USAID
FROM THE AMERICAN PEOPLE

GOVERNING MANGROVES

UNIQUE CHALLENGES FOR MANAGING TANZANIA'S COASTAL FORESTS

JULY 2017

GOVERNING MANGROVES

UNIQUE CHALLENGES FOR MANAGING TANZANIA'S COASTAL FORESTS

Baruani Mshale
Center for International Forestry Research (CIFOR)

Mathew Senga
Department of Sociology and Anthropology, University of Dar es Salaam

Esther Mwangi
Center for International Forestry Research (CIFOR)

JULY 2017

This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents of this report are the sole responsibility of its authors and do not necessarily reflect the views of USAID or the United States government.

This publication was produced for review by the United States Agency for International Development by Tetra Tech, through a Task Order under the Strengthening Tenure and Resource Rights Indefinite Delivery, Indefinite Quantity (USAID Contract No. AID-OAA-TO-13-00016).

Suggested Citation: Mshale, B., Senga, M., & Mwangi, E. (2017). *Governing mangroves: Unique challenges for managing Tanzania's coastal forests.* Bogor, Indonesia: CIFOR; Washington, DC: USAID Tenure and Global Climate Change Program.

This report is available at: https://www.land-links.org/
www.cifor.org/library

Prepared by: CIFOR for Tetra Tech

Tetra Tech
159 Bank Street, Suite 300
Burlington, VT 05401

CIFOR
Jl. CIFOR, Situ Gede
Bogor Barat 16115
Indonesia

Principal Contacts:

Stephen Brooks
Land Tenure and Resource Governance Advisor
USAID Office of Land and Urban
Bureau for Economic Growth, Education, and Environment
sbrooks@usaid.gov

Matt Sommerville, Chief of Party
Matt.Sommerville@tetratech.com

Cristina Alvarez, Project Manager
Cristina.Alvarez@tetratech.com

Megan Huth, Deputy Project Manager
Megan.Huth@tetratech.com

Cover photo by Mwita Mangora/University of Dar es Salaam. Paddy Farm Intercropped with Planted Mangroves.

CONTENTS

LIST OF FIGURES, TABLES, BOXES

FIGURES

TABLES

BOXES

ACRONYMS & ABBREVIATIONS

ACM	Adaptive Collaborative Management
CBFM	Community-based Forest Management
CIFOR	Center for International Forestry Research
DED	District Executive Director
DFO	District Forestry Officer
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussions
ha	hectares
IMS	Institute of Marine Sciences
JFM	Joint Forest Management
JMA	Joint Forest Management Agreement
KII	Key Informant Interviews
km	kilometers
MNRT	Ministry of Natural Resources and Tourism
MRTC	Mangrove Research and Training Center
NEMC	National Environmental Management Council
NIC	National Investment Center
NGO	Nongovernmental Organization
PFM	Participatory Forest Management
REDD+	Reducing emissions from deforestation and forest degradation in developing countries
TCMP	Tanga Coelacanth Marine Park
TFS	Tanzania Forest Service Agency
UNEP	United Nations Environment Program
USAID	United States Agency for International Development
VEO	Village Executive Officer
VFMA	Village Forest Management Areas
VLFR	Village Land Forest Reserve
VNRC	Village Natural Resources Committee
VPO	Vice President's Office
WWF	World Wide Fund for Nature

ACKNOWLEDGMENTS

As we reflect on the process of producing this report, we realize how grateful we are to several individuals, organizations, and institutions. First, thanks to Tetra Tech for partnering with the Center for International Forestry Research (CIFOR) in undertaking this assignment and much appreciation to the United States Agency for International Development (USAID) for funding the research. We are grateful to Stephen Brooks, Land Tenure and Resource Governance Advisor at USAID as well as Nayna Jhaveri and Matt Sommerville with Tetra Tech (on USAID's Tenure and Global Climate Change Program) for supporting this work and for overall guidance in its development and implementation. We wish to thank Dr. Steven Lawry, Director of CIFOR's Forests and Governance Research Portfolio for his insightful guidance from project design, data collection, to final report production. We are particularly grateful to Erin O'Connell, Erisa and Gideon Suharyanto at CIFOR, and Tracy Simmons at Tetra Tech for editing, layout, and report production. Our appreciation is extended to the University of Dar es Salaam, particularly the Head of Department of Sociology and Anthropology, Dr. Huruma Sigalla, who provided a review of policies and legislation; and Dr. Baraka Kanyabuhinya, who facilitated collaboration between CIFOR and the University of Dar es Salaam.

Our special thanks go to staff in the Tanzania Forestry Service Agency both in the headquarters and in Rufiji Zonal Office, National Environment Management Council (NEMC), National Investment Center (NIC), and the Institute of Marine Sciences (IMS) of the University of Dar es Salaam. Additional appreciation is extended to the various departments, institutions, and organizations (both governmental and nongovernmental) that provided us with information to advance this research.

We wish to thank the District Executive Director office in Rufiji for cooperation with our research team. We acknowledge the special support from village government leaders. In Dar es Salaam and Rufiji, we met with a range of people and organizations, of whom it will be impossible to mention by name, but their contributions are reflected in the research findings. Our thanks go to villagers of Kikale, Ruaruke A, Nyamisati, and Mchinga for their kindness and willingness to participate actively in the focus group discussions and key informant interviews that we conducted.

Lastly we wish to thank our devoted research assistants, Dr. Herieth Rwezaura and Ms. Julieth Kweka from the University of Dar es Salaam; our driver, Mr. Madaraka Haji for working tirelessly in the field; and Ms. Ivy Maledi for providing assistance in literature review and report editing.

The final product of this research, including its shortfalls, is the responsibility of the research team.

EXECUTIVE SUMMARY

This assessment report provides an analysis of natural resource governance, including land and resource tenure, in coastal mangrove forests in Tanzania, focusing in particular on the Rufiji delta. It forms part of a broader study that includes a global review and a parallel national-level study of Indonesian mangroves. By examining national-level legal and policy frameworks covering forestry, wildlife, fisheries, land, and agriculture sectors, the report identifies the way in which regulations and institutional coordination affects the governance of mangrove forests including tenure arrangements. The study particularly focuses on the Rufiji delta to examine how national-level policy and legislative frameworks are applied in practice within a river delta system that is the largest in Tanzania and East Africa. The Rufiji estuary provides an excellent case study because it has the most extensive mangrove forest area (about 22,000 hectares [ha]) in the region; experiences the full range of threats facing mangrove forests in the country, and relies on different types of mangrove management approaches. The assessment report investigates how local-level governance arrangements for mangrove management and rehabilitation interact with the national framework. In particular, the report takes a close look at tenure rights within mangrove forests, gendered dimensions of use and management, as well as interactions among communities and government authorities in mangrove protection and rehabilitation.

This report is based on a review of the literature, national laws, and policies, as well as interviews and discussions with key actors at the national, district, and village levels. At the sub-national level, the study covered four villages in the Rufiji delta, interviewing groups of men and women. The main gaps and challenges in mangrove management in Tanzania emerging from this study relate to community rights and access; the distribution of power, responsibilities, and benefits between government authorities and communities; and coordination between relevant government agencies. These results provide specific insights that need to be addressed in Tanzania to move toward a sustainable approach to mangrove management.

MAIN FINDINGS

Status of Mangrove Forests. The Rufiji estuary is one of the two largest mangrove areas in the East African region. Other important mangrove sites include deltas within the Ruvu, Pangani, and Wami rivers. Mangroves are also found along the coasts of the three major islands of Unguja (Zanzibar), Pemba, and Mafia. Remote sensing data provides a mixed picture of mangrove forest status in Tanzania. Some data suggest that the mangrove forest area in Tanzania has declined only slightly from 109,593 ha in 1990 (Semesi, 1991) to 108,138 ha in 2000 (Wang et al., 2003). A later study utilizing satellite imagery from 1999 to 2000 indicated even lower coverage at 80,900 ha (Fatoyinbo & Simard, 2013).

Threats. Despite high seedling success rates for most mangrove species, as well as relatively fast growth, mangrove forests in Tanzania are facing serious pressures that threaten their survival. Semesi (1992) characterized both ecological and socioeconomic threats to mangroves in Tanzania. The ecological threats include floods resulting in water-level alteration, bank erosion, and diversion of water courses; sand deposition from sea and land that cuts off portions of mangrove forests from salt water resulting in their death; and sea-level rise as a result of global warming. Socioeconomic threats include mangrove cutting for fuelwood used in salt production, lime burning, or smoking fish; clearance of mangrove areas for salt pans involving solar evaporation; unregulated pole cutting for sale in Dar es Salaam, Zanzibar, and in the Middle East; and the expansion of agricultural activities, particularly paddy rice and aquaculture in the Rufiji delta. Industrial activities, oil pollution, and siltation also threaten mangroves.

History of Mangrove Management. Mangrove forest management in Tanzania is historically based around the classification of mangroves as forest reserves. The devolution of rights to mangroves has been limited, with the government retaining ownership rights and regulating other rights (access, use, management, alienation, and right to income). The German colonial government created the first mangrove forest reserve in the Rufiji delta in the 1890s. Subsequently, the British colonial government adopted and expanded a strict protection approach in the 1920s and 1930s. This was largely continued by the independent Tanzanian government, which also expanded mangrove forest reserves in the 1960s. Tanzania was the first country in Africa to develop a mangrove management plan. Strict mangrove protection entailed actively excluding people living in and around mangroves from accessing and using mangroves for their survival, while the government controlled the harvest and export of mangrove products, particularly for timber and poles. In 1987, the government banned the harvesting of mangrove products. More recently (from 2010 onward), the state actively prevented rice paddy expansion in the Rufiji delta.

Tanzania's protectionist policies have achieved limited and short-lived success in some locations around the country, with general failure in most mangrove areas. The 1991 National Mangrove Management Plan crafted by the Tanzania Forest Service Agency (TFS) was the first attempt at halting mangrove conversion alongside monitoring and regulating the use of mangroves; however, this was never implemented. Effective management of mangroves under strict protection (i.e., forest reserves) is difficult for a number of reasons related to the current pressures facing these forests, including (1) continued expansion of paddy rice farming; (2) conflicts over forest use between local residents and outsiders seeking to use the forests; (3) increased demand for mangrove forest products; (4) political interference at the national and sub-national levels; (5) land scarcity due to the recent influx of pastoralists and large-scale, land-based investments; (6) lack of government coordination; and (7) limited human and financial resources for effective forest extension services and rule enforcement. While mangrove forests experienced major losses in the 1970s and 1980s due to unregulated harvesting, the introduction of paddy rice farming in the 1990s has caused the most significant negative impacts on mangroves due to associated extensive clearing.

Recent Legal Framework, Implementation, and Challenges. Tanzania has no specific policy on mangrove forests; instead, mangrove management in the Rufiji delta and elsewhere in the country apply those forest management arrangements used in terrestrial forests. The Forest Act of 2002 is the basis of the legal framework for forest management. The act provides an architecture that incorporates community participation; gender equality; financial incentives/mechanisms; conflict resolution; and cross-agency, cross-level coordination, and collaboration. Legal provisions are supportive of community participation in forest management and stress the distribution of the benefits of forest conservation and management. The 2002 Forest Act established the Tanzania Forest Fund, a financing mechanism that promotes the development of community forestry and provides advisory services and assistance to community groups. Although implementation of the Forest Act, inclusive of mangroves, is the responsibility of TFS, experience with participatory forest management (PFM) in Tanzania remains limited.

As threats increased on mangroves over recent decades, the Government of Tanzania began piloting different governance and tenure arrangements, starting in 2010. These arrangements aim to devolve forest management through a collaborative relationship between state and non-state actors who hold a stake in mangroves and coastal resources (Table 1).

The management approaches outlined below in Table 1 have achieved various degrees of success and failure since their application in the Rufiji delta. Generally, the individual farming permits system has proven to be unsuccessful in reaching its intended objectives in the Rufiji delta. It is a one-sided scheme that concentrates power and discretion in TFS, while imposing a broad range of responsibilities on farmers for a permit that is of short duration and provides relatively insecure rights. The group rehabilitation scheme has delivered some tangible benefits in the form of financial incentives to participating members and has proven successful, despite being in its infancy and conferring no long-term management rights or responsibilities. Community members have preferred the Joint Forest Management (JFM) system as it provides broader rights and benefits to participating communities compared to the other two mechanisms. Through this approach, communities have the ability to negotiate their rights (although ownership remains with the state) so that their actions (e.g., harvesting timber, poles, charcoal, firewood, and other products) are no longer criminalized as they have been for decades.

From a gender perspective, although women in the Rufiji delta use mangroves extensively, their participation is not reflected in their role in mangrove management and group leadership. Village regulations require that women comprise 40 percent of resource committee

Table 1. Recently introduced governance and tenure arrangements for mangrove management in Tanzania

Management approach	Rights distribution between the state and communities	Status
Mangrove forest reserves: strict protection	State retains all rights	Implemented for the longest duration, but has not been able to keep up with recent pressures.
Individual farming permits: a rehabilitation scheme	State retains all rights and grants regulated access and use (farming only), rights to participating individuals	Introduced in 2011 with over 250 individual permits signed in four villages. Particular attention is paid to native residents as they were identified to be the most affected by the ban on expanding and opening new paddy land. The program has largely failed due to the realization that rights are for a short duration only. TFS does not plan to pursue this approach further.
Group rehabilitation scheme	State retains all rights with communities receiving compensation for their labor	Started in early 2015; thus far 31 groups of 15 to 30 members have formed, comprising 688 villagers from four villages. Members are paid US $7 for replanting and US $5 for weeding per day. Villagers complain that TFS favors groups from near Kibiti, involving them instead of those from the delta. In response, TFS stated that all groups will be involved and that there are funds to involve all groups.
Joint Forest Management (JFM) areas	State retains ownership rights but shares/devolves management rights to villages	Introduced in late 2015 with four villages participating in the steps to form village natural resource committees and develop village forest by-laws and village forest management plans. These committees participated in the drafting of Joint Forest Management agreements between villages and TFS for subsequent implementation from 2016 onward. Villagers prefer this approach compared to the three above because it grants them more rights.

members, but cultural and religious norms often counter the legal requirements. For example, it is considered bad manners for a woman to speak in public, particularly in front of men. Women are generally keen to participate in mangrove monitoring and patrolling, which are paid activities, yet efforts are needed to increase their active engagement in management.

Despite a positive legal framework for forest management and the recognition of community rights, there have been additional institutional challenges in mangrove management. Lack of coordination between forestry and marine conservation agencies results in ineffective mangrove management. For instance, forestry agents cannot pursue illegal mangrove loggers transporting mangrove logs and poles on the high seas. Overlapping jurisdictions between forest management authorities and marine and coastal resource management authorities has often led to conflict. In one incident, marine park conservation agents arrested forest conservation agents who were conducting regular patrols in a recently gazetted marine park that was, prior to gazettement, under the jurisdiction of the Forestry Department.

