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WHERE LAND MEETS THE SEA

A GLOBAL REVIEW OF THE GOVERNANCE
AND TENURE DIMENSIONS OF COASTAL
MANGROVE FORESTS

DECEMBER 2016

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Cover photo by Klaus Schmitt/GIZ. Mangroves along Vietnam's coast – the first line of defence for houses and shrimp ponds.

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ACRONYMS & ABBREVIATIONS

BFAR	Bureau of Fisheries and Aquatic Resources (Philippines)
BFD	Bangladesh Forest Department
CBEMR	Community-Based Ecological Mangrove Restoration
CBMM	Community Based Mangrove Management
CIFOR	Center for International Forestry Research
CONABIO	National Commission for Knowledge and Use of Biodiversity (Mexico)
CPC	Commune People's Committee (Vietnam)
DENR	Department of Environment and Natural Resources (Philippines)
EMR	Ecological Mangrove Restoration
FAO	Food and Agriculture Organization
FLMA	Forest Land Management Agreement (Philippines)
GIZ	German International Agency for Technical Cooperation
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
MARD	Ministry of Agriculture and Rural Development (Vietnam)
MFF	Mangroves for the Future
MONRE	Ministry of Natural Resources and Environment (Vietnam)
NGO	Nongovernmental Organization
NTFP	Non-Timber Forest Product
SEMARNAT	Ministry of Environment and Natural Resources (Mexico)
TGCC	Tenure and Global Climate Change Program
USAID	United States Agency for International Development

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EXECUTIVE SUMMARY



Clam collection in sandbank beyond mangroves. Credit: Nguyen Tan Phong/GIZ

This assessment provides a synoptic analysis of the legal and governance frameworks that relate to the use and management of mangrove forests globally. It highlights the range of challenges typically encountered in the governance and tenure dimensions of mangrove forest management. This assessment forms part of a broader study that includes national-level assessments in Indonesia and Tanzania. It was carried out under the USAID-funded Tenure and Global Climate Change Program.

Most of the research on mangroves has traditionally focused on the biophysical aspects of mangrove management, such as mangrove tree species

differentiation and relative growth rates; factors influencing restoration and rehabilitation; and physical effects on coastal erosion and biodiversity. Increasingly, new ecological studies focus on the role of mangroves in climate mitigation and adaptation. In contrast, there is a dearth of information on the social dimensions of mangrove management; and while there is a small but steadily growing amount of literature on community-based management, a substantial gap in governance work is clearly evident.

Primary findings from this assessment show that authority over mangrove forest management is

overwhelmingly vested in state institutions and that mangrove protection is a central objective. Given the ambiguous role of mangroves situated between the land and sea, the configuration of state authority for mangrove management is quite complex. Most commonly, this authority falls on a single line agency—usually the forestry agency, but occasionally the environmental or wildlife agency. Within the forest sector, however, mangroves normally occupy a relatively marginal role with few policies or regulations tailored to the unique needs of mangrove forests. In some countries, there is fragmentation of responsibilities across two or more agencies such as forests, fisheries, environment, and wildlife. This contributes to a high level of segmentation and jurisdictional ambiguity. Frameworks and mechanisms for enabling multi-sectoral coordination across agencies and governance levels are uncommon, and where they exist, they are difficult to put into practice.

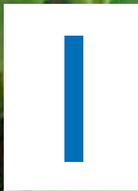
In general, laws and policies have not been crafted for the specific management requirements of mangroves. Instead, mangroves are regulated under legal frameworks intended for forests, environment, water, land, or marine fisheries. In practice, regulation and management are even more complex than the legal and policy frameworks governing mangroves. Government-led mangrove protection efforts, permitting no substantive use of its natural resources by local communities, face major challenges: mainly that enforcement is constrained by inadequate personnel, capacities, and budgets.

While mangrove forests largely remain under the jurisdictional authority of the government, there is increasing recognition that devolving tenure rights to the local communities (including indigenous peoples) who use and manage resources in mangrove forests offers important benefits for the government, local residents, and the forest ecology. There is a nascent mangrove tenure transition taking place in a range of countries through which devolution to a range of local governance

bodies is either being promoted by the government itself, or taking place in a de facto fashion by communities creatively forging their own regulations to manage their forests in collaboration with the local government and other stakeholders such as universities.

The lack of recognition of customary practices of mangrove use and management is prevalent. This undermines traditional forms of livelihoods which often revolve around a sophisticated understanding of mangrove ecologies. That said, there is increasing experimentation with community-based approaches. Community concessions and extractive reserves that accord full ownership or longer-term rights appear to be more effective in mangrove conservation. Joint programs involving communities and external institutions, such as nongovernmental organizations (NGOs) or research organizations, permit capacity building and utilization of new technologies, and generate better outcomes in terms of mangrove rehabilitation and management.

In contrast, mangroves tend to deteriorate where customary rights are not respected or recognized, are actively undermined, or where community institutions are subject to government interference. Within this devolution of tenure rights to local communities, gender equity remains a missing element in mangrove conservation and management. The few available studies have shown that there is gender differentiation in the type of products harvested, the economic value of products harvested, and the locations where harvesting is conducted. The role of women in mangrove utilization and management is seldom recognized, and their representation in decision-making bodies is minimal. However, community-based rehabilitation or income generation programs are increasingly integrating gender-based considerations and some are even focused solely on empowering women. It is clear that more research is needed to examine the impacts and effectiveness of different types of governance approaches associated with specific types of tenure arrangements.



INTRODUCTION

A man catching fish inside mangroves in Au Tho B village, Soc Trang Vietnam.
Credit: Richard Lloyd/GIZ



Mangrove forests play a critical role in multiple ways within coastal landscapes, particularly where communities depend on the richness of the aquatic resources their habitat supports. In particular, mangroves provide an important bulkhead against climate change. In the wake of major disasters such as the 2004 tsunami in the Indian Ocean, it has become clear that mangroves have played a critical role as a “bioshield” that buffers coastal communities, infrastructure, and ecosystems from devastating damage. In contrast to terrestrial forests, the significant potential of mangroves to mitigate climate change has brought further attention to their importance within the global sustainability agenda. As a result, many countries have started to develop new policies and regulatory frameworks specifically targeted to the unique needs of mangrove forest conservation, protection, and development. Global attention on mangroves has therefore been considerably elevated in recent years.

Over the period 1980-2000, nearly 20 percent of mangrove forests have been lost (FAO, 2007). In attempting to remedy this problem, the primary form of intervention has been to plant and identify ways to convert specific types of land use (from aquaculture, for example) back to mangroves. Given their unique and resilient characteristics, which enable them to create a complex architecture of protection, much of the focus

has been on understanding their biophysical dimensions so that restoration and rehabilitation can be done in an ecologically sound way (see Box 1). Beyond the issue of species identification, scientific activity has also sought to understand the specific types of conditions to plant and grow mangroves successfully. Concentrating solely on such a biophysical or ecological orientation, while necessary, has sidetracked focus from the important question of how to develop a comprehensive approach to mangrove management that includes consideration of governance and tenure arrangements. Attending to governance and tenure dimensions can provide the institutional framework through which a range of objectives can be met: reducing the drivers behind mangrove deforestation and degradation; supporting rehabilitation and afforestation; ensuring programming to meet multiple objectives, including climate change mitigation and adaptation; and engaging in long-term planning to support healthy mangrove ecosystems. There is clearly a need to bring the biophysical or ecological focus within the broader frame of identifying appropriate governance approaches.

Since numerous governments have recently set into motion new policies to protect and expand mangrove forests in the face of climate change, it is vital to assess the current state of governance and tenure within mangrove forests. This report provides such an appraisal

Box 1. Mangroves at the interface between the land and sea

Mangroves are trees and shrubs juxtaposed between land and sea in the world’s subtropics and tropics, with the largest percentage of mangroves occurring between 5° N and 5° S latitude (Alongi, 2002; Giri et al., 2011). Mangrove forest ecosystems are highly productive, rich in biodiversity, and adapted to the harsh and variable interface between the land and sea. In total, 73 mangrove species and hybrids are considered true mangroves (ITTO, 2012). Mangrove forest structure and species composition vary considerably in each continent (FAO, 2007).

Mangroves fulfill important socioeconomic and environmental functions, including the provision of a large variety of wood and non-timber forest products (NTFPs); coastal protection against the effects of wind, waves, and water currents; conservation of biological diversity, including a number of endangered mammals, reptiles, amphibians, and birds; protection of coral reefs and sea-grass beds; protection of shipping lanes against siltation; and provision of habitat, spawning grounds, and nutrients for a variety of fish and shellfish, including many commercial species (FAO, 2007).

Satellite imagery captured between 1999 and 2003 estimates the total mangrove forest area of the world at 152,360 km², distributed within 123 countries and territories (ITTO, 2012). According to the *World Atlas of Mangroves* (Spalding, Kainuma & Collins, 2010), the five countries with the largest mangrove areas are Indonesia, which has 21 percent of the global total; Brazil, with nine percent; Australia, with seven percent; and Mexico and Nigeria, with five percent each. Forty-two percent of mangroves are found in Asia, followed by Africa (20 percent), North and Central America (15 percent), Oceania (12 percent), and South America (11 percent). About 75 percent of all mangrove forests are found in just 15 countries (Giri et al., 2011).

