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RED RIVER DELTA COASTAL SPATIAL PLANNING AND MANGROVE GOVERNANCE ASSESSMENT

TENURE AND GLOBAL CLIMATE CHANGE (TGCC) PROGRAM

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Cover Photo: Tien Lang district coastal landscape.

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ACRONYMS AND ABBREVIATIONS

CF	Coastal Forests
CPC	Commune People's Committee
DARD	Department of Agriculture and Rural Development
DONRE	Department of Natural Resources and Environment
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GVN	Government of Vietnam
KfW	KfW Development Bank
LMIRE	Law on Marine and Island Resources and Environment
MARD	Ministry of Agriculture and Rural Development
MCD	Center for Marinelife Conservation and Community Development
MONRE	Ministry of Natural Resources and Environment
MSP	Marine Spatial Planning
NGO	Non-Governmental Organization
PPC	Provincial People's Committee
TGCC	Tenure and Global Climate Change Program
USAID	United States Agency for International Development
VFD	Vietnam Forests and Deltas Program
VND	Vietnamese Dong

EXECUTIVE SUMMARY

In Vietnam, there is growing support for protecting coastal forests and the environment in the context of climate change. The passing of the 2015 Law on Marine and Island Resources and Environment together with the 2016 approval of the Coastal Forests Decree (No. 119/2016/ND) indicate the importance of developing an integrated, multi-sectoral approach to coastal landscape planning and mangrove management. In the context of the Red River Delta, identifying effective coastal spatial planning and mangrove management is particularly important given the significant risks associated with flooding and coastal erosion from the intense typhoon events this area experiences. As climate change takes place, the government is promoting a precautionary approach emphasizing investments in coastal forests, better management and planning, and development of a stronger knowledge base about these coastal forests.

One of the provinces in the Red River Delta, Haiphong municipality, has had significant experience with marine spatial planning at the provincial level in order to proactively address the potential conflicts between infrastructure development, biodiversity conservation, coastal protection, and other important land uses. However, it is recognized that there is a need to develop more localized spatial planning scenarios through the development of a strong knowledge base on resource use, resource users, tenure and governance systems, and conflicts/complementarities between different sets of interest. Such a planning process would need to facilitate the participatory engagement of key local stakeholders in order for an acceptable and inclusive spatial plan to be implemented.

The planning process is particularly important in the context of competing land uses and the continuing expansion of mangrove forests along much of the Red River Delta coastline. Within Haiphong's coastline, the most successful experience with planting and protecting mangroves can be found in Tien Lang district in the south. Through the active engagement of mass organizations such as the Women's Union and Vietnamese Red Cross, the process of raising seedlings and planting has been localized so that success rates have been increased and costs lowered. Together with afforestation, each of the three coastal communes within Tien Lang district have established limited management approaches aimed at preventing mangrove tree cutting and damage. Each commune has established its own distinctive approach relying on either border guards, a limited set of forest protection agreements, or oscillating between these two approaches. It is clear that these approaches do not rely on the broad-base engagement of local community members, nor do they develop an integrated approach to mangrove management that considers the multiple uses and sets of users relying on mangrove ecosystem products.

As such, there is an important opportunity to carry out a pilot in Tien Lang district that develops clearer guidance for the implementation of the Coastal Forests decree for both planning and mangrove management goals. This will involve both carrying out a participatory coastal spatial planning process and developing a more effective system of mangrove management at the commune and inter-commune level. This can be achieved through the establishment of a governance approach that enables multiple stakeholders to collaboratively develop an understanding of natural resource access, use, management, exclusion, and benefit-sharing arrangements and its effect on resource conditions. Such a spatial planning and mangrove co-management approach can promote stronger involvement by women and marginalized groups to ensure that a wide range of users and their needs are addressed.

There is significant interest among Tien Lang's district and commune leaders, mass organizations as well as community members in developing a participatory coastal spatial planning process that addresses commune-level and inter-commune needs. This can then form the basis upon which a mangrove co-management approach can be designed that can effectively support the development of rules for using

the common mangrove resources in the coastal landscape. Such a co-management approach can draw upon diverse lessons from other mangrove co-management pilots developed for addressing disaster risk reduction, coastal protection, and biodiversity conservation along Vietnam's coastline.

1.0 INTRODUCTION

The communities living along Vietnam's long coastline, particularly in the Red River Delta, have been significantly affected by strong typhoons that have created substantial damage to infrastructure, coastal landscapes, livelihoods, and ecosystems. Vietnam's mangroves have long played a role in providing coastal protection against flooding and erosion as well as support for a diversity of ecosystem services. Even so, mangroves have experienced consistent deforestation pressures from the 1960s onwards, initially from the Vietnam War and later from conversion to aquaculture production. As the multiple types of negative impacts of mangrove loss have come into clearer focus in recent years, reforestation and protection activities have been initiated by the Government of Vietnam (GVN) as well as donor agencies and non-governmental organizations over the last decade or more. Today, the GVN clearly recognizes the importance of mangrove and other coastal forests for promoting adaptation, mitigation, and resilience in the face of climate change by reducing flooding, stabilizing coastlines, securing a range of coastal livelihood options, sustaining ecosystem services, increasing biodiversity conservation, and supporting carbon sequestration.

In response, the GVN has recently been developing new laws and policies specifically focused on coastal regions. In 2015, the Law on Marine and Island Resources and Environment (LMIRE) was passed (and went into effect in July 2016), and in August 2016 the Coastal Forests (CF) Decree No. 119/2016/ND, was approved which focuses on coastal forest management, protection, and restoration in the context of climate change. In sum, the effect of these two developments has been to bring a clear focus on the integrated management needs of coastal and marine environments in the context of climate change. The LMIRE aims to clearly move the existing sectoral management and planning processes towards a multi-sectoral, coordinated approach to coastal and marine development in order to ensure sustainable forms of economic growth. The aim is to avoid the considerable negative environmental impacts that have resulted from sectoral interests in the coastal environment.

The CF Decree draws attention to evaluating and mapping the condition of coastal forests; promoting targeted government investment in coastal forests management, protection, and development; identifying effective forms of coastal forest management; and, clarifying sectoral responsibilities over coastal forests for protection, management, and planning. This is in line with the general shift in forestry management in Vietnam, as seen in the 2006-2020 Forestry Development Strategy that seeks to move away from a production focus towards one that protects ecosystem services for sustainable development, livelihoods, and growth while anticipating the risks climate change poses.

In addition, the Social and Economic Development Plan for 2016-2020 has established ambitious targets for increasing the coastal area under mangroves. This new focus on coastal forests opens the door to considering how community forestry, piloted in terrestrial forests, could be implemented within coastal forests such as mangroves. The concurrent development of a new Forest Law (to replace the 2004 Law on Forest Protection and Development) that began in early 2016 potentially provides an opportunity to explicitly consider how stipulations and provisions in the law can support the specific needs of mangrove and other coastal forests. The impetus behind the new law is to develop an integrated approach to the forest sector in the context of climate change. In short, the Forest Law and CF Decree will have areas of intersection that are yet to be identified, especially as it relates to the challenges of climate change.

