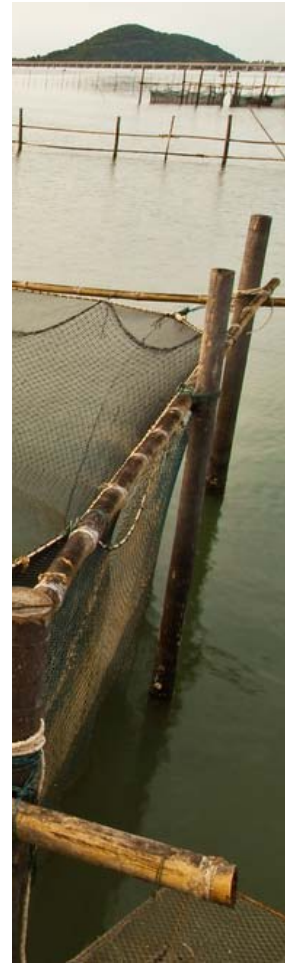
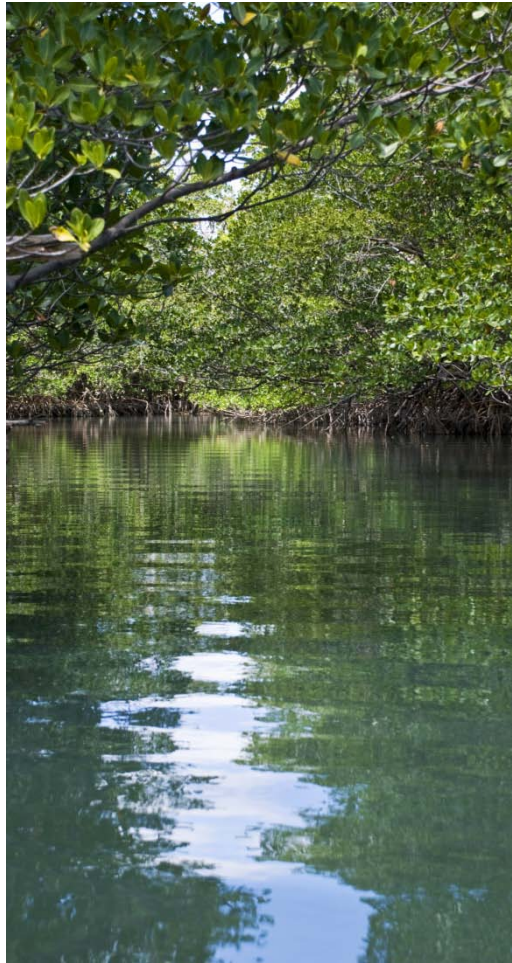

ROOTS IN THE WATER:

Legal Frameworks for Mangrove PES in Vietnam



From the Katoomba Group's Legal Initiative Country Study Series

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ROOTS IN THE WATER:

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List of Abbreviations

DARD	Department of Agriculture and Rural Development
DONRE	Department of Natural Resources and Environment
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
MARD	Ministry of Agriculture and Rural Development
MONRE	Ministry of Natural Resources and Environment
PES	Payments for Ecosystem Services
SNV	Netherlands Development Organization
USD	United States Dollar
VND	Vietnamese Dong
XTNP	Xuan Thuy National Park

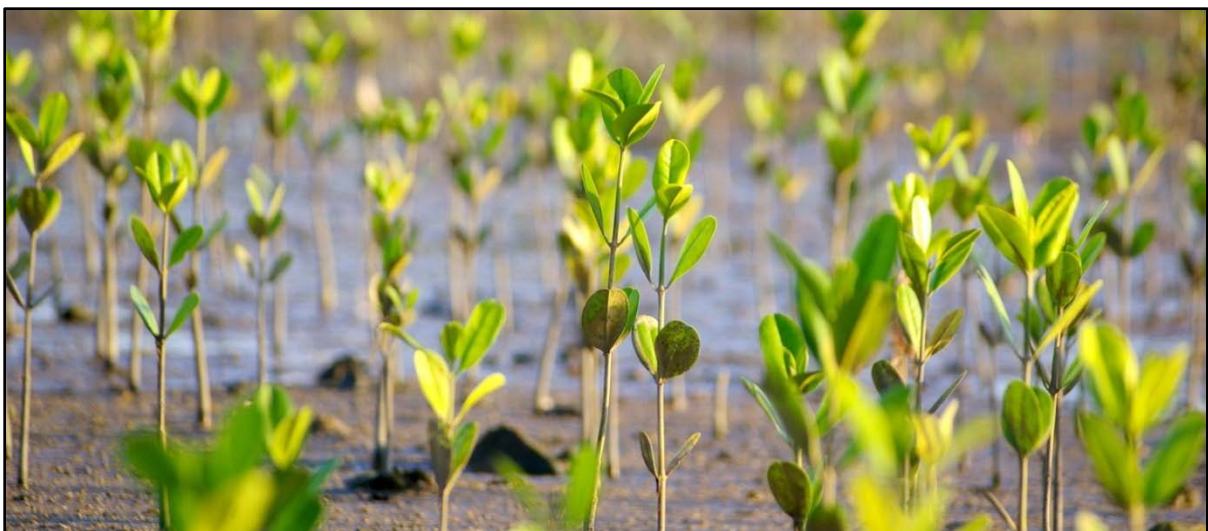
Executive Summary

With rapid coastal development in tropical and subtropical areas around the world, mangrove forests have declined rapidly in recent decades. For coastal residents as well as national governments, this decline has serious negative consequences, from decreased protection against storms and floods, to increased erosion, and decreased carbon sequestration.

Concern about the loss of mangroves has led to innovation around mangrove conservation and restoration efforts, including exploration of payments for ecosystem services (PES) to create incentives through conservation-based revenue streams for local people. Application of the PES concept to mangroves presents a particularly interesting opportunity to send a “price signal” around the value of standing mangroves. Given the pressures, however, PES is unlikely to be a cure-all, but rather an additional tool for counter-balancing degradation and deforestation pressures on mangroves.

Before PES can be tested in Vietnam’s mangrove ecosystems, it is essential to understand the legal and regulatory context. Applicable laws and regulations will determine the feasibility of mangrove PES in the country, what environmental and social requirements apply, and who is eligible to receive PES revenues. In other words, the legal and regulatory environment will establish whether PES can be applied in mangrove ecosystems and whether it can be effective in terms of preserving mangroves.

Forest Trends and the Katoomba Group have commissioned this study into the legal and regulatory frameworks for mangrove management and PES in Vietnam. This study is timely as in recent years various Vietnamese policies have prioritized terrestrial forest, mangrove, and coastal conservation, and the national government is now considering market mechanisms as a potential conservation tool. The recently-signed Decree No. 99 of 2010 on the Policy for Payment for Forest Environmental Services, for example, stipulates that certain ecosystem services users (including hydropower, water supply, and tourist companies) must pay ecosystem services providers for valuable forest ecosystem services.



One key finding from this report is that fully private mangrove PES are *not* feasible in Vietnam due to State ownership over the vast majority of mangrove forests.

Yet, mangrove PES can move forward in specific circumstances. For example, local people are eligible to receive PES revenues via forestland allocation, forest contracting, or co-management arrangements. Furthermore, the new government policy reiterates Vietnam's commitment to channeling PES revenues to local people. Further clarity, as well as information around the efficacy and equitability of PES benefit distribution, will emerge as pilot projects are developed and as new laws, policies, and regulations are enacted.

However, insights about when and where PES can be used in mangrove ecosystems are limited by unclear regulatory and management authority over Vietnam's mangroves due to overlapping mandates of the Ministry of Agriculture and Rural Development (MARD), the Ministry of Natural Resources and Environment (MONRE), and the People's Committees at the provincial, district, and commune levels. This lack of clarity has the potential to undermine mangrove PES and market mechanisms in general, which require a stable, predictable regulatory system.

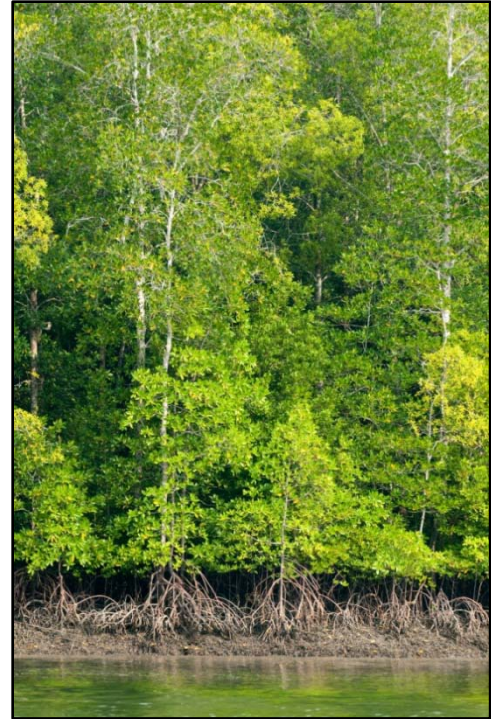
This study suggests that a sector-based approach cannot ensure effective mangrove management, as disparate interests conflict and erode mangrove protections. Rather, an inclusive, ecosystem-based, cross-sectoral approach is needed in – and should be a key characteristic of – mangrove management in areas with high conservation value. Integrated approaches are increasingly feasible within Vietnam, given the support of the national Government in exploring PES and other innovative approaches. We hope that this legal study provides greater clarity and increased interest in the potential for payments for ecosystem services in Vietnam's mangrove forests.

Introduction

The mangrove forests that grow in salty waters along coastlines and in river deltas are essential to local people as well as the healthy functioning of the local environment. Mangrove forests provide a wealth of ecosystem services and products, including carbon sequestration, coastal protection from storms, floods, and erosion, timber and non-timber forest products, and habitat for aquatic and terrestrial species. Local people rely upon these ecosystem services for protection, subsistence, and income.

The major challenge in Vietnam is that while coastal mangrove areas support large surrounding populations and diverse economic activities, these in turn drive mangrove loss.

The decline of Vietnam's mangrove forests over the past 50 years represents a serious environmental and social area of concern. Today, mangrove forests continue to be converted for development, agriculture, and aquaculture, and degraded by over-exploitation and pollution.¹ As mangroves are lost, so are associated ecosystem services.



Climate change introduces new dimensions to the issue of mangrove loss. A changing climate is likely to exacerbate mangrove loss, while healthy coastal mangroves will be increasingly needed to protect against more frequent and severe storms. Mangrove conservation and restoration can help to mitigate climate change, as mangroves collect soil beneath their extensive roots, raising the seafloor and sequestering large amounts of soil carbon.

Yet, financial resources to preserve mangroves are often lacking. This lack of funding can be attributed in part to a systematic undervaluation of mangrove ecosystems, as well as the reality that limited conservation funding must be shared between various conservation goals.²

One potential way to generate revenue streams for conserving mangroves is via payments for ecosystem services (PES), such as payments from an ecosystem services beneficiary to a land user for improving mangrove biomass, health, or diversity, or for preventing deterioration or loss of mangroves. With regulatory support, mangrove PES may make conservation a viable alternative to development in the short term, generating significant, long-term monetary and non-monetary benefits.

Particularly promising in Vietnam are payments to mangrove managers for carbon sequestration, storm and flood protection, and aquaculture support. Although carbon markets are by far the most well-established ecosystem services markets internationally, a project to conserve or restore mangrove for carbon revenues *only* may not be cost-effective. This is due to the common growth pattern of mangroves – long, narrow strips

¹ Do Dinh Sam *et al.*, 2005.

² Macintosh & Ashton, 2002.

along the coast – which translates into a high cost per unit of carbon emissions avoided by conservation or sequestered by restoration. The best option for mangrove carbon may therefore be in combination with other mangrove-friendly revenue sources, such as payments for other types of ecosystem services, ecotourism, or revenues from sustainably-produced mangrove forest products.

Other types of payments may be more or less viable, depending on the circumstances. For example, in areas where the national or local government spends significant funds on seawall repair and maintenance, some funds could be diverted to local people to conserve or restore protective mangrove buffers (thereby delivering some of the same benefits). Such payments could protect inland areas from waves, storms, and flooding, while also providing livelihood benefits to local people and mangrove managers and improving the coastal ecosystem. Tourism operators could also pay for mangrove conservation or restoration to control erosion in scenic areas. Aquaculture operators could pay mangrove managers to “offset” mangrove loss due to aquaculture.

Payments for ecosystem services are still new in Vietnam and are, as yet, untested in Vietnam’s mangrove areas. Legal and regulatory uncertainty around mangrove PES hinders widespread use of these innovative tools.

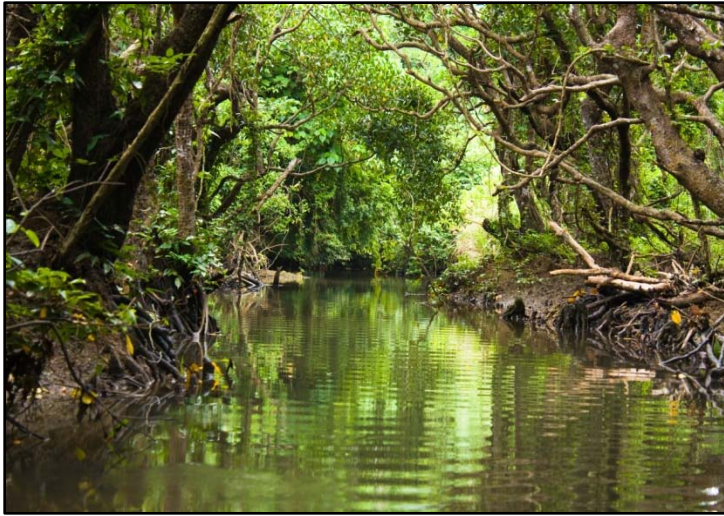
In order to lay the groundwork for mangrove PES in Vietnam, this report describes the overall legal and regulatory system for the country’s mangrove forests and implications for PES in part I, and presents an on-the-ground view of mangrove status, drivers of mangrove loss, and local initiatives in part II.