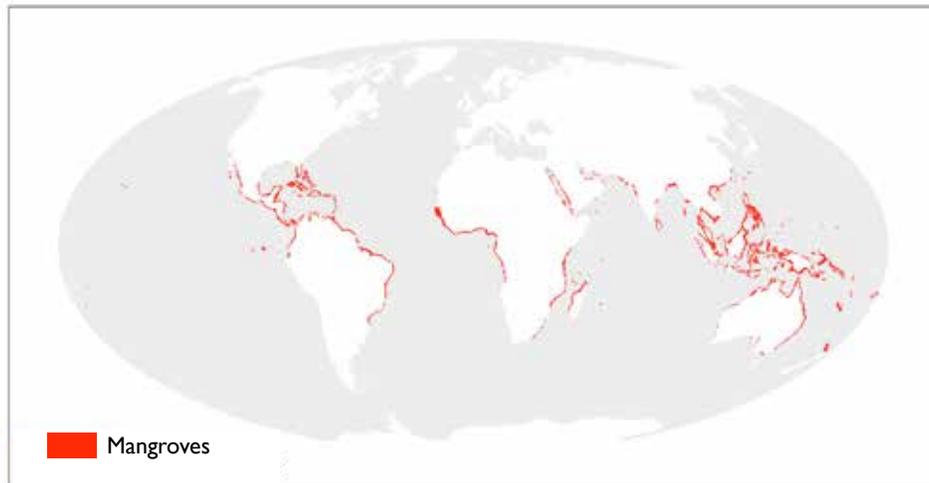


Figure 1. Global map of mangrove forests

Source: Spalding, Kainuma & Collins, 2010

of how a wide range of countries approach mangrove management across Africa, Asia, and Latin America. The purpose of this report is twofold: provide a general picture of the legal and governance frameworks that relate to the use and management of mangrove forests globally; and highlight challenges typically encountered in the governance and tenure dimensions of mangrove forest management at both the legal and policy levels, as well as the level of local practices within coastal landscapes. This review is part of a study that includes national-level reports on Indonesia and Tanzania. It was carried out under the USAID-funded Tenure and Global Climate Change Program.

1.1 THE CHALLENGE: TRANSFORMING THE DRIVERS OF DEFORESTATION AND DEGRADATION OF MANGROVES

The management of mangroves requires careful attention to the multidimensional benefits they provide, both ecologically and socially. Within the tropics, mangrove forests occupy the intertidal zone between the land and sea, creating both highly productive zones and a complex forest architecture that contribute to a valuable coastal bioshield for inland settlements, infrastructure, and agricultural production (Box 2). Moreover, while they possess significant resilience in the face of constant environmental changes, they are also vulnerable to a range of changes in their ecological context. In the context of climate change, it is evident that mangrove

forests can provide significant support for both adapting to sea level rise, salinity changes, intensified tidal surges, cyclones, and changing weather patterns (Ellison, 2012; McLeod & Salm, 2006), as well as mitigating increases in atmospheric carbon. Recent studies of carbon sequestration levels within mangrove forests indicate they possess an incredible capacity to store carbon, about 10 times greater than upland tropical forests (Donato et al., 2011; Hutchison, Manica, Swetnam, Balmford & Spalding, 2014). The importance of mangroves in carbon accounting has consequently come into clearer focus. Given the magnitude of their importance, research is being carried out to specify more precisely how climate change is affecting particular types of mangroves on a region-by-region basis (Ward, Friess, Day & Mackenzie, 2016).

Yet, throughout history, mangroves were largely seen as wastelands—unproductive and unhealthy areas (Cormier-Salem, 2006; FAO, 2007) heavily deforested to meet fuel or timber needs, or converted to aquaculture ponds that provided high-value marketable products. As a result, for many decades, the world's mangroves have been under serious threat. The major causes of decline in mangrove forests have been anthropogenic and include overextraction and deforestation; infilling, drainage, and conversion to aquaculture or agriculture (e.g., paddy rice); pollution from agricultural, urban, and industrial runoff; oil spills; and poorly managed dredging and coastal development (Van Lavieren et al., 2012).

According to the United Nation's Food and Agriculture Organization (FAO), there was a dramatic loss in

mangroves between 1980 and 2000 in nearly all the regions of the world (except Australasia), with estimates of greater than 20 percent loss in East Asia, Pacific Islands, Southeast Asia, and North and Central America (FAO, 2007¹). During the 1980s, Indonesia, Mexico, Pakistan, Papua New Guinea, and Panama had the highest losses of mangroves with a total of one million hectares lost (FAO, 2007). The annual rate of forest loss between 2000 and 2005 was slightly reduced at 0.66 percent (ITTO, 2012). Box 2 below illustrates trends in mangrove losses in eight selected countries in Africa, Asia, and Latin America. Mangrove losses have been primarily associated with economic development, especially conversion to aquaculture in Asia and Latin America. Within Southeast Asia, where the majority of the world's mangroves are found, new studies indicate that from 2000 to 2010, mangrove forests were lost at an average annual rate of 0.18 percent, indicating a lower level of deforestation than earlier estimates (Richards & Friess, 2016). Some 30 percent of 100,000 hectares lost resulted from conversion to aquaculture, with other major drivers including rapid expansion of rice production in Burma, and sustained conversion to oil palm plantations in Indonesia and Malaysia. In African oil-producing countries, such as Nigeria and Mozambique, pollution from the industrial production of oil and gas is a major factor in mangrove degradation and loss.

1.2 FOCUS ON MANGROVE REHABILITATION AND RESTORATION

As interest in the resilient and protective role of mangroves in the face of disasters such as tsunamis and intense storms grows, a groundswell of concern has emerged within governments and communities for ensuring that mangrove forests are planted, rehabilitated, and managed in effective ways. With climate change developing apace, the additional mitigation and adaptation facets of mangrove benefits are coming into clear view. As such, the rehabilitation, afforestation, and management of mangrove habitats is now recognized to be a cost-effective way of generating multiple co-benefit streams at the local to global scales.

Given this unfolding scenario, it is notable that there is a dearth of research on how mangrove forests are governed and the role of enabling conditions, such as tenure arrangements, to support mangrove management that meets multiple goals in the context of climate change. Rather, much of the attention has been given to the biophysical or ecological dimensions of mangroves, initially to support rehabilitation and restoration, and more recently, to understand the carbon sequestration capacity of

Box 2. Mangrove deforestation trends in select countries

- Bangladesh: decreased by 215 ha from 1982 to 2005 (FAO, 2007).
- Philippines: from 1918 to 2011, lost about 250,000 of 500,000 ha (Long & Giri, 2011).
- Vietnam: heavy losses due to use of defoliants in the war; and since the end of the war, 155,290 ha lost from 1980 to 2007 primarily to aquaculture (Marchand, 2008).
- Mozambique: 60,451 ha lost between 1997 and 2005 due to population pressure and oil spills (FAO, 2007).
- Nigeria: 21,342 ha lost between 1986 and 2003 due to urbanization, dredging activities, and pollution from the oil and gas industries (Adedeji, Ibeh, & Oyebanji, 2012).
- Senegal: about 45,000 ha lost since the 1970s due to droughts and overexploitation (Livelihoods, 2016).
- Brazil: from 1980 to 2005, 50,000 ha were lost, although after 2000, there has been little deforestation (FAO, 2007).
- Honduras: from 1985 to 2013, about 9,278 ha were lost due to shrimp farming (Chen et al., 2013).
- Mexico: a national inventory of mangroves carried out in the late 2000s indicated there are currently 770,057 ha (CONABIO, 2009); since 1980, about 10,000 to 14,000 ha have been lost annually to aquaculture, agriculture, and urban and tourist development (FAO, 2007).

¹ There are initiatives currently underway to update the data on mangrove loss.

mangroves. Most studies on mangrove rehabilitation and restoration started in the early 2000s, and picked up after the 2004 tsunami in the Indian Ocean that affected 13 Asian countries. This literature tends to focus on such ecological topics as mangrove tree species differentiation and relative growth rates, biophysical factors influencing restoration/rehabilitation, and physical effects on coastal erosion and biodiversity (Ahmad, 2012; Brown, 2016; Kairo, Dahdouh-Guebas, Bosire & Koedam, 2001; Kanagaratnam, Adhuri, Dey & Schwartz, 2006; Katon, Pomeroy, Garces & Ring, 2000; Maliao & Polohan, 2008; Marchand, 2008; Powell, Osbeck & Sinh, 2007; Primavera & Esteban, 2008; Primavera, Rollon & Samson, 2011; Quarto, 2005).

This rich and diverse set of biophysical studies has provided a strong empirical foundation for the actual implementation of mangrove rehabilitation programs, mostly in Asia. These studies have been initiated by a wide range of international and national NGOs, such as the Mangrove Action Project, International Union for Conservation of Nature's (IUCN) Mangroves for the Future (MFF) initiative (Box 3), Seacology, and Oceanium; and by a range of donor agencies and academic organizations, such as the Zoological Society of London, in partnership with national governments and local communities. Among these, MFF is a unique partner-led initiative, established after the 2004 tsunami, to promote investment in coastal ecosystem conservation for sustainable development in Asia.

Box 3. Collaborative governance: Mangroves for the Future (MFF)

Co-chaired by IUCN and the United Nations Development Program, MFF provides a platform for collaboration among the many different agencies, sectors, and countries that are addressing challenges to coastal ecosystem and livelihood issues. The goal is to promote an integrated ocean-wide approach to coastal management and build the resilience of ecosystem-dependent coastal communities. MFF builds on a history of coastal management interventions before and after the 2004 Indian Ocean tsunami. It initially focused on the countries most affected by the tsunami: India, Indonesia, Maldives, Seychelles, Sri Lanka, and Thailand. More recently, it has expanded to include Bangladesh, Burma, Cambodia, Pakistan, and Vietnam (MFF, 2011).

At this juncture, it is recognized that many mangrove planting projects do not have good success rates for a range of reasons: simplified approach involving growing mangroves in intertidal mud flats (often below mean sea level) where mangroves do not grow; land tenure issues in areas where mangroves can grow prevent their being planted in the correct environment; and poor understanding of the ecological context within which mangroves flourish (Brown, 2016). Over time, the rehabilitation, restoration, and afforestation programs² have attempted to improve the success rates of mangrove planting moving toward the development of ecological mangrove restoration (EMR). EMR is an approach to coastland wetland rehabilitation or restoration that aims to facilitate natural regeneration to encourage self-sustaining wetland ecosystems. It is often reliant on community-based approaches. More recently, there has been a new type of biophysical study focused on the role of mangroves in carbon stocks and cycling for the mitigation of climate change. Most of these studies have been conducted since 2010 (Alongi & Mukhopadhyay, 2015; Liu et al., 2014; Murdiyoso et al., 2015; Stringer, Trettin, Zarnock & Tang, 2015; Wang, Guan, Peart, Chen, & Peng, 2013).