The development of new policies and laws focused on coastal forests and their environment has created a new policy arena that aims to identify innovative and effective approaches for the planning, governance and management of mangrove forests that can be implemented through initiatives by the government, local and international NGOs, and donor agencies. Given that the Red River Delta in Vietnam's

northern coast faces intense storm events that create significant flooding events and damage to sea dikes, developing pilots on participatory coastal spatial planning and mangrove co-management within its coastal environment can support the establishment of effective approaches specifically tailored to high risk areas.

By distilling lessons learned from a range of coastal spatial planning and mangrove management projects along Vietnam's coastline implemented by the Red Cross, USAID, Deutsche Gesellschaft für Internationale (GIZ), CARE, Center for Marinelife Conservation and Community Development (MCD) and others, as well as other Asian countries, it will be possible to design and implement pilots among selected coastal communes in the Red River Delta that build upon these earlier experiences. A collaborative learning process involving the local government, local mass organizations, and community leaders and members ensures that workable and effective planning and management approaches are put into place over the long-term.

These projects involving mangroves management have focused on different goals such as disaster risk reduction in the face of climate change (CARE), integrated coastal zone management (GIZ), and mangroves co-management for conservation (MCD). They have piloted approaches to mangrove co-management, participatory land use planning, and benefit sharing agreements among communities using mangrove areas by promoting greater community participation. In some cases, such as in CARE's project, they have emphasized the role of women and gender equality in designing their interventions. While their experiences to date have much to offer in the development of an effective co-management approach for the Red River Delta, as yet, there has not been any attempt to systematically study the lessons learned from these projects. Such an assessment could offer valuable lessons to the government, NGOs, donor agencies, and the local communities on the key components that make up a co-management modality.

USAID plans to design and support a pilot project in Tien Lang district of Haiphong municipality[1] where there has been a considerable increase in the mangrove area over the last twenty to thirty years even in the face of multiple land and coastal resource use pressures. This assessment seeks to understand the prevailing development conditions, policy and legal conditions, as well as tenure and governance arrangements within Tien Lang's coastal landscape in order to identify successes, gaps and challenges[2]. Presently, having achieved positive reforestation successes, there is interest within the Tien Lang district government to identify both a participatory coastal spatial planning approach as well as a more effective mangrove management system in order to both meet their additional 2016-2020 mangrove reforestation targets and ensure protection of their existing mangrove areas that provide multiple ecological and social benefits to coastal communities.

1.1 PURPOSE OF ASSESSMENT

In order to inform the pilot design, an assessment was carried out to evaluate the effectiveness of the different existing mangrove management approaches being used in the three main coastal communes, as well as examine the extent to which the current marine spatial planning and mapping process in

[1] Haiphong is a municipality rather than province from an administrative point of view even though the area includes a range of non-urban districts.

[2] The Appendix sets out the key stakeholders in Haiphong city and Tien Lang district that were interviewed during this assessment.

Haiphong municipality is able to meet local-level planning needs within coastal communes. In sum, the purpose of this assessment in Tien Lang district's three coastal communes was to:

- Evaluate the achievements, gaps, and challenges within the current approach to mangrove management at the commune level; and,
- Examine the extent to which the coastal spatial planning process addresses the local commune and district-level planning needs for mangrove and aquatic resource management.

A standalone assessment of opportunities for coastal payment for environmental services in Haiphong was also developed, but was not integrated into this assessment as it has a different audience[3].

In addition, the relevant roles and level of inter-sectoral collaboration between different government ministries and departments at the commune, district, province, and national levels in coastal mangrove management and planning were examined. In particular, emphasis was given to identifying the capacity of government agencies to share and analyze geospatial data.

1.2 ASSESSMENT METHODOLOGY

This assessment was carried out by a team that examined the multiple dimensions of mangrove management, as well as coastal spatial planning in Tien Lang district[4]. The assessment involved:

1. Interviews with project personnel involved in mangrove management and participatory land use planning in Vietnamese coastal environments from non-governmental organizations and agencies such as GIZ, CARE and MCD;
2. Desk review of third party research and other relevant documents prior to the site visit;
3. Key informant interviews with relevant stakeholders and government officials during the site visit (Aug 2-8, 2016) in Haiphong city, Tien Lang district and the three coastal communes: Vinh Quang, Tien Hung, and Dong Hung (see Appendix 1); and,
4. Focus group discussion with members of villages in the three communes of Vinh Quang, Tien Hung, and Dong Hung.

[3] See Sommerville, M. (2016). *Mangrove payment for environmental services in Vietnam: Opportunities and challenges.* Washington, DC: USAID Tenure and Global Climate Change Program.

[4] A list of the key stakeholders interviewed during the assessment is provided in Appendix 1.

2.0 COASTAL MANAGEMENT AND MANGROVES IN HAIPHONG MUNICIPALITY

2.1 INTRODUCTION

Since the end of the Vietnam War, mass organizations such as the Vietnamese Red Cross and Women's Union have been actively involved in planting mangrove forests to replace the habitat loss from defoliant use during the war. Although the importance of mangroves for protecting the sea dike system in northern Vietnam was recognized, the emerging pressures to convert mangrove areas to aquaculture ponds in the 1990s led to a new round of mangrove loss. Presently, in the context of the LMIRE and the CF Decree, it is important to understand how these new laws and decrees can be implemented in Haiphong municipality in order to protect and expand mangrove forests in a context where rapid economic growth is leading to accelerated transformations in land and coastal resource use through port development, tourism infrastructure, and aquaculture production.

Mangrove seedlings that will be planted along Do Son peninsula coastline.
PHOTO: NAYNA JHAVERI

The aim of this chapter is to set out how the development context affecting the coastal environment in Haiphong municipality generally and Tien Lang district specifically affects mangrove management and coastal spatial planning. Haiphong is the one of the largest cities in Vietnam. More broadly, the Red River Delta is one of the two main agricultural areas in Vietnam. Haiphong is not only an important port city (the largest in northern Vietnam) and industrial center, but also serves as a key cultural, education, science/technology, and health services center. As a municipality, it is both a port city in the process of considerable infrastructure expansion as well as a nationally important conservation area with a growing tourist economy that centers around Cat Ba island as well as Do Son peninsula (with its beaches and resorts). Cat Ba island has a national park, a biosphere reserve as well as a world heritage site, with the latter two recognized by UNESCO. There is considerable interest among government officials to promote a "blue port" future for Haiphong that establishes a green pattern of future growth.

Within the Vietnamese context, Haiphong (together with Quang Ninh province to the north) have been actively engaged, over a period of a decade or more, in establishing marine spatial planning (MSP)

processes to support the implementation of their five-year Social and Economic Development Plans and ten-year Social and Economic Development strategies. These have, as their ultimate goal, the establishment of a sustainable future for the region. As such, the groundwork is already in place for MSP in these Red River Delta provinces, a development that still remains a rarity in Asia. Although macro-level plans are now part of the regular MSP process, it is clear that developing a more localized dimension to participatory planning will bring significant attention to the granular level of detail needed for effective planning considerations. Developing a clear process for carrying out participatory coastal spatial planning through an ecosystem based approach at the local district and commune level through an inclusive approach will permit the identification and implementation of planning and management interventions to protect and manage mangrove forests providing multiple forms of benefits. This is recognized as an important policy arena both in terms of strengthening technical knowledge as well as building capacity of government, local officials, and coastal communities.