I Mangrove Management in Vietnam: The National Framework

The national regulatory context determines whether mangrove PES is possible and sets broad priorities for – or against – mangrove conservation. Historically, government policy has encouraged development and aquaculture in mangrove areas, prioritizing short-term economic gains over long-term ecosystem health, structure, and function. However, current policy appears to move the other way, emphasizing the importance of mangrove protection.³ Nevertheless, policy implementation can fall short, perpetuating long-standing biases in favor of short-term economic development activities.

Section 1 describes the national framework for mangrove management and mangrove PES in Vietnam, beginning with an overview of mangrove classification and extent. Section 2 describes the governmental bodies with authority in mangrove areas, and some of the major laws that apply in these areas. Section 3 continues the regulatory discussion, describing mangrove management and use rights.

1 Forests and Mangroves in Vietnam



In Vietnam, the same laws and regulations apply to both terrestrial and mangrove forests. Together, these forests cover just over 13 million ha, and are categorized into three types:

Special use forest, mainly protected areas, accounts for about 15% of the total forest area and is meant for protection of ecosystems and plant and animal diversity;

Protection forest, which accounts for 36% of the total forest area, is intended for protection of the watershed, soil health and

the environment; and *Production forest*, the remaining 47% of the forest area, is a source of wood and other forest products.⁴

Timber extraction is heavily restricted in protection and special use forests. Cutting of naturally-regenerated trees in these areas is prohibited. Selective cutting of a maximum of 20% may be allowed in mature planted protection forest that is established with state funds. At the other end of the spectrum, landholders have an unrestricted right to extract timber from plantation forest established with their own funding.⁵

³ MARD Proposal on Restoration and Development of Mangrove Forest in Coastal Areas for 2008-2015.

⁴ Minister of Agriculture and Rural Development, Decision No. 2140 of 2010 Announcing Assessment of Forest Status.

⁵ In general, timber extraction is regulated by Government of Vietnam Decision No. 186 of 2006 Promulgating the Regulation on Forest Management, the Minister of Agriculture and Rural Development Decision No. 40 of 2005 Promulgating the Regulation on Exploitation of Timber and Other Forest Products, as well as the Government of Vietnam's Law on Forest Protection and Development of 2004.

Vietnam has 323,712 ha designated as mangrove forest, more than 70% of which is classified as protection forest.⁶ However, much of this land is bare of standing trees – only 209,741 ha of mangrove forest now has standing mangroves, almost three-quarters of which were planted, rather than naturally-regenerated. The Mekong delta is home to more than 60% of Vietnam’s mangroves, with an additional 20% found in the southeast region, and almost 20% in the coastal north and Red River delta (Table I-1).

Table I-1: Current Distribution and Origin of Mangroves in Vietnam⁷

Location	Total Area (ha)	% of total	Natural (ha)	Planted (ha)
Quang Ninh, northern region	37,651	18	19,745	17,905
Central-northern region	1,885	1	564	1,321
Central-southern region	2	0	2	0
Southeast region	41,666	20	14,898	26,768
Mekong river delta	128,537	61	22,400	106,137
All Vietnam	209,741	100	57,610	152,131

In many areas, mangroves grow in narrow strips along a highly dynamic coastline. These narrow strips protect against and mitigate high winds and waves, control erosion, and contribute to soil accretion.

Vietnam’s mangroves have decreased substantially since the 1960s.⁸ According to the Ministry of Agriculture and Rural Development (MARD), the main causes of mangrove loss are: (i) conversion of land from mangrove to aquaculture production; (ii) storms, waves, and natural disasters; (iii) over-extraction of timber, fuel-wood, and natural resources; (iv) environmental pollution caused by chemical residues from agricultural production and wastes; and (v) weak regulatory mechanisms that cannot mobilize local communities and households to protect and sustainably develop mangrove areas.

In recent years, the government has issued or revised key laws that govern forest use and management. The most significant laws are the **Land Law**, as amended in 2003, and the **Forest Protection and Development Law** of 2004. Together with the **Civil Law**, these laws form the basis for the establishment of rights and duties for mangrove stakeholders. Selected other laws, policies, and programs with implications for Vietnam’s mangroves are detailed in Annex 1.

2 Mangrove Jurisdiction

Jurisdiction over mangroves rests primarily with the Ministry of Agriculture and Rural Development (MARD) and the Ministry of Natural Resources and Environment (MONRE), as well as the People’s Committees – representing the executive arm of the State at the province, district, and commune levels (Figure I-1).

⁶ Ministry of Agriculture and Rural Development, 2008.

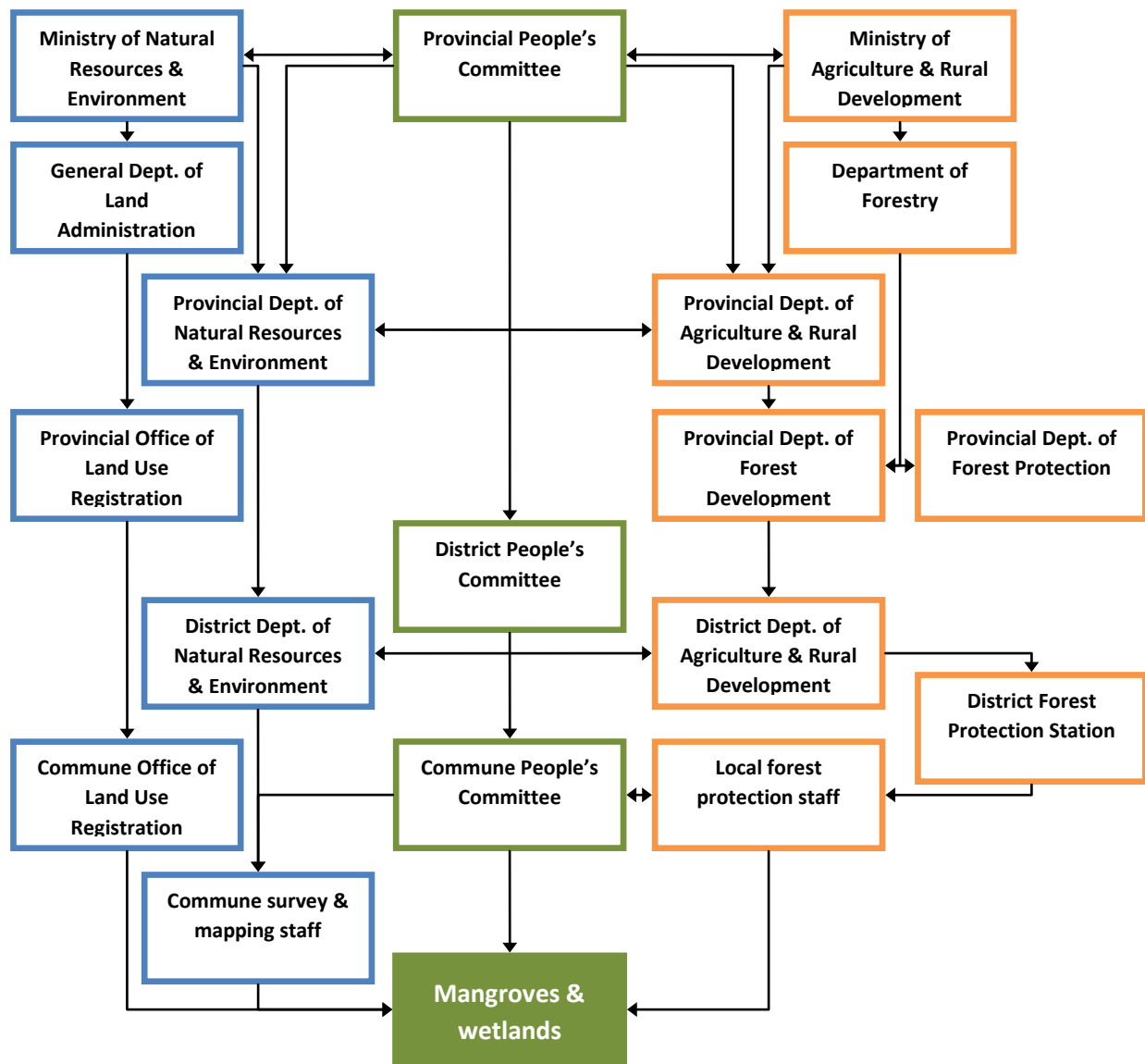
⁷ MARD Proposal on Restoration and Development of Mangrove Forest in Coastal Areas for 2008-2015.

⁸ Ministry of Agriculture and Rural Development, 2008.

The People’s Committee at each level oversees implementation and enforcement of the Land Law within its jurisdictional boundaries. Provincial People’s Committees are responsible for evaluating and approving land and forest conversion plans of organizations, while District People’s Committees evaluate and approve household and individual plans. To be approved, a conversion plan must comply with the applicable land use master plan and forest protection and development strategy. Moreover, an **environmental impact assessment** must be completed for the clearing of forest land.

The commune People’s Committee is additionally responsible for exercising State authority over land at the local level, and becomes a temporary custodian for land that is not allocated elsewhere. Because commune People’s Committees generally lack the resources and expertise to exercise effective mangrove management, and areas under their control often become *de facto* open access areas.

Figure I-1. Basic Institutional Structure of Mangrove Management and Jurisdiction in Vietnam



MARD is responsible for forest management overall in Vietnam. In this capacity, MARD has the duty to make forest protection and development plans, demarcate forest boundaries, handle forest allocation and leasing, and make the final decision on forest conversion or re-categorization. Locally, forests are managed by MARD’s branch offices at the provincial and district levels. Mangrove forests fall under MARD’s jurisdiction over forests in general; there is no particular department within MARD responsible for mangrove management. At the commune level – the lowest level of state administration – mangroves are managed by the commune People’s Committee, usually supported by the district-based staff of MARD’s Department of Forest Protection.

According to the 2003 Land Law, the Ministry of Natural Resources and Environment (MONRE) is charged with management of lands – including wetlands – in the country. MONRE is responsible for land use planning, overseeing surveying and land use mapping, land allocation and registration, and issuance of land use certificates. MONRE’s branch offices at the province and district levels are responsible for local land management and for advising People’s Committees at each level in exercising state management of land.

The roles of MARD and MONRE in mangrove forests overlap considerably, creating a large potential for confusion about regulatory authority. On paper, MARD has jurisdiction over the trees in mangrove forest, while MONRE has jurisdiction over the land itself. Forest activities, however, will almost always affect both trees and the land. Further complicating the question of jurisdiction between these two ministries, MARD regulates aquaculture and fisheries, while MONRE regulates geology, mining and water. A summary of this division of jurisdiction is shown in Table I-2.

Table I-2: Jurisdiction over Mangrove Forests in Vietnam in MONRE and MARD

Ministry of Natural Resources & Environment <i>Management of land, including wetlands</i>	Ministry of Agriculture & Rural Development <i>Mangrove forest & fisheries management</i>
<ul style="list-style-type: none"> • Land-use planning • Surveys and mapping • Land allocation • Land registration • Issuance of land-use certificates • Geology and mining • Water 	<ul style="list-style-type: none"> • Forest-use planning • Forest protection and development • Forest boundary demarcation • Forest allocation and leasing • Forest conversion • Aquaculture and fisheries management

The Land Law and Forest Protection and Development Law each provide that MARD and MONRE must coordinate their activities with one another in managing lands and forests. Such coordination is important, for example, for MONRE to issue accurate land use certificates to landholders, as required. The certificate should reflect the quality, type, and extent of any forest on the land, information that can only be obtained from MARD. If the ministries fail to coordinate, land use certificates for forest land will be incomplete and inaccurate. Yet, in practice, coordination between MARD and MONRE at all levels is often very weak.

The awkward division of jurisdiction and weak collaboration between these two ministries creates confusion for stakeholders and uncertainty in mangrove management. While People’s Committees have clear jurisdiction, they may lack the resources of specialized expertise to exercise effective mangrove management.

3 Rights in Mangrove Areas

According to the Constitution of Vietnam, the Land Law, and the Law on Forest Protection and Development, land and forest resources are the property of the people of Vietnam. The State, representing the people, holds title and ultimate management authority. The State conducts land use planning and grants use rights to the people of Vietnam either by direct land allocation, or by allocation to a State body that contracts with third parties.

The use rights available in allocated land and forest depend upon the land holder, forest type, and source of funds for use fees or planted trees, among other factors. Broadly, types of use rights can be categorized according to whether the allocated land is treated like private property, is state-owned, or is community property. However, these simple distinctions are not always helpful, as there is considerable overlap between the categories, as well as management arrangements that defy categorization.

When the State allocates land, the person or entity who is allocated land – the landholder – is responsible for land management and is usually entitled to a long-term land use certificate (LUC) as evidence of allocated rights. The landholder’s rights in the land depend upon the landholder, forest type, and source of funds for use fees or planted trees, among other factors. Broadly, types of use rights can be categorized according to whether the allocated land is treated like private property, is state-owned, or is community property. However, these simple distinctions are not always helpful, as there is considerable overlap between the categories, as well as management arrangements that defy categorization.