Mangrove management is also challenged by a mismatch of rules between the mainland and the semiautonomous status of Zanzibar. For example, while mainland Tanzania has banned charcoal exports, the Zanzibari government, which is semi-autonomous, allows charcoal exports. As a result, loopholes exist and charcoal produced (legally and illegally) from mangrove forests on the mainland is often transported to Zanzibar before being exported. Both governments signed a memorandum of understanding on forest management that is expected to address these discrepancies.

MAIN RECOMMENDATIONS

The government's new approach toward devolving control over mangrove tenure holds promise for achieving positive impacts within the coastal seascape. It is clear that providing stronger forms of security over land and forest tenure for local communities will be a central component of improving mangrove conservation within a dynamic delta ecology such as the Rufiji (Mwansasu, 2016).

Revive the National Mangrove Forest Management Plan and Adopt a Landscape Approach. Currently, there is no specific legislation or policy on mangroves in Tanzania, although the Forest Act (2002) and other policies and legislation have been applied to mangrove forests. In 1991, the government developed a mangrove management framework (relying on community-based approaches) which, due to the absence of an enabling institutional framework and inadequate financial and technical resources, was not implemented. Following recent developments, both in terms of changing threats and the status of mangroves, as well as the introduction of new policies and legislation in relevant sectors (forestry, wildlife, fisheries, land, and agriculture) that directly affect mangrove forests, it is imperative to revive and update this strategy at the national level and apply it through local plans at the sub-national level. A national mangrove management plan will fill the vacuum resulting from the lack of mangrove-specific policy and legislation and provide coherence to mangrove conservation and management.

At the sub-national level, such as in the Rufiji delta, such plans should adopt a landscape approach that includes processes that take place outside the delta area but impact delta mangroves. In doing so, it is important to systematically document the impediments to the implementation of the 1991 management plan to improve upon the new approaches recently been set into motion. Indeed, this type of holistic approach is reflected in current efforts. For example, the national parliament commissioned a special task force to review the situation in the Rufiji River floodplain area and propose recommendations to reconcile the range of competing land demands. The task force review provided a holistic consideration of various significant land and development issues in the Rufiji delta such as mangrove conservation, the relocation of pastoralists, the relocation of delta people, large-scale and medium-scale land-based investments, and human settlements. While the report has not yet been publically released, there is some evidence that the government has begun adopting its recommendations that focus on facilitating the identification of land for investments in the Rufiji delta. However, its recommendations that have direct implications on mangrove conservation and management (such as addressing the pastoralist problem and seeking land to relocate delta residents outside mangrove areas) remain unimplemented. Therefore, any attempt at reviving and updating the national mangrove management plan should take into account the task force findings and recommendations as it provides a sound basis for a landscape approach to mangrove management.

Integrate Women's Role into Mangrove Decision Making, Management, and Benefit Sharing. Existing laws and guidelines, particularly JFM guidelines, have clear provisions on women's participation in village leadership and in the distribution of benefits from mangrove forests, stating that more attention should be accorded to women given the unique sociocultural and religious context of coastal communities in Tanzania. However, existing sociocultural and religious norms undermine the implementation of JFM guidelines because they prevent women from active participation in leadership roles and decision-making processes that occur in public spaces. Special women's groups or committees, where women can discuss their issues and make decisions, are one way to achieve meaningful participation. The pilot for this approach in northern Dar es Salaam (Kunduchi area) in the early 2000s is thought to have been successful in promoting women's participation in mangrove restoration programs but requires systematic investigation to draw out lessons. However, the development of alternative, women-only structures and spaces should be managed to safeguard against isolating women from broader community engagement. Furthermore, guidelines for gender integration in mangrove management and rehabilitation that draw lessons from mangrove projects and from the forestry sector would be helpful in supporting gender integration.

Women's exclusion from participating in mangrove decision making is not unique to Tanzania but rather is a broader challenge in the global management of mangroves (Rotich, Mwangi, & Lawry, 2016). Increasing women's participation in decision making and strengthening their rights to forests and trees is achievable under certain conditions that have been elaborated for terrestrial forestry in similar settings. For example, using the "Adaptive Collaborative Management" approach, CIFOR researchers and partners have demonstrated that building leadership capacity, providing mentoring support, adopting decision rules that favor consensus, and ensuring men's support for women's leadership can reduce gender bias due to cultural norms and indeed create opportunities for women's leadership and benefits capture (Evans et al., 2014).

Pay Special Attention to Relations between Long-Term Delta Residents and Outsiders. Human activities resulting in mangrove forest clearance is performed both by people residing in the delta area on a long-term basis and by people from outside the delta area from neighboring communities or who travel a great distance. Relationships vary between outsiders and residents, based on a range of factors including kinship and purely economic transaction. Additionally, it is often difficult to distinguish between an outsider and a long-term resident due to the evolution of these relationships. TFS adopts a punitive solution when

trying to establish the identity of the outsiders clearing mangroves or supporting illegal logging. This approach is counterproductive as it builds resentment among residents and thwarts any possibility of cooperation. Residents have tended to be reluctant to expose the identity of outsiders who may be funding activities in the delta. Instead of repeatedly punishing non-cooperating residents, TFS may consider investing in understanding motivations and designing ways and means of addressing the issues that drive residents' reluctance to reveal the identities of outsiders or participate more actively in mangrove management. In addition, the TFS should also consider implementing interventions that offer alternative and sustainable livelihood options for local residents that reduce their dependence on mangroves. Diversifying local income base from mangroves can offer a pathway out of relying on payments from non-residents' illicit exploitation of mangroves.

Improve TFS Capacity to Manage Mangrove Forests. TFS urgently needs additional resources to manage mangrove forests effectively in the country. For instance, there are only three full-time forestry officers covering an area of about 22,000 ha using one small boat, with a limited budget for fuel and fieldwork. As a result, monitoring for both legal and illegal harvesting of mangrove forest products is simply not possible. There is also a need to expand the human resource base to have more staff with knowledge and experience in community forestry mechanisms. The establishment of JFM agreements in four villages, formation of 31 community rehabilitation groups, and numerous individual contracts with farmers requires a larger pool of staff with diverse skill sets beyond technical forestry. While these initiatives are successful elsewhere in Tanzania and show great promise in the delta, limited financial and human resources hamper their effectiveness in the future. The Tanzania government is best placed to identify mechanisms for strengthening TFS's management capacity.

Implement both JFM and Community-Based Forestry Management (CBFM) Approaches in Mangrove Forests. Now that benefit-sharing agreements have been finalized and four villages have started the process of establishing village land forest reserves under JFM agreements, it is imperative that TFS and partners undertake measures to build local residents' capacity for effective co-management of their forests. Under the JFM approach, mangrove forest ownership rights remain with the state and the state enters into agreements with adjacent communities for managing and using mangrove forests. JFM is the most applicable mechanism for community engagement in mangrove forests, as all are state-owned. In contrast, the CBFM approach is applicable to non-state forests on community land. TFS and district councils can work in close collaboration with the central government and NGOs in supporting community mangrove forest management projects in the delta area. Using lessons learned from JFM and CBFM implementation in terrestrial forests, community mangrove forest management has the opportunity to avoid mistakes from elsewhere and adopt appropriate best practices. Areas in need of immediate support include (1) technical aspects, including appropriate species selection in rehabilitation schemes; (2) financial management, particularly equitable distribution of benefits and cost of mangrove management among community members; (3) management and enforcement capacity to ensure that villages are capable of regulating legal harvests; and (4) effective enforcement of rules both within and outside the community.

In the discussions undertaken in this study, a number of participants, including government officials and NGO representatives, recommended that the government transfer ownership rights to communities in some areas and establish CBFM projects. As CBFM grants more rights and powers to communities, they recognize that CBFM may be a better option than JFM, as it has the power to heal historical and current enmity between local people and state forest conservation authorities. A review of this policy to expand community rights to include ownership would not only be consistent with forestry practice in Tanzania but would also align local incentives with sustainable use and management priorities.

Lessons from terrestrial forests should be taken into account to ensure that mistakes reported elsewhere are not repeated in the mangrove forests. At present, there are two initiatives that offer the most experience on participatory forest management, the Mpingo Conservation and Development Initiative in Kilwa District, which has been operational since 2005; and the Tanzania Forest Conservation Group participatory forest management projects in several districts across the country, including Lindi District. For example, in cases where decisions affecting forests are made at the individual, household, and community levels, delivering benefits only at the community level may not be adequate. Individual-level payments and community-level benefits may be considered, as have been implemented in Lindi district under a REDD+ project.

Additionally, it is important to ensure that formal processes of deliberation are accessible to all and that the majority accept the decisions reached. Experiences from Kilwa and Lindi reveal that participation in public spaces and processes for forest management is not always accessible to all community members for various reasons. The decisions may be legal, but democratically illegitimate. Additional

alternative participatory processes may be necessary to ensure all groups within the community participate meaningfully in decision making. This is often the case with respect to women's cooperation. In addition to these lessons learned for effective implementation of a CBFM approach, engagement in mangrove forests would require policy changes that allow community ownership of mangrove forest areas.

Address Political Influence at the National and Local Levels. Statements and actions of elected and appointed officials at the village (chairman and members of village council), ward (ward councilors), district (district commissioners), constituency (parliamentarians), and national (president and ministers) levels play crucial roles in enabling or constraining effective mangrove forest management in Tanzania. In the Rufiji delta, politicians at various levels have issued statements that encourage unsustainable use of mangrove forests and mangrove clearance for paddy rice farming to gain residents' political support, particularly during election times. This creates mixed messages from the government, where politicians promote mangrove clearance, but the civil service continues a strict protection approach.

To turn political influence from a hindrance to an enabler of effective mangrove forest management, special communications campaigns are needed to diffuse current conflicts by targeting local people and politicians while involving other actors such as bureaucrats/technocrats and civil society representatives. The campaign should aim to increase the awareness of politicians and other actors of practical and sustainable ways of using and managing mangroves as well as the local, national, and global values of mangroves. Such a campaign could turn some politicians from advocates of mangrove destruction to champions of win–win strategies that have the potential to achieve both environmental and livelihood outcomes sustainably and equitably. This approach would need to be implemented alongside a clear policy or land use planning process that tries to reconcile the threats facing mangroves and the legitimate rights and needs of local residents.

Strengthen Coordination between Forest and Fisheries Ministries and Agencies. Coordination has been a challenge at both the policy and practice levels, with the Fisheries Department generating tools and guidance on mangrove fisheries with limited input from forest officers, and a lack of ability of enforcement officers to collaborate on the ground. TFS complained about the situation of limited resources (boats and fuel) to patrol and apprehend illegal loggers. Fisheries officers at the district described situations when they encounter dhows full of mangrove poles sailing to Zanzibar from Rufiji, but they cannot inspect or make arrests since these are two separate jurisdictions. TFS explained that, since mangrove products are transported by sea, coordination with fisheries units would be very useful. TFS would assist in arresting illegal fishers on land, and Fisheries Departments would assist in apprehending illegal loggers at sea, as it was before the two ministries were separated. In other countries, this has been achieved through memoranda of understanding between enforcement agencies, as well as instruments that allow local communities to act on behalf of these multiple ministries.

Conduct Further Research. While this assessment has contributed to understanding governance of coastal mangroves in Tanzania, additional research is required to improve understanding of various aspects of mangrove forest management. At present, it is not clear that the land and forests tenure conditions and the range of de facto historical rights held by residents are fully considered by the government in mangrove management. To reconcile the history of animosity and conflict, comprehensive socioeconomic studies are needed to understand people–mangrove interactions and interdependencies, particularly how such interactions have changed over time and space, and the multiple factors that have influenced transformations in people–mangrove relations. This social context should inform the design and adaptation of management strategies.

In addition to social conditions, there is a need to better understand the dynamics of mangrove deforestation and degradation and identify the causes for changes in mangrove coverage and condition through localized analyses. Such analyses would seek to understand where different drivers are most pronounced and how they interact. The results of this study would have benefited from a complementary analysis of forest cover change, and indeed the total area degraded in these areas of the Rufiji delta remains unclear even as actors introduce rehabilitation schemes.

1 INTRODUCTION

Encroaching and clear felling mangroves for paddy farming. Credit: Mwita Mangora/ University of Dar es Salaam

This report provides an assessment of the status of mangrove tenure and governance in Tanzania. It is part of a global study on governance and its tenure dimensions within coastal mangrove forests, which includes a national-level assessment in Indonesia with a focus on Lampung province. To date, while the biophysical dimension of mangrove forests has received appreciable attention (Brown, Mwansasu & Westerberg, 2016; Wagner & Sallema-Mtui, 2016), the governance and tenure dimensions have largely been neglected (Brown et al., 2016; Kulindwa, Sosovele & Mgaya, 2001; Semesi, 1992). Given the growing recognition of the importance of mangroves, most recently in the context of adapting to and mitigating climate change, there is a strong need for understanding the best forms of governance and management suited to improving mangrove conservation in different types of ecological and social contexts.

This study identifies the primary forms of mangrove governance in Tanzania at the national and local levels by examining both national and legal enabling frameworks as well as local-level institutions and practices. The study evaluates the overall mangrove management orientation of the government, and the extent to which national laws and policies in relevant sectors (such as forestry, fisheries, wildlife, and agriculture) address mangrove forest and land governance. At the local level, it examines how national laws and policies interact with local institutions and how they affect governance arrangements (including tenure) in specific sites within the Rufiji delta, which has more than half of Tanzania's mangroves. In particular, this study examines the role of gender in mangrove management.

The governance and tenure dynamics within Rufiji's mangroves are in a state of considerable transformation because of a range of important factors that include climate change, in-migration, large and medium-scale land-based investments, and conservation goals. As a result, the study encompasses an analysis of how processes occurring outside the delta area have affected mangrove governance within the Rufiji. Specifically, these factors include (1) increased land allocation to large land-based investors, such as commercial rice farmers; (2) medium-scale land investments by urban dwellers from Dar es Salaam; (3) the recent influx of pastoralists relocated from the southern highlands, resulting in land conflict; and (4) recent effects of climatic variability, particularly erratic rainfall and drought that have led to increased demand for paddy rice fields in the delta area covered by mangroves. This study generates several findings that advance knowledge on mangrove tenure and governance, including how the unique occurrence of mangroves at the land–sea interface affects their management, the capacity for coordination at the national level, institutional approaches to mangrove management, and the role of participatory forest management (PFM) in mangrove use and protection.

This study defines mangrove forest tenure as the legally or customarily defined distribution of rights (including ownership, use, management, alienation, and exclusion rights) between public and private entities (FAO, 2014b). The work is guided by Giessen and Buttoud's (2014) definition of forest governance as a broad concept comprising (1) all formal and informal, public, and private regulatory structures (i.e., institutions consisting of rules, norms, principles and decision procedures, concerning forests, their utilization, and their conservation); (2) the interactions between public and private actors; and (3) the effects of either on forests.

Chapter 2 provides an overview of the study methodology including site selection. The subsequent chapters presents an analysis of how national laws and policies affect mangrove governance (Chapter 3), followed by a detailed examination of the forms of mangrove governance and tenure found in practice in the Rufiji delta (Chapter 4). The final chapter sets out the conclusions and recommendations for improved mangrove governance in Tanzania (Chapter 5).