In terms of its coastal landscape, Haiphong municipality has plentiful rivers and streams mainly flowing from northwest to southeast bringing alluvial sediment into its coastal landscapes. All of the Thai Binh rivers empty into the sea along Haiphong's coast creating a fertile downstream area with abundant freshwater for settlements. Haiphong's coastline is over 125 km long, is low in elevation, and relatively flat. Haiphong has created an extensive system of sea dikes in order to protect coastal farming and settlements from flooding and salinization. All in all, there are 416 km of dikes with about 60 km being sea dikes (with the rest being river and estuary dikes).

2.2 MANGROVE PLANTING

In order to protect the dikes within this northern coastline, the Vietnamese Red Cross and Women's Union have been engaged in mangrove planting in the Red River Delta since the 1980s (after the end of the Vietnam War) with the aid of government as well as humanitarian assistance funds. Some of the oldest remaining mangrove stands can be found in Quang Ninh province. From the late 1990s, a new round of funding support for disaster risk reduction from the Japanese Red Cross has resulted in the Vietnamese Red Cross targeting eight northern provinces (from Quang Ninh to Ha Tinh) for mangrove planting. By the end of 2011, after fifteen years of implementation, Haiphong municipality had planted 1,354 ha of mangroves in seven islands, communes, and districts of Hai An, Duong Kinh, Do Son, Kien Thuy, Cat Hai, Bach Long Vi, as well as 58 ha of bamboo forest in twelve communal areas with river dikes in the districts of Vinh Bao, Tien Lang, and An Lao. The total area of mangroves in Haiphong in 2015 stood at about 4,084 ha of which *Sonneratia caseolaris* occupied over 68 percent of the area, mixed mangrove species covered 25.6 percent, and *Kandelia obovata* occupied 6.25 percent (Pham & Yoshino, 2016).

Hired labor to plant mangrove seedlings along Do Son peninsula.
PHOTO: NAYNA JHAVERI

In recent years, as a result of growing recognition that mangrove loss has resulted in high levels of damage both in an economic and livelihood sense, the government has clearly committed to protecting and planting mangroves. In 2006, a Haiphong government decree to strengthen the sea dike system called for both upgrading the dike system as well as planting mangroves to enhance sea dike protection. As a result, Haiphong has currently prioritized three main strategic areas for mangrove protection: Do Son

peninsula, Kien Thuy, and Cat Hai/Cat Ba. These areas were prioritized because they have been the hardest hit by typhoons in terms of the highest economic loss given the prevalence of tourism and conservation sectors in these localities. While the KfW and Red Cross have both separately supported successful mangrove planting in the Do Son/Kien Thuy area, afforestation has not been successful in the Cat Hai/Cat Ba area due to the unstable alluvial conditions that prevail there.

Although Tien Lang is not among the critical areas prioritized by the government, what Tien Lang has achieved in recent years in expanding their mangrove area, shows that the government and the people have obtained very good progress in terms of nursery development, mangrove planting methods, and protection. As a result, among the coastal districts in Haiphong, Tien Lang has the largest mangrove area (Figure 1). Tien Lang's ability to successfully increase its mangrove area over the last two decades in the face of aquaculture development and other competing land uses indicates it possesses a strong motivation to mobilize its leaders and residents to expand and protect mangrove forests. The area is now poised to move into its second phase involving participatory coastal spatial planning and improved

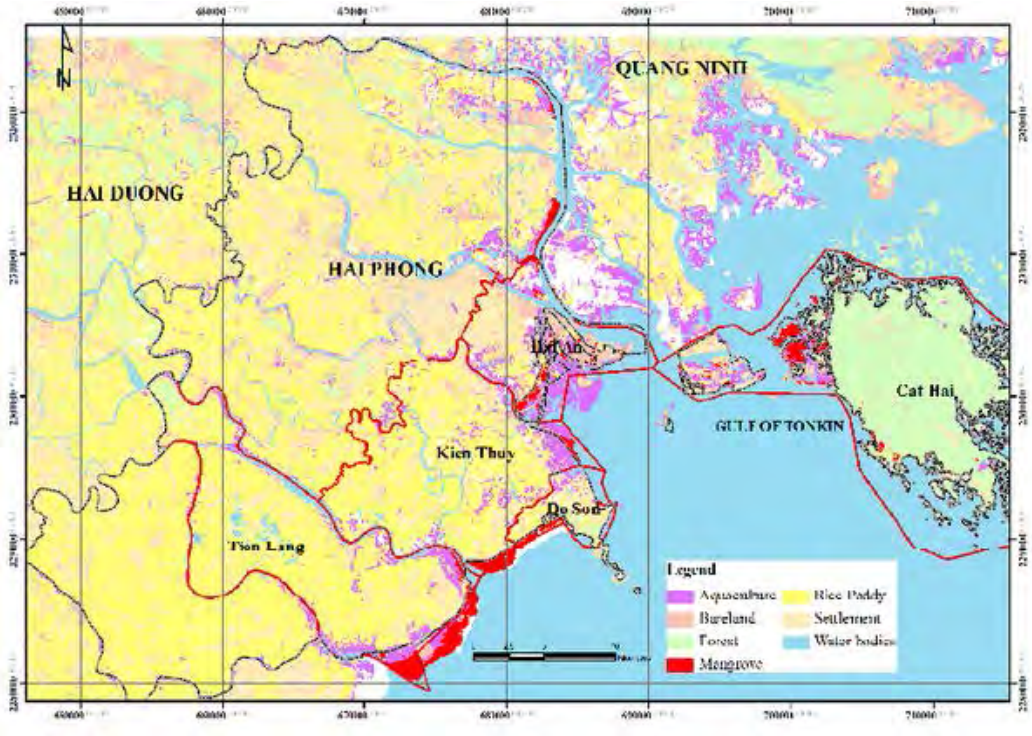

FIGURE 1: 2013 LAND COVER MAP FOR HAIPHONG MUNICIPALITY

Source: Pham & Yoshino, 2015.

mangrove management where the various stakeholders determine how best to zone, use, protect and develop the mangrove and coastal environment in the context of multiple use pressures as well as climate change.

KEY POINTS

- Haiphong experiences intense typhoon events that create significant flooding and coastal erosion given the low coastal elevation. As a result, sea dikes have been essential to protecting agricultural land and settlements behind the sea wall. In the context of climate change, it is expected that risks from flooding, coastal erosion as well as sea level rise will increase.
- Since the end of the Vietnam War, there has been consistent work towards planting and protecting mangroves by mass organizations such as the Vietnamese Red Cross and Women's Union. Since the 1990s, however, the expansion of the aquaculture industry has taken place at the expense of mangrove loss.
- From the mid-2000s, the Haiphong government has clearly recognized the importance of increasing mangrove areas in order to cost-effectively protect sea dikes. The areas targeted for government support include areas where the cost of damage to infrastructure and tourism industry is high.
- Haiphong municipality is, together with Quang Ninh province, the two provinces in Vietnam that have been implementing MSP at the provincial scale for the last decade or more. Since Haiphong would like to promote green growth and become a blue port city, MSP enables the municipality to explicitly consider the conflicts between infrastructure facilities, conservation goals, and coastal protection during the planning process. However, it is recognized that the next step towards improving MSP is to develop more localized, participatory approaches so that an inclusive and more detailed understanding of planning needs is possible at the district and commune scale.