In the process of finding effective ways of restoring mangroves through a biophysically oriented approach, much less attention has been directed at understanding how the governance and tenure dimensions of mangrove management affect the likelihood of successful restoration as well as long-term management of mangroves. In particular, there is a need for better understanding what types of governance institutions; rules on mangrove tenure, use, and management; and collaborative relationships with the government and other key stakeholders (such as NGOs or universities) can set up the conditions to produce positive results related to mangrove expansion and care. As the role of mangroves in climate change mitigation and adaptation comes into global focus, there is a small but steadily growing amount of literature on case studies of community-based management. Nevertheless, there has been no systematic review of approaches to mangrove governance (including its tenure dimensions) at the national or local levels to identify gaps and challenges that need to be addressed.

Given the location of mangroves at the interface between the land and sea, the micro-complexities of land and resource tenure practices (taking into consideration gender and social inclusion issues) over the course of an annual cycle need to be carefully negotiated. A sturdy

2 Rehabilitation and restoration aims to bring back the original mangrove forests whereas afforestation involves planting in areas where mangroves may not necessarily have existed.

enabling environment will provide incentives to local government staff, community leaders, NGOs, and coastal residents to invest their time and effort in managing mangrove ecologies. Good governance and secure tenure are also stepping stones to creating participatory platforms for landscape-level coastal spatial planning that bring together an ecosystem-based approach across numerous administrative jurisdictions. In addition, interactions of actors across different governance levels is an important issue that needs to be addressed within the legal and policy systems set up for mangrove management. Altogether, mangrove governance structures at multiple scales influence how mangroves are managed and determine whether management efforts have the potential for achieving sustainability, as well as human wellbeing and livelihood outcomes.

1.3 MANGROVES GOVERNANCE AND TENURE ARRANGEMENTS

This review aims to provide an overview of the status of mangrove governance globally. In particular, it is concerned with identifying the variety of institutional structures, formal and informal, that enable mangrove governance across different settings, as well as the governance challenges commonly encountered. The review also examines the institutions and patterns of local management and use, including tenure rights and gender differentiation, and how these local institutions might influence mangrove management and rehabilitation efforts.

The review focuses on published and gray literature in English from 2000 to 2016 and uses online databases such as Science Direct, Google Scholar, and Web of Science. Searches were also conducted in databases of specialized agencies such as the FAO and IUCN, and mangroves-focused websites, using the keywords “mangrove and tenure,” “mangrove and governance,” “mangrove and management,” “mangrove and gender,” “mangrove and climate change,” “mangrove and restoration,” and “mangrove and rehabilitation.” After reviewing the abstracts of retrieved articles and determining their relevance, selected articles were reviewed for insights and relevance to the respective themes. A total of 111 articles, covering studies from Asia, Africa, North and Central America, Oceania, and South America, were reviewed, as tabulated in Annex 1.

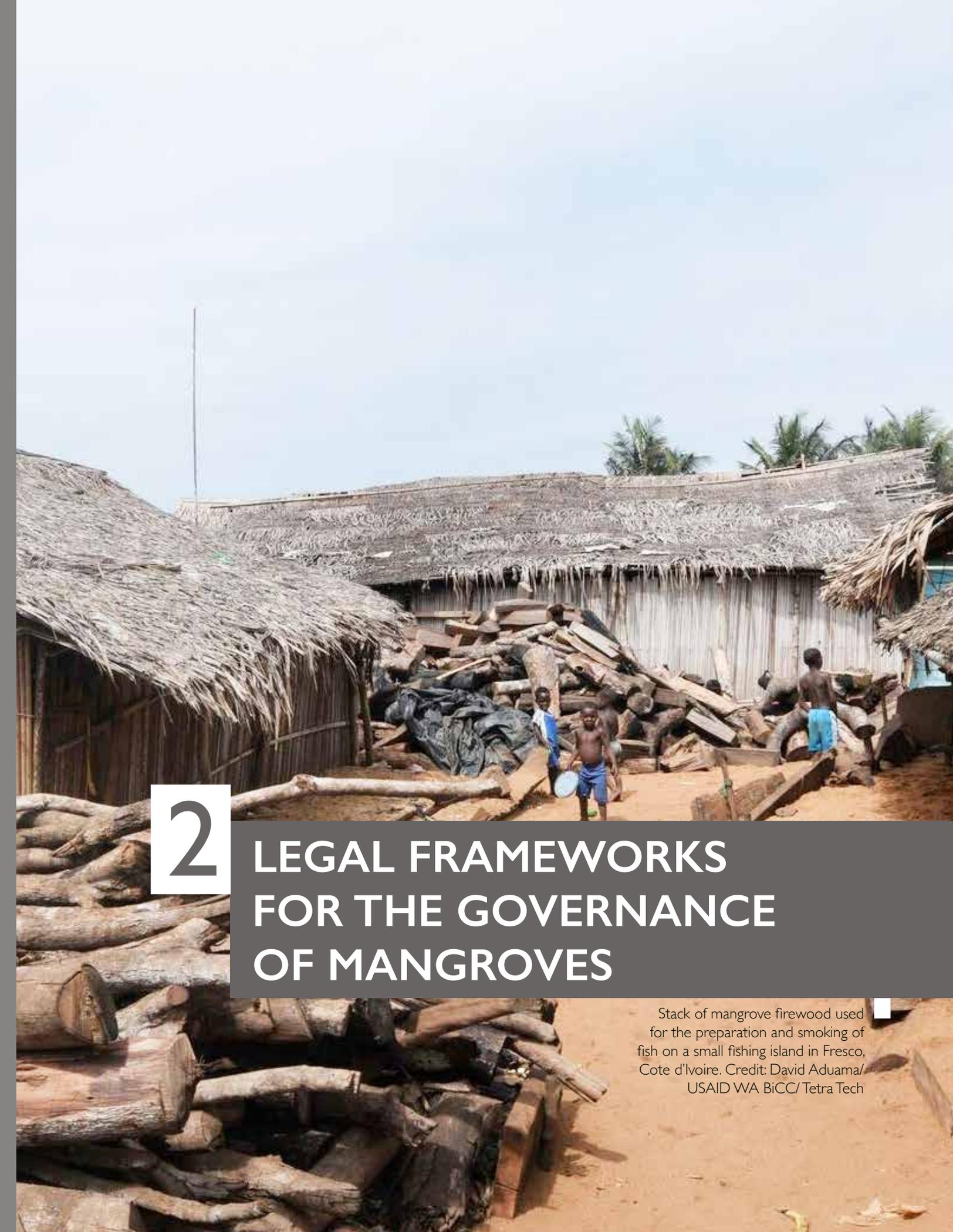
The policy and legal architecture for mangrove forest governance across the globe is diverse. In most of the countries represented in the review, the architecture does not reflect the unique positioning of mangroves

on both the land and seascapes, but instead applies the framework established for terrestrial forests to mangrove governance. In a smaller number of countries, the authority for mangrove governance is fragmented across forestry and other land-based agencies as well as marine and fisheries agencies. Whether under the sole responsibility of the forestry agency or multiple agencies, governance in practice is constrained by lack of enforcement and implementation of established mandates, weak cross-sectoral coordination, and sometimes conflict and competition among agencies. Although state-led protection and regulation appear to be the main objective of management across most settings, there is a transition toward increased community participation. These often involve co-management arrangements that grant communities management rights and responsibility for rehabilitation but retain ownership rights with the government.

A variety of small and large conservation efforts around the world are working to slow the rate of mangrove loss. These efforts have included legislation seeking to regulate use, such as in Colombia where licenses are required for exploitation; enhanced protection and conservation, as in Brazil where some mangrove forests are designated as areas of permanent preservation; and expanded restoration and rehabilitation through community-based initiatives, such as in the Philippines, Thailand, and Indonesia (Spalding, Kainuma & Collins, 2010; Van Lavieren et al., 2012).

The FAO (2007) notes that even with the existence of protected areas and conservation policies, effective implementation and enforcement have remained a challenge, particularly in places with limited resources and capacity, and with high pressures for conversion to other land uses. A range of factors such as poor enforcement of regulations; corruption; jurisdictional ambiguities; overlapping mandates of different management authorities; and strong pressure for conversion of mangrove forests to aquaculture, agriculture, and urban development have provided substantial challenges to conservation and sustainable management efforts (Lugo, Medina & McGinley, 2014).

This report is divided into three main sections. Chapter 2 presents the legal and institutional frameworks for mangrove management. Chapter 3 sets out key issues in the local practice of mangrove governance; this includes issues in the implementation of legal frameworks and policies, local tenure rules and institutions, and gender differentiation in use and management. Chapter 4 covers the main lessons learned for mangrove governance based on this review. It draws out recommendations regarding governance arrangements for promoting sustainable management and conservation of mangrove forests. Annex 1 classifies the geographical focus of the articles reviewed for this report.



2

LEGAL FRAMEWORKS FOR THE GOVERNANCE OF MANGROVES

Stack of mangrove firewood used for the preparation and smoking of fish on a small fishing island in Fresco, Cote d'Ivoire. Credit: David Aduama/ USAID WA BiCC/Tetra Tech

This section examines the types of legal frameworks and policy approaches utilized for protecting and managing mangroves. It focuses on an analysis of the types of governance and tenure arrangements promoted within legal frameworks, including the range of stakeholders with statutory authority for managing mangroves.

Globally, the authority for mangrove conservation and management is overwhelmingly vested in state institutions, most often within the forestry ministry but sometimes in the environmental ministry. Authority can also be split between multiple national agencies to include wildlife, fisheries, coastal, or planning sectors. The specific configuration of authority among agencies is diverse. Indeed, no pattern can be discerned between the type of national legal and policy approach to mangrove governance and management, and the level of importance given to mangroves for coastal protection within any given country. This fragmentation of authority across agencies is unsurprising given the ambiguous nature of mangroves between land and sea. In some countries, the legal framework explicitly provides for a mechanism that encourages coordination across multiple agencies and stakeholders. Countries such as India or Fiji established such mechanisms early on, and similar efforts are now underway in Indonesia's National Strategy on Mangrove Ecosystem Management, which was authorized by Presidential Regulation 73 of 2012, as well as Vietnam's recently approved Coastal Forests decree of 2016.