Due to the specific ownership regime applicable to forests, a landholder may have more extensive rights to allocated land than to the forests on the land. As provided by the Constitution and the Law on Forest Protection and Development, the State owns all naturally-regenerated forests and forests established with state funds, regardless of land allocation. In State-owned forests, the State must evaluate and approve forest use and forest protection plans, as well as any planned re-categorization of the forest, and is responsible for distributing benefits from forest resources to local people and other stakeholders. This is a very important point for PES, because it means that in most mangrove areas, the State is the rightful ecosystem service “seller.” In other words, fully private mangrove PES deals can only occur in Vietnam on allocated or contracted land where the landholder planted mangroves using no State funding.

Importantly, however, current government policy provides that State entities may maintain only a small part of any revenues from PES for administrative purposes. The majority of revenues should go to local

landholders.⁹ In fact, government efforts to allocate forestland to local people and communities have been ongoing for some time, particularly since the issuance of Decree 01 in 1995.¹⁰ These policies lay the foundation for effective benefit-sharing with local people, despite the fact that the State is officially entitled to PES revenues from naturally-regenerated forests and forests planted with State funds.

There are 8 major groups that officially manage part of Vietnam’s 13 million ha of forest land, as shown in Table I-3. Uniquely among these groups, commune People’s Committees are not allocated land in their own right, but act as temporary custodians of land that has not yet been allocated elsewhere.

Table I-3: Major Landholders in Vietnam¹¹

User Group	Forest Area (ha)
Management Boards	4,318,000
Households	3,287,000
Commune People’s Committees	2,530,000
State Forest Companies	2,044,000
Mass Organizations	660,000
Army	244,000
Communities	191,000
Joint-Stock Companies	92,000

Mangrove forests, in comparison, are held almost entirely by three major stakeholders: management boards (51%), commune People’s Committees (29%), and private companies (10%).¹² It is notable that private companies, which are not major forest-holders overall, play a significant role in the mangrove context. The remaining 10% of mangrove protection forests are managed by other stakeholders such as households and communities. In the coastal north most mangrove protection forest is allocated to communities and civic organizations.

3.1 Private Management & Use Rights

Private management and use rights in mangroves involve the most extensive set of rights. The landholders in this category include individuals, households, private companies, joint-stock companies, and other economic organizations.

The Civil Code explicitly recognizes individuals, households, and economic organizations (including private companies and joint-stock companies) as legal persons.¹³ Under the Land Law and the Forest Protection and

⁹ Government of Vietnam, Decision No. 99 of 2010 on Policy for Payment for Forest Environmental Services.

¹⁰ Government of Vietnam, Decree 01 of 1995 on Land Allocation for Agriculture, Forestry and Fishery Production to State Enterprises requires the contracting of land in special use and protection forest to local households for forest protection and planting.

¹¹ Minister of Agriculture and Rural Development, Decision No. 2140 of 2010 Announcing Assessment of Forest Status.

¹² MARD Proposal on Restoration and Development of Mangrove Forest in Coastal Areas for 2008-2015.

¹³ Government of Vietnam, Civil Code of 2005.

Development Law, they are eligible to be allocated land and *production forest*, and are entitled to 50-year long-term use certificates. As a result, about 24% of the forest land in the country is now managed by households.

Landholders in this category may transfer or lease their land use rights, use the rights as collateral for a loan or mortgage, and pass the rights by inheritance. If the State withdraws use rights for public purposes, the landholder is entitled to compensation. Furthermore, these landholders are entitled to economic benefits derived from allocated land and forest, except that revenues from naturally-regenerated forests and forests planted with state funds officially belong to the State.

3.2 State Management

Mangrove forest management can be – and very often is – entrusted to a State body such as a State-run management board allocated special use or protection forest, a State-owned company, an army unit, or a commune People’s Committee that manages unallocated land. State property rights in mangroves can vary widely and are therefore difficult to generalize.

3.2.1 Management Boards

Management Boards of special use and protection forest manage more than 30% of the total forest area in the country, mainly protected areas. These areas are generally in better condition than production forests, and may be good candidates for projects to preserve or restore ecosystem services. Many Management Boards are granted long term use certificates to evidence their authority over allocated lands. All Management Boards operate with state funding and are not allowed to transfer or lease the land or use it as collateral or to secure a mortgage. However, they can lease landscapes within their boundaries for ecotourism, and are entitled to the revenue from such leases. Similarly, they should be entitled to revenues from ecosystem services payments.

Decree 01/CP of 1995 requires Management Boards to contract with local people for forest protection in protected areas, generally under one- or two-year contracts. Rights and duties are agreed between the parties. In practice, Management Boards may be reluctant to contract for forest protection, which involves sharing some State funding with forest protection contractors. Many Management Boards therefore maintain large areas of forest under their own control, rather than contracting with local people. There is a danger that revenues for PES in protected areas will be captured and retained by Management Boards unless effective mechanisms are created to require Management Boards to contract with local people. This danger is particularly acute in mangrove areas, where Management Boards are the dominant landholder.

The Policy on Payments for Forest Environmental Services attempts to address the problem by providing that Management Boards may retain no more than 10% of PES revenues, and must distribute 90% local people via to local land users via forest contracting.¹⁴ The policy does not describe how benefit distribution should occur, allowing for flexible and effective implementation at the local level.

3.2.2 State-Owned Companies

About 16% of the forest areas in the country are managed by State companies (formerly state-owned enterprises). The rights of State companies are similar to private management and use rights. State companies largely manage production forest, where they are entitled to long-term (50-year) land use certificates

¹⁴ Government of Vietnam, Decree No. 99 of 2010 on Policy for Payment for Forest Environmental Services, Article 15.

evidencing their rights. They are entitled to benefits derived from the forest, including revenues from carbon markets or other payments for forest ecosystem services.

State companies may contract with households and individuals on a yearly basis to manage the land. This is one way in which PES revenues can be channeled to local people.

3.2.3 Commune People's Committees

Commune People's Committees manage more than 19% of the forest area in the country. According to the Land Law, commune People's Committees represent the State in managing land within the commune but are not proper landholders and do not hold formal titles over land or forest. Large areas of forest that were not allocated to forest users as planned (or that were rejected by local communities that did not want to receive the land) remain under the direct management and authority of the relevant commune People's Committee. Because of a lack of resources to implement forestland allocation policy, or to manage the land and enforce use restrictions, these areas often became *de facto* open access areas.

It is not clear how PES revenues generated from forest managed directly by a commune People's Committee are distributed.

3.3 Community Management

Communities are not legally-recognized entities under the Civil Law, meaning that a community may not enter into an economic transaction.¹⁵ However, communities are granted land title over protected forest, and large areas of forest in Vietnam are *de facto* managed by communities.

The State must allocate protected forest to local communities under the Land Law, the Forest Protection and Development Law, and related decrees, which are regulatory attempts to channel benefits to local communities. A community landholder is entitled to a long-term land use certificate in some jurisdictions, but is not permitted to distribute communal rights to individual community members or households, and may not transfer, lease, or mortgage its rights.

Only about 1% of the total forest area in Vietnam is now allocated to communities. In the coastal north, however, most mangrove protection forest is allocated to communities and civic organizations. In general, a community is entitled to economic benefits from allocated land. Because the community is not a legally recognized entity under the Civil Code, it may not itself enter into PES contracts with ecosystem services buyers. However, a government landholder can contract with a community to manage the land in order to ensure that PES revenues flow to the community.

Regardless of official allocation, mangroves in some areas have long been controlled and managed by local communities according to customary laws. The State does not recognize customary authority, meaning that if a conflict arises, official landholders, not the local communities exercising customary authority, will be

¹⁵ A community cannot satisfy the definition of a legally recognized entity in the Civil Code as one that: (i) is established lawfully; (ii) has a well-organized structure; (iii) possesses property independent from that of individual members or other organizations; (iv) independently enters into legal relations in its own name. Government of Vietnam, Civil Code of 2005, Article 84.

entitled to receive benefits from PES. The magnitude of this benefit-sharing problem is indefinite, as the total mangrove area under customary control is not known.

3.4 Mass Organizations

Government-sanctioned mass organizations, such as the women's union, the youth union, and the veterans' union, manage around 450,000 ha of forest land in Vietnam. In Son La province and other areas in the northwest, for example, large areas of forest have been allocated to these organizations, with long-term use certificates granted to them. Under the Civil Law, these organizations are not recognized as legal entities, and therefore may not enter into PES transactions.

3.5 Forest Contracts

In addition to forest allocation, rights in land, generally in special use and protection forest, can be granted via forest contracts. As described above, state-owned companies that have been allocated forest land may contract with individuals and households on a yearly basis to manage the land. Similarly, Management Boards are required to contract with individuals, households, communities, and organizations to manage special use and protection forests. The forest user is entitled to payment and/or a share of the profits from forest products extracted from the land. When forest contracting is used, rights and responsibilities are defined by the contract.

Recent and emerging national policy in Vietnam provides that the revenues from PES should go to local people, with only a small portion retained for administrative costs at the national and local levels.¹⁶ Forest contracting is a useful mechanism for directing PES revenue to local people in areas that are under the management authority of a State body.

¹⁶ See, for example, Government of Vietnam, Decision No. 380 of 2008 on Pilot Policy for Payment for Forest Ecosystem Services, Government of Vietnam, Decree No. 99 of 2010 on Policy for Payment for Forest Environmental Services.

II Mangrove Management in Practice

To determine the feasibility of mangrove PES in Vietnam, it is necessary to understand not only the national framework, but also the drivers of mangrove loss and local opportunities and barriers to mangrove conservation. Moreover, innovative local initiatives that are working within the national system can provide opportunities for scaling up, even to the national level. Part II therefore draws upon information from several sites to describe local circumstances and approaches.

Section 1 provides background information about the focus sites and the value of mangrove ecosystems to local people. Section 2 discusses specific local drivers of mangrove loss. Section 3 describes barriers to mangrove conservation, including high opportunity costs, management challenges, and stakeholder capacity. Finally, section 4 highlights innovative local approaches to addressing mangrove loss while supporting local livelihoods.

1 Background

The focus sites are Xuan Thuy National Park (XTNP) in Nam Dinh Province, Kien Giang Province, and Nghe An Province (Figure I-1). These focus sites were selected because each exemplifies different challenges and opportunities for mangrove conservation and PES in Vietnam. XTNP provides an example of northern mangroves, managed in the context of a National Park. Nghe An shows mangrove management in the context of a large province with relatively low mangrove density. Kien Giang provides an example of mangrove management in the mangrove-rich Mekong Delta.

Of the three sites, Kien Giang has the greatest area of mangroves, with 5,430.7 ha. XTNP is the smallest site – only 15,100 ha of land – yet 3,486 ha, or more than 20% of the total area, is mangrove forest. Population pressures are high in all three sites (Table II-1).

Figure II-1. Map of Vietnam (focus provinces in purple). Blue circles show mangrove-rich areas.



Table II-1: Total Area, Mangrove Area, Population, and Population Density in Three Sites

Location	Area (ha)	Mangrove Forest Area (ha)	Population in 2004 (persons)	Population Density (people/km ²)
XTNP	15,100	3,486	46,585	308.51
Kien Giang	629,900	5430.7	1,634,043	259.41
Nghe An	1,648,700	530.3	3,003,200	182.2

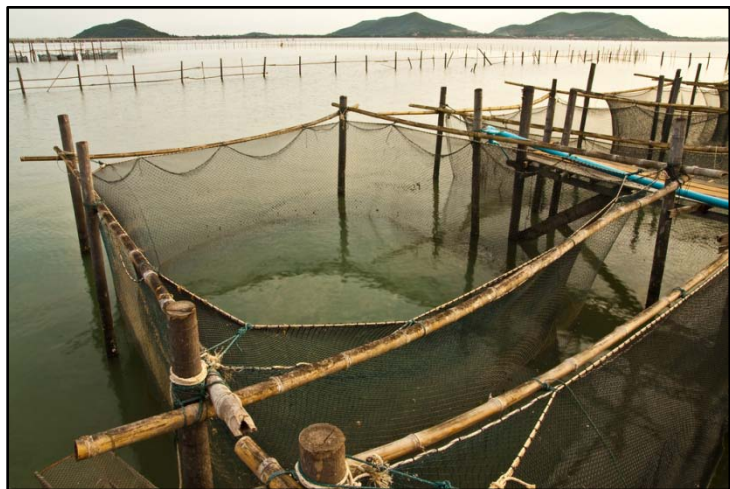
In the focus sites, as elsewhere, mangroves provide important ecosystem services to local people, particularly in terms of provisioning and protection from floods and storms. Understanding the economic value of these ecosystem services is important to setting priorities for mangrove conservation and, potentially, to setting the price for mangrove PES. One detailed estimate for the direct and indirect economic values provided by wetlands and mangroves in the Ba Lat estuary of XTNP appears in Annex 2. That estimate puts the total between USD 2,063-2,263 per hectare of wetlands and mangroves per year. These figures not only show the importance of mangroves to local people, but also highlight opportunities for compensation for mangrove ecosystem services.

Mangroves are commonly found in narrow belts along the coast, where they provide essential protection and stabilization benefits for local people and coastal communities, and create PES opportunities. State payments for conservation or restoration of the protective mangrove belt, for example, can reduce the government's costs of seawall repair and maintenance while providing funds for mangrove conservation. Similarly, payments from tourism operators could go to mangrove managers that control erosion and enhance soil accretion in areas that are valuable for tourism. At the same time, areas where mangroves grow in thin strips along the coast may be particularly costly or challenging places to develop mangrove carbon PES projects. In general, developing a carbon project that involves narrow strips of mangroves is almost certain to be more costly than developing one that involves more extensive areas of mangrove forest.