3.0 TIEN LANG DISTRICT: DEVELOPMENT PRESSURES AND MANGROVE MANAGEMENT

3.1 DEVELOPMENT PRESSURES

Tien Lang is a rural district within Haiphong municipality that is undergoing significant economic and ecological transformation. On the one hand, aquaculture production is in a transition period whereby some large-scale intensive aquaculture operations, established early on, have moved towards a semi-extensive or extensive system of production due to some production issues. On the other hand, increasing areas of mangrove forests (and therefore alluvial or mud flats) has led to new opportunistic resource users such as crab collectors, clam farmers, and fisherfolk in mangrove peripheries as well as the further expansion of aquaculture operations seaward.

This is a dynamically changing landscape in which the continuation of the largely ad-hoc use of a wide range of aquatic resources in conjunction with limited mangrove protection patrolling systems has the potential to generate conflict as well as negative environmental and economic impacts. With each commune relying on different types/limited sets of management interventions to protect mangroves, there is, at present, no integrated approach to coastal planning or mangrove co-management that brings together the wide range of stakeholders with interests in the coastal landscape in a socially inclusive manner.

Within Haiphong, Tien Lang is the southernmost district on the coast with the next province of Thai Binh further to the south (Figure 2). Located about 25 km southeast of Haiphong city center, it is a relatively more rural district than others closer to Haiphong city that are more directly affected by port development and/or critical conservation areas. The district has, in the last few years, become better connected to Haiphong city; there are plans for further road construction to increase transportation networks with Namh Dinh and other areas in the region.

FIGURE 2: MAP OF TIEN LANG DISTRICT IN HAIPHONG MUNICIPALITY

Source: Vietnam Provincial Map Guide, 2015

Women wading into mangrove areas along Tien Lang district coastline to collect aquatic resources.
PHOTO: MATT SOMMERVILLE

Tien Lang's agricultural and aquaculture development are well-established. Tien Lang has 19,336 hectares of land area of which 12,991 hectares are agricultural land, 6,226 hectares are non-agricultural, and 118 hectares are other land types. It has about 12 km of coastline with sea dikes and 3,000 ha of aquaculture ponds; there are additional river dykes. According to the National Forest Inventory completed last year, there are 810 ha of mangroves along Tien Lang's coastline protecting the sea dike system and providing a wide range of ecosystem services.

In general, the district has experienced significant economic growth with the period from 2006 to 2015 having a nine percent annual growth rate on average (although the 2011-2015 period during the global economic recession had reduced growth rates). Economically, 58 percent of the GDP is dependent on the agriculture and fisheries sector. The poverty level is about six to seven percent; these are mainly disabled people or the elderly. Even though Haiphong municipality is seeking to only promote off-shore fishing (for medium to large-scale operations), Tien Lang's fisheries is dominated by small-scale fishing operations in near shore waters, and as such, will be directly affected by the way in which mangroves support fish production. Over the 2006-2015 period, the production value of agriculture-forestry-fishery grew six percent per year, the construction sector by 17 percent a year, and services by 20 percent a year.

There has been a shift in aquaculture production in recent years away from intensive towards semi-extensive and extensive systems. Some large-scale industrial aquaculture production sites (raising tiger prawn), particularly in Tien Hung commune[5], went through management problems and so were subcontracted out to local community members who moved towards a semi-extensive or extensive system of production. Typically, the large-scale aquaculture companies possess a 50-year license (no red book) while the subcontracts to local community members are for five years covering 40 ha each. Pond holders pay, depending on the type of contract, anywhere between five to ten million dong per year in taxes. Additionally, some intensive aquaculture ponds have experienced heat and disease problems and so have been abandoned. The area is altogether exposed to a range of threats, including floods, storms, salinization, access to sea, and access to freshwater. In 2005, a major storm broke through the sea wall. As a result, the commitment to planting and protecting mangroves is very strong among community members and local leaders.

Clam harvesting huts where clam farmers protect their crop during harvesting season.
PHOTO: MATT SOMMERVILLE

[5] A one hectare pond can produce two to three tons of shrimp twice a year.

The total population is about 153,000 with 94,000 of working age; some 80 percent of the population is engaged in the agricultural-fisheries-forest sector. Even though this is a high dependency level, over time, there has been a transition as labor has moved away from agriculture towards the construction industry and services sector. There is considerable local seasonal migration to urban areas for work; both men and women travel to work for up to a year in Haiphong city engaged in domestic work, construction labor, and other sectors. Residents seek greater government investments in the education sector in order to expand their labor opportunities.

Three coastal communes have the majority of mangroves: Vinh Quang, Tien Hung, and Dong Hung. Table 1 provides a breakdown of their area, population, livelihoods, and income/poverty rate. Vinh Quang (northernmost) is the largest of these communes in terms of area and population, and possesses the largest mangrove area (likely related to the abundance of alluvial sediment being delivered by the river).

Rice fields next to house in Tien Lang district.
PHOTO: NAYNA JHAVERI

TABLE 1: BASIC INFORMATION ON VINH QUANG, TIEN HUNG, AND DONG HUNG COMMUNES

Commune	Total Area	Population	Livelihoods	Income & Poverty Rate
Vinh Quang	1,929.6 ha	9,970	-Rice cultivation -Cash crops: tobacco, winter vegetables -Petty trade -Waged labor -Animal husbandry -Aquaculture -Inshore fishing; collection of intertidal mudflat products	Income/year/capita: 31 million VND Poverty rate: 5.9%
Tien Hung	1105.86 ha	3,572	-Rice cultivation -Cash crops: tobacco, tomatoes -Animal husbandry -Aquaculture --Inshore fishing; collection of intertidal mudflat products -Waged labor	Income/year/capita: 29.5 million VND Poverty rate: 6.6%
Dong Hung	1420.15 ha	7,861	-Rice cultivation -Cash crops: tobacco, winter vegetables -Overseas waged labor -Animal husbandry	Income/year/capita: 30 million VND Poverty rate: 7%

Commune	Total Area	Population	Livelihoods	Income & Poverty Rate
			-Aquaculture -Inshore fishing; collection of intertidal mudflat products	

In general, in this area, land use certificates (or red books) are only given out for agricultural production lands such as paddy behind the sea dike. All communes have completed their land use certification process involving Commune People's Committee (CPC) and district government coordination. At times, even after certification, paddy fields are converted to aquaculture ponds. In some situations, such as in Tien Hung, red books that had been given out in the alluvial flats were largely revoked in 2003 in order to allow a new private sector company (Vietnam America) to establish aquaculture ponds. Some, however, managed to retain their red books. Vietnam America, however, was only able to clear part of the area that was allocated to it for aquaculture production. Aquaculture ponds in front of the sea dikes do not receive red books. These ponds have contracts with the CPC covering from 5-10 year periods. It was clear that villagers would like longer term contracts for such aquaculture ponds so that their investments are secure.

Village meeting in Vinh Quang commune.
PHOTO: NAYNA JHAVERI

Very recently, some pilot two-year contracts have been given out to new arrivals (12 families) in the mudflats who have started clam farming in 214 ha about 3-6 km offshore with about 20-30 ha each. There are about 500 ha in total of such mudflats available for clam farming. Dong Hung is less involved in clam farming given its distance from the mudflat area. Since there is no formalized process for allocating such areas to villagers, these contracts were given out by the CPC purely to bring a limited form of regulatory control over opportunistic farmers and thereby prevent conflict. Still, there is increasing conflict in Tien Lang around clam production and shell harvesting.