With the exception of Mexico, most countries do not have specific laws for mangroves. As such, management approaches are defined within the law administered by the sectoral agency that mangrove management largely falls under. In terms of the approach to mangrove management, protection is the primary pathway through which conservation management is intended to be achieved, either through formal integration into the protected area system defined by IUCN or through other international obligations such as the 1971 Ramsar Convention on Wetlands Conservation.³ Protection-oriented management does not permit local and limited uses by neighboring communities. Whether it falls

3 The Ramsar Convention is an international treaty for the conservation and sustainable use of wetlands. It is the oldest multilateral international conservation convention, signed in 1971, and the only one to deal with one habitat or ecosystem type (wetlands). The Convention's mission is the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution toward achieving sustainable development throughout the world. It has 169 contracting parties. Wetlands included in the Ramsar List are recognized for their significant value, not only for the country or countries in which they are located, but for humanity as a whole.

under the forestry, wildlife, or environment ministries, it is rarely the case that management approaches by government agencies are specifically tailored for the unique conditions and needs of mangrove ecologies.

Although government-led protection is the main approach, some countries in Africa, Asia, and Latin America have adopted a more integrated approach, where multiple types of regulated uses are permitted within mangroves to include subsistence needs as well as a level of consumptive use (such as timber logging) by issuing user licenses and permits. Lease agreements are another instrument used by states for the management and utilization of mangrove forests. Such attempts at providing communities with incentives for investing in resource management, through long-term leases and permits or formal co-management agreements, suggest that mangrove conservation and management is transitioning from strict protection by line agencies toward greater participation by communities.

Although there have been a range of turning points leading to new policy attention for mangroves in different countries, it is also clear that there is currently a new momentum currently in the making as a result of the global agenda on climate change. In Asia, the 2004 tsunami led to a prioritization of mangrove restoration by most affected national governments in the Indian Ocean in an effort to protect their coastal areas from future storms and natural hazards. The changing timing and increasing intensity of storms and typhoons (particularly in Vietnam) have motivated the development of new mangrove policies by governments. These new steps have not only been set into motion by governments; national and international NGOs have also played a leading role. IUCN established the multi-partner MFF initiative to support a wide-ranging set of interventions at both the national and local levels.

In Africa, rather than a singular disaster that jumpstarted policy interest in mangroves, the management of mangroves benefitted from an overall paradigm shift that took place in the early 1990s in the forestry sector whereby state-controlled forests were increasingly devolved to community engagement in forest management. This shift toward community inclusion in management was necessitated by the failure of state-centric management systems and the continued loss of mangrove forests associated with them. Here, the Africa Mangrove Network has promoted sharing of lessons and approaches with the aim of contributing to nursery development, income generation projects, and an improved policy environment for mangrove management.

In Latin America, civil unrest contributed to the change in the management regimes of Brazil and Mexico. In Mexico, the Mexican Revolution in the second decade of the 20th century led to the implementation of land reforms that allowed communities to exercise greater autonomy over mangrove resources. Uprisings among Brazil's forest communities in the late 1980s were part of a bid to gain legal recognition of territorial rights. Their resultant inclusion in the co-management of natural resources under the provisions for *reservas extrativista* led to fewer conflicts between the state and forest communities.

The chronological evolution of these legal and policy configurations requires further exploration as does their relative performance. More broadly, the growing recognition of the ecological and socioeconomic values of wetlands (including mangroves)—previously viewed as wastelands—also led to increased conservation and management efforts globally for ecological, social, and economic benefits, particularly in the face of increasingly evident negative repercussions of climate change.

2.1 SECTORAL RESPONSIBILITIES OVER MANGROVES

There is significant diversity across countries regarding which government ministries and agencies hold jurisdictional authority for mangrove management in any given country. There is no preferred approach found in countries with significant mangrove areas, although the forest sector has the central responsibility for mangrove management in nearly all cases. This occurs in a wide range of countries across Africa, Asia, and Latin America such as Bangladesh, Brazil, Burma, Kenya, Mozambique, and Tanzania. Whether mangrove management falls under the authority of one agency or multiple agencies, it is clear that it does not receive dedicated attention. Within forestry ministries, most of the attention is directed at terrestrial forests; as such, the unique needs of mangroves are not given serious consideration. In such countries, the approach toward mangrove management can also be informed by the goals of other policy areas, such as environmental policy and coastal zone policy. Where multiple ministries have responsibilities toward mangroves, the overlapping or ambiguous authority results in mangrove management falling through the cracks of the government's administrative and regulatory structure. As such, mangroves do not receive the targeted support needed to ensure they are protected and well managed.

In some countries, by virtue of mangrove management falling under the authority of environmental agencies that function in a multi-sectoral fashion, mangrove management takes on a more integrated approach. Colombia, Honduras, Nigeria, and Senegal are examples of such countries. In Colombia, the Forestry and Wildlife Institute (in the Ministry of Environment, Housing, and Territorial Development) has the legal mandate over mangrove management. In Nigeria, the Federal Environment Protection Agency relies on the Environmental Law, whereas in Senegal, the Ministry of Environment and Protection of Nature draws heavily from the Forest Code for implementing mangrove management.

At times, there is split authority across two ministries or agencies. In countries such as Sri Lanka and Mexico, two separate agencies hold the legal mandate for mangrove management. In Sri Lanka, this involves the Forest Department (within the Ministry of Environment and Natural Resources) as well as the Department of Wildlife Conservation (within the Ministry of Agrarian and Wildlife Services). In a similar fashion, Mexico's mangroves are under the authority of the Ministry of Environment and Natural Resources as well as the National Forestry Council.

In a limited set of countries, the authority over mangroves is divided among three or more agencies. Indonesia, as the country with the largest area of mangroves globally, is a key example of this approach. In Indonesia, there are at least four ministries involved directly or indirectly in regulating mangrove resource allocation and management. These include the Ministry of Environment and Forestry, Ministry of Maritime Affairs and Fisheries, Ministry of Home Affairs, and National Land Office. Among these, however, it is the Ministry of Environment and Forestry that holds the prime authority to regulate the exploitation, protection, and rehabilitation of mangrove resources. Since authority is fractured across multiple ministries, Indonesia moved forward in 2012 to establish a National Strategy for Mangrove Ecosystem Management, and a National Multi-Sectoral Coordination Team. This was followed by the creation of a dedicated Mangrove Restoration Agency in 2016. Similarly, in Cameroon, mangroves fall under the responsibility of a number of ministries, including the Ministry of Forestry and Wildlife, Ministry of Environment and Nature Protection, Ministry of Tourism, and Ministry of Fisheries and Animal Industries.

2.2 APPROACHES TO MANGROVE MANAGEMENT

Legal and policy frameworks that govern mangrove management also vary along a continuum: from strict protection that bans any consumptive use, to mixed protection and use where some regulated use is tolerated, to the promotion of multiple-use regimes that endorse sustainable use and management.

Several countries, such as Sri Lanka, India, China, Tanzania, Kenya, and Brazil, pursue protectionist policies. In Sri Lanka, traditional fishing is the only activity allowed in mangrove areas, with a total ban on collection, removal, and clearing of mangroves (Department of Wildlife Conservation, 2009). A large proportion of mangrove forests in India are declared as reserve forests, reserve lands, or sanctuaries, and are protected by the Forest Department of the different states (Kumar, 2000; Ministry of Environment, Forest, and Climate Change, 2008). In China, 34 mangrove nature reserves, accounting for more than 80 percent of the mangrove areas, have been established in different locations as of 2009 (Chen, Wang, Zhang & Lin, 2009). Mangroves were gazetted as forest reserves in Tanzania from 1928, under the management of the Forestry Department and successor agencies. Mangrove areas in Kenya were declared government

reserve forests in 1932. A ban on exporting mangrove wood was implemented in 1978, lifted in 1981, and reinstated again in 1982 (Taylor, Ravilious & Green, 2003). Currently, mangroves in Kenya fall under the jurisdiction of the Forest Act (2005) and are managed by County Forest Officers, who administer licenses and are in charge of conservation within their respective counties. Since the primary focus of the Kenya Forest Service is on terrestrial forests (with more valuable timber), less emphasis is placed on mangrove ecosystems (Samoily et al., 2013). In Brazil, mangroves are protected under the federal Forest Law and are designated as “areas of permanent preservation” through the Forestry Code. Total or partial removal of mangrove vegetation is prohibited unless authorized by relevant government agencies and only when deemed to be in the “public interest” (Almeida, Magris & Barreto, 2010).

Approximately 14.2 percent of all mangroves worldwide (Schmitt et al., 2009) contribute to the global protected areas system, some of which are found in the above-mentioned countries where mangrove protection is the main policy objective. In Brazil, for example, more than 82 percent of the country’s mangroves are located within protected areas (IUCN Categories I–VI), with many of them permitting sustainable harvesting of resources (Gravez, Bensted-Smith, Heylings & Gregoire



■ Communities fishing in Madagascar among mangrove wetlands. Credit: Blue Ventures

Wright, 2013). Several mangrove-rich countries have ratified the Ramsar Convention on Wetlands and have subsequently designated mangrove areas as Ramsar sites, national parks, reserves, or wildlife sanctuaries. All South American countries with mangroves, with the exception of Guyana, have at least one Ramsar mangrove site, a clear indication of a good level of political commitment to protecting these habitats and their environmental richness (FAO, 2007).

Despite positive intentions by the government, mangrove-dependent populations have not always adhered to strict protection and total bans on mangrove harvesting. Despite long-standing legal protection, extensive mangrove losses and degradation have occurred in Tanzania, with the greatest losses occurring around Dar es Salaam due to conversion to urban and agricultural uses (Samoilys et al., 2013). Nevertheless, the gazettement of forest reserves in Tanzania has helped reduce degradation rates when compared with neighboring East African countries. In addition to this, Tanzania's Mangrove Management Project, that started in 1988 helped to bring concern for mangroves into greater national prominence. This helped reduce illegal cutting and clearance of mangrove forests and encouraged replanting of large, degraded areas (Samoilys et al., 2013).