2 Drivers of Mangrove Loss

Mangrove loss, due both to natural and anthropogenic causes, is a major problem in all three sites. Natural causes, including storms, flooding, and naturally-occurring erosion and siltation changes, play a significant role, but the main drivers of mangrove loss in all three sites are closely related to development and high population pressures near mangrove areas (Table II-1).

Development includes simultaneous, small-scale development by households, individuals, and economic entities, as well as large-scale government-led development. In XTNP, small-scale development is the primary driver, whereas in Kien Giang and Nghe An, mangrove loss is driven by both small-scale and government-led development.



In addition to directly causing mangrove loss, development pressures limit the extent to which mangroves can respond to natural stresses, not only by geographically limiting mangrove habitat, but also by putting additional stress on mangrove areas, for example by increasing air and water pollution.

Payments for ecosystem services may be able to address some of these drivers and reduce, halt, or reverse mangrove loss, if payments are sufficiently high to compensate for opportunity costs. Such payments can also

provide a powerful incentive for innovations toward mangrove-friendly development. Knowing where payments are likely to work and what payment levels will be necessary requires an understanding of local drivers of mangrove loss. A description of the main drivers in the three study sites appears below.

2.1 Small-Scale Development

Small-scale development occurs due to subsistence and income-generation activities by individuals, households, and communities living in and around mangrove areas. These activities include aquaculture and agriculture, as well as fishing, timber harvesting, and shellfish collection. In the aggregate, these activities can have major impacts on mangrove habitat.

2.1.1 Aquaculture

Conversion of mangrove areas for fish, shrimp, clam, crab, and algae aquaculture is highly destructive to mangrove and coastal ecosystems, and may be the greatest single threat to Vietnam's mangrove forests. Not only do aquaculture operations require the clearing of large areas of mangroves, but they also leave antibiotic and other farming residues in the soil and water that damage nearby mangroves.¹⁷ The heavy machinery that is increasingly used to construct ponds or sandy clam-raising areas also is extremely damaging to affected ecosystems.

Shrimp aquaculture, in particular, is a major driver of mangrove loss in Vietnam. For example, one study estimates that 63% of XTNP's mangrove areas were replaced by shrimp ponds between 1986 and 2001.¹⁸ In Kien Giang, authorities plan to convert 440 ha of mangroves to shrimp and rice production, destroying a large area of the threatened mangrove species *Lumnitzera littorea*, which is categorized as vulnerable in the 2007 Vietnam Red Book.

The popularity of other forms of aquaculture, such as clam and fish farming have fluctuated over time in response to price and other factors. In recent years, high prices for aquaculture products have caused a large increase in aquaculture activities.

The high returns available from aquaculture create difficulties for PES, by making it less likely that payments can be set high enough to compensate for these opportunity costs. However, other incentives, such as increased tenure, can be combined with monetary payments. It will also be important to highlight non-monetary benefits of mangrove conservation to local people, which may help to offset opportunity costs. Finally, it may be possible to “bundle” payments for different ecosystem services, for example carbon sequestration and avoided dike maintenance and repair, in order to make PES more competitive with competing land uses.

2.1.2 Natural Resource Exploitation

Natural resource exploitation – shellfish collection, fishing, and timber harvesting – in mangrove areas is very common in all three study sites, and overexploitation is a significant danger. In one village in XTNP, a reported 90% of all households rely on natural resource exploitation in the core zone of the national park for income. Natural resource use in the park is so important to local people because limited agricultural land in the buffer zone of XTNP cannot meet the needs of a rapidly increasing population, and there are few off-farm

¹⁷ Le *et al.*, 2005 cited in Chau, 2007.

¹⁸ Béland *et al.*, 2006.

income opportunities. Similar pressures exist in Kien Giang and Nghe An, though population density in XTNP makes the problem more acute.

Fishing can be harmful to mangroves in a number of ways. In Nghe An, uncontrolled fishing boat traffic damages mangrove seedlings at the water margin, particularly in narrow estuarine waterways, and creates water pollution that is harmful to coastal salt marshes and mangrove forests. In all sites, increasing use of dynamite and electricity in fishing activities also contributes to mangrove loss.



Overexploitation by shellfish collectors damages the ecosystem and young plantation areas. Because shellfish collection requires flat areas with little or no vegetation, collectors often remove mangrove seedlings in the mudflats. Degradation increases with collector density, which can be very high: there are often between 500 and 600 shellfish collectors on the intertidal mudflats in XTNP every day during the peak seasons (March-May and October-December).

Mangrove harvesting, for fuel, timber, and construction is common, and illegal harvesting can be a major problem. In An Minh district of Kien Giang province, 46% of mangroves show signs of significant cutting.¹⁹ In XTNP, however, local demand for firewood has been reduced since 2002, thanks to increased access to electricity and the introduction of new cooking stoves.

PES may be effective for addressing natural resource overexploitation, especially where returns are low or alternative income activities are readily available.

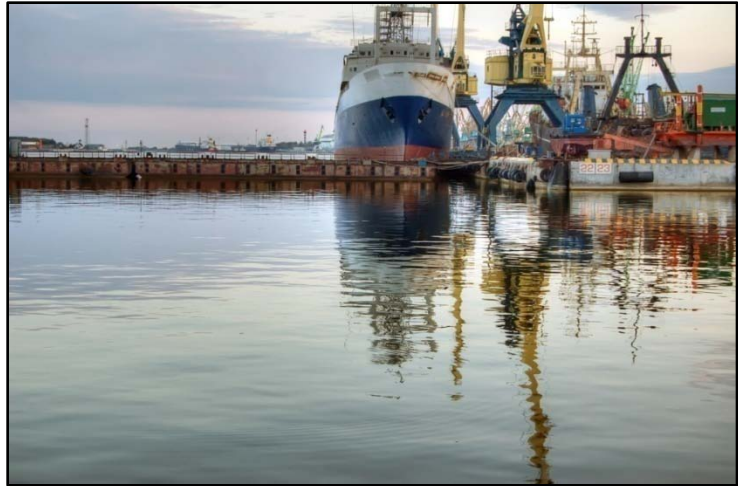
2.2 Large-Scale Development

Government-led economic and infrastructure development in coastal areas cause significant mangrove losses as areas are converted for agriculture, infrastructure, industry, and tourism. This type of development is difficult to address using private or small-scale PES, which is likely to be undermined by government incentives for traditional, mangrove-destructive economic development activities. Government-led PES or PES-like arrangements, however, may be effective in shifting government priorities and engaging the many different stakeholders involved. If PES are implemented at a local or regional level, however, decision-makers must be aware of the danger that payments will not *change* development practices, but will simply shift harmful development to another area in the country. In PES, this is called “leakage,” and it undermines the efficacy of the system overall.

Large-scale development is not permitted in XTNP, but it represents an ongoing threat to mangroves in Kien Giang and Nghe An.

¹⁹ Mackenzie, 2009.

Nearly half of the area previously classified as natural mangrove forest has been allocated for conversion to other land uses under “three types of forest” planning in Kien Giang.²⁰ Some of the planned conversion will accommodate aquaculture or agriculture. Other areas will be converted for residential, industrial, or tourist uses. In Rach Tram river, Phu Quoc National Park, a 400 ha tourism development threatens to destroy the largest remaining population of



Lumnitzera littorea in Vietnam, along with other unique ecosystems in the affected estuary.²¹ By official measures, conversion will reduce mangrove forests by about 2,000 ha in Kien Giang.

In Nghe An, rapid development for tourism, infrastructure, and industry (particularly shipbuilding) is a major driver of mangrove conversion. Approved development often has a larger effect on mangroves than planned, as it spills over and encroaches on nearby mangrove areas. Strategic development planning does not yet incorporate environmental protection and conservation goals.

Development near mangrove areas results not only in mangrove conversion, but also in degradation from increased household and industrial wastes, farming residues, and other environmental pollution. Household interviewees in XTNP attributed the death of at least 30% of mangroves in the core and buffer zones to water pollution due to waste discharges.

2.3 Erosion and Sedimentation Changes

Mangroves, which root in mudflats and alluvial deposits, are under threat from increased or changing erosion patterns and from decreased sediment deposition. While changes in erosion and sediment deposition occur naturally, extensive canal and dyke systems in coastal areas have significantly altered naturally-occurring patterns. Moreover, population and development pressures reduce the ability of mangrove ecosystems to adapt to changing erosion and siltation by limiting where mangroves can grow, and by degrading mangrove ecosystems such that they are more vulnerable to natural changes.

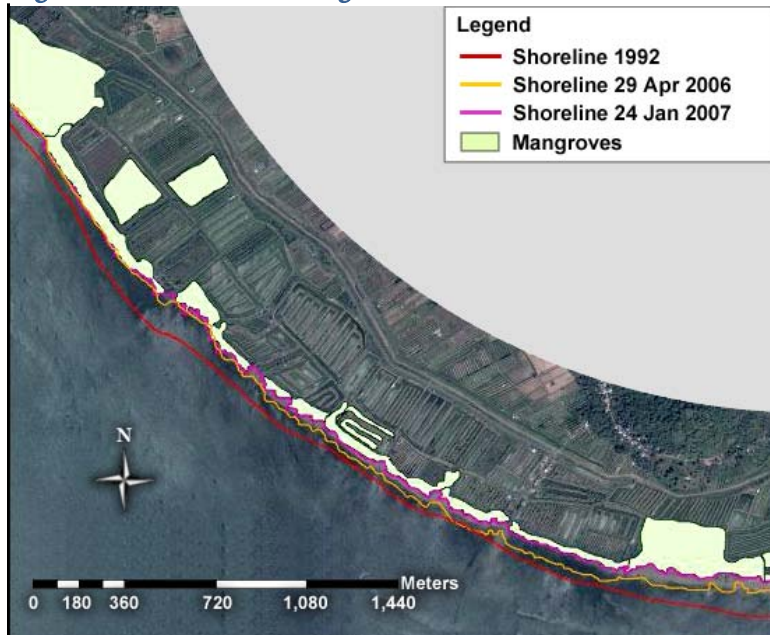
In Nghe An, annual deposition has been low in the area’s many estuaries, due in part to unstable river currents that interfere with silt deposition and marshland creation. Decreased silt deposition means decreased mudflats and alluvial deposits suitable for mangroves to grow, impairing natural mangrove regeneration and limiting options for mangrove plantation.

²⁰ Kien Giang Provincial People’s Committee Decision No. 51 of 2005 on Regulation, Plantation, and Protection of Protective Coastal Forest in Kien Giang.

²¹ Nguyen Xuan Dang, 2009.

In Kien Giang, erosion is a major problem, and one that is likely to become increasingly important as sea levels rise. Recent data show that a band of up to 26 m wide of coastline is lost annually (Duke, 2009), with a consequent loss of mangroves. Put another way, according to a 2009 field study, 34% of the coastline in Kien Giang is eroding, 59% is “at risk” of erosion, and 29% of coastal mangroves are likely to be lost due to erosion in the near future.²² Figure II-2 shows 2009 erosion levels along Kien Giang’s coastline. The most vulnerable areas are in An Bien and An Minh districts. Half of the coastline is eroding in each of these two districts.²³

Figure II-2. Shoreline changes in Hon Dat district 1992-2007.



Ongoing erosion leads to a steadily receding coastline, as shown by a 2009 study that traced the coastline in Hon Dat in 1992, 2006, and 2007.²⁴

One cause of changing erosion pattern is the alteration of currents and sea dynamics caused by Kien Giang’s extensive canal system. Kien Giang has 71 canals that channel flood water from the Mekong River to the sea. Surface water that once was diverted over land or through many shallow channels now concentrates through a limited number of sluice gates, disturbing natural water

currents and resulting in increased erosion, particularly near the mouths of the gates.

Extensive canals in XTNP and Nghe An have similar effects on erosion and silt deposition in those areas. The combination of natural erosion, changing erosion patterns, and human-caused pressures is a serious concern, especially in light of predicted sea level rise that is expected to inundate Vietnam’s low-lying coastal and mangrove areas.

Preserving or planting mangroves in order to prevent erosion is an excellent mangrove PES opportunity because of the high value of erosion control. Ideally, payment should come from people and entities along the coast, all of whom benefit from erosion control, as well as people and entities inland who benefit from the canals and dikes that exacerbate erosion problems. Payment would go toward mangrove plantation and management in at-risk areas. The difficulty, however, lies in how to collect money from such a large and diverse group of beneficiaries.

Another challenge will be mangrove survival, which tends to be low in areas that are quickly eroding and in areas near sluice gates. Engineering solutions, such as breakwater barriers or fencing, can help to mitigate

²² Mackenzie, 2009.

²³ Mackenzie, 2009.

²⁴ Duke, 2009.

ocean currents to allow mangroves to become well-established, but swift water flows through sluice gates continue to be problematic both for erosion and for mangrove survival.

2.4 Natural Disasters and Sea Level Rise

Annual storms, typhoons, and flooding also regularly damage mangrove forests. These natural events cause physical damage to trees and habitat and make future plantation more difficult. In XTNP, an intense storm season in August 2005 was especially destructive.

Sea level rise that is predicted to occur because of climate change is likely to have an enormous impact on Vietnam's mangroves. For example, Kien Giang province is very flat and stands only 0.8 – 1.5 m above sea level. Yet, a 1 m sea level rise is projected for the province by 2100. If that sea level rise were to occur today, it would inundate 175,680 ha, or 28.22% of the total land in Kien Giang.²⁵ Low-lying coastal mangroves will be among the first areas to flood as sea levels rise.