The communities along Tien Lang's coast are involved in small-scale fisheries even though they do possess the capital to move into larger size operations. Fishers are registered (given a plate number) and rents are managed by the fisheries guard working for the Department of Fisheries.

3.2 MANGROVE MANAGEMENT IN COASTAL COMMUNITIES

"Afforestation was difficult, but forest protection is even more difficult."
- Pham Hai Yen, Chairperson of the Women's Union of Haiphong city

The Tien Lang coastline faces divergent types of land and coastal resource use pressures. Over the last three decades, there has been significant conversion of mangrove areas for aquaculture production. This

has seen mixed success because intensive systems of shrimp production[6] are prone to a boom-bust cycle primarily due to disease-related problems stemming from reliance on a high-inputs approach for a few years. In some cases, these aquaculture ponds have been converted to some form of extensive (or semi-extensive) system of production, at times through new subcontracts by the original private sector company with local households. In addition, there can be many combinations of rice-cum-fish or livestock-cum-fish production systems within the aquaculture context. This has led to a complex mosaic of contracting arrangements within the coastal landscape. In order to find a balance between mangrove protection and income generation from aquaculture production, the Haiphong Department of Agriculture and Rural Development (DARD) is now seeking to promote high-value aquaculture production that does not require the expansion of area under aquaculture.

In terms of the management modality for mangrove protection, while mangroves along Vietnam's coastline can fall into any one of the three formal forest classification types (production forests, protection forests, and special use forests [conservation]) depending on local development economy, in Haiphong, all mangroves are classified as protection or special use forests by the Ministry of Agriculture and Rural Development (MARD). In the Mekong Delta, where the export-oriented aquaculture economy is very strong, many mangrove areas fall under the "production forests" category. Rather than a strict protection approach across the board, in the Mekong, rules require aquaculture ponds in production forests to either have 60 or 70 percent under mangroves depending on the size of ponds. To what extent these have been successfully implemented has been the focus of recent research.

Haiphong mangroves, being under a stricter protection regime, are growing well and bring practical benefits in the form of coastal protection and more abundant aquatic resources which have been highly appreciated by the government and local people. At critical dikes, mangroves act as a natural wall for protecting dikes during the rainy season. Some species of mangrove trees are suitable for saltwater tidal areas, with deep underground roots, rising to a 10-meter high lush forest on the beach, covering an area of 900-1200m from the foot of the dikes. The outermost *Sonneratia caseolaris* are 10-12m high; behind them are *Kandelia obovata* at 5-7m height; and, on the inside are *Avicennia alba* at 2-3m height (Table 2). These protect dikes from storms of level 10, level 11, and level 12 with high tides. *Sonneratia*, *Kandelia,* and *Avicennia* are the most commonly planted species.

TABLE 2: MANGROVE SPECIES IN TIEN LANG

Latin Name	Vietnamese Name	English Name
Aegiceras corniculatum	Su	River mangrove
Avicennia alba	Mam trang	A species of mangrove tree
Kandelia obovate	Trang	A species of mangrove tree
Rhizophora apiculate	Duoc doi	A species of mangrove tree
Sonneratia caseolaris	Ban chua	Crabapple mangrove

The 2016 National Forest Inventory suggests that mangroves cover 810 ha of Tien Lang district with 50% in Vinh Quang, 20% in Tien Hung, and 30% in Dong Hung. It is recognized that in the past few years, landslides and dike breaks caused by storms combined with flood-tides in Haiphong have only occurred where there were no mangroves. Because the waves are suppressed, or their intensity reduced, the slopes of dikes are less damaged, thus reducing the costs of annual renovation. According to calculations by Haiphong's Dike Protection and Flood Prevention Department, the average cost of a one meter-long dike renovation is reduced from 5 million VND per year to 1.2 million per year for

[6] Intensive systems of aquaculture production (mainly shrimp) require the provision of sufficient oxygen, fresh water and food. Extensive or semi-extensive systems of aquaculture involve minimum inputs or some limited form of food supply.

dikes with mangroves. Previously, the concrete blocks or paving stones that were used to cover dikes only lasted one or two years; after that, they were usually washed away by waves. When mangroves are strong enough to protect the dikes, the dike surface is more stable, the base is solid, and paving stones and concrete blocks are easily paved with renovation not necessary for many years. Therefore, it is clear that mangroves have improved the coastal environment while providing economic benefits for local residents safeguarding both their agricultural production lands as well as improving aquatic productivity for subsistence and market purposes.

Starting in the mid-1990s, Tien Lang's mangrove area has steadily expanded over time due to the planting activities of the Women's Union. Later, in the late 2000s, the Red Cross began mangrove reforestation activities as well, learning from the experience of the Women's Union. Both organizations receive a 3-4 year contract through the Provincial People's Committee (PPC) to carry out their planting activities and rely on a task force in each commune for management. More recently, as a result of small grants by Mangroves for the Future to Tien Lang's Women's Union, they have started to identify ways of generating income from the mangroves by, for example, producing honey from mangrove flowers, and mangrove syrup from their fruit.

There is generally strong awareness of the role of mangroves for both adaptation and mitigation purposes in the context of climate change. After training by World Vision International (as part of their climate change project) in recent years, the level of people's awareness in Vinh Quang, Tien Hung, and Dong Hung communes on the importance of mangrove forests has been raised and therefore led to significant behavioral changes.

Head of Women's Union in Tien Lang district.
PHOTO: NAYNA JHAVERI

Additionally, the Vietnamese Chamber of Commerce has worked with certain international NGOs on climate change including Save the Children, World Vision, Peacewinds, and JICA (e.g., on hazard mapping) even though they have not been actively involved in mangrove planting. They have worked with small and medium sized businesses to help them prepare for climate change and associated hazards.

Over time, the local communities have improved their success rates in mangrove plantings. After initially relying on seedlings available from government-run nurseries, the Women's Union found that locally raised seedlings had higher success rates. They were able to more affordably and effectively plant seedlings with larger root balls grown in the local mud. As a result, a local nursery has now become a successful business not only supplying all the needs for Tien Lang but also selling seedlings to neighboring areas. The Red Cross also followed this approach and over time has recognized its merit. It is unclear what the planting success rate is, but some have noted that it was about 50 percent due to the destructive effects of tidal force.

Over the years, the momentum for mangrove planting generated by the communes of Tien Lang will continue moving forward. It is clear that there is significant commitment among villagers to protect the mangroves. They recognize the benefits in terms of storm surge protection, sea dike protection, increase in a wide range of aquatic resources, and more recently, opportunities for income generation through non-timber forest product collection and processing. Even so, there are some small cases of mangrove cutting for firewood used in brick production.

According to the Master Plan for 2016 to 2020, the additional area of mangroves to be planted in the municipality is significantly large. Therefore, according to the Haiphong DARD, there is a recognized need to find an appropriate management model that protects existing mangroves. Rather than simply amending existing models, they are interested in developing more effective models that can ensure sustainable management of mangroves in the face of climate change and economic growth. Beyond improving mangrove management at the commune level, there is significant local enthusiasm for establishing inter-commune forms of collaboration on coastal management.