Box 1. Global status of mangrove forests

Mangroves are a unique type of forest growing at the interface of land and sea throughout the tropics and sub-tropics. Although mangroves constitute only 0.5 percent of the global forest area, they play crucial ecological and socioeconomic roles. Millions of people living in and around mangrove ecosystems in the tropics rely heavily on mangroves for their food and income, as well as protection of their settlements and agricultural land. Mangrove forests are not only the natural guardians of tropical coastlines against erosion by waves, currents, and winds, but they provide fertile nursery grounds for fish and invertebrate species that later move into marine ecosystems (Wagner & Sallema-Mtui, 2016). Additionally, mangrove forests regulate water chemistry in coastal zones. More recently, it has become evident that mangroves play an important role in climate change mitigation, holding up to 50 times more carbon sequestration potential than other tropical forests, and storing up to five times the amount of carbon per unit area compared to upland tropical forests (Murdiyarso et al., 2015; Sandilyan & Kathiresan, 2012; Wagner & Sallema-Mtui, 2016). Though mangroves occupy only 0.5 percent of the global coastal area, they store 10-15 percent of all coastal sediment carbon globally (Alongi, 2014).

Just like tropical terrestrial forests, mangrove forests have been disappearing at an alarming rate, especially during the last three decades. Between 1980 and the present, about one-fifth of global mangroves have disappeared, with the Asian and Pacific regions recording the highest decline (greater than 20 percent) and Africa recording the lowest decline (8 percent) in mangrove forest cover change (Van Lavieren et al., 2012). The destruction of mangroves results in potentially irreversible effects to the coastline from lost ecological and socioeconomic functions and services (MEA, 2005).

It is widely recognized that without deliberate efforts to restore and protect mangrove forests, the current trajectory of mangrove loss will result in negative climate impacts, unprotected coastlines, damaged coastal infrastructure, and reduced coastal fisheries production (see FAO, 2014a). To date, much of the global research has focused on the biophysical and ecological roles of mangroves to both support mangrove rehabilitation as well as understand their role in carbon sequestration. There has been a dearth of research on the socioeconomic and governance conditions that facilitate successful restoration and long-term management of mangrove systems. Since the Indian Ocean tsunami of 2004, there has been a large amount of global investment in mangrove restoration, with mixed success. As more countries have begun to develop new policies and laws on mangrove management in the context of climate change, there is growing awareness that coastal governance systems, particularly around land tenure and resource rights, play a large role in the successful design and implementation of mangrove interventions and long-term management.

1.1 TANZANIA'S MANGROVES

Tanzania houses one of the largest contiguous areas of mangroves in Africa, with forests occurring at the land–sea interface of major river estuaries and deltas along the 1,424 kilometer (km)-long coastline from the border with Kenya in the north to the border with Mozambique in the south (FAO, 2005). Major river deltas and estuaries include the Rufiji, Ruvuma, Ruvu, Pangani, and Wami rivers. Mangroves are also found along the coasts of the three major islands of Unguja (Zanzibar), Pemba, and Mafia. The Rufiji estuary of Tanzania is one of the two largest mangrove areas in the East African region (Figure 1). The Rufiji watershed covers about 20 percent of the country's land area. This area holds numerous tidal channels and multiple creeks where mangroves control the tidal water flow from the Indian Ocean (Wang et al., 2003). The Rufiji delta constitutes the most important fishery along Tanzania's coastline, accounting for about 80 percent of all wild shrimp catch (Masalu, 2003).

The Forest Resources Assessment of 2005 provides a list of the full set of mangrove mapping studies carried out in Tanzania since the mid-1960s (FAO, 2005). Among the earlier studies, Spalding, Blasco & Field (1997) reported mangrove areas in the region ranging from 2,555 to 7,211 square kilometers (km^2). Subsequent work based on remote sensing data

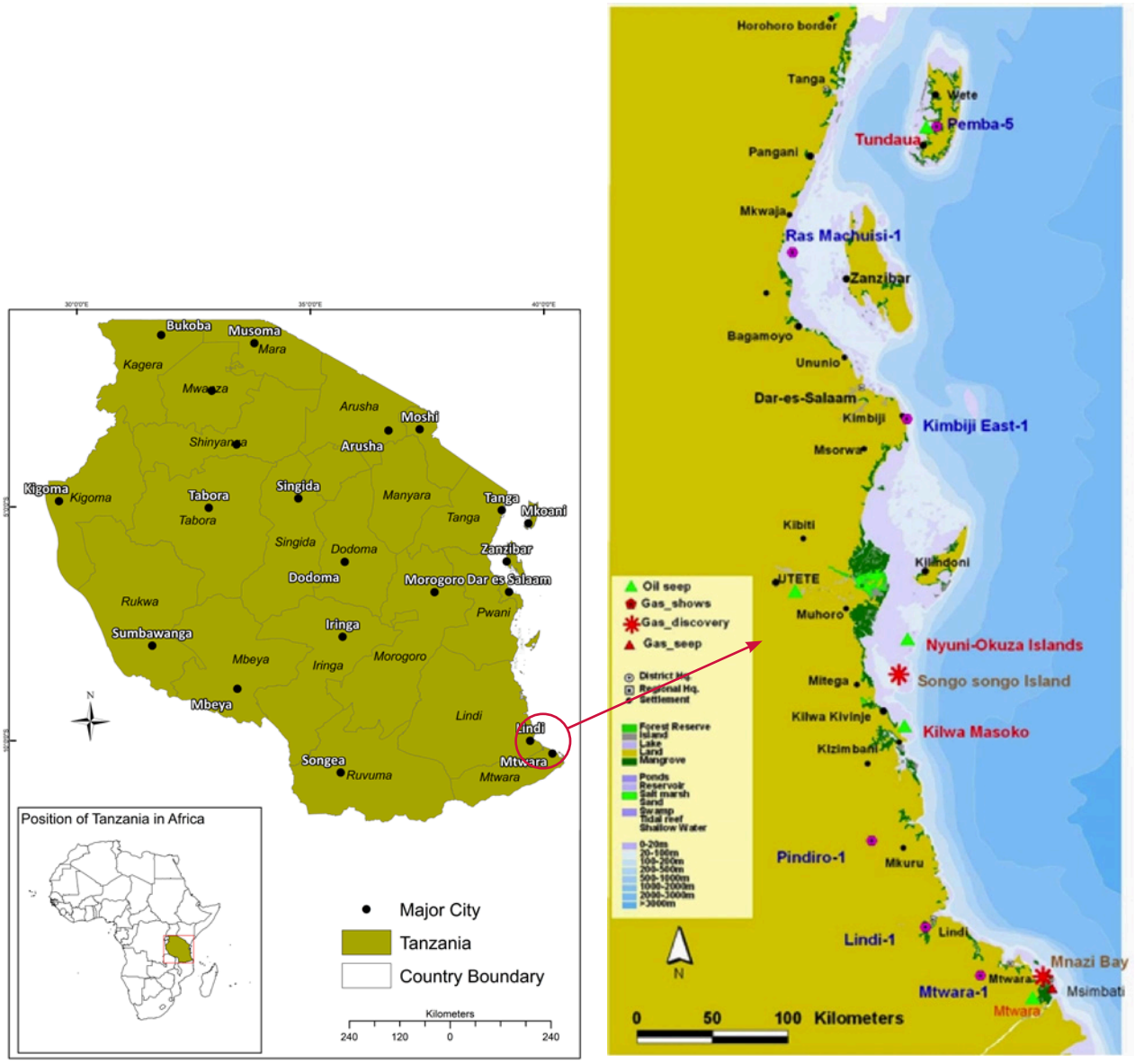


Figure 1. Distribution and status of coastal habitats and resources in Tanzania.

Source: Ojwang (2017), Muhando & Rumisha (2008)

indicated that mangrove forest area in Tanzania had declined only slightly from 109,593 hectares (ha) in 1990 (Semesi, 1991) to 108,138 ha in 2000 (Wang et al., 2003). In the Rufiji delta, 49,799 ha of mangroves in 1990 had experienced a similar level of decline leaving 48,030 ha by 2000 (Wang et al., 2003). Most of Rufiji's mangrove loss over 1990 to 2000 took place at the upper end of river mouths and edges of mangrove areas (Wang et al., 2003). However, Wagner and Sallema-Mtui (2016), in reviewing this study, suggested that this was an underestimate of forest loss and they called for more ground truthing in combination with social science research methods to understand mangrove forest loss and degradation.

A later study of African mangroves utilizing satellite imagery from 1999 to 2000 indicated that there were only 80,900 ha of mangroves in Tanzania (Fatoyinbo & Simard, 2013). Fatoyinbo and Simard note that earlier

estimates were unable to distinguish between mangrove areas and similar areas such as salt flats. Recent studies of mangrove change in the Rufiji, commissioned by the World Wide Fund for Nature (WWF), closely examined the types of land use and mangrove species change between 1989 and 2010 (Nindi, Machano & Rubens, 2014). Nindi et al. noted that 1,054 ha of mangroves dominated by *Avicenna marina* had been converted to *Rhizophora* species, and 1,808 ha of rice farming land had increased to 5,948 ha by 2010. The 2014 analysis concluded that there was a reduction in mangrove coverage from 25,312 ha in 1989 to 22,447 ha in 2010 in the Rufiji. Overall, these later studies indicate that the total mangrove area is smaller in extent than originally estimated in the 2003 study. While some areas have lost mangroves to rice paddy farming, there has been increase in mangrove areas in other parts of the delta (Mwansasu, 2016).

The mangroves in the Rufiji cover three main areas: north Rufiji with the largest mangrove areas, central Rufiji with small mangrove areas, and south Rufiji with half the mangrove area of the north (Wagner & Sallema-Mtui, 2016). In a biophysical sense, the delta is in a constant state of transformation with the creation of new channels, sedimentation of old channels, and diversions created by new sand banks. Before 1978, most of the river flowed to the south, but after 1978, the river flow moved northward.

Although East African mangroves have less species diversity than Southeast Asian mangroves, the Rufiji delta possesses the greatest flora and fauna diversity among African mangroves. Tanzania has 10 species of mangroves. The eight most commonly reported ones (with common Kiswahili names in parentheses) are *Avicenia marina (Mchu), Bruguiera gymnorrhiza (Mkoko wimbi), Ceriops tagal (Mkoko mwekundu), Heritiera littoralis (Msikundazi), Lumnitzera racemosa (Mkaa pwani), Rhizophora mucronata (Mkoko)*, *Sonneratia alba (Mpira)*, and *Xylocarpus granatum (Mkomafi)* (Taylor, Ravilious & Green, 2003; Wagner & Sallema-Mtui, 2016). All these species are found in the Rufiji estuary, and they are used for a variety of food, fuel, and other products for both local consumption and income generation. Products include posts and poles for construction and boats, beehives, fuelwood, and charcoal, as well as fruits and roots for medicinal purposes. Mangroves are also home to a large number of fish, particularly juveniles, which provide food and income to local villagers. Appendix A provides the range of products derived from the different species of mangroves in the Rufiji delta.

1.2 DRIVERS OF MANGROVE DEFORESTATION AND DEGRADATION

Mangrove timber from Tanzania has been commercially traded since the ninth century, when it was sold to northern non-forested countries, particularly in the Arabian Peninsula (FAO, 2005). Today, mangrove forests in Tanzania face serious pressures from a range of drivers. Semesi (1992) categorizes these threats into ecological and socioeconomic causes. Ecological threats to mangroves include floods resulting in water-level alteration, bank erosion, and diversion of water courses; sand deposition from sea and land that cuts off portions of mangrove forests from salt water; and sea-level rise as a result of climate change. Socioeconomic threats across Tanzania include mangrove cutting to obtain fuelwood used for salt production (particularly in Tanga); lime burning (in Bagamoyo, Lindi, and Mtwara) and fish smoking (in Pangani). Mangrove areas are also cleared for salt pans in Tanga, Bagamoyo, and Mtwara. Unregulated pole cutting for sale in Dar es Salaam, Zanzibar, and the Middle East is another driver of mangrove deforestation. In the Rufiji delta, the main drivers of the destruction of mangroves include rice paddy production and prawn farming. In addition, dragging seine nets under mangrove canopies, dynamite fishing, industrial activities, oil pollution, and siltation threaten mangroves. There is also a growing threat of oil palm plantation expansion in the Rufiji through small-scale land leases.

Within the Rufiji, in particular, there have been project proposals that have threatened large parts of the mangrove forest. In 1997, the Tanzanian government approved the African Fishing Company's proposal to establish a 19,000 shrimp aquaculture operation that would have covered between one-third to one-half of Rufiji's mangroves, particularly within the Mafia Island Marine Park (just offshore from the delta) (Masalu, 2003; Mwansasu, 2016). As a result of a campaign launched by local communities; and national (i.e., Journalist Environmental Association of Tanzania), regional (i.e., East Africa Wildlife Society), and international nongovernmental organizations (NGOs), the project was halted and the African Fishing Company liquidated in 2001. Tanzania's National Environmental Council also rejected the proposal based on its multiple negative environmental impacts in the delta.

Wagner and Sallema-Mtui (2016) emphasize that it is not always easy to separate socioeconomic and environmental threats to mangroves, since there are feedback loops and reinforcing interactions between these social and environmental threats. For instance, in the Rufiji delta area, people from outside the delta

are pushed into paddy rice farming inside the delta by a combination of external socioeconomic and environmental factors. Socioeconomic factors include relocating their farmlands to avoid conflicts with recent pastoralist immigrants, and responding to increased land scarcity because of government allocation of land to large-scale, land-based investors. Environmental factors include droughts and floods outside the delta area where the main livelihood strategy is rain-fed smallholder farming (Wang et al., 2003). Because of these dynamics, any interventions to conserve mangroves should consider both ecological and socioeconomic factors (Wagner & Sallema-Mtui, 2016).

1.3 APPROACH TO MANGROVE PROTECTION

Since 1980, the Government of Tanzania and other development actors have undertaken a variety of initiatives to reduce mangrove deforestation and degradation, and to restore, rehabilitate, and preserve mangrove areas. From independence in 1961 until the 1990s, initiatives set into motion by the government mainly focused on strict protection of mangroves for timber production. Since the 1990s, the approach to mangrove protection has changed, with new efforts more focused on collaboratively managing mangroves with local communities. This turn toward community-based management was motivated by several challenges that emerged from both the local and national scales.

At the national level, failure by the Tanzanian state to protect all forests effectively (including mangroves) in the 1970s and 1980s justified the involvement of non-state actors in the management of forests. At the local level, from the colonial period to the present, local residents have actively resisted state-led protection interventions on mangroves and other coastal resources because it marginalized their resource dependency on the coastal ecology. As a result, recent efforts by the government to continue with strict protection approaches, such as establishment of new marine parks in the late 1990s and mangrove forest reserves, have faced serious implementation challenges, including resistance from coastal residents who complain that these forest reserves and marine parks cut them off from their main livelihood activities. It is evident that the forest reserve-based management approach since the early 1900s and the subsequent 1987 ban on mangrove product harvesting has failed in most mangrove areas (Mangora, 2011; Samoilys et al., 2013). This is in part due to the lack of an appropriate institutional framework for the allocation of management rights and responsibilities between the local government and the state, as well as weak government enforcement capacity (Kulindwa et al., 2001; Rabe & Saunders, 2013; Saunders et al., 2010; Semesi, 1992). Increased demand for paddy rice fields and mangrove products have created additional threats over recent decades, which has cast doubts on the viability of the current mangrove management approach in Tanzania (Brown et al., 2016; Mangora, 2011). In 2010, recognizing these pressures and limitations of strict government protection, the Tanzanian government introduced new models for governance and tenure arrangements focused around PFM. The details of these new models, in particular how the associated allocation of rights and responsibilities have been negotiated between stakeholder groups, are outlined in Chapter 3.