On the other hand, mangroves protect coastal areas from damage by winds, flooding, and waves, and protect Vietnam's extensive dyke system.

3 Barriers to Mangrove Conservation and PES

Despite the importance of mangroves to the environment and to local people, mangrove PES face difficult challenges in the study sites. One hurdle is the high economic returns available from alternative activities, particularly aquaculture. This creates a particular barrier for payments for ecosystem services, as it may not be possible to set payments high enough to compensate land managers for opportunity costs. Management and governance challenges are also significant, creating difficulties for payments and markets for ecosystem services, which rely upon stable governance, enforcement of contracts, and the capacity of local land managers. Finally there is limited local capacity for mangrove management and little funding for changing current practices.

3.1 High Opportunity Costs

The cost of mangrove restoration and maintenance has two components: (i) the direct cost of planting mangroves, restoring degraded mangrove areas, and maintaining healthy mangrove ecosystems, and (ii) the opportunity cost, or forgone income from alternative land uses like fishing, aquaculture, and agriculture. The direct costs of planting, restoring, and maintaining healthy mangrove ecosystems include labor costs, the costs of site analysis, planning, and monitoring, and the cost of acquiring mangrove seeds or young plants, where applicable.

While precise calculations of the opportunity costs of avoided mangrove conversion have not yet been developed,²⁶ it is clear that opportunity costs in for mangrove conservation in Vietnam are high.²⁷ On the

²⁵ Mekong River Commission, 2009.

²⁶ In Kien Giang, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), a German development organization involved in mangrove conservation and capacity-building, is using a methodology that is now being developed in collaboration with the University of Queensland to accurately calculate the opportunity cost of avoided mangrove conversion.

other side of the equation, payments for mangrove conservation and restoration are largely nonexistent. Where they are available, they are too low to compensate for opportunity costs.²⁸

If it is to overcome the challenges of high opportunity costs, effective mangrove conservation will have to take into account both market and non-market values provided by mangrove ecosystems. Furthermore, a combination of market (PES) and traditional regulatory practices is recommended to provide strong incentives for mangrove conservation.

3.2 Management Challenges

Even well-designed mangrove conservation and restoration efforts may fail due to weak management and oversight, poor coordination among relevant authorities and insufficient funding. These problems were observed in all study sites.



As noted at the national level, the division of authority between the natural resources and environment and agriculture and rural development sectors is unclear in mangrove forests. There is no clear roadmap for coordination, information-sharing, or deference. Nor is it clear which goals take precedence when there is a conflict, for example, where aquaculture development under the Department of Agriculture and Rural Development is harmful to protected wetlands under the Department of Natural Resources and Environment. This confusion will undermine mangrove PES, which could be subject

to multiple layers of inconsistent legal requirements. It can also create a regulatory void. The XTNP park director, for example, commented that because XTNP falls between the jurisdiction of MARD and MONRE, it is not supervised or supported by either ministry.

At all levels, a general lack of long-term planning has led to poor policies for natural resource conservation. Various government bodies have long prioritized aquaculture development over mangrove conservation, generating high short-term profits at the expense of ecosystem health and productivity over the long term. Past destruction of newly-planted mangrove forests for shrimp-farming shows how weak long-term planning

²⁷ According to local authorities in XTNP, a shellfish collector can earn VND 100,000 per day, and a fisherman practicing dynamite fishing can earn VND 60,000-120,000 per day. Aquaculture is even more lucrative. Communities near XTNP earned a total of VND 7-8 billion from selling *Meretrix* clams in 2004-2005. XTNP, 2007.

²⁸ For example, people in the Giao An commune near XTNP were eligible to receive only VND 100,000 (USD 7) per ha of reforested mangroves per year under Vietnam's 5 Million Hectare Reforestation Program. The 5 Million Hectare Reforestation Program, effective from 1998 to 2010, aims to increase nation-wide forest coverage up to 43% of the total land cover. Government of Vietnam. Decision on the Establishment of the Five Million Hectare Reforestation Program, No. 661/QD-TT (29 July 1998). According to many observers, results have been mixed (McElwee, 2009).

can result in massive destruction of resources.²⁹ Moreover, legally and scientifically sound inter-sectoral land use planning that includes mangrove ecosystems is still weak at the national, provincial and district levels.³⁰

Even where authority is clear on paper, the proper mangrove forest management authority may lack the resources for implementation. Various bodies with mangrove forest management authority – e.g. protection forest management boards and local authorities – often lack the resources and expertise to conduct effective forest management and protection. Without necessary resources, the rights and responsibilities of these entities over mangrove forests are merely formalities.

Furthermore, some local authorities and government agencies lack understanding about laws, rights, and responsibilities in the mangrove context. For example, the Forest Protection Department with jurisdiction within XTNP does not have a good understanding of management areas and forest classifications under its control. As a consequence, most of the work that ostensibly falls under the Forest Protection Department has been carried out largely by XTNP staff. A representative at the provincial Department of Natural Resources and Environment also indicated that department staff have a similarly limited understanding of mangrove ecosystems.

In sum, coordination between relevant government bodies is poor in the three sites. Various bodies with forest management authority lack the resources and expertise to conduct effective forest management and protection. Appropriate political or institutional mechanisms may also be lacking. Where this is the case, regulation and clear allocation of authority in mangrove forests may have little practical effect, and any mangrove PES will struggle due to unclear or inconsistent regulation.

3.3 Compliance and Enforcement

Compliance with, and enforcement of, mangrove conservation law and regulation is also a major hurdle. In some places, the problem is a lack of resources for effective enforcement. In other places, there is simply a lack of political will for enforcement.

Interviewees in XTNP claimed that violations of environmental and management laws and regulations are common in the core and buffer zones. Because each commune manages its own resources separately from its neighbors, there are also high levels of leakage between communes: if one commune successfully enforces restrictions on natural resource exploitation, people simply move to another commune to continue the restricted activity. In the context of mangrove PES, this could lead to unacceptable levels of “leakage” – where harmful activities are not discontinued, but merely continued elsewhere. If leakage is too high, payments will be ineffective at increasing ecosystem service provision overall, and the market will fail.

While XTNP interviewees noted that the capacity of the local government to enforce legal obligations has been strengthened thanks to trainings provided by donors and governments, commune leaders expressed concern about conflicts of interest. Some district and commune leaders have aquaculture ponds, which can mean that authorities are more likely to issue documents permitting aquaculture activities and that commune authorities cannot effectively enforce existing rules against powerful pond-owners. More generally, national

²⁹ Ministry of Natural Resources and Environment, Environment Administration, 2008.

³⁰ Do Dinh Sam & Vu Tan Phuong, 2005.

park staff said that park officials and heads of villages often have trouble imposing penalties on violators who are friends and fellow community-members.

In all three sites, it was observed that local people are not afraid of violating management and environmental regulations because penalties for infractions are too low. Some suggested that high fines, or even jail time, could be used to increase compliance. On the other hand, if penalties are not imposed because of acquaintance or familial ties, increasing punishments will have little effect. XTNP national park staff suggested that “shaming” – by announcing violations over the community radio system – could be an effective alternative.



However, increased enforcement may not be fair where low compliance is due to overlapping tenure rights. In various places, including in Kien Giang and XTNP, mangrove protected areas have been established without recognizing the tenure rights of local people who have been living in and using the forest for years. Low regulatory compliance by local people in these areas reflects conflicts between local people and authorities as a result of overlapping and conflicting rights.

Especially in the face of weak law enforcement, strong economic incentives for aquaculture production can easily override conservation efforts and undermine payments for mangrove ecosystem services.

3.4 Stakeholder Capacity

Households and enterprises may have a limited awareness of their legal obligations, may lack an understanding about the value of mangroves or the effect of their activities on mangrove ecosystems, and may need training or additional support in order to pursue alternative livelihood activities in mangrove areas.

There is some disagreement about how well local people understand their legal obligations in terms of mangrove conservation. It was observed in Nghe An that households and enterprises have limited awareness of legal rights and responsibilities in mangrove ecosystems. Likewise, some interviewees in XTNP claimed that resource users do not have a good understanding of their legal obligations towards environmental protection. One interviewee noted that most local people cannot distinguish between the core zone and buffer zone, so they do not see the need to change their activities in the core zone.

However, others disagreed. They pointed out that past awareness-raising campaigns have significantly improved the understanding of local people in terms of their legal obligations. Furthermore, many households understand that aquaculture production damages the local environment in a way that interferes with traditional land uses, and may generate benefits only for the first few years. These interviewees argued that high economic returns from environmentally-damaging activities, rather than a lack of understanding of the law, drive mangrove loss.

A similar finding was that many people understand and appreciate the values that mangroves provide, particularly in terms of forming a protective barrier against storms, waves, and flooding. *Meretrix* clam producers in XTNP also cited the role that mangroves play in the life cycle of the *Meretrix* clam and expressed an interest in participating in mangrove protection activities.

Making sure that local people understand their legal obligations and the value of standing mangroves, and that they have alternative income opportunities to mangrove exploitation, will be one key component of a successful strategy to change practices on the ground.

4 Balancing Development and Conservation: New Approaches

The success of mangrove conservation in Vietnam will ultimately depend on establishing a balance between development and conservation goals. Over the past decade, as the importance of mangroves has come to be more widely recognized in Vietnam, various management approaches, which may be used independently or as part of an integrated strategy, have emerged to promote mangrove conservation and restoration while supporting economic activities.

One approach to balancing development and conservation can be described as **coordinated management** and shared conservation and development objectives between relevant regulatory bodies, including commune, district, and provincial People's Committees, relevant Management Boards, and offices of MARD and MONRE. This type of approach is being used in XTNP, though coordination in practice has tended to fall short of expectation, and is in development in Nghe An (see Annex 2). Coordinated management among decision-makers is often part of a broader strategy.

Another approach, called **co-management**, entails increased involvement of resource user groups in the decision-making process. In Vietnam, co-management occurs on State lands, where the government maintains ultimate management authority while granting stakeholders use rights, along with the responsibility to protect natural resources and engage in sustainable land and natural resource management. In practice, specific rights, goals, and responsibilities will vary depending on the circumstances, as they are based upon negotiations between the government and relevant stakeholder groups. Well-designed co-management should involve participatory negotiation, joint-decision making, and equitable benefit distribution among stakeholders. In the specific circumstances, a co-management approach may additionally involve things like integrated coastal and natural resource management, conservation zoning, and the type of coordinated management described above.

One of the distinguishing features of co-management, compared to land allocation to individuals, households, or groups, is that fairly large areas of land are maintained under integrated management. The benefit of this arrangement, in theory, is that zoning can be used to establish priorities over large areas of land and to protect vulnerable areas or areas of particular value for conservation while encouraging economic activities elsewhere.

A third approach devolves management power to local people via **increased land allocation**, with land use restrictions on allocated land in order to conserve and restore mangroves. Like co-management, this approach involves local people more closely in natural resource management and creates a mechanism for benefit sharing with local people. Unlike co-management, however, parcels of land are officially allocated to

individuals and households rather than maintained under integrated management by the State. These two distinct approaches to increased involvement of local people in natural resource management and benefit sharing each have advantages and appear to be well-suited to different circumstances.

4.1 Co-Management in Soc Trang

Co-management can be used to engage local people and establish equitable benefit sharing in areas that are, and will remain, under the management authority of a State entity. For example, a co-management pilot that incorporates the principles of Integrated Coastal Area Management and emphasizes livelihood improvements for local people, has been deployed with early success in Soc Trang Province.³¹

Central principles of co-management, as implemented in Soc Trang, include not only participatory negotiation and equitable benefit sharing with local communities, but also integrated coastal and natural



resource management and robust zoning of natural resource uses.

The Soc Trang pilot project has established conservation priorities and rules of use for more than 240 participating households in coastal mangrove areas in Au Tho B Village in Soc Trang. Livelihood benefits are an important component of the pilot project, particularly as 90% of initial households were categorized as poor or very poor during project planning meetings.³² Early successes include establishing a clam-raising

collective, helping local people to transition to more efficient wood-burning stoves, and effectively involving local people in the decision-making and management process. While longer-term results for mangrove conservation are not yet clear, co-management, as implemented in Soc Trang, appears to be one promising approach to sustainable mangrove management in Vietnam.³³

4.2 Increased Allocation to Local People in Kien Giang

In Kien Giang, provincial and local authorities are working to implement an ambitious mangrove conservation and restoration initiative that grants tenure and limited use rights to local people. Essentially, each landholder gains long-term tenure and use rights in a parcel of land, but is required to observe land use restrictions and to maintain 70% of that land under forest cover. This approach provides for economic development and conservation on each parcel of land, whereas the co-management approach described above uses zoning to separate high-priority conservation areas from economic development areas.

³¹ Schmitt, 2010, Lloyd, 2010.

³² Lloyd, 2010.

³³ Lloyd, 2010.

4.2.1 Decision 51

Under Decision 51, also called the 7:3 policy, forest protection Management Boards enter into long-term contracts with individuals and households to protect and use the forest.³⁴ Generally, landholders are required to maintain 70% of contracted land under forest cover, and are encouraged to use the remaining 30% of the land and surface water for agriculture, aquaculture, and other income-generating activities. The 7:3 policy applies in mangrove and terrestrial forests, and has special provisions that apply in mangrove areas.

Because the policy provides benefits to local people – in the form of use rights in protection mangrove forests that they would not otherwise have – in return for preserving mangroves, it can be seen as a form of State-run, in-kind payments for conservation system. The policy *may* also permit private PES in the 30% of contracted land provided for income-generating activities. This kind of mechanism, which combines non-monetary incentives, encourages limited economic development, and which may be compatible with private PES, is an interesting approach to the problem of high opportunity costs for conservation. The policy is now in its pilot phase in two districts (An Minh and An Bien). If successful, it may represent a promising option for mangrove conservation and PES in Vietnam.