There has been no consistent mangrove management approach applied in all three communes of Vinh Quang, Tien Hung, and Dong Hung. In order to ensure that there is no mangrove tree cutting, each commune has individually identified approaches that were considered adequate for their context. Beyond this, there is simply an ad hoc system of aquatic resource use in mangrove areas. On the perimeter of the forest, individuals have placed poles for fishing nets based on space availability on a first-come-first-serve basis. Villagers go out into the mangrove areas and alluvial flats to collect crabs (of all sizes), shrimp, and other products. There is no explicit planning process that leads to management rules for achieving a prescribed set of goals.

While the ecological outcomes of the existing management approach could not be evaluated through the tenure and governance assessment; there were a number of issues that had led to dissatisfaction or complaints. The communities had not considered management issues beyond regulating tree-cutting such as zoning of mangroves, regulations on aquatic resource utilization, or which sets of users should receive (if at all) any preferential access to resources.

Although Haiphong DARD stated that villagers are able to obtain "green books" that provide a certificate for 10-15 years to villagers for protection of mangrove areas, there was no evidence of them being used in Tien Lang. These certificates permit villagers to harvest specified resources in exchange for protecting specified areas of mangroves based on set criteria. Villagers noted a preference for green books to other options because of the long-term, secure nature of these certificates. The mangrove management approach in each commune is as follows:

In **Vinh Quang**, with the largest mangrove area, seven households have been selected to receive forest protection agreements each covering between 20-60 ha for which they receive a payment of VND200,000 per ha/year. This is an annually renewable agreement. Forest protection agreements are a formally established regulatory tool for protecting mangrove forests that fall within the "protection forests" category. While forest protection agreements provide a level of devolution in management of mangroves, there is some informal evidence that the certificate holders do possess the authority to exclude others from accessing the protected areas for collecting aquatic resources. That form of exclusion has led to conflicts in the village, particularly when holders of the forest protection agreements are wealthier members of the commune.

Tien Hung is the commune with the largest area under some form of industrial style aquaculture production involving outsider private sector companies such as Vietnam America. Some 70 ponds covering 5,000 square meters are involved in this type of production. Mangrove management is assigned to government border guards. Mangroves cover about half of the area outside the seawall. A Forest Development Fund is used to support management by border guards who are part of the Coast Guard service. There are two groups of ten guards who patrol the mangrove forests. They hold considerable power, and their strong form of top-down authority is not necessarily the approach villagers would like to see implemented for effective mangrove management.

In **Dong Hung**, there is a changing situation at work where mangrove management was originally assigned to the community, then transferred to the border guards (or a coastal militia unit), and now the CPC is considering allocating it back to the community. There are 250 ha of mangroves in this area that

protect some two kms of seawall. This commune is still in search of the best modality for mangrove protection.

The challenge ahead is how to develop a participatory mangrove governance system that is able to bring together the range of local stakeholders (aquaculture pond holders, poor to rich farmers, fisherfolk, and varied gleaners) to consider the best ways of managing a constantly changing coastal landscape in terms of ecological, aquatic production, and tenure conditions. Although the awareness of the direct relation between mangrove forest and disaster preparedness is strong among government staff, commune leaders, and the people, it has not been developed in such a way as to address the social and ecological complexities of coastal dynamics.

There are both ecological and social factors and pressures affecting the long-term status of mangroves in the commune area. Since there is plentiful sediment flowing down the river into the Tien Lang coastline, there is tremendous potential for expansion of mangrove areas. It was unclear, however, if the local governance system was considering the overall changing nature of sedimentation and how it would affect mangrove planting (species and extent), the likely expansion of new aquaculture sites, as well as impacts on fishing patterns and clam farming. One Commune chairperson underscored that his vision of the coastline was one of the Netherlands where a system of dikes continues to expand the area of land outwards for agricultural cultivation. He perceived the planting of mangrove forests as a method for the commune to acquire more land. As part of this succession, he envisioned that as mangroves expand for coastal protection, the older mangroves could be cleared for aquaculture or fields. Alternatively, because of soil accretion over time and the expansion of mangroves toward the sea, the areas of mangroves closest to the seawall, which are now approaching 30 years old may no longer be suitable for the species that were initially planted.

It is not clear whether the mangrove establishment process in the area is fully considering the natural ecological succession associated with mangrove growth. In addition to these biophysical/ecological constraints, there are social demands affecting mangroves. While the general public still recalls a shrimp farming project of 200 ha wiping out a decade-old mangroves in tidal Trang Cat of Hai An District in Hai Phong municipality, it is unclear whether the conflicts and complementarities between different forms of land and coastal resource use, and their future patterns, have been identified for the Tien Lang context. Furthermore, the role of the coastal landscape in economic growth and income generation through, for example, the eco-tourism potential of mangrove forests has not been fully explored.

At present, the process of land use planning at the district level simply follows the guidance handed down by the Haiphong government. As such, the local commune leaders and residents have no direct engagement with how land is allocated for aquaculture and other major land uses as well as how these are to be used and managed in an equitable fashion.

In short, Tien Lang has successfully established mangroves and created a minimal system of management in order to ensure mangroves are not cut or damaged. Now the district is entering a new phase where the management approach needs to consider additional objectives beyond simply prohibiting cutting or damaging trees. The next phase is to set up clear and distinct management goals that facilitate multiple uses and ecological needs; develop micro-zoning of mangrove areas; specify the right of access to different aquatic resources by specific groups of stakeholders; formulate a benefit sharing plan; clearly define the management roles of key stakeholders; establish community-oriented patrolling and monitoring; consider long-term ecological pressures; and, create an acceptable grievance mechanism. A co-management model for managing mangroves can mobilize the power of the entire community for managing and developing mangrove forests in a sustainable way. In order to do that, there is a need to provide appropriate incentives to ensure the active participation of the community in the management of protected mangrove forests over the long term.

As a first step towards co-management, establishing a participatory coastal spatial planning process will help develop the baseline understanding of the resource use and tenure patterns within the district's coastal landscape, determine the short-term and long-term coastal planning goals for the landscape in the context of climate change, and establish a level of planning literacy among all residents and relevant government officials/leaders of coastal communes so that they can effectively move forward with zonation, development of forest management operational plans, benefit-sharing plans, monitoring systems, grievance mechanisms, and other management approaches.

KEY POINTS

- Tien Lang district, while experiencing significant economic growth, remains a largely agricultural and fisheries dependent economy. That said, increasing numbers of men and women are engaging in short-term migration for seasonal work in large cities such as Haiphong.
- There are about 810 ha of mangroves along the Tien Lang coastline. The successful efforts of the Women's Union and Red Cross since the mid-1990s has resulted in Tien Lang having the largest mangrove area among all coastal districts of Haiphong. Lessons about how to raise seedlings, plant them, and protect them have resulted in a replanting approach attentive to the specifics of local conditions.
- While the expansion of aquaculture has resulted in mangrove loss, the problems faced by intensive forms of aquaculture has stalled its expansion in favor of extensive or semi-extensive systems of aquaculture that can work in combination with retaining some mangrove stands.
- The focus on mangrove management to date has been on preventing tree cutting and damage. The use of the coastal landscape for harvesting aquatic resources takes place on an ad hoc basis. There has been little consideration of how mangroves can be managed to address multiple needs for ecological protection, subsistence livelihood support, enterprise development, fisheries and sea dike protection.
- Each commune has developed its own approach to mangrove management involving sole reliance on border guards, use of a limited set of forest protection agreements, or transitioning from one type to another due to dissatisfaction and conflict generated by the prevailing approach.
- There is significant interest in both engaging in participatory coastal spatial planning at the commune and inter-commune level, as well as formulating a mangrove co-management governance system that will generate a socially acceptable and inclusive approach to planning and management.