Although mangrove losses in El Salvador led to a complete ban on mangrove logging in 1992, illegal logging and other unauthorized uses of mangroves have continued across their range, due in large part to limited resources for law enforcement and to complex and onerous regulations that make illegality a more attractive option for many mangrove users who are daunted by the complex bureaucratic hurdles (Gammage, Benít & Machado, 2002).

Vietnam is a country that exemplifies a mixed approach, where the legal and institutional framework pursues both protection and a specified level of mangrove use. Here, the ownership of mangrove forests is primarily vested in the state, with 70 percent of mangroves classified as protection or special use forest (national parks and nature reserves), and the remaining as production forest (Brunner, 2010). The state has also granted short-term (50 years or less) and long-term (greater than 50 years) lease agreements to households with the aim of improving community livelihoods and mangrove forest protection. The legal framework of forest tenure in Vietnam changed from state-based to society-based after the enactment of the Land Law of 1993, which stipulates that land is the property of the Vietnamese people. The state

therefore allocates land to organizations, households, and individuals for sustainable and long-term uses. The rights enjoyed by resource users include use, transfer, rent, inheritance, and mortgage (Do & Iyer, 2003). In August 2016, the Vietnamese Prime Minister issued Decision No. 120/QĐ-TT to approve the plan on coastal forest protection and development in response to climate change during the period 2015-2020. The plan targets expanding the coastal forest coverage from 16.9 percent (current) to 19.5 percent by 2020, and to grow an additional 46,058 hectares of forests in order to have a total coastal forest area of 356,753 hectares (Vietnam Law and Legal Forum Magazine, 2015).

While Indonesia currently pursues a legal framework that primarily promotes mangrove protection and non-consumptive use (such as ecotourism), two categories of lease permits for mangrove exploitation have been issued over the past couple of decades by central and local governments. The central government has issued 30-year lease permits for major mangrove forests (greater than 100 hectares), while provincial governments granted two-year lease permits for areas less than or equal to 100 hectares. The shift of leasing responsibility for major mangrove forests from the provincial to the central government was aimed at stimulating and facilitating foreign investment in mangrove resources (Kusmana, 2012).

Very few countries pursue policies and statutes that explicitly advocate for multiple use as a pathway toward sustainable mangrove management. Among the countries with large mangrove areas, Mexico is the only country in this review with formal regulations specifically designed for mangroves, and pursues sustainable use with respect to mangrove management (Box 4). The legislation on mangroves in Mexico was restored and strengthened in 2007 (following the formation of the National Mangrove Committee in 2005) to provide for their absolute protection after the legislation had been initially rescinded in 2004 (CONABIO, 2009). Protection efforts, however, have faced challenges in the form of poor enforcement due to limited human and fiscal resources. Developers in the tourism sector have also continued to push for reduced regulations (Spalding, Kainuma & Collins, 2010). As a result, many mangrove areas in Mexico remain in a degraded state, with a 2.1 percent annual loss of mangroves from 1990 to 2000 as a result of coastal development and aquaculture (Alatorre, Sánchez-Andrés, Cirujano, Beguería & Sánchez-Carrillo, 2011; Kovacs, King, Flores de Santiago & Flores-Verdugo, 2009).

Box 4. Mexico: Mangrove-specific law and policy

In contrast to most countries around the world, Mexico has established a set of laws and regulations specifically governing mangrove management. Mangrove forests in Mexico are under the authority of the Ministry of Environment and Natural Resources (SEMARNAT) as well as the National Forestry Council. Within the General Law for Ecological Equilibrium and Environmental Protection, which regulates access to natural resources and their use to promote the pursuit of economic benefits and ecosystem preservation, there is a regulation that focuses specifically on mangroves (Fraga & Jesus, 2008). Within this, the *Norma Oficial Mexicana* (NOM-022-SEMARNAT-2003), establishes guidelines for the preservation, conservation, sustainable use, and restoration of coastal wetlands in mangrove areas (Ruiz-Luna, Acosta-Velázquez & Berlanga-Robles, 2008). Regulations within the Wildlife Law specifically focus on mangrove protection and preservation (Ruiz-Luna, Acosta-Velázquez & Berlanga-Robles, 2008).

The Philippines is a country that has now had more than two decades of working with communities through devolved governance and dedicated tenure instruments in mangrove areas. Starting in 1990, the Philippine government and individual families, communities, and corporations could enter into production-sharing contracts for the management of plantation areas previously established under the short-term contract reforestation program, on a 25-plus-25-year tenure basis. Under these Forest Land Management Agreements (FLMAs), contract holders were entitled to harvest, process, utilize, or sell the wood and other commodities produced from the plantation in exchange for protecting, maintaining, and managing the forest

(Primavera & Esteban, 2008). In 1993, the Department of Environment and Natural Resources (DENR) combined a three-year mangrove reforestation contract and 25-year FLMA into a new 25-year FLMA of one to ten hectares for families and 10 to 1,000 hectares for communities (Primavera et al., 2013). Similarly, the Bangladesh Forest Department (BFD), through its local forest offices, allocates operational-level rights by issuing permits to forest-dependent communities (Roy, Alam & Gow, 2013). However, only about half of the forest-dependent communities are licensed, authorized users. The excluded half enter the forest illegally by paying bribes to BFD staff, which is unavoidable due to their high dependency on forests for their livelihoods (Roy, Alam & Gow, 2013).



3

MANGROVE GOVERNANCE AND TENURE IN PRACTICE

Women in Andavadoaka, Madagascar harvest sea cucumbers from a locally established and managed fishery enterprise in a mangrove area.
Credit: Blue Ventures

3.1 LACK OF CLEAR AND EFFECTIVE GOVERNANCE APPROACH SPECIFICALLY FOR MANGROVE MANAGEMENT

In this section, the ways in which the governance and management of mangrove forests play out in practice are considered. The section starts by considering the actual implementation of legal and institutional frameworks and provides examples of the main challenges and opportunities for implementing laws and policies relevant for mangrove governance. This is followed in the next section by an examination of local-level governance and tenure arrangements, and concludes with a final section that reviews how gender considerations enter into governance and management practices.

As discussed in the previous sections, despite the ecological uniqueness and socioeconomic importance of mangrove forests, few countries have passed laws that are specifically focused on their management. Instead, mangroves generally fall under the broad regulatory framework, be it under law or policy, for governing one or a number of sectors including forests, environment, wildlife, water, land, and fisheries. In the case of the forest sector, this means that mangroves do not receive special attention in terms of the uniqueness of their geography as well as the multiple types of benefits they provide in comparison with terrestrial forests. Where they fall under multiple government ministries, this results not only in fragmentation of authority and in ambiguities, but also in conflict and competition during implementation (see Feka [2015] for example). Multi-stakeholder consultations and cross-sectoral coordination are not widely practiced in mangrove conservation management, although they can be found in some countries with large mangroves areas such as Indonesia or Mexico.

Beyond the issue of inadequate capacity and resources to implement protection-oriented management approaches, the problem is worsened in countries where responsibility for mangroves falls under either multiple ministries or disparate policies. For example, in Vietnam, jurisdiction over mangroves falls under two ministries: the Ministry of Agriculture and Rural Development (MARD), and the Ministry of Natural Resources and Environment (MONRE). MARD is in charge of the management of forests, terrestrial and marine protected areas, capture fisheries, aquaculture, sea dikes, and storm and flood control (Swan, 2009); while MONRE is responsible for coastal planning, land allocation, biodiversity conservation, aquatic ecosystem management and protection, and climate change.

The overlapping jurisdiction and weak collaboration between these two ministries has created confusion for stakeholders and uncertainty in mangrove management. In the instance of mangrove-rich Xuan Thuy National Park in northern Vietnam, failed coordination between these two ministries has resulted in no support or oversight over the mangroves (Hawkins et al., 2010).

In Bangladesh, the management of mangroves is part of an institutional maze. To begin with, there are three policies relevant to the management of coastal forests: the Forest Policy (1994), Environment Policy (1992), and Coastal Area Policy (2005). The Forest Policy emphasizes the establishment of plantations on all newly accreted lands in the coastal areas, whereas the Coastal Area Policy is committed to sustainable development in the coastal region that includes both establishing coastal plantations as well as conserving existing coastal forests and habitats (Islam, 2006). In practice, it is the Forest Department that is mainly responsible for policy implementation, although other institutions are also involved in mangrove management, including the Local Government Engineering Department, the Water Development Board, and NGOs operating in the region.

In the Philippines, regulation of mangrove forestlands has historically fallen under the legal jurisdiction of both the DENR, whose mandate is to protect and sustainably manage these forests, and the Department of Agriculture, whose mandate is to promote brackish water aquaculture development in these same areas (Walters, 2003). These government agencies have exhibited a lack of coordination. This was particularly evident in a case where the Department of Agriculture issued fishpond lease agreements for mangroves around Cogtong Bay of Bohol Province but where DENR later refused to grant cutting permits to save the well-developed mangroves from pond development (Primavera, 2000). Decisions on mangrove use can be made concurrently by these two departments, which often have differing priorities, leading to conflicts. Similar problems have been documented in Ecuador, India, Thailand, Indonesia, Sri Lanka, and Brazil (Walters et al., 2008).

Development decisions in other sectors, such as extractive industries, can also have important repercussions for mangroves. Conflicts are not uncommon between the oil and gas industry and the fisheries sector in the Mahakam Delta in Indonesia, and between coastal communities and the oil and gas industry in the Niger Delta in Nigeria (Mmom & Arokoyu, 2010; Powell & Osbeck, 2010). In Nigeria, which has the largest mangrove areas in Africa, the effectiveness of policies and laws for mangrove management has been hindered by weak enforcement,

alleged mismanagement within the Federal Environmental Protection Agency, and the strong influence of the petroleum industry on the government (Ayanlade & Proske, 2015). In the absence of shared understanding and agreements regarding mangrove use and management, clarity of government rules and regulations, and effective means of enforcement and dispute resolution, conflict will continue to undermine the conservation and sustainable use of mangrove forests given the multiple uses, users, and interests within the same coastal landscape.