On paper, Decision 51 does not look like a radical change from existing law, which also allocates land and mangrove forest to households under 50 year protection contracts. In fact, the decision is based on current national legal policies on forest management and protection.³⁵ However, it has certain unique characteristics, which are designed to balance mangrove and other forest conservation and develop in a novel way.

In the five years since Decision 51 passed, 490 households (or 52.5% of the 932 eligible households) have participated. The policy has received the strong support from Forest Protection Management Boards, local authorities and local people. Many households took advantage of the program to invest in expanded aquaculture, and are now earning increased income from shrimp, blood shell culture, and fish farming. At the same time, forest cover has increased by 20%, according to the An Minh-An Bien Forest Protection Management Board.³⁶ However, there are rumors that local people tend to develop more than 30% of contracted land, reducing the proportion of the forest that is conserved. This underlines the importance of strong enforcement to the success of this innovative policy.

4.2.2 Mechanics of the 7:3 Policy

Mangrove forests in Kien Giang are categorized as protection forest. Under Decision 51, the Kien Giang provincial People's committee assigns direct management of these forests to Forest Protection Management

³⁴ Kien Giang People's Committee. Decision No. 51 of 2005 Promulgating Regulation on Organization, Operation and Financial Policies.

³⁵ Including the Government of Vietnam's: (a) Law on Forest Protection and Development of 2004; (b) Decree No. 01 of 1995 on Land Allocation for Agriculture, Forestry and Fishery Production to State Enterprises; (c) Regulation No. 245 of 1998 on State Management of Forest and Forest Land; (d) Decision no 08 of 2001 on Management of Natural Forest as Special Use Forest, Protection Forest, and Production Forest; (e) Decision No. 178 of 2001 on the Rights and Responsibilities of Households and Individuals who have been Allocated Forest, Forest Land, Land Leases, and Forest Protection Contracts, in particular, articles 6, 16, 17, 21.

³⁶ An Minh-An Bien Forest Protection Management Board, 2010.

Boards.³⁷ The Management Boards then act as forest owners, implementing all protection, plantation, and management activities and entering into protection contracts with local people.

Local people are given a long-term (50 year) interest in contracted land, during which time they are ensured rights and benefits from the land. They receive compensation for labor and investment costs and they have the right to pass their contractual use rights to their heirs or transfer their rights during the period of the contract. In addition to encouraging economic use of 30% of contracted land, the policy supports local people in expanding or merging existing canals and fish ponds in order to overcome the disadvantages associated with small land holdings and limited access to production land and surface water.

For management purposes, the protective mangrove belt is subdivided into 3 sub-belts, as shown in Table II-2.

Table II-2: Sub-Belts of the Protective Mangrove Barrier in Kien Giang

Sub-Belt	Location	Primary Ecosystem Services
Assistant belt - Permanent mangrove forest	Closest to dry land - from sea dykes and transportation roads seaward	<ul style="list-style-type: none"> · Wind & wave protection & mitigation · Erosion control · Salinity reduction · Habitat for aquatic species · Timber, firewood provision
Main protective belt - Pioneering mangrove areas	Seaward of the assistant belt and expanding away from land, leaving stable mangrove forest land in its path	<ul style="list-style-type: none"> · Wind & wave protection & mitigation · Soil accretion · Erosion control
Depositional belt - Protective mangrove buffer	Furthest from dry land, a narrow belt (100-200m) seaward of the main protective belt	<ul style="list-style-type: none"> · Protection / expansion of main protective belt by soil accretion and by preventing fishing access from the sea

Use rights are most restricted in the main protective belt, where forest contractors may not thin or harvest trees. However, contractors may develop newly formed depositional land as the protective belt moves naturally seaward. Use rights in the assistant protective belt are more permissive, as shown in Table II-3

Any harvesting, thinning, canal dredging, and other land use changes must be reviewed and approved by the Department of Agriculture and Rural Development and supervised by the Forest Protection Management Board, the commune People's Committee, and forest rangers.

³⁷ Kien Giang Decision No. 51 of 2005 on Regulation, Plantation, and Protection of Protective Coastal Forest in Kien Giang, Article 6.

Table II-3: Forest Contractor Use Rights in the Assistant Protective Belt under Decision 51

Activity	Use rights	Division of proceeds
Thinning of seedlings in a growing stand	May thin up to 20% of seedlings, so long as forest cover is maintained at 60%	100% to contractor
Harvesting of mangroves in a mature stand	May clear cut rows or small areas on 10% of the total contracted forest area	70% to contractor 30% to government - or - 100% to contractor that used own money to plant
Harvesting of non-timber forest products	May harvest non-timber forest products	100% to contractor
Aquaculture, agriculture, canal development	May use 30% of bare land for aquaculture, pond construction, agriculture, or canal development, but may not adversely affect the forest and must maintain 70% of the forest on the contracted land	100% to contractor
House building	May use 200 square meters to build a simple house	

Contractual use rights under Decision 51 seem to provide the necessary certainty for contractors to enter into private PES transactions on contracted land. However, a contractor would likely have to conserve or plant mangroves above and beyond Decision 51 minimums in order to satisfy additionality requirements for PES projects.³⁸ If payments from ecosystem services are treated similarly to revenues from harvesting of non-timber forest products, then a Decision 51 contractor would be entitled to 100% of the revenues from PES.

³⁸ Additionality refers to the requirement that, in order to be eligible for payments under a PES mechanism, the amount of ecosystem services generated be greater than (or additional to) what would have been generated under business as usual.

III Conclusion

Vietnam's mangrove forests are not only vitally important to local people, who rely on them for their livelihoods, but also provide economically valuable ecosystem services to businesses, households, and society at large. Ecosystem services include storm protection, fisheries support, and carbon sequestration, to name a few. Recent government policy in Vietnam, such as the mangrove development plan by 2015, recognizes the high value of mangrove ecosystems and prioritizes mangrove conservation and restoration.³⁹

One of the greatest challenges going forward is balancing short term subsistence and economic growth needs with long term mangrove ecosystem health and survival. Successful mangrove conservation – through PES initiatives or otherwise – must address the development drivers of mangrove loss

Pilot projects may include compensation to local people or mangrove managers who manage the ecosystem from ecosystem services beneficiaries or the State. Ensuring appropriate incentives and payment structures will be essential to identifying workable approaches. Details will vary between pilot projects.

Compensation programs can be structured in numerous ways. The national or local government, for example, can (and in fact already does) pay local people for mangrove conservation or restoration that protects existing seawalls. Improving this natural buffer reduces the costs to the government of dike repair and maintenance, while providing livelihood benefits to mangrove managers. Another option is for payments from tourism operators to mangrove managers who control erosion and enhance soil accretion in areas that are valuable for tourism.

Yet another approach would be to structure mangrove carbon projects to access established markets for reduced emissions from deforestation and forest degradation or for increased carbon sequestration in forests. Mangrove carbon projects, however, are complicated by fact that mangroves are often found in narrow strips along the coast, rather than in extensive areas of mangrove forest. In general, developing a carbon project that involves narrow strips of mangroves is almost certain to be more costly than developing one that involves

more consolidated areas of mangrove forest.



Effective compensation to mangrove managers need not closely resemble so-called “pure” PES, nor even involve monetary payments. For example, Decision 51 in Kien Giang shows an interesting PES-like approach, where mangrove use rights are granted in exchange for conservation and plantation activities. The policy encourages forest contractors to use up to 30% of contracted land and surface

³⁹ Government of Vietnam, Ministry of Natural Resources and Development, Synthesis report on proposed restoration and development of mangrove forest in coastal zones from 2008-2015.

water to develop aquaculture and agriculture, thereby generating significant income. As long as 70% of the land is maintained as standing forest (or replanted with new forest), these activities should support the livelihoods of local people in a way that is consistent with long-term mangrove conservation. Co-management also grants land use rights in mangrove areas in connection with mangrove conservation or restoration activities, thereby supporting local livelihoods while working to reverse mangrove losses.

With any mangrove conservation or PES initiative, land use restrictions in mangrove areas should be strictly enforced. Activities that cause mangrove loss can be highly profitable, and provide a powerful incentive to violate land use restrictions⁴⁰ Lax enforcement allows violators to capture a large proportion of the profits from harmful activities, while surrounding households and communities bear the loss of ecosystem services. On the other hand, enforcement should not be unduly harsh against poor, subsistence households, and should be paired with programs to develop sustainable sources of income for those living in and near mangrove areas.

An ongoing challenge for halting or reversing mangrove losses in Vietnam is coordination between different sectors, separate government bodies, and the relevant ministries – especially between MARD, MONRE, and Provincial People’s Committees. Historically, such coordination has been lacking, and making improvements in this area will lead to a more effective and efficient regulatory framework for mangrove conservation and restoration.



Integrated mangrove use and management planning is needed at every level, to secure long-term rights and benefits for forest users, balance competing interests, and engage relevant sectors. Planning should prioritize long-term ecosystem health and

productivity; and should involve all relevant sectors, (including agriculture and rural development, natural resources and environment, fishery, tourism, and construction). Such integrated planning is vital to the success of payments and markets for ecosystem services, which require stable, predictable, and consistent legal frameworks.

As PES initiatives are developed in mangrove areas, the government must ensure that PES revenues flow to local people. Fully private mangrove PES transactions are not feasible in Vietnam because of State ownership of naturally-regenerated mangroves and mangroves planted with State funding, meaning that mangrove PES revenues belong to the State. For equitable reasons and in order to provide incentives for effective mangrove conservation and restoration, PES revenues should flow to those local people that are responsible for ensuring the continued provision of ecosystem services. While new policies have indicated the State’s willingness to direct PES money to communities and to local people, effective benefit sharing and enforcement mechanisms

⁴⁰ Duke *et al.*, 2010; Schmitt, 2009; Do Dinh Sam *et al.*, 2005; Mai Trong Nhuan *et al.*, 2003.

are not yet available. Emerging laws and regulations must ensure that a large proportion of PES revenues is channeled to local people and is not captured by Management Boards or local elites.

In order to lay the groundwork for equitable benefit sharing, forest land allocation should be streamlined, in order to transfer areas currently managed by commune People's Committees to local people. Also important will be to fully recognize the legal rights of communities at same level as other forest users such as individuals, households, and companies, and to develop mechanisms to ensure that forest benefits are shared among community members. Finally, outstanding tenure issues, including the validity of longstanding customary rights in land and forests, must be addressed. With these foundational issues taken care of, various mechanisms – such as co-management, forest contracting, and increased land allocation to local people – can be used to ensure that benefits reach mangrove dependent individuals and households.

Importantly, however, any approach to mangrove conservation must consider the wide variation between different mangrove sites in Vietnam, in terms of mangrove extent, density, and quality, mangrove species composition, drivers of mangrove loss, local law and politics, and socio-economic conditions. Different mangrove management and benefit sharing arrangements may be effective for addressing mangrove losses and livelihood issues in different places. Pilot programs that are now underway will play an important role in testing different approaches and in setting the stage for larger conservation efforts and broader use of mangrove PES. Thinking creatively about the many regulatory tools that are available, and about how different stakeholders can be engaged, will help mangrove conservation and PES initiatives to overcome challenges like high opportunity costs and diverse drivers of mangrove loss.

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Annex 1 - Mangrove Conservation Regulation and Policy in Vietnam

The following table contains a list of selected regulations and policies in Vietnam with implications for mangrove conservation and mangrove PES.

Number	Regulation or Policy and its Significance for Mangrove Ecosystems
1	<p>Vietnam signed the Convention on Wetlands of International Importance (Ramsar) in 1986.⁴¹ The purpose of the Ramsar Convention is to promote sustainable use of wetlands.⁴² A state signatory to Ramsar commits to:</p> <ol style="list-style-type: none"> 1) Designate at least one wetland to be included on the Ramsar list of internationally important wetlands (XTNP, in Vietnam). 2) Enact policies and promote management strategies encouraging wise use of wetlands. 3) Provide training on wetlands research, management, and monitoring, and establish measures to protect wetlands on the Ramsar List. 4) Consult with other contracting parties to implement the Convention for shared wetlands, water systems and species.
2	<p>The National Strategy for Environmental Protection Until 2010 and Vision Until 2020,⁴³ part of the Government of Vietnam's overall strategic framework for sustainable development, sets a goal of increasing overall forest cover 43% by 2010, while improving forest quality and restoring mangrove forest. The strategy recommends activities to increase mangrove areas to 80% of 1990 levels.</p>
3	<p>Decision 109 of 2003 on the conservation and sustainable use of wetlands recognizes wetlands as a distinct land use and conservation management category.⁴⁴ The Decision outlines management structures in wetlands, regulates wetland production activities, and describes specific rights and duties of relevant stakeholders. Specifically:</p> <ul style="list-style-type: none"> • MONRE is responsible for forming strategic action plans and for State management of conservation and sustainable development of wetlands. • Wetland protection areas are subject to restricted exploitation, and certain activities are encouraged and prohibited in wetland areas.
4	<p>Decision 192 of 2003 incorporates mangrove protection forest into Vietnam's system of protected areas.⁴⁵</p>

⁴¹ Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar (Iran), 2 February 1971. UN Treaty Series No. 14583. As amended by the Paris Protocol, 3 December 1982, and Regina Amendments, 28 May 1987.