4.0 MARINE/COASTAL SPATIAL PLANNING IN HAIPHONG MUNICIPALITY

"To find an appropriate model for mangrove management is a must for us.
It is much better than just amending existing models."

--Mr. Tran Van Khanh, Vice Chairman, Tien Lang District People's Committee

Haiphong municipality has been actively engaged, for the last decade or more, in establishing an MSP process operating at a macro-level working hand-in-hand with the Social and Economic Development planning process. There is a recognition among MSP proponents that a participatory coastal spatial planning process at the district and commune level can help build a locally relevant system of planning that can also feed into provincial level planning processes. This localized planning process would not only be tasked with addressing the conservation needs of mangrove areas, but also a range of other livelihood uses of the coastal landscape including aquaculture, clam farming, net and boat fishing, tourism, and so on.

MSP is a public process of analyzing and allocating the spatial and temporal distribution of human activities in coastal and marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process (Ehler & Douvere, 2009). MSP is a tool that addresses coastal management challenges advancing the goals of economic development, livelihoods improvement, disaster mitigation and conservation. The process aims to decrease conflicts and engage local communities and relevant stakeholders while identifying critical coastal ecosystem functions and services. MSP is spatially explicit and provides an opportunity for sharing of information among central and local government agencies and communities.

Although MSP has been successfully applied around the globe (mostly in first world settings), the concept has been slowly promoted in Vietnam over the last ten years, particularly in Haiphong municipality and Quang Ninh province. The Ministry of Natural Resources and Environment (MONRE) has the mandate for approving provincial MSPs, while the provincial Department of Natural Resources and Environment (DONRE) takes on the responsibilities of engaging with district and commune level authorities and relevant stakeholders to develop and implement these plans.

Haiphong municipality is one of the twelve economic zones that will receive government investments until 2020 for economic development and coastal forest conservation. Haiphong municipality has been involved in coastal spatial use zoning and mapping efforts jointly with Quang Ninh province since 2007, developing maps for both provinces at 1:250,000 scale, including maps for Cat Ba and Cat Hai areas at 1:100,000 scale (Nguyen et al., 2013). NOAA has been actively engaged in numerous provinces in Vietnam to develop stronger capacity on MSP. In addition, the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) has worked on integrated coastal resource management in Vietnam (such as in Danang city) helping to build up methodologies and processes for sustainable coastal landscape use.

The national master land use plan is created on a five-year cycle and follows the socio-economic development plan of Vietnam with a vision strategy covering ten years. The process of preparing the national five-year master land use plan as well as mandates and responsibilities of different government agencies in Vietnam is well defined by the national law. The National Assembly approves the national five-year land use plan, while MONRE as the central government institution, has the responsibility to create and approve the five-year land use plan promulgating these responsibilities down to the provincial and district level. The CPC at the commune level provides input to the survey led by the district and provincial DONRE team with regards to land use and allocation. The actual mapping activities are carried out by DONRE. According to the central government guidance and regulation, each sector is also responsible for creating a sectoral five-year plan, which needs to fit in with the national five-year master plan.

The current master land use plan for Vietnam covers 2016-2020, and the plan for Haiphong municipality is presently being finalized/approved by MONRE. Once this plan is approved at the central level, each sector (forestry, fishing, aquaculture, etc.) develops plans following the same cycle and attempts to fit their respective sector's plans within the master land use plan. Although the master and sector plans are somehow spatially explicit (broad scale maps) these plans usually contain annual and five year targets against which the actual development is reported. All sectoral plans are developed by the relevant departments at province level. For example, the Forestry Protection Department at Department of Agriculture and Rural Development (DARD) is responsible for the forestry plan, the Aquaculture Department at DARD is responsible for the aquaculture spatial plan, the Department of Sea and Islands at MONRE is responsible for preparing the marine spatial plan.

The master land use plan is usually consulted with district and commune authorities before being approved at the province level. Although the responsibilities of preparing the sectoral plans fall within the respective provincial departments, the information on the current use and condition of the land is obtained from the district and commune level. These plans are largely focused on productivity goals within each given sector as opposed to reconciling uses and supporting sustainable management of landscapes.

Annual changes on the land use and condition are monitored and recorded at the commune level in a registry notebook, not in a spatial format. This information is transferred to the provincial department(s). For example, the Aquaculture Spatial Unit under DARD in Haiphong city is responsible for conducting surveys on aquaculture production, collecting samples of soil and water parameters to determine the environmental parameters suitable for different aquaculture production. These surveys are performed every year and the information is recorded in files and sent to the Aquaculture Economic and Planning Institute, which is under the supervision of the Ministry of Agriculture and Rural Development (MARD), where the information is used for planning and management purposes.

In terms of the scale of maps created, the provincial DARD/Aquaculture Department has a map at scale of 1:20,000, sufficient for planning and monitoring purposes, but not sufficiently detailed for district or commune level aquaculture production management. The Aquaculture Department noted that for better management in the aquaculture sector, the province needs to focus on detailed (micro-scale) aquaculture mapping at the district leel. The Mekong region has been using such detailed/ micro mapping since its aquaculture production is significantly export-oriented, but in the Red River Delta this approach is a fairly new. So far, there is neither sufficient budget nor capacity to carry this out. For example, 15,000 households along the coast of Haiphong municipality have aquaculture licenses, but only ten have received VIETGAP certificates (meeting good agricultural practice standards). The municipality has identified that such an effort would cost approximately VND 500 Million.

The Department of Sea and Islands at DONRE is responsible for marine spatial planning at the province level. Although Haiphong municipality has been involved in coastal spatial zoning and mapping efforts

jointly with Quang Ninh province since 2007 and a series of maps defining the natural elements, coastal ecosystem, current situation of coastal use and scenarios were created, more detailed and current maps for spatial and coastal planning purposes are needed. The department has prepared a proposal for developing a MSP for Haiphong municipality up to 2020, with a vision to 2030, which has received city government approval and currently is seeking funds for its implementation.[7]

The fact that the coastal landscape is in a state of dynamic change in Haiphong, with new land becoming available every year due to the alluvial sediments brought from the rivers, presents significant challenges in coastal management and planning. The new land is not included in the current five-year master land use plan and in Tien Lang district there is no organization responsible for authorizing new land rights to users, thus presenting conflict over new lands. In Tien Lang district, there are 12 households that occupy an area of 300 ha of new land for clam farming; as a result, only a small number of people benefit from the resources of the new land.