Most recently, there is growing interest in understanding the role of mangroves in terms of their carbon stock pools, ability to sequester carbon, and impact of converting mangroves to other land uses (Mangora et al., 2016). The East Africa Mangrove Carbon Project is being carried out by University of Dar es Salaam, TFS, and the US Forest Service within the Rufiji mangrove research and demonstration forest (9,200 ha). There are likely to be new projects that will provide financing for enhancing carbon pools in mangroves.

2 METHODOLOGY

A load of mangrove poles shipped from the delta. Credit: Mwita Mangora/ University of Dar es Salaam

The mangrove governance and tenure assessment team used a mixed method approach to gather and analyze both primary and secondary data at multiple levels of governance from the national to local levels. The data collected provided insights into:

- The extent to which national laws and policies in relevant sectors (such as forestry, fisheries, wildlife, and agriculture) address forest and land governance, especially tenure rights in mangrove forests;
- The effects of national laws and policies on local institutions for mangroves governance; and
- The impact of governance arrangements on mangrove status and livelihoods, with particular attention to gendered impacts.

In assessing different mangrove management interventions, special attention was paid to the distribution of rights and powers between the state and local people (tenure dimensions) and the interaction between the state and community actors (governance dimensions). The study sites focused on examples from the range of tenure regimes being reviewed that, broadly speaking, include mangrove management by the state alone, and management by the state in collaboration with communities and individuals.

The study started with a review of the literature followed by a scoping visit to explore the key governance issues, identify main actors, and narrow the selection of field sites. This was followed by additional literature reviews and field data collection trips. The research team comprised both male and female researchers who conducted interviews and group discussions with younger and older male and female groups separately. Conducting multiple interviews and discussions increased the opportunity for cross-validation of results and improved the credibility of findings. Research activities concluded with a validation workshop to present, discuss, and update preliminary findings. The validation workshop was held a month after field data collection to allow time to analyze data and summarize the main findings for discussion during the workshop. In attendance were representatives from the ministry, TFS, WWF, University of Dar es Salaam, National Environment Management Council (NEMC), and Rufiji District Council. Field data collection in four communities in the Rufiji delta provided a grounded overview of local context and key issues, which aided in the refinement of data-gathering instruments.

2.1 SITE SELECTION

The Rufiji river delta mangrove forest, selected as the case study area (Figure 2), is located about 100 km south of Dar es Salaam, the biggest city and commercial capital of the country. While there are several coastal mangrove areas in Tanzania, the Rufiji delta provides the ideal case study for several reasons. First, it is the largest single mangrove forest in the East African region and the second largest river delta in Africa, covering 53,255 ha, and representing almost half of the mangrove area in Tanzania. The Rufiji River catchment area covers 20 percent of the country, making it the largest river in Tanzania (Wagner & Sallema-Mtui, 2016). Given its large size and proximity to Dar es Salaam and Zanzibar, the Rufiji delta is representative of the type of threats most other mangroves in the country experience (personal communication with three TFS officers in Dar es Salaam, December 2015).

Second, in Rufiji, the historical coexistence of delta people and mangrove forests has necessitated the introduction of various co-management arrangements. This study is keen to distill key governance and tenure lessons from these new arrangements to improve mangrove co-management in the delta as well as inform co-management approaches in other parts of the country.

Third, the Rufiji delta is characterized by a rapidly changing and uncertain socioecological context. Following flooding due to heavy rains in the late 1980s, several Rufiji River tributaries and distributaries changed their course resulting in increased freshwater flow and reduced salinity in the northern part of the Rufiji delta (Wagner & Sallema-Mtui, 2016). As a result, the area has become favorable for paddy rice farming since the early 1990s. To respond to the increased threat of paddy rice farming, the government actively implemented mangrove protection initiatives from the early 1990s. The main state-led protectionist intervention in the Rufiji delta has involved burning farmers' temporary stilt huts (*madungu*) and burning young rice farms almost annually during December and January since the early 1990s. This has stimulated substantial resentment and protest from local farmers. The researchers avoided conducting fieldwork for this study during the time TFS was actively burning rice farms and farm huts (December and January). Despite these forest protection efforts, as well as more PFM approaches, paddy rice farming continues to expand inside the delta area. In response, the study has focused on active conflict sites to understand how people–state relations are affecting the range of mangrove forest management initiatives recently implemented.

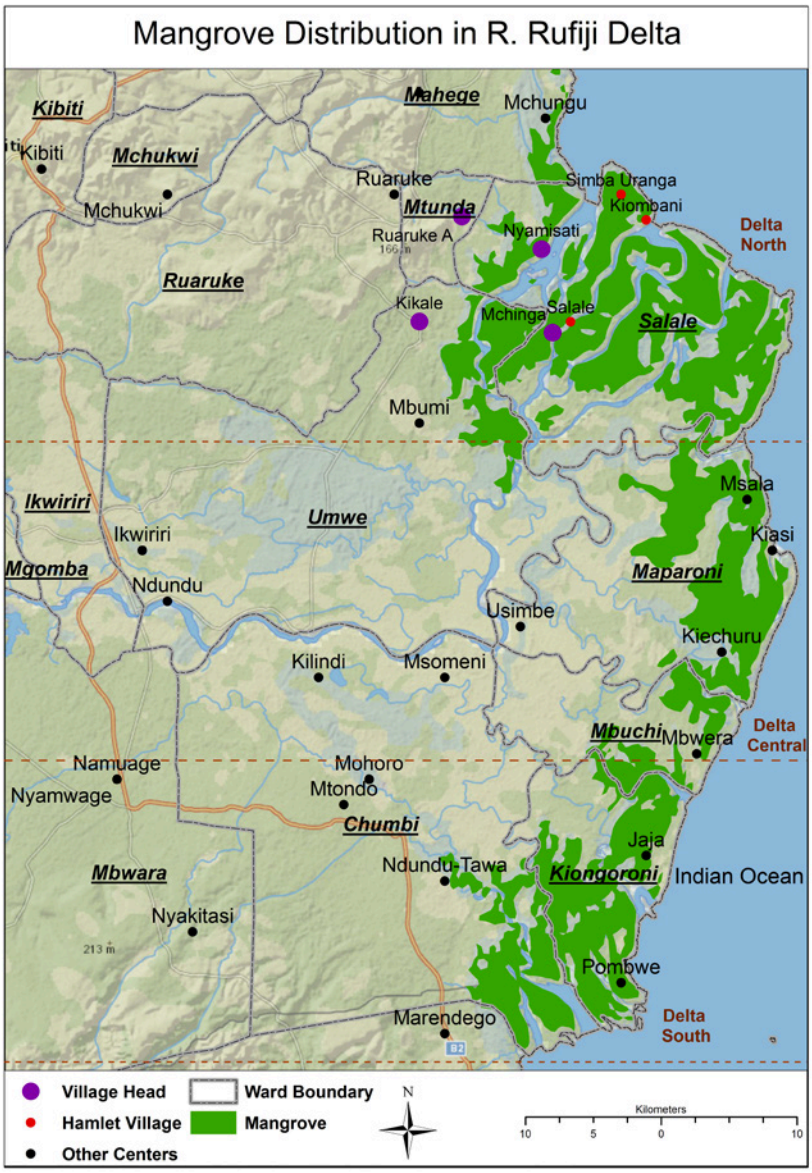


Figure 2. Mangrove distribution in the Rufiji estuary and location of the study villages.

Source: Ojwang (2017)

Finally, the existence of different institutions and organizations working on mangrove forests in the Rufiji River delta provides an opportunity to leverage data and share findings for greater impact. Currently, the Vice President's Office, through the Rufiji District Council, is implementing a project to develop core capacity to adapt to the impacts of climate change in productive coastal zones of Tanzania. The project involves formation of community members' groups that are involved in planting mangrove seedlings and rehabilitation, among other activities. Moreover, the University of Dar es Salaam's Institute of Marine Sciences, in partnership with the US Forest Service, has signed a memorandum of understanding with the Government of Tanzania through TFS to establish a Mangrove Research and Training Center (MRTC) in the Rufiji delta. This initiative has supported the collection of biophysical and socioeconomic data in the area. This assessment thus makes a timely contribution on socioeconomic and governance aspects of mangrove management, which will support the knowledge base of this emerging research center.

2.2 DATA GATHERING AND ANALYSIS TECHNIQUES

This assessment is based on data gathered at the national and sub-national levels. It uses interviews with national experts alongside a review of policies, legislation, regulatory guidelines, and reports. These reviews identify the relevant provisions in forestry, wildlife, fisheries, agriculture, as well as land and environment sectors that affect, either positively or negatively, mangrove forest tenure and governance in the country. At the sub-national level, results were informed by key informant interviews (KIIs); focus group discussions (FGDs); field observations; and a review of gray literature, including plans, by-laws, village assembly meetings, and other records. Broadly, the purpose of KIIs was to understand past and current people–mangrove interactions and the institutions that mediated these relationships. The methodological tools utilized in this assessment are provided in Appendix B.

The assessment team conducted a reconnaissance visit in December 2015, which included meeting with national-level stakeholders and district/zonal officials, and FGDs in two communities (Nyamisati village and Mchinga village, Salale hamlet). In Dar es Salaam, both TFS officials responsible for mangrove governance and staff from the University of Dar es Salaam's Institute of Marine Science provided contextual information. Table 2 summarizes the major data-gathering activities.

Prior to fieldwork in the four villages in Rufiji delta area, KIIs were held with several national and sub-national actors as summarized in Table 3. Interviews with national actors aimed to understand the origin and implementation of the various policies, legislation, programs, and plans affecting mangrove forest tenure and governance at the national and sub-national levels. These interviews also solicited opinions on future prospects of mangrove governance given past and current interventions on mangrove management in the country.

Following the reconnaissance visit, four villages were selected including two villages inside the immediate delta area (Mchinga and Nyamisati) and two outside the delta area (Kikale and Ruaruke A) that had mangrove forests (Figure 2). Table 4 provides a summary of the main features of these four villages. While the villages are similar in terms of demographics, as well as their main uses of mangroves and dominant livelihood activities, they differ with regard to the types of mangrove management interventions implemented. For example, Ruaruke A has not had any rehabilitation programs; however, the other three villages are now part of a project that aims to rehabilitate mangroves. Of the four villages, two have JFM programs underway.

Table 5 presents the list and locations of FGDs and KIIs conducted at the village level to gather data. Each village visit included four FGDs (one each with older men, older women, younger males, and younger females) separately in groups of 8–12 participants. Young women and men were categorized as between 18 and 30 years, and older women and men as 31 years and above. Within the FGDs, topics focused on current tenure (mangrove rights distribution) and mangrove governance, local residents' understanding of management approaches, historical context of mangrove management, and perceptions on the fairness and effectiveness of mangrove management interventions implemented in the delta area. FGD participants represented all hamlets/sub-villages in the village. FGDs were conducted at the most convenient location for all, given transport options in the delta area.

Additionally, in every village, at least five KIIs were held with official village leaders, specific village members, or representatives of village committees/groups involved in mangrove activities. Brief, targeted interviews were held with one to two older persons (above 50 years of age) to follow up on the community's history and specific aspects of mangrove management activities in each village. The subjects covered included individual

Table 2. Schedule of fieldwork activities

No	Activity	Dates
1.	Reconnaissance visit in Dar es Salaam	December 2015
2.	Reconnaissance visits in Rufiji district and in two villages	December 2015
3.	Interviews with national-level mangrove governance actors in Dar es Salaam	March 2016
4.	Interview with zonal and district-level mangrove governance actors in Rufiji	March–April 2016
5.	Fieldwork in four villages: KII, FGD, review of documents and observations	March–April 2016
6.	Follow-up interviews with zonal and district-level mangrove governance actors in Rufiji	April 2016
7.	Debriefing workshop involving national- and sub-national-level actors to present findings for validation, revision, and dissemination in Dar es Salaam	13 May 2016

Table 3. KIIs at the national and district levels

No	Participant	Organization	Sex	Date of interview
1	Manager, Natural Forestry	TFS Headquarters	M	December 2015
2	Officer, Resource Assessment	TFS Headquarters	M	December 2015
3	Officer, Resource Assessment	TFS Headquarters	M	December 2015
4	Scientist and Researcher	IMS and Rufiji Mangrove Research and Training Forest	M	December 2015
5	Social Scientist and Researcher	IMS and Rufiji Mangrove Research and Training Forest	F	December 2015
6	Director, Beekeeping and Forestry	TFS	M	March 2016
7	Zonal Manager	TFS Rufiji	M	March 2016
8	Assistant Zonal Manager	TFS Rufiji	M	March 2016
9	Officer, Investment Facilitation (Project)	Tanzania Investment Center	F	April 2016
10	Officer, Projects	Rufiji Basin Development Authority	M	April 2016
11	Officer, Compliance and Enforcement	National Environment Management Council	M	April 2016
12	District Executive Director	Rufiji District Council	M	March 2016
13	District Forestry Officer	Rufiji District Council	M	March 2016
14	Head of Land, Natural Resources & Environment	Rufiji District Council	M	March 2016
15	Project Coordinator	Vice President's Office/UNEP Project Rufiji	M	March 2016
16	WWF Officers (2)	WWF Coastal East Africa Initiative	M	May 2016
17	Principal Environmental Management Officer and Head of Environmental Research Coordination Department	National Environmental Management Council	F	May 2016

Table 4. Information on the villages selected

	Delta villages		Non-delta villages	
	Mchinga	Nyamisati	Ruaruke A	Kikale
Date village established	Settlement began in 1974 and registered in 1982	Settlement began in 1972 and registered in 1982	Settlement began in 1974 and registered in 1982	Settlement began in 1974 and registered in 1982
Total population	2,726	2,100	1,944	2,030
Total households	644	517	400	300
Main livelihood activities	Agriculture, fishing, forestry products business	Agriculture, fishing, forestry products business	Agriculture	Agriculture, fishing
Involvement in mangrove management	Joint Forest Management Agreements (JMA) Taungya system (individual farming permits/licenses) 7 rehabilitation groups	JMA Taungya system (individual farming permits/licenses) 10 rehabilitation groups	None	5 rehabilitation groups
Interaction with mangrove forests	Paddy rice, pole cutting, fishing	Paddy rice, pole cutting, fishing	Paddy rice, pole cutting, fishing	Paddy rice, pole cutting, fishing

Table 5. KIIs and FGDs at the village level

Villages	No. of FGDs	No. of Participants	No. of KIIs	No. of Participants	
				Female	Male
Nyamisati	1 FGD with older men	8	7	3	4
	1 FGD with older women	8			
	1 FGD with younger men	8			
	1 FGD with younger women	8			
Kikale	1 FGD with older men	9	6	3	3
	1 FGD with older women	8			
	1 FGD with younger men	9			
	1 FGD with younger women	8			
Ruaruke A	1 FGD with older men	8	6	3	3
	1 FGD with older women	8			
	1 FGD with younger men	8			
	1 FGD with younger women	8			
Mchinga	1 FGD with older men	7	7	3	4
	1 FGD with older women	8			
	1 FGD with younger men	10			
	1 FGD with younger women	8			

Focus group discussion with older men in Mchinga village, March 2016. Credit: Baruani Mshale/CIFOR

Key informant interviews with women in Mchinga village, December 2015. Credit: Baruani Mshale/CIFOR

farming permits, community involvement in mangrove patrol exercises, and recently introduced mangrove group rehabilitation schemes (described in detail in the following sections). Conducting the interviews with two elderly persons enabled collective reflection, particularly with regard to people–mangrove interactions and activities implemented during the 1970s and 1980s.

