Pr.1: The objectives of management of land, water and living resources are a matter of societal choice.
- Pr.7: The ecosystem approach should be undertaken at the appropriate spatial scale.
- Pr.11: The ecosystem approach should consider all forms of relevant information.
- Pr.12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

### STEP B: Ecosystem Structure, Function And Management

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

### STEP C: Economic Issues

- Pr.4: There is usually a need to understand and manage the ecosystem in an economic context and to:
  - i - reduce market distortions that adversely affect biological diversity;
  - ii - align incentives to promote biodiversity conservation and sustainable use;
  - iii - internalise costs and benefits in the given ecosystem

### STEP D: Adaptive Management over Space: Impact on Adjacent Ecosystems

- Pr.3: Ecosystem managers should consider the effects of their activities on adjacent and other ecosystems.

### STEP E: Adaptive Management over Time

- Pr.7: The ecosystem approach should be undertaken at the appropriate temporal scale.
- Pr.8: Recognising the varying temporal scales and lag-effects that characterise ecosystem processes, objectives for ecosystem management should be set for the long term.
- Pr.9: Management must recognise that change is inevitable

## The 12 Ecosystem Principles in their original order

- Pr. 1: The objectives of management of land, water and living resources are a matter of societal choice.
- Pr. 2: Management should be decentralised to the lowest appropriate level.
- Pr. 3: Ecosystem managers should consider the effects of their activities on adjacent and other ecosystems.
- Pr. 4: There is usually a need to understand and manage the ecosystem in an economic context and to:
  - Reduce market distortions that adversely affect biological diversity;
  - Align incentives to promote biodiversity conservation and sustainable use;
  - internalise costs and benefits in the ecosystem
- Pr. 5: Conservation of ecosystem structure and function, to maintain ecosystem services, should be a priority target.
- Pr. 6: Ecosystems must be managed within the limits of their functioning.
- Pr. 7: The ecosystem approach should be undertaken at the appropriate spatial scale.
- Pr. 8: Recognising the varying temporal scales and lag-effects that characterise ecosystem processes, objectives for ecosystem management should be set for the long term.
- Pr. 9: Management must recognise that change is inevitable
- Pr. 10: The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
- Pr. 11: The ecosystem approach should consider all forms of relevant information.
- Pr. 12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

Gill Shepherd, January 2008