The geospatial capacity is different across the province, district, and commune levels as well as across departments at the same level of governance. The Division of Natural Resources Management at DONRE is in charge of mapping the land in the master land use planning map and has excellent geospatial capacity in terms of human resources, hardware, and software (i.e. MicroStation, MapInfo, AutoCAD). However, this does not flow down to the District DONRE. In DARD, the Forest Protection Division responsible for forest management has geospatial capacity, while other divisions have limited geospatial capacity. The Provincial DARD/Aquaculture Spatial Unit is using MapSource software (Garmin Corporation software) to transfer GPS survey points from the GPS unit and display them in Google Earth. The Unit does not have GIS software for mapping and analysis purposes. Geospatial capacity is even weaker at the district and commune level, where the land use maps are usually received only in paper, not in digital format. There are thus important cross training efforts that could improve the use of geospatial data among the DARD and DONRE offices, particularly at the District level.

KEY POINTS

- Haiphong municipality has been actively engaged in establishing a MSP process operating at a macro-level working hand-in-hand with the Social and Economic Development planning process for the last ten years or more. Even so, the process relies on a top-down approach. The maps developed for this purpose are broad-scale maps. DONRE has prepared a proposal for MSP development for Haiphong municipality up to 2020, with a vision to 2030 (awaiting funds).
- There is a recognized need among MSP proponents that a participatory coastal spatial planning process at the district and commune level can help build a locally relevant system of planning that can also feed into provincial level planning processes. This localized planning process would not only be tasked with addressing the management needs of mangrove areas, but also a range of other uses of the coastal landscape including aquaculture, clam farming, net and boat fishing, and tourism. This is particularly important in a dynamic coastal context with new land being created, and new sets of resource users entering the landscape. The current and future level of conflict and complementarity between the different types of users needs to be identified and resolved.
- There remains limited geospatial capacity among the relevant units of DONRE and DARD for mapping and geospatial analysis.

[7] According to the proposal, the budget plan is around VD3.9 billion.

5.0 RECOMMENDATIONS

The outcomes of this assessment identified a number of opportunities for piloting that could help to inform longer-term implementation of the Coastal Forest decree, and other coastal forest investments, such as the upcoming World Bank and KfW investments. In particular, there are opportunities to test methodologies on participatory mapping, engage in inter-commune planning and management activities, raise awareness of coastal forest management issues, and engage in training across government agencies working in coastal resource management.

A. Conduct detailed coastal resource assessment, mapping, and participatory planning of land and coastal resources at the district level.

The marine spatial and sectoral planning maps created at the province level lack the details needed for managing the mangrove forest and coastal resources at the district level. With the availability of new land every year and competition over it from different sectors, there is a need for detailed resource assessment and micro-mapping of coastal resources and users for management and planning purposes. At the provincial level, the aquaculture spatial planning division at DARD is interested in collaborating with Tien Lang district to map the aquaculture resources inside and outside the sea wall to be able to better manage aquaculture production and achieve the production targets set in the socio-economic development plan. The provincial aquaculture maps are at a scale of 1:20,000.

At the commune level, the three communes expressed interest in a joint coastal resources planning process, which would allow them to identify lessons learned from different mangrove forest management approaches and to be able to manage the existing and new land in a more sustainable way. A participatory coastal resource assessment can support the development of a coastal profile for each commune that helps identify existing key resource conditions, resource users, and tenure and management arrangements. This can be followed up with a mapping activity that may bring divisions and offices from various levels of governance closer and develop inter-government level coordination and collaboration through the collection and joint analysis of geospatial data on coastal resources (e.g. aquaculture fields, clam farms, mangrove areas etc.). A more detailed assessment on the needs, mapping technology, capacity to carry out mapping activity, mapping standards/procedures and data management solutions is needed to assure sustainability of such activity and the ability to institutionalize it across all relevant levels of government.

B. Build geospatial capacity at all levels for collection and use of data.

The assessment identified that geospatial data, and in some cases simple digital maps, are not available to provincial, district, and commune authorities. Therefore, there are opportunities to build the capacity of relevant offices at the provincial, district, and commune levels based on their geospatial information needs. A focused assessment is needed to identify the particular geospatial needs at each government level. This will include consideration of how technical capacity can be built in regarding the role and responsibilities of departments and divisions across all levels of government in the management of the mangrove forest and coastal resources. The training approach should be designed with participation of all levels of government in mind and should provide incentives for the higher level government (i.e. national and provincial departments and divisions) to continue provision of trainings and support in geospatial data collection and analysis (if identified) to lower level government (i.e. district and commune divisions and extension offices). Strengthening the capacity at province level and designing a mechanism of transferring geospatial knowledge and skills to the lower level government, following the "training of the trainers" approach, will provide a sustainable solution and lasting impact after the end of the project.

C. Develop an effective mangrove co-management approach.

In order to expand the limited system of commune-level mangrove management at present, a mangrove co-management approach can be designed that involves the participation of key sets of stakeholders at the village, commune, and district levels. It would bring together the government, local leaders, mass organizations, and community members to consider key aspects of access, use, management, exclusion, benefit-sharing, and conflict management. A governance system that enabled broad-based participation in decision-making would ensure that any type of conflictual or complementary uses of mangrove forests could be explicitly recognized in the process of developing forest operational plans for sustainable mangrove management. This approach would build off of the other models that are currently operating in Vietnam and apply learning from regional models. Scalability and replicability, in terms of costs, technical skills, and time, are of crucial importance to any approach, as these have been common criticisms of the models that have been tested to date.

D. Increase participation of women and marginalized households in planning activities and data collection.

Based on the village focus groups' discussion in the three communes, the involvement of women and marginalized households in planning and management activities is quite limited. Women are responsible for mangrove forest restoration, aquaculture and agriculture production, while men are mainly occupied in fishing activities. Women's involvement in the decision-making process regarding mangrove management is low. Since the Women's Union is represented at the communes, district, and PPC, there is an opportunity to work through the Women's Union to increase the participation of women and marginalized household in decision making regarding, the use of new land, and/or data collection because they are the ones who know the landscape and its potential for production inside and outside the sea walls.

APPENDIX 1

The following key stakeholders were interviewed or consulted during the Haiphong field trip component of the assessment process (names provided where appropriate):

a. Mr. Hung of MARD/Hanoi
b. Mr. Khanh, Vice Chairman of Tien Lang District People's Committee
c. Haiphong Department of Planning and Finance
d. Haiphong DARD Dyke Management, Flood Control, and Storm Control Division
e. Haiphong DARD Forest Protection Unit
f. Haiphong DARD Forest Development
g. Haiphong DARD Forest Breeding Center
h. Haiphong DARD Crop Production Unit
i. Haiphong DARD Aquaculture Office
j. Haiphong DARD Fisheries Division
k. Haiphong DARD Center for Fishery and Agriculture Extension
l. Haiphong Cat Ba Nature Reserve
m. Haiphong DONRE Marine Spatial Planning Office
n. Haiphong office of Vietnam Red Cross
o. Haiphong Women's Union
p. Tien Lang, Agriculture Unit of District People's Committee
q. Tien Lang Women's Union
r. Tien Lang Vietnamese Red Cross
s. Tien Lang Farmer's Association
t. Tien Lang Veteran's Association
u. Tien Lang Fatherland Fund
v. Tien Hung Commune People's Committee
w. Dong Hung Commune People's Committee
x. Vinh Quang Commune People's Committee
y. Duyen Hai village focus group meeting in Vinh Quang commune
z. Thuy Hung village focus group meeting in Dong Hung commune

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