At the district/zonal levels, a courtesy call was made to the District Executive Director (DED) and subsequent KIIs were held with his officials (a District Forestry Officer [DFO] and the Head of Land, Natural Resources, and Environment). A visit was also made to the southern delta area (Muhoro), where interviews were held with the area TFS officer responsible for mangrove and terrestrial management, and with a few community members to gather information about threats and approaches to mangrove conservation in the southern delta area and their challenges and successes/failures to date.

Findings from interviews were jointly agreed upon among the research assistants based on discussions over transcripts. Disagreements or issues that needed further clarity were resolved through debriefing that involved discussions and reexamination of data sources. A qualitative content analysis technique was used. Data were condensed and organized (i.e., shortened) without losing quality. Open coding was performed and codes were grouped into categories. Subsequently, themes were identified as stipulated by Graneheim and Lundman (2004). In addition, document analysis forms were constructed and used to extract relevant data from the range of reports and records.

3

MANGROVE GOVERNANCE AND TENURE

NATIONAL POLICY AND LEGAL FRAMEWORK

A distributary of the Rufiji river. Credit: Planet Labs Inc

The Tanzanian government has addressed mangrove management since the German colonial administration at the end of the nineteenth century. Since that time, there have been significant changes in the approach taken to mangrove management. This chapter briefly reviews this history, and outlines Tanzania's current legal and policy architecture to identify which policies, laws, and strategies are the most important for mangrove governance. Additionally, it analyzes and assesses the extent to which this framework provides an enabling environment for effective mangrove governance and local tenure security.

3.1 POLICY AND LEGAL ARCHITECTURE FOR MANGROVE GOVERNANCE: A HISTORICAL PERSPECTIVE

Tanzania has a long history of mangrove management and use, going back to the colonial period. The German colonial administration established a mangrove ordinance in 1898 that covered all mangroves in the country (Adams, 1992). This first mangrove ordinance designated all mangroves as state property to be managed for their timber value. Local people were allowed regulated access and use of mangrove resources strictly for domestic consumption, but were prohibited from obtaining mangrove products for commercial purposes. Local people's contestations over access to and use of mangrove resources were some of the reasons behind the bloodiest anti-colonial revolt, the Maji Maji war, from 1905 to 1907. This war started in the Rufiji area and spread across the entire southern part of the country (Sunseri, 2009).

The British colonial administration continued the legal protection of mangroves as stipulated in the Forests Ordinances of 1928-1930 because of the continued history of mangrove pole use and trade. Mangroves were managed under the Forest Ordinances together with other terrestrial forests. This management of mangrove forests initially focused only on wood products and stipulated a complete ban on tree felling. While the colonial government harvested mangrove timber for railway construction in Tanzania (then Tanganyika) and in its other colonies (particularly India and Rhodesia), it actively prevented local populations from accessing mangrove forest areas for other uses such as obtaining non-timber products (Sunseri, 2009).

In 1957, the British colonial government developed the Forest Ordinance of Tanzania (then Tanganyika), which remained the principal legislation on forests in the country until 1998, when a new Forest Policy (1998) was adopted. The ordinance established forest management authorities, comprising a ministry, forest division, forest officers, and forest reserves, with procedures for establishing and managing forest reserves. Forest management considered people living in and around forest reserves as threats to forest conservation and hence called for their removal from forest reserves and prevented their access and use of forests. Until the introduction of JFM in mangrove management in 1998, all mangroves were managed as strict forest reserves stemming from Forest Ordinance No. 389 of 1957.

Despite this strict protection of mangroves under the law, the government had limited success in actively managing mangrove areas through the late 1980s, due to the lack of an appropriate institutional framework, and weak enforcement capacity to implement the existing forest laws (Kulindwa et al., 2001). Delta residents noted that most commercially harvestable mangroves disappeared in the 1970s and 1980s when there was no active management.

In response to this loss of mangrove cover, in 1987 the Government of Tanzania announced a total ban on mangrove harvesting to pave the way for a comprehensive assessment of the status of mangrove forests to inform the design of a national mangrove management plan. Under the National Mangrove Project that began in 1988, a National Mangrove Management Plan was created in 1991. This was the first ever in Africa, and gave the responsibility of regulating and monitoring the production and use of mangrove forests to a small team of specially trained forest officers under the direct control of the Director of Forests (Adams, 1992; Wang et al., 2003). The project team provided advice and assistance to local people and government officials on mangrove management. The National Mangrove Management Plan identified the two immediate threats across the country that needed urgent attention: conversion of mangrove areas into salt evaporation pans, and rice fields. The plan divided mangroves into four management zones: protection, production, degraded areas for recovery, and areas to be set aside for development (Diop et al., 2002). The plan recognized that forestry officers alone would not succeed in effective mangrove management, which opened up opportunities to engage the active support of the local population living in and around mangrove forests. Part of this Mangrove Management Plan included a number of projects in the Rufiji such as the Rufiji Environmental Management Project; in addition, there were other initiatives such as the Tanzania Mangroves Protection Association and the Rufiji Beekeeping Project (Wang et al., 2003). Supplementing these efforts were other coastal projects such as the Tanzania Coastal Management Partnership, formed in 1997 as a joint effort between the National Environmental Management Council, the University of Rhode Island, and USAID (Wang et al., 2003).

Given that different mangrove ecosystems faced different types of threats and that some were in peri-urban areas while others were in rural areas, the plan advocated a pilot program to test a variety of participatory approaches to mangrove management in three locations. Despite the promise of these pilots, the mangrove management plans were not effectively implemented due to a lack of legal authority, inadequate technical and financial resources for enforcement and implementation, lack of a clear institutional framework (Kulindwa et al., 2001), limited trained personnel, and lack of community involvement (Diop et al., 2002). As a result, Rufiji delta mangroves, like other mangrove forests in Tanzania, have remained territorial (state) forest reserves. Despite these challenges, coastal communities have reported that mangrove forest coverage had expanded during the last 10 to 15 years due to active management. However, many lament that this expansion has been, in most cases, at the expense of local livelihoods.

3.2 CURRENT POLICIES AND LAWS FOR THE GOVERNANCE OF MANGROVES

To systematically analyze the legal and policy environment affecting mangrove forest governance and tenure in the country, a review of policy and legislation examined 8 international and regional instruments, 21 national laws and policies, and 18 laws pertaining to local governance and institutions relevant to mangrove management. The assessment team examined the regulatory tools to understand their approach to five key categories of variables that relate to governance and tenure issues:

- Rights, security of tenure rights, and their distribution among stakeholders;
- Community participation, including the participants' knowledge and capacity, and ability to undertake conflict resolution;
- Benefits, costs, and incentives, including financing mechanisms for sustainable mangrove management and permitted uses of mangrove forests;
- Institutional coordination among government departments and agencies, including on biodiversity conservation; and
- Gender equality/equity.

Appendix C provides a summary of the policy and legislative environment following this framework for mangrove governance in Tanzania, with a discussion of key elements below.

Broadly speaking, mangrove management in Tanzania follows legislation and guidelines governing the forest sector. For over 40 years, the 1957 Forest Ordinance was the primary forest management legislation. The 1998 Forest Policy replaced it and promoted devolution in forest management, which received legal support through the 2002 Forest Act. As a result, the Forest Policy and Forest Act have the most direct impact on mangrove governance and tenure. Subsequently, development of specific regulations and guidelines convert the provisions of the 1998 Policy and the 2002 Act into action, though other policies and laws interact with the forest legislation. In this legislation, there are no specific provisions for mangroves; rather, the forest management approach writ large encompasses mangroves.

From the perspective of rights and security of tenure, the Village Land Act (1999) governs settlement areas, while the Land Act (1999) and Forest Act (2002) govern the forest areas surrounding the settlements. The Forest Act provides for the categorization of forests into national forest reserves, local authority forest reserves, and village land forest reserves. National forest reserves are centrally owned and managed by the central government, local authority forest reserves by district councils, and village land forest reserves by village governments. All mangrove forests are categorized as national forest reserves and are under the management authority of TFS, a government agency, which pursues a protectionist approach that prohibits consumptive use such as timber harvesting unless specifically licensed. As a result, the Forest Act takes precedence over the Village Land Act with respect to management and use of forest reserves. Due to the protected status of mangrove species, if mangroves are planted on village land, the customary rights of the village land will presumably be revoked and the mangrove areas will technically be protected. However, there have not been any recorded cases where this loss of customary rights has occurred due to mangrove restoration or protection.

A more common circumstance is related to agricultural fields established within a reserved forest. Since 2011, TFS has legitimized "old" fields in the reserved forests, while newer clearings are actively prohibited (through burning of fields and huts). Despite these protectionist measures, provisions in the Forest Policy and Forest Act recognize the need for local communities to access resources and provide mechanisms for permitting resource use. As a result, some rights may be devolved to the local authority or village to establish local authority forest reserves or village land forest reserves, but the management of these would remain protectionist in nature.

The Forest Policy recognizes the importance of trade in non-wood and wood products as sources of income, and the Forest Act provides for the harvest and trade of forest products based on licenses issued to authorized users at the district level. Similarly, the Beekeeping Policy acknowledges the importance of beekeeping and honey production in smallholder farmer livelihoods. The National Environmental Policy, a framework instrument that views environmental protection and biodiversity conservation as important to the national economy, backs up all the provisions that provide options for devolving rights in the Forest Policy, Forest Act, and Beekeeping Policy. Although the central government owns and manages mangroves, the law does not entirely outlaw their use for trade or subsistence. Subsistence uses of forest products are permitted only for villages inside the delta, and not for the neighboring communities adjacent to the delta. The current policy framework does create administrative hurdles for commercial activities. As a result, although the government encourages forest use as a pathway for economic benefit and poverty reduction, it is under the auspices of a state-managed system.

Community participation, knowledge, and conflict resolution, related to conservation and management of mangroves is often held up as important dimensions of resource governance linked to tenure security and sustainable use and management. Community and broader stakeholder participation is entrenched in various statutes and policies such as the Village Land Act (1999), National Environmental Policy (1997), Forest Policy (1998), and Forest Act (2002). The National Environmental Policy, for example, is unequivocal about the need for individuals, groups, and organizations to be involved in decisions that potentially affect where they live and work. It views stakeholder participation as a fundamental prerequisite for sustainability. Likewise, both the Forest Act and Forest Policy view participatory forest management as a strategy for achieving sustainable forest management and promoting community management or co-management of forest and woodland resources. This means involving all stakeholders in the process of demarcating forest reserves, devising mechanisms for benefit distribution, and leasing out forest reserves to private investors.

Traditional beekeeping in a household mangrove woodlot. Credit: Mwita Mangora/ University of Dar es Salaam

Importantly, the Local Government (District) Authorities Act (1982) provides legal authority to villagers to propose by-laws for adoption by the village assembly prior to approval by the district council. Village-established by-laws can touch on any matter, including local rules for conservation and management of local resources. Taken together, these acts not only support local decision making, but also provide a legally recognized mechanism for embedding locally established rules. Unfortunately, none of these measures applies in any meaningful way to mangroves, but to terrestrial forests— especially in state-owned terrestrial forest reserves—where co-management between state actors and local communities is pursued.

Although the Forest Act appears not to have a provision relating to conflict resolution, mechanisms for resolution of forest and land conflicts are stipulated in other statutes. The Land Disputes Court Act (2002) gives a range of local to national institutions the jurisdiction to consider land disputes. These courts include the Village Land Council, Ward Tribunal, District Land and Housing Tribunal, High Court, and Court of Appeal, thus spanning the entire scale and levels of natural resources in Tanzania, from the local, village level to national level. The acts that established these various courts encourage the resolution of disputes through negotiation and conciliation, and the Ward Tribunal Act (1985) encourages the resolution of natural resource conflicts through mediation. These acts also recognize the jurisdiction of informal elders' councils, village councils, and ward-level tribunals. Village councils, for example, can establish an adjudication committee comprising members elected by the village assembly.

From the perspective of costs, benefits, and incentives, the PFM1 guidelines provide for two broad mechanisms through which people living in and around forests can directly benefit from forest management: JFM and CBFM. Under the JFM approach, mangrove forest ownership rights remain with the state and the state enters into agreements with adjacent communities for managing and using mangrove forests. JFM is the most applicable mechanism for community engagement in mangrove forests, as all are state-owned, while the CBFM approach is applicable to non-state forests on community land. In support of PFM guidelines, the forestry sector has developed specific guidelines for benefit sharing under JFM (Ministry of Natural Resources and Tourism, 2013). These guidelines provide details on how to distribute benefits between resource users and government. Additionally, the Tanzania Forest Fund is a financing mechanism under the Forest Act that may be used in mangrove areas to promote the development of community forestry, by providing advisory services and assistance to community groups. While the needed mechanisms and institutional frameworks exist, lessons from early experiences are only just emerging and clearly have not been applied to mangrove systems.

Cross-sectoral coordination on environmental issues and contributions to biodiversity conservation are highlighted across a range of policy and legislation. The National Environmental Policy (1997) recognizes the contribution of different sectors and their role in environmental management. The Environmental Management Act (2004) binds each ministry to establish a section that coordinates with other ministries to address the complexity and inter-relatedness of environmental problems. This act vests responsibility for environmental coordination in the Office of the Vice President (VPO). The Forest Act aligns well with the Environmental Management Act, and as one of its objectives, promotes coordination and cooperation between the forest sector and other agencies and bodies in the public and private sectors that have interest in or responsibility for natural resource management. In practice, managing mangrove forests requires particular collaboration with fisheries and marine resource departments, but it is not clear that the Forest Act or other environmental legislation specifically foresees or promotes this level of collaboration. Thus, while Tanzania's legal framework generally calls for cross-sectoral integration, true collaboration on mangroves remains elusive.