⁴² Wetlands are defined as "areas of marsh, fen, peatland, or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including marine water the depth of which at low tides does not exceed six meters." Ramsar Art. 1.1 1971.

⁴³ Government of Vietnam. National Strategy for Environmental Protection Until 2010 and Vision until 2020 (2 December 2003).

⁴⁴ Government of Vietnam, Decision on the Conservation and Development of Wetlands, No. 109/CP (28 September 2003).

⁴⁵ Government of Vietnam. Decision on a Strategy for Vietnam's Protected Areas System, No. 192/TTg (17 September 2003).

5	Decree 120 of 2008 on river basin management regulates the management of water sources within a watershed area, with an emphasis on integrated watershed management and equitable benefit distribution. ⁴⁶
6	Decree 25 of 2009 on integrated natural resource management and the protection of sea and island environments emphasizes cross-sectoral and regional management for marine and coastal areas. ⁴⁷ It specifies protection measures for mangrove forests, prevention of soil erosion, and disaster mitigation measures.
7	The master plan on development of the fisheries sector until 2010 and vision through 2020 has a goal of promoting sustainable extraction of aquatic products and and sustainable aquaculture development across 1.4-1.5 million ha of surface water and production centers in the Red River Delta, southeast region, and Mekong River Delta. ⁴⁸
8	The socio-economic development master plan for coastal areas and the Gulf of Thailand through 2020 encourages development of mangrove forest cover in the area by 20-21%. ⁴⁹ The decision emphasizes the importance of strengthening mangrove protections, particularly in coastal protected areas.
9	Decision 26 of 2008, on mechanisms and policies to support socio-economic development in Mekong river delta provinces through 2010, emphasizes protection and expansion of mangrove forest in the region. ⁵⁰
10	The Environmental Protection Law of 2005 requires strategic environmental assessments (SEA) for land use planning and forest development and protection. ⁵¹ If a project is to take place in a protected area or a coastal area, or is likely to have negative impacts on any protected area or watershed, an environmental impact assessment must be completed before project activities may begin. The Environmental Protection Law of 2005 also specifies that the trading of emissions credits with foreign buyers will be regulated by the Prime Minister.
11	The master plan for the development of the Tonkin Gulf coastal economic belt prioritizes fish production and calls for increased investment in mangrove protection and restoration, particularly in critical areas. ⁵²

⁴⁶ Government of Vietnam. Decree on River Basin Management, No 120/2008/ND-CP (01 December 2008).

⁴⁷ Government of Vietnam. Decree on Integrated Natural Resource Management and Protection of Sea and Island Environments, No 25/2009/ND-CP (6 March 2009).

⁴⁸ Government of Vietnam. Decision Approving the Master Plan on Development of the Fisheries Sector Until 2010 and Vision through 2020, No. 10/2006/QD-TTg (11 January 2006).

⁴⁹ Government of Vietnam. Decision Approving the Master Plan for Socio-Economic Development of the Vietnam Sea and Coastal Areas in the Gulf Of Thailand through 2020, No. 18/2009/QD-TTg (03 February 2009).

⁵⁰ Government of Vietnam. Decision Promulgating Mechanisms and Policies to Support Socio-Economic Development In Mekong River Delta Provinces Through 2010, No. 26/2008/QD-TTg (05 February 2008).

⁵¹ Government of Vietnam. Law on Protection of the Environment, No. 52-2005-QH11 (29 November 2005).

⁵² Government of Vietnam. Decision Approving the Master Plan for the Development of the Tonkin Gulf Coastal Economic Belt, No. 34/2009/QD-TTg (02 March 2009).

12	The plan for mangrove restoration and development for 2008-2015, approved by the Prime Minister in 2009, sets a goal to increase the area of mangrove in Vietnam from 209,741 ha to 307,295 ha, mainly by planting. ⁵³ 29 coastal provinces are subject to this plan. Forest contracting and allocation to local households and communities are prioritized.
13	The National Forestry Strategy for 2006-2020, aims to increase overall forest cover to 47% by 2020, including 5.68 million ha of protection forest and 2.16 ha of special use forest. ⁵⁴ Through 2010, all forest land must be contracted or allocated to user groups.
14	The five-million ha program (or 661 program) began as the 327 program in 1993. ⁵⁵ Its goals through 2010 are to: protect existing forest, plant 2 million ha of protection and special use forest, and plant 3 million ha of production forest. Almost all coastal provinces are subject to program implementation.
15	The UNDP/GEF project Reversing Environmental Degradation Trends in the South China Sea and the Gulf of Thailand, which was implemented in 7 countries (Cambodia, China, Indonesia, Malaysia, Philippines, Thailand, and Vietnam), aims to increase mangrove forests in the region to 90% of 1998 levels.
16	The Ministry of Natural Resources and Environment's Action Plan on the Conservation and Sustainable Management of Wetlands for 2004-2010 aims to strengthen inter-sectoral collaboration for mangrove and wetland management and to establish or strengthen institutional frameworks for mangrove use and management. ⁵⁶
17	The Biodiversity Law of 2008 emphasizes the protection and conservation of biodiversity resources in the country. ⁵⁷ The law recognizes the environmental value of forests and mangroves and lays a foundation for the development of markets for ecosystem services. ⁵⁸
18	Decision 380 of 2008 outlines a pilot policy on payment for forest ecosystem services, under which ecosystem service users pay ecosystem service providers for the value of services provided by the forest. ⁵⁹

⁵³ Government of Vietnam, Ministry of Agriculture and Rural Development (2008). *Báo cáo tóm tắt đề án phục hồi và phát triển rừng ngập mặn ven biển giai đoạn 2008-2015 [A synthesis report on proposed restoration and development of mangrove forest in coastal zones from 2008-2015]*. Hanoi.

⁵⁴ Government of Vietnam, Decision Approving the National Forestry Strategy 2006-2020, No. 18/2007/QĐ-TTg (5 February 2007).

⁵⁵ Government of Vietnam, Decision On Objectives, Tasks, Policies and Organization for the Establishment of Five Million Hectares of New Forest, No. 661/QĐ TTg (29 July 1998).

⁵⁶ Government of Vietnam, Minister of Natural Resources and Environment. Decision approving the Action Plan for Conservation and Sustainable Development of Wetland Areas, No. 04/2004/QĐ-BTNMT (5 April 2004).

⁵⁷ Government of Vietnam, Decision Promulgating the Law on Biodiversity Conservation and Sustainable Development, No. 20/2008/QH12 (November 13, 2008).

⁵⁸ Article 74 states "organizations and individuals using environmental services...shall pay charges to service providers."

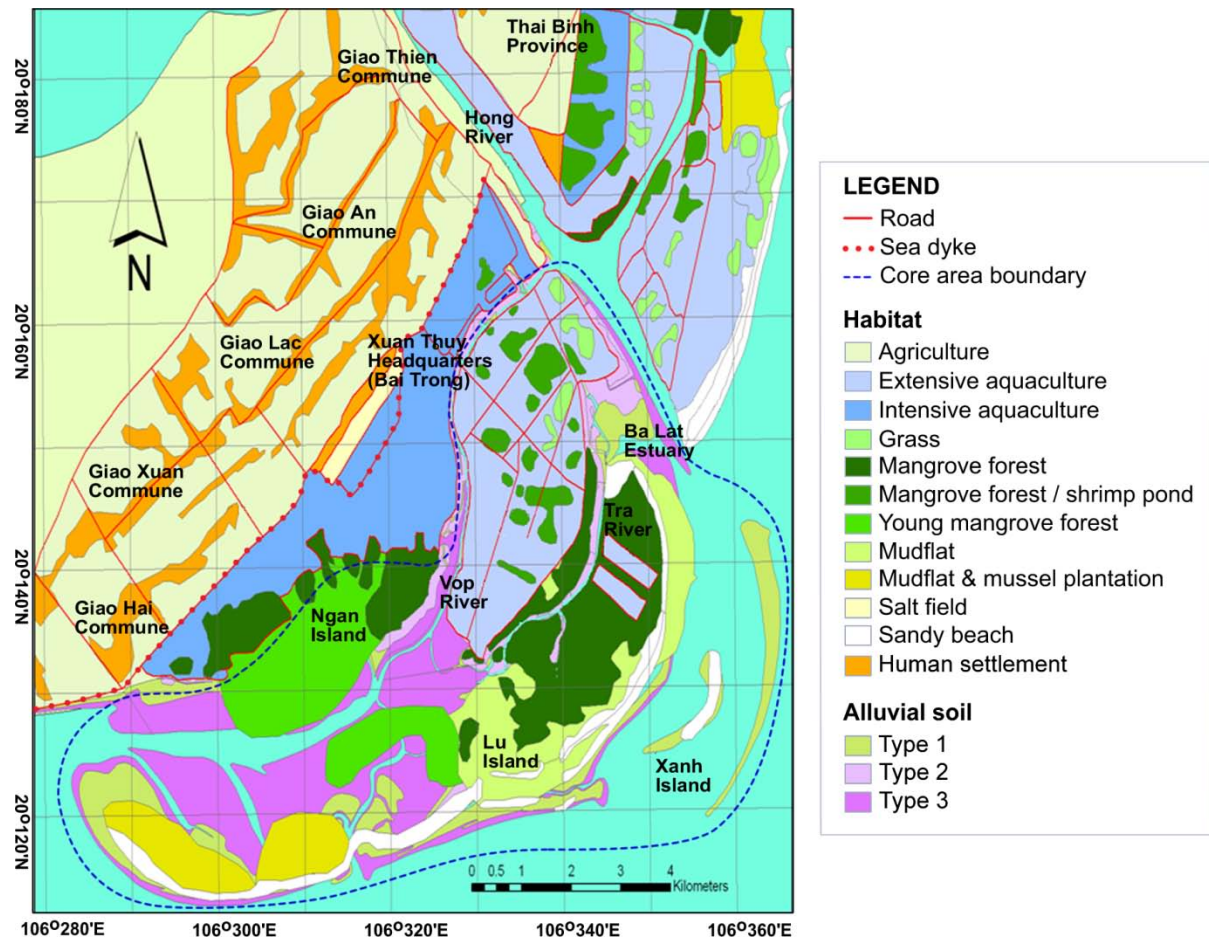
⁵⁹ Government of Vietnam. Decision on Pilot Policy for Payment for Forest Ecosystem Services, No. 380/QĐ-TTg (April 10, 2008).

Annex 2 - Site Maps and More Information

1 Xuan Thuy National Park

Xuan Thuy National Park, located in Nam Dinh province, is a Ramsar site that also forms part of the UNESCO Red River Delta World Biosphere Heritage Site.⁶⁰ The park lies along the coast of Nam Dinh province in the Red River Delta of northern Vietnam. Under domestic law, the area was designated a nature reserve in 1994⁶¹ and made a national park in 2003.⁶² National park status strengthens the management power of the State and ensures national financial support for environmental protection.

Figure A1. Land-Use Map of Xuan Thuy National Park⁶³



⁶⁰ Ramsar status conveys the responsibility to ensure the conservation and wise use of wetland resources by national action and international cooperation. Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971.

⁶¹ Regulation on the Establishment of Xuan Thuy Nature Reserve, No. 4893/KGVX (5 September 1994).

⁶² Decision of the Prime Minister on converting Xuan Thuy Wetland Nature Reserve to Xuan Thuy National Park, No. 01/2003/QĐ-TTg (2 January 2003).

⁶³ Adapted from Ho Dac Thai Hoang & Le Xuan Anh, 2009

The core zone of the park contains mainly mangroves, mudflats, and aquaculture ponds. The buffer zone is used for intensive aquaculture, agriculture, and villages for the almost 50,000 people living near the park (Figure A1). In all, mangrove forest covers 25% of the core zone and 22% of the buffer zone in XTNP, and forms a narrow barrier 0.5 km to 3.5 km wide that shields more than a third of Nam Dinh's 30.2 km of protective dykes.⁶⁴

Though not shown in the land use map, sources say that the mud flats outside the Bai Trong sea dyke and along Giao Xuan, Giao An, and Giao Lac communes were all covered by mangrove forests in 2004.⁶⁵ XTNP has a total of 3,486 ha of mangrove forest, distributed as shown in Table A1.

Table A1: Mangrove Forest Area and Land Area in the Core and Buffer Zones in XTNP⁶⁶

	Total Mangrove Forest (ha)	Total Land Area (ha)
Core Zone	1,762	7,100
Ngan Island	644	1,284
Lu Island	1,118	3,182
Xanh Island	NA	2,634
Buffer Zone	1,724	8,000
Buffer Zone Communes	NA	4,276
Bai Trong	844	2,764
Ngan Island	880	960

Natural mangroves are dominated by *Bruguiera gymnorrhiza* and *Kandelia candel*, with a wide scattering of *Sonneratia caseola*. In places, the mangrove includes *S. caseolaris*, *B. gymnorrhiza*, *Aegiceras corniculatum*, *K. candel* and *Acanthus ilicifolius*. *Phragmites vallatoria* grows in large clumps in aquaculture ponds, sometimes with *B. gymnorrhiza* and *A. corniculatum*.⁶⁷

These mangroves provide valuable ecosystem services to local people, particularly in terms of provisioning and protection from floods and storms. Estimating the exact values is difficult and estimates vary. These values are clearly significant, however, as shown by one set of estimated values for the Ba Lat estuary in XTNP (Table A2).

⁶⁴ Vu Tan Phuong & Tran Thi Thu Ha, 2008.

⁶⁵ Le Thi Van Hue, 2004.

⁶⁶ Dang Thanh Long, 2004.

⁶⁷ Nguyen Duc Tu *et al.*, 2006.