Efforts at coordinating across sectors are not necessarily new, but are lately on the rise. Earlier initiatives include those in India where a National Mangrove Committee was formed in 1976 by the Ministry of Environment and Forests, and in Fiji where a National Mangrove Management Committee has been in existence (on and off) since the 1990s. Tanzania's mangrove management plan of 1991 was forward thinking but in the end expired, speaking to the need for improved coordination between sectors, especially forestry, marine, and fisheries. In Mexico, a National Mangrove Committee was established in 2005 as part of its big push to address significant deforestation dynamics within mangroves. In Mozambique, there are calls to carry out a comprehensive review of all the legislation and regulations pertaining to mangroves so that new harmonized policies can be designed (Chevallier, 2013).

The momentum to create coordination mechanisms and national mangrove management plans is growing, and indicates the need to address insufficient technical and enforcement capacity as well as institutional cooperation that has hampered existing approaches within single or multiple ministries. Fiji created a new Mangrove Management Plan in 2013 by jumpstarting their National Mangrove Management Committee through the Pacific Mangroves Initiative. More recently, countries such as Indonesia or Sri Lanka have taken major strides in addressing mangrove governance needs. In Indonesia, the president authorized a National Strategy for Mangrove Ecosystem Management in 2012, which includes committees at national and subnational levels charged with ensuring coordination across the four authorities responsible for mangrove management. The strategy, however, has not yet been implemented in practice due to lack of budget and personnel, as well as an overall reluctance to collaborate, indicating the invisibility of mangroves and their needs within individual ministries.

The most recent effort has been the Government of Sri Lanka's comprehensive five-year plan, initiated in 2015, to protect and rehabilitate all of its mangrove forests. The plan aims to protect 8,815 hectares and

rehabilitate 3,885 hectares of degraded mangrove forests by providing socioeconomic benefits in the form of alternative job training opportunities and microloans to 15,000 women. It will also establish for the first time a national mangrove conservation museum. This program is being conducted in partnership with two NGOs: Sudeesa, a national small fishers federation, and the US-based Seacology (Seacology, 2015).

3.2 LOCAL MANGROVE GOVERNANCE AND TENURE

Irrespective of the national structure of policy and law governing mangroves, communities who live in coastal environments use and manage mangroves, be it under state-sanctioned institutional arrangements or de facto customary practices. Many coastal communities (including indigenous groups) around the world have customary rules for mangrove management embedded within social structures that often evolve with them. These rules may be specific to mangroves, or consider mangroves as part of the near-shore and coastal landscapes that they use to develop flourishing cultures sustained over a long duration. This set of rules determines which areas can be accessed by the community, what kind of uses are permitted at particular times of year, how the areas are to be managed, who is to be excluded, and how monitoring and sanctions are to be carried out.

These customary practices have been based on a sophisticated understanding of coastal ecologies. Where harvesting methods themselves are less technologically complex, people's in-depth knowledge enables them to determine how best to look after the local aquatic environment to ensure long-term viability of a range of aquatic harvests. Local communities, given the right regulatory context, are often best placed to manage these local ecosystems, as their close proximity permits them to develop rules that match the resource and social situation. For this reason, forest tenure within terrestrial forests has shifted over the last two decades: the state-managed forest management system did not have the capacity or knowledge within which to manage the entire forest estate under the jurisdiction of the government.

In practice, within mangroves, only a few governments have formally devolved control to communities (through local associations, user groups, unions, and so on) to manage these coastal forests. Overall, failure to recognize customary practices by the state is a source of tension between coastal communities and formal



■ Wood collected from mangroves for cooking.
Credit: Nguyen Anh Dung/GIZ

institutions (Van Laveren et al., 2012). The same type of devolution seen in terrestrial forestry settings, leading to what can broadly be called “community-based forestry management,” is now gathering steam within mangroves. Experimentation in mangrove management is increasing; various kinds and ranges of rights have been granted to lower-level entities, including households and communities.

In Nigeria, although communities traditionally owned mangrove forests, today all land (and mineral rights) is legally vested in the state government, with individuals and communities continuing to use the land in practice. This has caused anger and spurred communities to protest in oil-producing areas because the industrial exploitation has not benefitted them. Instead, it contributes to the impoverishment of coastal and agricultural soils on which the communities depend for their livelihoods (Abere & Ekeke, 2011). Nevertheless, traditional resource conservation practices are still applied in the Niger Delta, as certain portions of the mangrove forest and its fauna are designated as sacred and their harvesting prohibited. In some communities, periodic or seasonal harvesting of these mangrove resources is permitted, with periwinkle harvesting and other seafood restricted to specified seasons or days of

the week. Other customary rules include the prohibition of logging premature mangrove trees and strict sanctions that include fines, seizure of property, punishment by the gods, and the excommunication of repeat defaulters (Mmom & Arokoyu, 2010).

Similarly, communities in Ghana have organizational structures, traditional authorities, and family elders that are in charge of decision making and control of the mangroves. Most mangrove lands are held in trust by these structures for the communities’ members or families. With decentralization in 1992, district assemblies and unit committees were established as key parts of a formally devolved political structure. These formal administrative structures greatly diminished the powers of the traditional institutions, resulting in competing claims of ownership and authority over mangrove resources (Agyeman, Kyereh & Agyeman, 2007).

In the Solomon Islands, local family groups or clans/tribes own or use about 90 percent of land and marine areas through inheritance (Aswani, Albert, Sabetian & Furusawa, 2007). As in Ghana, prior permission from the tribal chiefs is required for access and use of mangrove resources (Warren-Rhodes et al., 2011). Long-term mangrove loss in Fiji has been associated with the

mismatch between the mangrove ecosystem and the property rights regime owing to the government's declaration of communal claims by traditional clans (*mataqali*) over physical resources and the environment, including mangroves, to be temporary to limit the amount of compensation paid for losses to mangrove access (Lal, 2002). Under the Pacific Mangroves Initiative, led by MFF, legal registration of mangrove taboo areas was piloted in Vanuatu in 2014 to formalize customary mangrove management systems.

At the other end of the spectrum, there are situations where governments have formally recognized local claims to the extent of granting full, documented ownership. These cases are associated with better mangrove management outcomes, including less conflict among stakeholders. For example, local stakeholders in Ecuador have clear, legal title to mangroves. Here, more than 40 mangrove concessions covering nearly 40,000 hectares are proving effective in curbing deforestation, sustaining increased seafood yields, improving livelihoods, empowering concession holders, and reducing conflicts with the large-scale shrimp industry (Lugo, Medina & McGinley, 2014). In Brazil, the establishment of large extractive reserves in mangrove forests offers an alternative management approach to strict protected areas that generally exclude local inhabitants. In the extractive reserves, control and ownership of natural resources is conferred to local communities, who regulate access and the harvesting of timber and fishing resources. Saint Paul (2006) finds that many of these extractive reserves are more effective at protecting the area and resources of mangrove and other forests than are reserves managed by Brazil's federal government. Local resource users assume the duties of resource management such as monitoring, excluding outsiders from resource access, and designing local management rules (Glaser & Oliveira, 2004).

Falling between unrecognized customary institutions and fully titled community ownership are leases of various kinds to households, communities, and corporations, as well as joint state-community management of mangroves. Under Vietnam's Decision 51, also known as the 7:3 Policy, individuals and households enter into long-term contracts with Forest Protection Management Boards for forest use and protection (Hawkins et al., 2010). Under the agreement, landholders are required to maintain 70 percent of the contracted land under forest cover; while the remaining 30 percent of the land and surface water can be utilized for agriculture, aquaculture, and other income-generating activities. The 7:3 Policy is applicable for mangrove and terrestrial forests, and has special provisions that apply in mangrove areas. There

is mixed evidence of the benefits. In Vietnam's Kien Giang Province, 490 households (or 52.5 percent of the 932 eligible households) have already participated in such arrangements for five years; there has generally been strong support for the policy from Forest Protection Management Boards, local authorities, and local communities. Most households that participate in the program have expanded aquaculture and are now earning increased income from shrimp, blood shell culture, and fish farming. Forest cover has increased by 20 percent, according to the An Minh-An Bien Forest Protection Management Board (Hawkins et al., 2010). In another recent study carried out in Ca Mau Province, evidence from a survey of 40 households indicates that the households depend substantially on the income from shrimp and crab cultivation but do not have a share of any income from timber harvests due to lack of full ownership (Baumgartner, Kell & Nguyen, 2016). Given that the study found a strong relationship between per pond area income and mangrove coverage, it concluded that the regulations in the form of universal mangrove-to-water ratios do not take into consideration the economic realities of local households.

After the 2004 tsunami in Asia, efforts were launched in most affected countries to restore mangroves in the areas where they were destroyed (Abdullah, Said & Omar, 2014). The Philippines, Thailand, and Indonesia have achieved successes with mangrove restoration. The Philippines has the most extensive experience with establishing and improving community-based mangrove management (CBMM) for the rehabilitation of degraded mangrove forests. From the 1980s to the present, mangrove restoration has been a key objective of the Philippine central government; mangrove replanting has been popular in the country, mostly in collaboration with coastal communities. USAID supported the development of community-based forest management agreements in mangrove areas starting in the late 1990s (Melana et al., 2000). A community-based forest management agreement is a production-sharing agreement between the government and a community to develop, utilize, manage, and conserve a specific part of the forestland. More recently, a Community-Based Mangrove Rehabilitation Program, which commenced in 2009, was established with the aid of international assistance from entities such as the Zoological Society of London. The program aims to reestablish legally mandated mangrove greenbelts along the Philippine coast and rehabilitate abandoned government fishpond lease agreement ponds in Panay Island, in central Philippines. This is in line with several legal provisions, including DENR Administrative Order 15 of 1990, DA-DENR Memo; Order 3 of 1991; and Rep. Act 8550, which provides for the cancellation

by the Bureau of Fisheries and Aquatic Resources (BFAR) of abandoned, underutilized, and unutilized ponds, and their reversion to DENR's Forestry Bureau for mangrove rehabilitation (Primavera, Rollon & Samson, 2011).