Gender equality is covered in detail in policies and legislation affecting forest use and management. The National Environmental Policy (1997) sets the foundation for gender equity in resource management. It acknowledges women's knowledge, experience, and traditional skills in resource management and promotes their involvement and integration. In particular, the policy views women's empowerment as a critical factor in environmental sustainability. The Forest Policy (1998) requires that clarity in the definition of forest and tree rights be established for both men and women, and indeed, requires that both men and women are

1 PFM implementation in terrestrial forests has been underway for close to two decades in Tanzania. It is expected that lessons learned to date will be applied, as that approach is currently being introduced in managing mangrove forests (beginning in 2015). Success stories on the impact of PFM on forest resources have been recorded in Tanzania in terms of recovering flora and fauna, and effective management at minimum cost (Zahabu et al., 2009). On the other hand, PFM reportedly has a number of problems associated with poor governance at the village level (Brockington, 2007) that resulted in declining forest stock (Zahabu et al., 2009).

supported in tree growing and other efforts aimed at promoting sustainable forest use. It further calls for a gender policy for the forestry sector, including the recruitment of women in extension services and other forestry services. The Forest Act (2002) further expands the scope for women's involvement in decision making by requiring that local-level resource management institutions, such as village land forest management committees, pursue gender balance in their composition.

The above review indicates that Tanzania's legal framework provides an architecture that is generally supportive of forest governance principles along basic dimensions such as community participation, gender equality, financial incentives/mechanisms, conflict resolution, and cross-agency coordination and collaboration. The forest sector instruments (i.e., the Forest Act and Forest Policy) make explicit mention of and have requirements for each of these themes, including clarity in the definition of both women's and men's rights to forests and trees, and the need for gender balance in local-level forest management institutions and structures. In practice, however, there is a substantial policy/implementation gap. This is largely due to limited resources and capacity. The assumption is that implementation in mangrove forests lags behind terrestrial forests due to their unique challenges.

Taken together, these laws and policies provide an architecture for the governance of mangroves and forest resources more generally. Outside of the National Mangrove Forests Management Plan (1991), which was largely unimplemented, there have been no specific policies and legislation on coastal mangroves in Tanzania. While additional laws and policies specific to mangroves may not be necessary, more specific guidance on successful approaches to protect and rehabilitate mangroves are certainly necessary, alongside an overarching guidance document such as an updated National Mangrove Forests Management Plan. The main issue for mangrove and forest management is to support implementation and enforcement of laws and policies while evaluating results. The following section focuses on the extent to which these laws on paper are realized on the ground within the Rufiji delta.

4 MANGROVE GOVERNANCE AND TENURE IN PRACTICE IN RUFIJI DELTA

Informal settlement near cleared paddy fields. Credit: Carl Trettin/US Forest Service

This chapter focuses on the varied dimensions of mangrove tenure and governance in the Rufiji delta. It provides a broad context of how communities have settled within the delta, highlighting in particular the gender dimensions of mangrove use and management. It draws from the experience of local communities in four villages that have mangrove forests: two villages located inside the delta (Nyamisati and Mchinga), and two villages outside the delta (Ruaruke A and Kikale). The chapter ends with an examination of the wide range of challenges facing mangrove governance and management that has, over time, led to the government rethinking its approach to protecting mangroves.

4.1 PEOPLE'S RELATIONSHIP WITH MANGROVES IN THE RUFIJI DELTA

People have lived in the Rufiji estuary for centuries. There are 43 islands in the Rufiji, with many of them sparsely inhabited (Wagner & Sallema-Mtui, 2016). One Rufiji delta resident noted, "About 75% of our life depends on mangrove. The remaining 25% is divided between farming and fishing" (cited in Taylor, Ravilious & Green, 2003, 16). Here, they practiced seasonal migration corresponding to the seasonal flooding of the area. All current villages in the Rufiji estuary were officially established between 1969 and 1973 as part of the government-promoted villagization program (formation of Ujamaa villages), although there has been a much longer historical human presence in the delta. The establishment of Ujamaa villages was the main mechanism for implementing a Tanzanian model of socialism built on the African sense of a family, characterized by collective sharing of means of production (such as land) and working together in a community. The socialist government actively encouraged people to relocate to pre-identified village centers within the delta to facilitate easy delivery of social services, such as schools and health centers. The government assisted villagers with transportation to the identified village centers and provided them with tools, such as machetes (*mapanga*) and axes (*mashoka*), for clearing forests for farming and erecting houses. These initial settlement areas are considered separately from the mangrove forest area, but were initially authorized by the district government. It was during this period that residents initially cleared forests for farming rice and other crops (Semesi, 1991). Thus, the government played an important role in settling people in the Rufiji mangrove areas and through this process recognized their communal rights to land and resources. Paddy rice in the 1970s occurred at a very small scale and was not considered a major threat to mangrove forests.

The government later reversed its policies and began the process of evicting communities, which continues to the present. The government, through TFS, argues that while people were allowed to settle in the delta area in defined village boundaries, they were not expected to expand those areas over time. The government has not revoked the settlement rights granted to residents in the early 1970s. The current contestations result from increased demand by locals to expand beyond the settlement areas following local population growth and the emergence of rice farming. There are also new forms of in-migration by pastoralist communities severely affected by drought in inland areas. There have been specific controversial flashpoints on the issue of evictions, such as the government's role in the establishment of a REDD+ (reducing emissions from deforestation and forest degradation in developing countries) project in the Rufiji. Although the issue of evictions, particularly of the Warufiji (people who have long lived in the delta), has been highlighted by the media within this REDD+ project site created by an international conservation NGO (Beymer-Farris & Bassett, 2012), it has been argued that no such REDD+ site exists within the delta (Burgess et al., 2013).

Overall, census data indicates that the population has decreased in the southern part of the delta and has only had a low increase in the north when compared with non-delta areas (Mwansasu, 2016). The delta villages have similar demographic and socioeconomic features, including ethnicity (Ndengereko), and they pursue similar livelihood strategies, mainly smallholder farming and artisanal fishing practices. In general, despite being divided into different Ujamaa villages, Rufiji people exhibit a close community maintained through inter-marriage and limited marriages with other ethnicities.

These communities are dependent on the aquatic resources of the Rufiji delta, because mangroves are important breeding and nursery grounds for a large variety of fish, shrimp, and oysters for at least part of their life cycle, offering shelter and food. The Rufiji communities that depend on these fisheries are keenly aware of the role of mangroves in maintaining their productivity. Mangroves also stabilize the coastline, protecting it from erosion. Unlike artificially constructed coastal defenses, mangroves normally maintain themselves at little or no cost.

Communities have multiple forms of dependencies on mangrove ecosystems. Mangroves provide an alternative source of food (herbs, honey, fodder), income, and employment for the local fishing communities who use different mangrove species for fuelwood, fences, house construction, boat building, fish trap construction, and tannin and medicinal purposes (Adams, 1992) (see Appendix A). Delta residents may use mangroves for subsistence

use without TFS approval. Commercial uses, however, require specific permits based on the Guidelines on Forest Products Harvesting (October 2015), which governs forest products across both public lands and private forests. Mangrove poles have been extracted in commercial quantities, both for the local market and for export. Villagers in Kikale, Nyamisati, Ruaruke A, and Mchinga confirmed that they use dhows to transport mangrove poles to Zanzibar, where the market price is high. For instance, one older man observed that:

> [W]e *normally export mangrove poles to Unguja in Zanzibar, frankly speaking, sometimes illegally because of complexities associated with securing licenses and permit from TFS officials. We don't have any other option on this because we want to get money quickly*.
>
> [FGD with older men, Village D, 25 March 2016]

Mangrove forest products contribute directly or indirectly to important livelihood activities as testified by the following young woman:

> [M]*angrove trees are traditionally used for housing materials and to make fishing equipment. But we farm rice in mangrove areas, therefore local village life depends substantially on the nearby mangrove forest. However, we are not certain whether we shall be farming in a few years to come because there are threats for us to be evicted from our areas by the government, despite the fact that we are the ones who patrol in mangrove forests*.
>
> [FGD with young women, Village A, 28 March 2016]

Mangroves provide a range of direct and indirect goods and services to communities living in and around them and contribute to their livelihoods. Communities recognize the importance of the mangroves, as well as the insecurity of their tenure situation, despite the local history of settlement encouraged by government programs.

4.2 INSTITUTIONS FOR MANGROVE GOVERNANCE AT THE LOCAL LEVEL

In Tanzania, mangroves have been classified as forest reserves from the 1920s to the present, with the government retaining ownership rights and regulating other rights-based (access, use, management, alienation, and right to income) forest legislation. In practice, little formal management has occurred for much of this time.

Currently, mangrove management in the Rufiji delta involves TFS, the Rufiji District Council, and actors at the ward and village levels. Figure 3 presents the organizational structure for mangrove governance in the area. Broadly, at the national level, the Ministry of Natural Resources and Tourism (MNRT) is responsible for translating relevant national-level policies and legislation, such as on forestry, into specific guidelines and regulations. For instance, in 2013 the ministry issued *Guidelines on JFM Benefit-sharing Agreements* that were simplified and translated into Kiswahili in 2015 and are now applied for establishing JFM forests in mangrove areas in the Rufiji delta. At the sub-national district level, the TFS zonal level deals with the technical aspects of mangrove management while district councils deal with the regulatory aspects. Specifically, the district council issues harvesting permits for mangrove forest products (charcoal, timber, and poles) for both subsistence needs and commercial services, while TFS coordinates and monitors management and harvesting plans. District councils also review and approve village forest by-laws and management plans before they become legally binding for all villagers. At the village level, the village natural resource committee (VNRC) serves as the technical body for local community partnership activities with TFS and the district council in planning and undertaking mangrove forest management and use activities. The district council assists villagers through VNRC and village councils to develop village forest by-laws and village forest management plans while TFS works with VNRC in developing and implementing annual village forest management plans.

Based on this structure, the primary responsibility for mangrove management at the sub-national level lies with the TFS zonal manager's office. The zonal manager's office is also responsible for managing terrestrial forests found in the zone. Rufiji falls under the TFS eastern zone that covers four regions: Dar es Salaam, Pwani, Tanga, and Morogoro. The zonal level is above the district level, so the district forest manager and forestry officers (Nyamisati field office) report to him/her. The district forest manager is responsible for the entire Rufiji District while the forestry officers are specifically responsible for mangrove management in the delta area. The forestry office in the Nyamisati management unit under the district currently comprises three full-time employees who are responsible for the entire delta area of about 22,000 ha. Due to the limited number of employees to support forest management, TFS relies heavily on local community cooperation. TFS expects local residents to inform them about rule violations in or near villages, including cases where outsiders open up new farms.

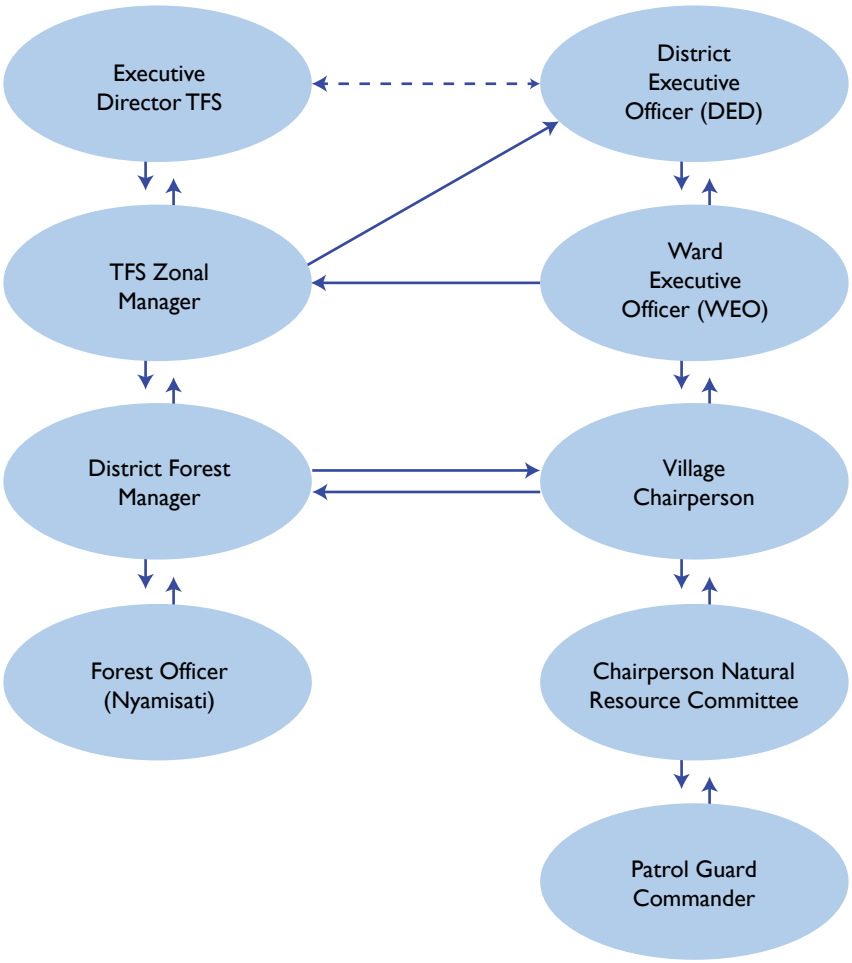


Figure 3. National, sub-national, and local-level institutions for the management of mangroves.

The organigram illustrates the hierarchical relationships among the different mangroves governance actors. Downward pointing arrows represent lines of command. Upward pointing arrows represent directions of accountability (i.e., reporting lines). Solid lines indicate direct/mandatory lines of communication/command and dotted lines indicate informal or discretionary lines of accountability/communication.

TFS mangrove management roles shared and coordinated between the zonal manager, district forest manager and Nyamisati officers include (1) providing technical expertise to village governments; (2) supervising harvesting permits and licenses to ensure adherence to the specified quotas, species, and harvesting locations; (3) training community members and VNRCs; (4) offering permits and licenses for harvesting mangroves (which cannot be authorized at the village level); (5) introducing policies and legislation responsible for mangrove forestry in accordance with social and economic changes; and (6) promoting adoption of alternative income sources to reduce excessive dependence on mangrove forests. While this structure can facilitate community access to and management of mangrove resources, in practice the relationship between local communities and government authorities has been one of difficult processes to obtain commercial permits, and conflicts over farming rights in areas of the Rufiji delta.

In theory, the government issues harvesting/use rights to private and community actors in different locations through TFS, with the cooperation of other local institutions. Requirements for commercial harvesting of mangrove forest products are expensive and difficult for local residents to undertake. Applicants must apply for a harvesting license from the DFO, and a transportation permit from the district forest harvesting regulation

committee. To obtain the harvesting license, the applicant must fill a specified form (Form FD.1A) and meet the following criteria:

- Complete form FD.1A, application letter, and attach minutes from the respective village council that confirms availability of specified forest products in the village.
- Hold permits to efficient harvesting equipment/machines, which will be given priority.
- Harvest in areas authorized and announced in the district harvesting plans.
- Follow the rules, as each applicant will be assessed on their past harvesting practices to follow instructions.

Subsequently the applicant must pay the license fees. These steps make it challenging for community members to comply with the guidelines, and as a result much of the local trade occurs without permits. Recognizing that the regulation of commercial forest product use was not effective, the Government of Tanzania banned all commercial harvesting of forest products in Rufiji District as of September 2016.