Table A2: Estimated Value per Hectare per Year Generated by Mangroves and Other Wetland Ecosystems in the Ba Lat Estuary of XTNP⁶⁸

	Value (low estimate)		Value (high estimate)	
	VND	USD	VND	USD
Direct value	16,456,720	1,075.40	18,205,100	1,189.88
Timber	103,620	6.77	108,200	7.07
Firewood	85,500	5.39	86,400	5.65
Aquaculture	13,500,000	882.35	15,000,000	980.39
Marine resources	2,640,000	172.55	2,860,000	186.93
Honey bee	112,000	7.32	132,000	8.63
Medical plants	15,600	1.02	18,500	1.21
Indirect value	15,112,000	987.71	16,415,000	1,072.88
Tourism	12,000	0.78	15,000	0.98
Climate, air & water filtration, storm protection	15,100,000	986.93	16,400,000	1,071.90
Total	31,565,720	2,063.12	34,620.100	2,262.75

Mangrove forests and other wetland ecosystems in the Ba Lat estuary provide significant benefits – both direct and indirect – to local people.

Many people are reliant upon these valuable ecosystem services – possibly too many people. High population pressures in XTNP create pressure on natural resources within the park (Table A3).

Table A3. Population and Population Density in XTNP Buffer Zone⁶⁹

Commune	Area (ha)	Households	Villages	Population	People / km ²
Giao Thien	993.5	2,346	14	10,088	1,023
Giao An	821.3	2,522	22	9,807	1,180
Giao Lac	740.7	2,315	22	9,986	1,331
Giao Xuan	757.7	2,598	10	9,985	1,291
Giao Hai	555.4	1,775	18	6,779	1,207
Total	3,868.6	11,556	86	46,585	1,206

In the past, local law has driven mangrove loss, for example by allocating private rights in aquaculture ponds. Collective aquaculture ponds were first established in the XTNP area in the early 1960s. Use rights were put up for public bid by households and household groups beginning in 1988, leading to the establishment of many household ponds between 1993 and 1994. A new national land allocation policy implemented in 1997 permitted shrimp farmers to lease aquaculture lands through 2010, fuelling an increased investment in aquaculture development that peaked in 1999.⁷⁰

⁶⁸ Vietnam Environment Protection Agency 2005, Appendix E, Table 3.

⁶⁹ Tran Hieu Minh, 2004.

⁷⁰ Nguyen Huu Ninh *et al.*, 2008.

Predictably, steady intensification of aquaculture in the XTNP increased the rate of deforestation and degradation of mangrove forests. From 1986 to 1998, the area's mangroves declined 71.4%, while the area under aquaculture ponds increased by 660.9%.⁷¹ There are now 1,800 ha of aquaculture ponds in the area, producing mainly shrimp, crabs, algae and fish.

2 Kien Giang

Kien Giang province, with its large mangrove forest areas, many natural waterways, and high population density, illustrates some of the opportunities and barriers to mangrove conservation the Mekong Delta as a whole. The province contains biologically diverse mangrove ecosystems that support agriculture and aquaculture production, while providing important habitat and other ecosystem services. The future of these ecosystems is critically threatened by continued development, population pressures, and changing weather patterns. Moreover, the area is extremely vulnerable to the effects of climate change, such as sea level rise, increased storm intensity, drought, and fire.

Figure A2. Map of Kien Giang Province

Note: Major Canals Marked in Blue



Official measurements indicate that there were 6,544 ha of mangroves in Kien Giang in 2006 (Table A4).

⁷¹ Centre for Resource and Environment Studies-CRES, 2002 cited in Dao *et al.*, 2008.

Table A4. Official Measure of Coastal Protection Mangrove Forests in Kien Giang in 2006

Note: Province total does not include mangrove forest on Phu Quoc Island, and was reduced to 6,544.4 ha by instruction from the Kien Giang Provincial People's Committee⁷²

Administrative Location	Total Mangrove Protection Forest (ha)	Mangrove Area (ha)		Bare Land (ha)
		Natural	Plantation	
An Minh district	1,064.1	138.7	682.0	243.4
An Bien district	3,027.7	130.7	2,423.9	473.1
Hon Dat district	1,004.4	242.0	266.4	496.0
Ha Tien town	998.6	460.2	538.4	-
Kien Luong district	937.1	118.3	409.0	409.8
Rach Gia city	71.7	3.4	17.7	50.6
Province total*	7,103.6	1,093.3	4,337.4	1,672.9

Actual mangrove extent is disputed, however, and one more recent measurement indicates that there is less than 3,000 ha of standing mangrove forest. Much this is degraded – only 22% of the coast has relatively intact mangrove forest.⁷³ Various provincial programs to rehabilitate and reforest coastal mangroves have created some large replanted areas, although most plantings did not survive.

Notably, there are small fragments (around 83 ha) of natural mangrove forest with high diversity in Kien Giang. The largest populations of the rare mangrove species *Lumnitzera littorea* in the country are found in the river estuaries of Phu Quoc Island and on the mainland in Ha Tien district. These valuable areas have not yet been entered into the provincial protection program.⁷⁴

In the context of the Decision 51, GTZ and the Kien Giang Provincial People Committee began to implement phase I of the Conservation and Development of the Kien Giang Biosphere Reserve project (the GTZ Kien Giang Project), funded by AusAID, in August, 2008. The project focuses on effective management and sustainable resource use in three important areas within the reserve: U Minh Thuong National Park, Phu Quoc National Park and the Kien Luong Hon Chong coastal area.

The Kien Giang Man and the Biosphere (MAB) Reserve, recognized by UNESCO in 2006, is the largest MAB in southeast Asia. It covers a total of 1.1 million ha across four districts (Hon Dat, Kien Luong, An Minh, and An Bien) and two national parks (U Minh Thuong National Park and Phu Quoc National Park).⁷⁵ The reserve is home to many rare and diverse plant and animal species, and critical coastal and wetland areas. However, it remains under threat of degradation from development and unsustainable resource exploitation.

The GTZ Kien Giang Project contributes to rehabilitation of the shoreline, restoration of mangrove environmental services, and livelihood projects in Kien Giang. Specific activities include:

⁷² Kien Giang Provincial People's Committee, Decision No. 38/2005/QD-TTg (2005)

⁷³ Mackenzie, 2009.

⁷⁴ Le Phat Quoi, 2010.

⁷⁵ UNESCO-MAB, 2007.

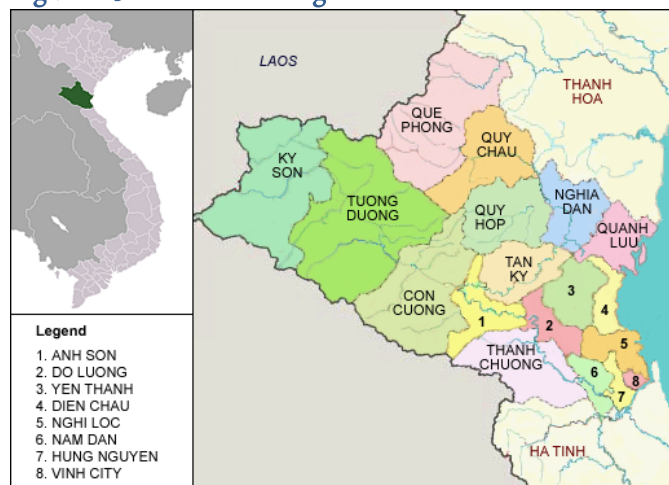
- A survey of mangrove species diversity in Kien Giang.
- Mangrove and coastline mapping via remote sensing and satellite image interpretation.
- An assessment of shoreline condition via a new video filming technique that is being used for the first time in Kien Giang and Vietnam, but can be applied elsewhere (Duke, 2009). This method allows for identification of areas:
 - That are most at-risk of erosion.
 - Where mangroves are largely intact and require greater protection effort.
 - Where seedling establishment is likely to be effective, where physical buffers will be required and where it is necessary that people retreat from the coastline.
- Detailed mapping of the area (supported by the video technique above) to identify where mangroves exist, forest condition, erosion status, and suitable slopes for reforestation.
- A study of biomass, carbon stocks, and biological diversity in Kien Giang, including an assessment of forest regeneration needs and potential.
- A REDD feasibility study.
- Outreach and environmental education for people living in the biosphere reserve and coastal zone:
 - TV and radio programs dealing with environmental management issues.
 - Work with the Women’s Union and Youth Union and Commune officials in environment awareness and sustainable livelihood projects.
 - Support for a novel primary school program on education about the environment.

These activities support planning and allocation of funds, both in the context of the GTZ Kien Giang Project, and in the broader context of the 7:3 policy. Ultimately, the GTZ Kien Giang Project also hopes to access mangrove PES funding to support project activities.

3 Nghe An

Nghe An is a coastal province in northern Vietnam that has 4,230 nautical square miles of territorial waters and 82 km of coastline. The coastal area of Nghe An is politically fragmented, spanning 5 districts and containing 437 communes, more than any other province in Vietnam. A provincial-level review in 2007 found that Nghe An had a total of 8,409 ha of forest land, including 928.4 ha of salt-marsh and 530.3 ha of mangrove forest (mostly protection forest).⁷⁶

Figure A3. Districts of Nghe An Province



⁷⁶ Nghe An Provincial People’s Committee Decision No. 482/QD.UBND.NN (2 February 2007).

In Nghe An, the provincial Department of Agriculture and Rural Development (DARD) recently developed a project called “Protection forest restoration and development in coastal areas of Nghe An province.” The project was approved by the Nghe An Provincial People’s Committee in March 2010 and is to be effective from 2010 through 2015. Nghe An DARD has the leading role in developing and implementing the project and securing funding.

The proposed project will cover 5,087 ha of coastal protection forest in 5 districts (Quynh Luu, Dien Chau, Nghi Loc, Vinh, and Cua Lo) and 2 islands (Ngu and Mat), and will involve a total of 37 communes. Mangrove forests make up a total of 928.4 ha out of the total 5,087 ha, though only 530.3 ha of that is standing mangrove forest, while the remaining 398.1 ha is bare land allocated for mangrove plantation.

The overall objective of this project is to improve and enhance forest cover and forest quality in order to:

- Protect dikes, embankments, irrigation schemes and agricultural areas;
- Protect the salt-marsh areas and alluvial bogs;
- Conserve biodiversity in local mangrove forests;
- Diminish pollution of land, water and air, particularly in inshore water areas;
- Prevent and mitigate damage by storms, waves, and winds;
- Prevent soil erosion and increase sediment accretion;
- Create infrastructure for sustainable development in industry, trade, and tourism.

The Netherlands Development Organization (SNV) plays a key supporting role. SNV provided advisory support to DARD to develop a concept note for the proposed project and helped to organize a stakeholders’ workshop to receive comments from stakeholders and interested parties. SNV is now actively promoting the project and seeking international donor support.

3.1 Project Activities

Planned project activities involve forest plantation, aided forest regeneration, protection of standing forest, demonstration projects, and capacity-building. Specific activities include:

- Protection of 3,862.4 ha of standing forest, including 434.3 ha of mangrove forest.
- Aided forest regeneration on 77.6 ha of forest on Mat and Ngu islands.
- Forest plantation, including planting and maintenance of 1,147.2 ha of new forest, of which 344.9 ha is to be mangrove forest.
- Planting of 50,000 trees (equivalent to 50 ha) scattered over the project area.
- Infrastructure construction to support forest protection activities, for example by constructing nurseries, firebreaks, sentry boxes, protection stations, and boundary lines.
- Pilot development to demonstrate sustainable forest management and exploitation, integrated mangrove forest protection and aquaculture, and disbursed tree plantation to support environmental protection and tourism.

- Capacity building for relevant stakeholders, including local communities, forest owners, local authorities, and voluntary organizations, by information dissemination, trainings, workshops, and study tours.

3.2 Challenges

As the program in Nghe An develops, it will be important to address challenges in terms of mangrove management, stakeholder capacity, and compliance.

In general, mangrove management expertise is fragmented and bodies with forest protection mandates are not well-established. For example, Protection Forest Management Boards in Nghi Loc and Quynh Luu were only recently delineated on a map and have not yet been properly marked on the ground. Authorities lack the budget to carry out conservation activities in these sites, causing difficulties for forest management and protection. Other areas have not yet qualified for the establishment of a protection forest management board. In these areas – in Dien Chau, Cua Lo and Vinh – the district Forest Protection Unit has primary forest protection and development responsibility.

As elsewhere, it is often unclear which sector – natural resources and environment or agriculture and rural development – has authority over mangroves. Where different bodies have overlapping authority, there are no guidelines or institutions for coordination and information-sharing. In comparison, local authorities have clearly-defined administrative and management responsibilities in their respective areas of jurisdiction. However, they have limited involvement in forest management and protection due to a lack of resources and technical expertise.

Stakeholder capacity can also be a challenge, as households generally have a limited awareness of legal rights and responsibilities in mangrove ecosystems. Therefore, an effective mangrove conservation projects in the area will need to incorporate capacity building for enterprises and households.

A third challenge will be securing compliance with environmental laws and regulations. In general, compliance is only about 50%, and is particularly low at the commune level. In many cases, there is no penalty imposed for noncompliance because of lax law enforcement in this area. Monitoring of land use activities is infrequent and may be cursory or poorly done.

Historically, the primary concerns for forestry enforcement have been illegal logging and forest fires. Going forward, it will be important to incorporate broader mangrove and coastal ecosystem conservation goals into compliance and enforcement measures. One possible way to increase compliance by stakeholders may be to provide meaningful opportunities for participation in planning and in project activities.



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