In the post-tsunami period, Thailand and Indonesia were the most successful nations in the implementation of mangrove rehabilitation programs through CBMM (Brown, Fadillah, Nurdin, Soulsby & Ahmad, 2014). Many coastal communities initiated CBMM programs voluntarily with various forms of support, such as appropriate technologies, from NGOs, research organizations, and belatedly, the government. Similar community-based programs in India, Pakistan, Vietnam, Tanzania, and South Africa achieved low to moderate levels of success, as rehabilitation programs in most of these countries were top-down, initiated primarily by the central government (Abdullah, Said & Omar, 2014).

Past failings of state management have prompted many communities to initiate local collective action for mangrove conservation. A study in Trang Province, in southern Thailand, showed successful mangrove conservation and management by two coastal villages. The communities crafted and maintained well-defined institutions for forest management, resulting in a superior stand structure in the community-managed mangrove forests compared with that of the open-access state forest (Sudtongkong & Webb, 2008).

In Senegal, scene of the world's largest mangrove rehabilitation project, several organizations are working with the local communities to restore and conserve mangrove forests. A Senegalese NGO, Waamé, and its Belgian counterpart, the Development Agency of Gembloux, in collaboration with local communities and under the supervision of the Senegalese National Parks Authority, launched a wide-ranging biodiversity conservation project in the Saloum delta in 2001, targeting 35 villages over three years (European Union, 2001). Additionally, the Senegalese NGO Oceanium mobilized about 350 local villages and 200,000 people in local communities to restore mangroves. They create groups comprised of professionals and volunteers in Senegal and in neighboring countries, such as the Gambia and Burkina Faso, to support the process. With initial support from Danone, and subsequently from the Livelihoods Fund, Oceanium started replanting mangroves in 2008 over a surface area of 173 hectares. Currently the replantation area stands at 10,000 hectares with 79 million mangroves already replanted (Livelihoods, 2016).

While community-based management of mangrove resources does provide many important benefits for

the communities and the forest ecology, it does not always result in improved conditions of mangrove forests. There have been several barriers to the expansion of community-based arrangements. This is well exhibited in Kisakasaka village, Zanzibar, which was selected as a pilot project site on community-based management of mangrove resources. There was initial success in setting up a local management structure and regulation of access to the mangrove for charcoal production. However, the management plan and associated by-laws were later revoked by the state after the initial five-year pilot period (1996-2001), and the local conservation committee was replaced with the formation of a new one, as it was believed that it was not fulfilling its responsibility and upholding its commitments within the institutional arrangements (Saunders, Mohammed, Jiddawi & Sjöling, 2008). This resulted in a dramatic deterioration of forest conditions due to inadequate formal powers by the new committee to issue permits, collect revenue, and undertake formal enforcement. Unregulated use of forest resources ultimately led to a less productive forest with lower resource values. Contextual factors such as urban population increase and market pressure for charcoal, coupled with shortcomings in governance arrangements (e.g., lack of operational support by the government, and abrupt withdrawal of the community-based natural resource management arrangements) contributed to mangrove degradation (Saunders, Mohammed, Jiddawi & Sjöling, 2008).

In Vietnam, mangroves that are not allocated to households under the national program of forest allocation constitute about 20 to 30 percent of the mangrove cover and remain under the management of commune people's committees (CPCs) (MARD, 2008; McNally, McEwin & Holland, 2010). CPCs typically lack the resources and expertise to exercise effective management, and consequently, mangroves under their control inevitably become de facto open access and subject to degradation (Hawkins et al., 2010). Because communities are not legal entities under Vietnamese law, they cannot enter into legally binding contracts with end users (Hawkins et al., 2010), and the areas under CPC control cannot be transferred to community groups. Even though the regulatory context limits the level of devolution of governance, by not allowing the transfer of authority to communities for mangrove management, projects supported by CARE and GIZ have sought to pilot community-based approaches to mangrove management drawing on co-management modalities.

In other settings such as Thailand and Cambodia, a major barrier to expansion of community-based mangrove forest conservation, management, and rehabilitation is lack

of access to suitable sites. Nearly all abandoned shrimp ponds in Thailand have either been planted out by the Department of Marine and Coastal Resources, are under private ownership, or are under dispute because of illegal occupation (Quarto, 2013). In the Philippines, abandoned fish and shrimp pond lands are held under leases, while restoration on privately owned land requires purchasing the land, which is expensive. Furthermore, although DENR gives BFAR the mandate for the cancellation of abandoned, underutilized, and unutilized ponds, and their subsequent reversion to the Forestry Bureau of the DENR for mangrove rehabilitation, in practice, few ponds have been reverted and made available for community rehabilitation programs (Primavera, Rollon & Samson, 2011). This is because of the generally poor level of law enforcement in the country and lack of implementing rules. Importantly, BFAR tends to retain the canceled leases within their area of jurisdiction by declaring them open and available to new applicants, instead of reverting them to the Forestry Bureau.

3.3 GENDER-DIFFERENTIATED APPROACHES: A MISSING DIMENSION IN MANGROVE GOVERNANCE

Given that women and men (young and old) use mangroves in different ways and therefore have unique perspectives about the importance of mangroves and how they should be conserved, it is clear that a gender-

differentiated approach needs to inform governance in terms of tenure rights and the distribution of benefits (Bosold, 2012). Gender differentiation is evident along various dimensions such as how women and men value different types of mangrove products as well as various aquatic resources within that ecosystem, their rights to forests and forest products, how they harvest forest and aquatic products, whether they take the products to market or use them for subsistence, and the extent to which they are involved in decision making about mangroves. The factors driving gender differentiation are primarily cultural norms, which also influence gender roles and expectations. Because studies of gender and mangroves are scarce, there is little empirical evidence from which to characterize or draw a pattern of gender differentiation with regard to mangroves. The following descriptions provide a preliminary sense of some of the themes of differentiation.

A study conducted in Honda Bay, Palawan, in the Philippines, showed different valuation by men and women of mangrove products for their livelihoods. Women placed a higher value on the sea cucumbers, shells, and invertebrates supported by mangroves in the intertidal zones, while men valued fish living in offshore reefs. Men's preferences tend to be perceived as more important and women's fishing needs are seen as secondary, leading to the marginalization of women, and negatively affecting biodiversity conservation (Siar, 2003).



■ Women planting mangrove seeds in Da Loc, Thanh Hoa province, Vietnam. Credit: Nguyen Viet Nghi/ USAID Vietnam Forests and Deltas Program/ Winrock

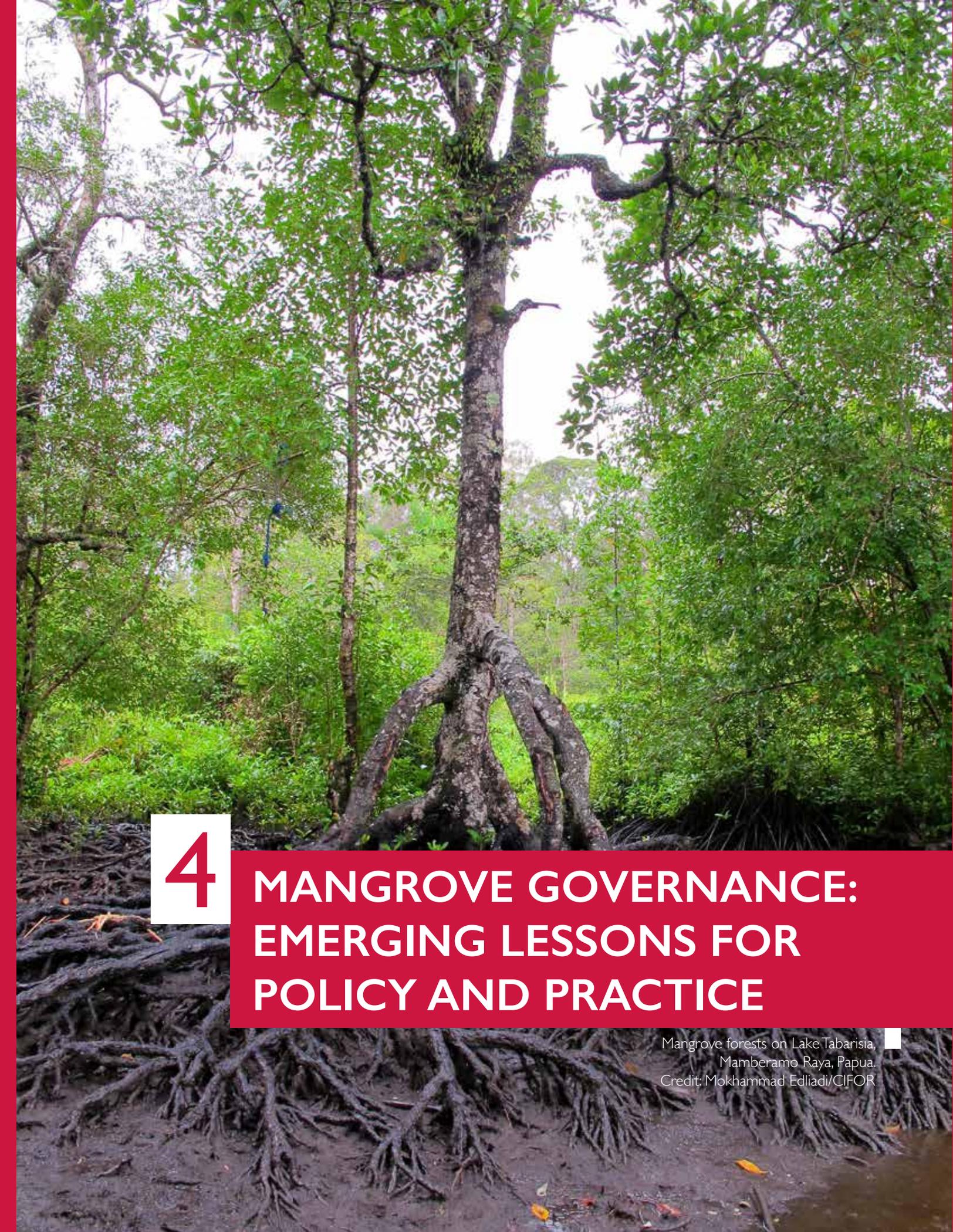
Product harvesting practices by men and women differ on their effects on mangrove forests. In southwest Cameroon, for example, women carry out seasonal, intensive harvesting of smaller mangrove trees over a larger working area closer to home, which contributes to mangrove ecosystem degradation. Men, on the other hand, carry out less frequent, small-scale, and selective harvesting of larger trees further from home (Feka, Manzano & Dahdou-Guebas, 2011).