With respect to conflicts over paddy field expansion, in the early 1990s, when TFS was created from the former Forest and Beekeeping Division under the MNRT, active mangrove protection resumed in the delta area with a focus on strict protection. Since this time, government forestry authorities have discouraged mangrove clearance by burning rice fields and farmers' temporary stilt huts (*madungu*). This happens almost annually during the farm preparation season from December to January. Between 2011 and 2016, TFS officers burned almost 250 *madungu*. Currently, two cases demanding compensation from TFS are in court. Political statements further exacerbate this tension. Politicians at various levels have attempted to deescalate conflicts in the Rufiji delta, although in practice these have caused more confusion. For example, high-level politicians have promised efforts to degazette part of the reserved forest and grant it to local communities, or find ways that communities can benefit directly from the mangrove areas.

4.3 WOMEN, MEN, AND MANGROVES: GENDER DIMENSIONS OF FOREST USE AND MANAGEMENT

Deep-rooted sociocultural and religious norms regarding gender roles and the place of men and women have led to highly differentiated approaches among men and women in terms of mangrove management and use in the Rufiji delta. Women's use of mangroves is usually on behalf of their households/families. Such uses include collecting firewood, rice farming, and catching crabs and small fishes. Men usually obtain logs and larger poles (*boriti* and *nguzo*) for building houses and boats. Both men and women use mangrove forests to collect rope material (tree bark) and smaller poles (*fito*) for various uses. Women's close interaction with mangrove forests makes them knowledgeable about mangrove species, their use, and conservation status. Elderly women's knowledge of mangrove forests is well recognized among community members, particularly their knowledge of alternative herbal medicines from the forests.

Ironically, women's close interaction with mangrove forests becomes a disadvantage in many instances, because it disproportionately increases their exposure to law enforcement units compared to men. However, TFS officers reported that since they (TFS) do not have female law enforcement agents, they usually do not arrest women. They also stated that they feel it is unfair to arrest women who, most of the time, only illegally enter mangrove forests to collect firewood and other "small" things for household use and not for sale. One officer even noted that:

> *I feel bad arresting a woman because I assume there are children at home that she has to go back and take care of. Although we have not done it, but we are thinking maybe when we arrest a woman inside the forest we should jail and fine the husband instead [finished with a laugh].*

Within households, women play a crucial role in decisions regarding the use of mangrove lands for farming because they are the main actors in farming. In preparing new rice farms, men fell the mangrove trees while women and children gather and burn the fallen trees and branches. Women and children then sow rice seeds and continue with crop management, especially guarding against destructive birds and crabs. While women are working in the rice fields from December to June, men usually remain in the homestead taking care of children, or fishing in the rivers and open sea. Crabs are a serious problem for young rice, and residents apply a poison that kills them. NEMC revealed that use of that poison kills not only crabs but also many species of young fish, affecting the ecosystem in general. Interestingly, while villagers mentioned crabs as a challenge to rice farming, they never mentioned their use of poison in dealing with the problem.

During the harvesting period, women and men work together but men retain and decide on the use of money from rice farming. A woman in Village C, for example, noted:

> *[Women] are the ones who cultivate rice, but when we harvest, our husbands decide on how much of the harvest will be sold and they [husbands] even decide on spending. We are okay about this because this is our tradition, who am I to protest? Akkkhaaaa [a local exclamation indicating a surprise that the respondent even asked this question because it is an acceptable norm]…I don't want to be divorced…*
>
> [FGD with older women, Village C, 26 March 2016]

This demonstrates that women do not have equal rights to men as to decisions on what to harvest, whether or not to sell, and how to spend the income generated from sales. They acknowledge having relatively equal rights in mangrove management issues and on farming practices. Women in Kikale village, for example, stated that they have rights to use the mangrove forest products and acknowledged that, in 2002, the government granted women rights to an area of 150 ha for beekeeping activities.

In the Rufiji delta area, women's participation in mangrove governance institutions exists on paper, but not in practice. All respondents to this study stated that they are aware of specific provisions for the village council and VNRCs, which specify that women must comprise at least 40 percent of their members. Women are also encouraged to attend public meetings such as village assembly meetings where important decisions on mangrove management are usually discussed and made. However, several factors arising from preexisting sociocultural and religious norms prevent women's active and meaningful participation in making and implementing decisions on mangrove management.

Additional factors affect women's attendance and participation in decision making. Meetings are usually held late in the afternoon when women are fetching firewood and water in preparation for evening meals. Even when meetings are organized at times that allow women to attend, it is generally considered bad manners for a woman to speak in public, particularly in front of men. A village executive officer (VEO) from Village B noted that in most instances, women attend VNRC meetings and other meetings but they usually do not air their views. They become *wajumbe ndio*, that is, they say "yes" to everything even if they disagree. When public meetings are held, women usually sit behind men or on another side away from the high tables where the leadership sits. This arrangement of public spaces for deliberation further affects women from airing their views. Some women noted that even when they want to participate in public meetings, the leaders usually do not give them a chance to speak.

With the exception of the recently introduced mangrove rehabilitation groups (*mwezeshe manamke* program), women are not formally involved in mangrove management activities, such as conducting mangrove patrols with the TFS officer. They expressed a desire to be involved in management activities, arguing that they too know about the forest and would like pay for conducting patrols. A TFS officer stated that women are usually not involved in management activities because they tend to have limited time for these activities, given their extensive household chores. He further noted that TFS pays women special consideration, such as paying them directly instead of paying their husbands, to ensure the money will reach the woman.

In general, the level of women's involvement in mangrove management remains low and there are not specific interventions that aim to enhance women's participation in mangrove decision making. Although women use mangroves in particular ways closely related to their gender roles in households, this is not reflected in management and group leadership. Women's exclusion is not unique to this delta and is a wider problem in mangrove and forest management. One of the three mangrove management schemes discussed further below is called "enable a woman." It is still too early to tell how effective this project will be in meaningfully integrating women into long-term mangrove management modes.

4.4 PRESENT CHALLENGES TO MANGROVE MANAGEMENT IN THE RUFIJI DELTA

Effective management of mangroves under strict protection (forest reserves) has been difficult for a number of reasons: (1) pressure to expand paddy rice farming, (2) conflicts over forest use between local residents and outsiders seeking to use the forests, (3) increased demand for mangrove forest products, (4) political interference at the national and sub-national levels, (5) land scarcity due to recent influx of pastoralists and increasing demand for large-scale land-based investments, (6) a lack of government coordination, and (7) limited human and financial resources for effective forest extension services and rule enforcement. The sections below highlight how these threats affect mangrove management in the Rufiji delta, followed by a discussion of the different ways TFS and partners address these challenges.

4.4.1 Expansion of Paddy Rice Farming

The expansion of rice farming is the most pressing threat to mangrove forests in the Rufiji delta area. Both socioeconomic and environmental factors facilitate mangrove clearance. Although people have lived in the delta area since time immemorial and government in the 1970s promoted further immigration, rapid mangrove forest clearance for paddy rice only began in the 1990s. This rapid clearance resulted from heavy rains in upland areas flooding the Rufiji delta in ways that changed both salinity levels and river courses. These ecological changes favorably expanded the area for paddy rice. Increased rainfall during the 1998 El Niño rains increased the freshwater input into the area and continued to alter river courses, particularly in areas dominated by *Heritiera littoralis*, further expanding the area favorable for paddy rice cultivation. These ecological changes coincided with socioeconomic changes, particularly growing local populations and increasing in-migration of people from outside the delta (such as pastoralists). This increased numbers of paddy rice farmers as well as the mangrove forest area cleared for farming.

Changing climate conditions in the region also influence the increase in area under paddy rice farming. Residents explained that the increased propensity of droughts and floods are affecting agricultural productivity in the rain-fed areas outside of the delta area. As a result, farmers are moving into the delta to undertake rice farming, which relies on the flow of riverine water rather than unpredictable rains. Additionally, local residents and forest officers observed that migrants are engaging in harvesting and selling various mangrove forest products, particularly poles and charcoal for export outside the district. No empirical data was collected in this study to support or refute these claims.

Despite this recognized threat, paddy rice farming has proven difficult to control or eliminate. A total ban on rice farming is challenging since delta people have lived in the area for decades and they were originally encouraged by the government to settle in the area. Realizing this, TFS allows farmers to continue farming on old rice farms, but prevents them from opening new farms through additional mangrove clearance. TFS also introduced rehabilitation activities for degraded and deforested areas, which further limits opportunities for paddy farming. To discourage the establishment of new rice farms, TFS, in partnership with the police, burn new rice farms and farmers' temporary huts (*madungu*) in the delta area, increasing community tensions with government authorities. This differentiation between "old farms" where rice farming continues to be allowed, and the "new rice paddies" remains somewhat discretionary based on the opinions of TFS staff members and local police as well as their ability to detect recent expansion.

Newly planted paddy farm on cleared mangrove area. Credit: Mwita Mangora/ University of Dar es Salaam

4.4.2 Tension between Delta Residents and Outsiders

Mangrove resources are attractive not only to the delta residents, but also to neighboring villages outside the delta and people with capital from cities like Dar es Salaam. This growing demand for access to the delta area has created tension among these groups, creating new tenure and resource governance challenges. For instance, some affluent people from Dar es Salaam have hired residents to work for them in cultivating rice. Alternatively, neighboring village members may rely on friends and relatives inside the delta to identify areas for paddy rice or harvesting and sale of mangrove products. Given the challenge of separating these different interests and motivations, TFS has adopted a blanket approach that targets the delta residents, who may be working on behalf of outsiders.

Some delta residents have claimed that TFS officers have charged them with crimes that they did not commit, or used coercion to apprehend outsiders. For example, TFS officers have been known to revoke the legitimate farming permits of people farming on new plots, as a way to force them to reveal the names of the absentee outsiders whose investment and actions affect mangrove management. Delta residents prefer not to reveal the identities of outsiders and some of them argue that this level of internal policing is not their responsibility. This reluctance is due in part to the often blurred distinction between outsider and delta resident, as the "outsiders" often have a historical linkage or social connection to the delta residents, and in some cases may be individuals who out-migrated, and are sending resources back to their historic homeland. As a result, it can be difficult for TFS to distinguish who is an outsider and who is a legitimate delta resident.

TFS has tended to adopt the easier option of repeatedly punishing non-cooperating delta residents. Unsurprisingly, this has created significant tension and distrust between authorities and local residents. The current approach of criminalizing the delta residents is unlikely to help the TFS constructively control the influx of outsider capital in mangrove clearance. From a land tenure perspective, since the Rufiji land and forests belong to government, the delta residents have little incentive to exclude outsiders, and it appears that their risk of being caught and criminalized is lower than the reward (financial or social) of assisting outsiders to access land for rice paddy production.

4.4.3 Increasing Demand for Mangrove Forest Products

Since early 2000, there has been a notable increase in demand for mangrove forest products, particularly timber, poles, and charcoal from Rufiji to supply towns near Dar es Salaam and beyond. While the supply of mangrove products to Dar es Salaam has been mainly from the north (Bagamoyo and Pangani), improved transportation following construction of roads and bridges connecting Rufiji and Dar es Salaam in the early 2000s has made it easier to obtain mangrove products. In response, TFS field officers try to persuade local residents in Rufiji to serve as informants to assist them in identifying and apprehending illegal loggers in the vast delta area. These informants are usually paid some cash reward and their identities kept confidential. However, delta residents' participation as informants has declined over the years because on several occasions, their identities were leaked to rule violators. It is unclear who (villagers or TFS officers) revealed informants' identities to the rule violators.

While villagers accuse some law enforcement units of collaborating with the illegal loggers and putting the village informants at risk, TFS officers assert that at times it is the informant themselves who revealed their own identities to the illegal loggers in retaliation for delayed payment by TFS. As with the land tenure situation above, because delta residents do not have existing rights to make decisions and benefit legally from the mangrove forest, they have little incentive to manage it for their own community needs. Therefore, the most profitable solution is for some individuals to support illegal loggers in accessing the forest, as they may hire residents for labor, or pay for local knowledge, and for other individuals to cooperate with TFS field officers to capitalize on government enforcement incentives. Regardless, this approach of focusing on compensation of communities for enforcement is unlikely to result in an effective management regime. As noted above, the government is struggling to manage commercial harvesting, and as a result, as of September 2016 has banned forest product harvesting in Rufiji District.

4.4.4 Political Interference at the National and Sub-national Levels

Given the tensions that have emerged over community actions and government reactions on paddy expansion, the land and resource rights in the delta have become highly political issues. Growing political divisions along political party affiliations adversely affects mangrove protection and restoration initiatives in the delta area.

It has become common practice for villagers belonging to one political party to boycott activities related to mangrove management organized by leaders from a rival political party so that the latter would fail. They then use the failure for political purposes during the subsequent elections. Moreover, external political influence/interference, whereby higher-level politicians excuse or even legitimize local residents' unregulated use of mangrove forests is common. For instance, one TFS officer noted that during the run up to the 2015 general elections, all aspirants for political positions (ward councilors and Member of Parliament candidates from all political parties) promised residents that, if elected, they would ensure local people were allowed access and use of mangrove forest areas.

4.4.5 Land Scarcity Due to Influx of Pastoralists and Increasing Demand for Large-scale Land-based Investments

The recent influx of pastoralists relocated from Tanzania's southern highlands is also contributing to land contestation inside and outside the delta area. In the early to mid-2000s, the Tanzanian government relocated livestock keepers from the Ihefu wetland area to the Lindi region in southeastern Tanzania. However, pastoralists have been migrating northward from Lindi and Kilwa districts to Rufiji, where water availability and grazing lands make it more favorable for livestock keeping, compared to the area set aside by the government in Lindi. Pastoralists have also migrated from Lindi to Rufiji to avoid tsetse flies that transmit trypanosomiasis to both humans and cattle. While pastoralists have not moved into the Rufiji delta area yet, their presence within the Rufiji floodplains has reduced the land available to farmers, resulting in violent clashes between farmers and livestock keepers in recent years. To avoid these dangerous conflicts with pastoralists (which occur outside the delta area), farmers tend toward farming rice inside the delta area, which results in further mangrove clearance. This insecurity of land rights outside of the delta has caused ecological pressures in the delta where there is a perception of land availability and somewhat open access.

A similar dynamic of land-insecure people moving to the Rufiji to access seemingly available and arable land is reportedly occurring due to land-based investments in the region. Increased land allocations to large-scale, land-based investors, such as commercial rice farmers, and increasing medium-scale land investments, including areas in close proximity to the delta by urban dwellers from Dar es Salaam, is leading to migration from these contested areas to the Rufiji delta. While the land given to these investors outside the delta is not under forestry jurisdiction, these allocations reduce available land to delta residents and outsiders alike, pushing them to clear mangrove forests for farming and settlement. This is a major threat that will continue into the future.

A TFS representative from the national level further emphasized that these investors can quickly acquire land given their huge financial capital, but TFS often is not provided enough time for full consultations or mitigation actions. Increased demand for investment land and TFS' strategy to remove people from the delta area has created land scarcity in villages near the delta where relocation would have previously occurred. Neither TFS nor district councils have the financial resources to compensate villagers willing to give up land to accommodate those who are to be relocated from the delta area. As a result, aggravated land contestations can be expected in the near future. These dynamics mean that people continue to migrate into the delta, even though the government is unable to effectively incentivize or force historical residents or new migrants alike to leave the area.