A gendered division of labor was observed in the Galle-Unawatuna mangroves of Sri Lanka, where men were involved mostly in fisheries-related activities and women in edible plant collection (Satyanarayana, Mulder, Jayatissa & Dahdouh-Guebas, 2013). Similar differentiation has been observed in charcoal value chains, where cutting mangrove trees for commercial firewood and charcoal burning in the Mida Creek area in Kenya is done by men, while the actual selling of charcoal in the creek area is performed by women (Dahdouh-Guebas & Mathenge, 2000). This differs from the coastal regions of Tanzania where income generated from mangrove activities is under the control and custody of men (Makalle, 2012). Here, women are restricted to contact only with family, kin, and close family friends, particularly before marriage, during menstruation, before and after childbirth, or following the death of the spouse. These taboos and restrictions often depress women's involvement in fisheries and result in women (married or widowed) being restricted to marginal activities such as seaweed farming (Makalle, 2012).

Some programs do focus on the importance of gender equality in mangrove management. The MFF Secretariat, recognizing the importance of gender equality and its critical role in achieving the objectives of MFF, developed a strategic framework for gender integration into its programs in eight of its countries of operation: India, Indonesia, Maldives, Pakistan, Seychelles,

Sri Lanka, Thailand, and Vietnam. The framework aimed to institutionalize gender equality into MFF programming through planning, budgeting, reporting, monitoring, and activity implementation, particularly to support meeting Sustainable Development Goals (MFF, 2016). In Phang Nga Bay in Thailand, MFF's gender equality programming initiatives that actively sought the equal participation of men and women in the rehabilitation and protection of coastal mangroves resulted in a stronger capability among women to voice their concerns. In particular, women leaders were more willing and able to discuss conflicts and problems affecting their communities (MFF, 2016).

Other organizations, such as the Locally-Managed Marine Area Network, have promoted women-only community groups in mangrove management. In Hinatuan Bay, in southern Philippines, there are mangrove areas managed by women where women's community groups have been formed to address pressing issues facing coastal resources, their primary source of income. The issues addressed by these groups include mangrove deforestation, illegal fishing methods and gears, and siltation of sea grass beds from limestone quarrying (Locally-Managed Marine Area Network, n.d.). In Indonesia, there have been recent efforts to incorporate gender analyses and gender sensitization in community projects, including the formation of Womangrove groups to ensure the equal involvement of women in the process of mangrove rehabilitation and management (Brown, Nurdin, Soulsby & Ahmad, 2014). This is similar to Tanzania, where a recently launched community mangrove rehabilitation initiative was formed to empower women through increasing their incomes from, and their decision-making roles in, mangrove management. The challenge of how to configure institutions so that they can lead to gender equity, and promote the importance of women's participation, knowledge, and management of mangroves is a theme that is set to receive greater importance.

A large, mature mangrove tree with a thick, textured trunk and a dense canopy of green leaves. The tree's most striking feature is its complex system of prop roots that spread out across the dark, muddy ground. The background is filled with other mangrove trees and dense foliage, creating a lush, green environment.

4

MANGROVE GOVERNANCE: EMERGING LESSONS FOR POLICY AND PRACTICE

Mangrove forests on Lake Tabarisia,
Mamberamo Raya, Papua.
Credit: Mokhammad Edliadi/CIFOR



The objective of this appraisal of the status of mangrove governance and tenure arrangements is to diagnose gaps and challenges, and identify themes for future legal, policy, and institutional engagement. It contributes to a growing interest in reviewing policy challenges and approaches for mangrove management as the global agenda on protecting and conserving mangroves comes into greater prominence (e.g., Friess et al., 2016).

At the outset, it is important to note that the literature on mangrove forest management is significantly limited when compared with that on terrestrial forests. From this review, it is evident that the majority of studies to date were conducted in Asia, especially after the 2004 tsunami. Fewer studies have been conducted in Latin America, Africa (especially West Africa), and Oceania. While the available literature flags some broad issues in the governance and tenure dimensions of coastal mangroves, it generates even more questions relating to details such as gender, the distribution of benefits and burdens, subsequent impacts on resources and livelihoods, cross-level governance, and coastal spatial planning. There is clearly a need for national-level studies of mangrove management taking into consideration both how national laws and policies are structured (including how inter-sectoral coordination and planning takes place), as well as how they intersect with actual mangrove management practices on the ground in terms of de facto governance and tenure arrangements. Since 15 countries have 75 percent of the world's mangroves, such studies can be focused on this primary group that will affect the global response to climate change mitigation and adaptation, disaster response, and regeneration of coastal livelihoods and ecologies.

A number of key lessons and recommendations can be identified from this review:

- The development of an inter-sectoral coordination mechanism and a national mangrove management plan can pave the way for identifying both the respective roles of specific ministries and agencies, as well as the overall approach to manage mangroves across the nation's coastal landscape. Taking into consideration the complexities of coastal ecologies, simplifying the mangrove management approach by locating jurisdictional authority within one government ministry is unlikely to produce sufficiently effective results. As such, a specific assessment of how coordination mechanisms and national mangrove management

plans have been created and how they operate in different national contexts will permit a more detailed understanding of effective approaches. This may result in recommending the necessity of a dedicated mangrove agency within a given ministry.

- Whether jurisdictional responsibility resides in one ministry or in multiple ministries, there is a substantial need to identify approaches to mangrove governance and its tenure dimensions specifically designed to meet the unique needs of mangrove ecosystems. Even when there are new initiatives at work to devolve control over mangroves to local, community-based institutions, simply including them under an overall management modality such as community-based forestry or joint forest management will not serve to address the specific ways in which mangroves need to be managed for long-term survival and sustainability. As such, within legislation or policies governing community-based forestry, there is a vital need to develop specific stipulations on mangrove management and governance. This, in turn, will permit the generation of greater resources and technical knowledge to improve mangrove management. Mangroves thereby become a clearly visible arena for management and regulation.
- Although numerous national governments continue to be central actors in mangrove conservation, international organizations and NGOs are increasingly exerting influence and shaping agendas as well as approaches to mangrove management. In particular, they are increasingly experimenting with inclusive models of community-based management. Although much of the global attention by governments and multi-stakeholder partnerships remains singularly focused on mangrove rehabilitation and afforestation, a shift towards understanding and strengthening community-based management systems can ensure that mangroves will be protected and appropriately managed over the long-term. Lessons from these governance and tenure arrangements can also offer improvements in mangrove planting success rates, for reducing drivers of mangrove deforestation and degradation, and enhancing coastal spatial planning processes. The specific factors that have inhibited successful protection of mangroves need to be identified, along with how they can be addressed.
- States, organizations, donor agencies, and communities in a range of key mangrove countries have experimented with community-based

programs, sharing management responsibility and benefits across the stakeholders under different terms and conditions. It is evident that a mangrove tenure transition is taking place as governments recognize that allocating tenure rights to local communities can improve management outcomes, given the right overall regulatory framework. Therefore, an examination of the institutional details of the governance and tenure arrangements can help identify which components and rules play a central role in improving success for mangrove management. In what way have local tenure rights been documented, formalized, and recognized? To what extent have multiple goals been addressed in developing these devolved modalities? Given that benefits flow in different ways to local communities as well as the national and global scale, how can incentives be structured to achieve an equitable approach that meets livelihood, infrastructure protection, as well as climate change adaptation and mitigation needs? In what way has the lack of tenure

rights prevented successful rehabilitation efforts? Drawing out lessons from the wide range of often undocumented pilots will provide a strong empirical basis from which to further support this mangrove forest tenure transition.

- Gender equity and social inclusion is clearly a missing element in mangrove conservation and management, be it at the national legal and policy level, or within local governance institutions. That said, gender and social inclusion is being increasingly integrated into new programming such as MFF and others. Gender differentiation in terms of the use and management of mangroves is an area in which a stronger knowledge base can support the design of tailored laws, policies, and institutions to promote gender equity and social inclusion. Cultural norms vary across different regions and communities, and as such, there are seldom general principles that can be used a priori to inform legal and policy design, as well as programming.



■ Planters preparing to take seedlings out to coastal areas to plant in Do Son peninsula, Vietnam. Credit: Nayna Jhaveri/ USAID Tenure and Global Climate Change Program/ Tetra Tech

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ANNEXES

ANNEX I. SUMMARY OF ARTICLES REVIEWED

Theme	Countries															TOTAL					
	General	Asia								Africa					LAC		Australia, South Seas				
		Bangladesh	Cambodia	India	Indonesia	Pakistan	Philippines	Thailand	Vietnam	Cameroon	Ghana	Kenya	Mozambique	Nigeria	Tanzania		Brazil	El Salvador	Mexico	Australia	Solomon Islands
Management	8				1	1	1	2		1	3		2	1	2		1	1		24	
Governance		3	1	1	1							1		1						8	
Tenure					3			1							1	1	2	1	1	10	
Climate change	5	1		1	2			2	1		2	1		1						16	
Rehabilitation				1	3		4	1					1							10	
Restoration							1	3				1								5	
Gender	3						4		1											8	
Overlapping	11	2		4	2		2	5						4						30	
TOTAL	19	6	1	7	11	1	11	4	9	2	1	3	2	3	6	3	1	3	2	1	



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