4.4.6 Lack of Cross-sector Coordination

Lack of adequate coordination and cooperation among relevant government sectors seriously affects effective management of mangrove forests in the Rufiji delta. Nationally, the Fisheries Department has developed and facilitated the implementation of "guidelines for aquaculture projects in mangroves" without consulting the forest management authorities. This lack of coordination is also reflected at the local level for implementation, resulting in the fragmentation of resources and efforts, weakening TFS' ability to effectively manage the area. TFS officers observed that joint monitoring patrols between fisheries and forestry authorities would be more cost-effective and time saving given their inadequate human and financial resources (discussed in the next section). TFS officers also observed that at times they have failed to pursue dhows with illegally obtained mangrove products once they entered the open sea, which is outside their jurisdiction. These officers noted that if there were better mechanisms for coordination, TFS could assist fisheries authorities in apprehending illegal fish transported by land across the Rufiji District, among other activities.

In another incident, in Tanga, which is outside of the Rufiji delta, this lack of institutional coordination and collaboration resulted in serious conflicts between

Charcoal bags ready for export to Zanzibar and mangroves poles for export to Dar es Salaam at Nyamisati village, December 2015. Credit: Baruani Mshale/CIFOR

forestry and fisheries officers. Following the gazettement of the Tanga Coelacanth Marine Park (TCMP) in the Pangani area, the role of coastal mangrove management shifted from the Forestry to the Fisheries Department. In late 2011, after development of TCMP general management plans, fisheries officers apprehended field forestry officers, who were patrolling the area. TCMP officers considered the presence of forestry officers inside the park to be illegal because the Marine Parks and Reserves Act (1994) gives legal authority to fisheries officers in managing coastal and marine resources in areas designated as marine parks. TCMP covers an area of 552 km2, of which 85 km2 are terrestrial and 467 km2 are aquatic. While this incident motivated both government departments to discuss roles and responsibilities for managing mangrove forests, no policy or program has been designed to address the problem of overlapping jurisdictions between these two sectors, even though both the Forest Act and Environmental Management Act call for coordination.

Another coordination failure that affects mangrove management is reflected in conflicting policies between mainland Tanzania and Zanzibar. Currently, there are different policies regarding mangrove product harvesting and export outside the country. While mainland Tanzania allows production and sale of charcoal including from mangroves within the country, it prohibits charcoal export. In contrast, Zanzibari policies and regulations permit regulated charcoal export. As a result, charcoal (both legally and illegally) produced from the mainland, particularly the Rufiji delta (see Figure 7), is first transported by sea to Zanzibar before export to the Middle East and other markets. As a positive step, the two governments have signed a memorandum of understanding on forest management that is expected to address these discrepancies.

4.4.7 Limited Human and Financial Resources for Effective Rule Enforcement

TFS is operating with seriously limited human and financial resources. There are three full-time TFS officers and their assistants (casual laborers), and a few volunteer villagers—an insufficient force to patrol the large swath of about 22,000 ha using a single small boat. Inadequate financial resources to buy boat fuel and incentivize the volunteers and assistants further restrict the operation of both regular and impromptu patrols across the delta.

In delta areas such as Mchinga village, settlements are interspersed within the mangroves on small islands reachable only by boat. On the rare occasions that TFS

and district council forest officers have access to road and river transport, mangroves are difficult to patrol, especially the outer margins, which are exposed to the ocean. Traders operating from dhows along the coast are cutting the most difficult to access areas illegally. TFS relies on informal collaboration with local people in conducting mangrove patrols. Yet delta residents and their village governments have limited capacity and fewer financial resources to protect these resources—crucial for local livelihoods, but of which they have no legal authority over. A village government leader noted that:

> *[I]t is very difficult to patrol mangrove forest here, I tell you. We don't receive enough cooperation from TFS officials. We don't have a boat, we don't have gears, we don't have anything to help our guards here to patrol. Although we catch the illegal encroachers, but the returns of their penalties are not brought to our villages. Sometimes we are forced to let the small ones go.*
>
> [KII with village leader, Village B, 30 March 2016]

In addition to patrolling the delta area, the three officers undertake other management activities. These activities include burning *madungu* and farms in prohibited mangrove areas; supervising legal harvesting for poles, charcoal, and timber; conducting awareness-raising activities; inspecting authorized paddy farms to ensure adherence to farming permits; coordinating establishment of joint mangrove management areas with the four participating villages; and collaborating and coordinating with district councils and higher-level TFS authorities.

The range of threats and management response from local communities and TFS highlighted above create a complex picture where TFS clearly does not have the capacity to manage the 22,000 ha of mangroves effectively without the active support of locals. Local residents participate in some of the activities that threaten the forest although they are often not the primary instigators of the illegal activity. Even so, they appear to be the primary targets of enforcement and punishment efforts. Residents stress that the penalties levied on communities are not fair given their economic status. There is clearly a need for the government through TFS to seek partnership with delta residents whose livelihoods depend on mangroves. These partnerships will be difficult, though, if residents have limited recognized rights to the mangrove forests and if their actions continue to be criminalized.

4.5 RETHINKING APPROACHES TO MANGROVE FOREST MANAGEMENT

Realizing the difficulty in implementing strict mangrove protection approaches that actively and harshly exclude delta people, TFS has introduced a variety of participatory approaches in a bid to involve delta residents in mangrove forest management. In addition to strict protection approaches described in previous sections, mangrove management in the Rufiji delta now involves three other approaches:

- Mangrove rehabilitation through individual farming permits similar to a taungya2 system,
- Mangrove rehabilitation through organized community groups of 15 to 30 villagers, and
- Mangrove forests managed as village land mangrove forest reserves under JFM arrangements.

Because there are no specific policies on mangroves in Tanzania, TFS and partners use various provisions in the Forest Act (2002), Land Act (1999) and Village Land Act (1999) to introduce these three approaches. The partitioning of rights and responsibilities between state and communities in these three schemes is summarized in Table 6. The rest of this sub-section provides further details of these three management approaches. Each approach has a relatively short history in the Rufiji delta and as a result, lessons are still being learned as the distribution of tenure rights and governance responsibilities between state actors and local residents are navigated. In each case, however, incentives for communities to engage in rehabilitation efforts should be evaluated within economic and socio-political contexts. In forest reserves, communities are not expected to gain new rights or see their existing de facto rights recognized. As a result, while they may be willing to engage in paid replanting efforts, their long-term incentive to rehabilitate mangrove forests is limited. Similarly, planting mangrove forests within the land registered under the Village Land Act would effectively result in the loss of rights to that land. It is not clear at present that the benefits from JFM will adequately outweigh this loss.

2 This is a modified form of shifting cultivation in which farmers may raise agri-crops in an area alongside planted forest species. The practice consists of preparing land, planting trees, growing agricultural crops for one to three years until shade becomes too dense, and then moving on to repeat the cycle in a different area. A large variety of crops and trees, depending on the soil and climatic conditions, are grown in similar arrangements in Asia. This system was introduced to raise forest plantations in Myanmar, but developed into a recognized agroforestry system.

Table 6. Comparison of the main mangrove management approaches in the Rufiji delta according to tenure rights distribution

Management approach	Rights distribution between the state and communities
Mangrove forest reserves (strict protection)	State retains all rights
Individual farming permits (a rehabilitation scheme)	State retains all rights and grants limited access and use (farming only) rights to participating individuals
Group rehabilitation scheme	State retains all rights with communities having rights to income from their labor
JFM areas	State retains ownership rights, but shares/devolves management rights to villages

4.5.1 Individual Farming Permits between Rufiji Residents and TFS

TFS, as the manager of central government forest reserves in Tanzania, used provisions from the Land Act (1999) and Forest Act (2002) to design and enter into contracts with individual farmers that allow the farmers to gain use rights to rice paddy fields. The goal was to restore degraded mangrove areas. This involves a taungya approach. TFS issued one-year renewable farming permits/licenses to individual farmers upon their application. In these agreements, farmers would sign a contract with TFS specifying the size of land granted, allowable activities, and duration of the farming license as summarized in Box 2.

In implementing this scheme, TFS targeted recently established rice farms (new farms), which are usually closer to settlements. Farmers may continue farming rice while facilitating mangrove regrowth. TFS trains farmers on appropriate species selection, encouraging natural regeneration of dominant species in a particular location. TFS does not provide farmers with mangrove seedlings; instead, farmers are encouraged to undertake actions that promote the growth and survival of the naturally growing seedlings from fallen seeds. Some actions by farmers include uprooting climbers (vines) that can kill mangrove trees and removing mangrove species accidently brought by water currents. When mangrove trees have reached a certain height and density, they shade the paddy rice, causing the paddies to be less productive. Farmers then relocate elsewhere if more degraded areas are available to repeat the same system. In selecting farmers to participate

Box 2. Specific provisions for farming permit in mangrove forest areas

- A farmer shall pay a specified amount.
- Permission is for the cultivation of rice only and farming other crops is prohibited.
- A farmer is allowed to cultivate within the specified boundaries only to avoid conflicts with other farmers.
- The farmer shall undertake preventive measures to avoid destruction of planted and natural mangrove trees and forests.
- The farmer and his/her associates shall assist the TFS in protecting planted and naturally growing mangrove trees within the farm boundaries and across the delta area according to Forest Act No. 14 of 2002.
- Any and all violations to this permit/license shall be liable to penalty and revocation of this permit according to Forest Act No. 14 of 2002.
- The farmer shall return the expired license/permit to TFS at the end of the contract period.
- If the farmer fails to use the permit/license during the specified duration, TFS shall extend the permit/license duration as appropriate.
- The farming permit prohibits use of fire and other destructive farming methods.
- The farming permit prohibits construction of a house or any other permanent structure on the farm.
- The farming permit provides that the farmer is not allowed to continue farming on the specified farm at the end of the permit/license period unless granted extension by TFS.
- Forest Officers shall plant any trees or seeds at any time on the farm or any part thereof leased out to the farmer by TFS.
- The farming permit provides that at the end of the license/permit period, the farmer shall be responsible for removing any/all assets/property on the farm without compensation.
- The farming permit provides similar provisions to numbers 4, 5, 6 and 9 above.

in this program, preference was given to delta residents for convenience and to ensure that delta residents benefit more than outsiders.

Analysis of the performance of this approach is hampered by a lack of detailed information on the number of villagers who signed the permits, their farm sizes, and total area covered. Following the introduction of JFM arrangements and group rehabilitation schemes, TFS officers and local residents have lost interest in this initiative. There was a general reluctance among TFS officials to discuss its performance, which would indicate a lack of broad adoption. Most farmers reportedly actively prevented regrowth because successful regrowth would result in them losing rights to farm the area. Others failed due to technical challenges, such as not observing the spacing and species selection requirements or selecting mangrove species that were not suitable for their specific locations. Moreover, some farmers remained skeptical of the initiative, expressing fears over signed documents that stipulated cash fines and other penalties/provisions if the farmer failed to observe the conditions of the agreements.

Discussion with a few farmers in Nyamisati and Mchinga villages revealed that they were mostly skeptical of provisions number 1, 5, 6, 9, and 12, which place financial responsibilities on and create liabilities for farmers, as summarized in Box 2. These provisions bring into sharp focus the discretionary nature of this arrangement. It not only concentrates potentially arbitrary power with TFS (e.g., to revoke, exert penalties, plant any trees or seeds on any part of the farm), but also focuses on what farmers are supposed to do and what they are prohibited from doing, and specifies a range of responsibilities, including payment to participate in the scheme. The provisions did not include a grievance mechanism nor were there any measures for resolving or managing conflict. It is unsurprising that communities were not interested in the scheme as it concentrated the costs of maintenance on them. Evidently, a one-sided scheme, which is highly discretionary, does not guarantee the tenure security of participants, as TFS can revoke it while imposing a broad range of responsibilities on participating farmers to pay, protect, prevent destruction, and not construct housing.

4.5.2 Mangrove Rehabilitation through Community Groups (15 or 30 villagers)

TFS and the Rufiji District Council are currently undertaking mangrove rehabilitation activities in degraded mangrove forest areas through organized groups of local residents from inside the delta and surrounding villages.

Table 7. Project focus for each district of the VPO/UNEP program, "Developing capacity to address adaptation to climate change in productive zones of Tanzania"

District	Project Focus
Rufiji	Rehabilitation of degraded mangrove areas through mangrove tree replanting activities
Pangani	Construction of a beach wall to prevent further beach erosion
Bagamoyo	Rehabilitation of freshwater wells in the mangrove areas

The United Nations Environment Program (UNEP) through the VPO supports this initiative, which is part of a larger climate change adaptation program under implementation across three districts (see Table 7) entitled "Developing capacity to address adaptation to climate change in productive zones of Tanzania." In each district, the program has a specific focus depending on its adaptation needs. The program was supposed to start in 2012 in the three districts but due to delays in release of funds and program design finalization, it started in 2013 in Pangani, 2014 in Bagamoyo, and in mid-2015 in Rufiji.

In Rufiji, this program is named *mwezeshe mwanamke* (enable a woman) to emphasize women's involvement in the program and to ensure women also benefit. The program coordinator explained that a specific focus on women was necessary given women's close interaction with mangrove forests on behalf of their families: women are responsible for collecting firewood, cultivating rice, and obtaining different non-timber products for household consumption such as honey, fish, fruits and vegetables. He further emphasized that mangrove protection interventions have affected women more than men because men are mainly involved in fishing and farming. However, the community mangrove rehabilitation groups involve both men and women.

The program plans to replant an estimated 1,500 ha, despite the lack of data on the total degraded area available for replanting. According to a TFS officer, the Institute of Resources Assessment judged the degraded area was about 8,000 ha out 22,000 total ha in 2011. He noted that, given recent expansion in paddy rice and unregulated harvesting of mangrove products, this area might have expanded to about 11,000 ha. The selected degraded area (1,500 ha) will be within the Rufiji mangrove forest reserve. It is not clear how TFS will identify the degraded area and what other interests, such as existing rice paddies, are present in these planting sites. Rights to the trees will not be transferred to the delta communities.

The district program coordinator for the VPO/UNEP program reported that 31 community groups, involving 688 villagers from four villages in the north delta area, have been established and supported. TFS has the discretion to decide which groups will be involved in replanting specific of this area, regardless of their village origin. Similarly to the individual farming permits (taungya system), this program promotes regrowth of dominant species in each location. Given the high germination success rate of fallen mangrove seeds, TFS will not provide seedlings to group members. Group members are expected to remove unwanted species of trees, particularly tree climbers that are reported to kill mangrove trees. Three of the four villages in this study are participating in the program (see Table 8).

Support provided to the groups has included training on group formation, technical aspects of mangrove tree replanting activities, and formation of the group constitution. Each group is provided with 3 axes and 10 machetes, and gumboots for each member. The groups will undertake two main activities: replanting, and taking care of the replanted areas. Each member is paid TSh 15,000 (about US $7) per day for five days of replanting activities, and TSh 10,000 (about US $5) per day for three days of replanting activities. Replanting activities began in 2015 and several groups have been involved so far.

Village leaders endorsed this program, particularly for its income opportunities to participating group members. The following statement attests village leaders' support:

[C]urrently there are groups that deal with planting of mangrove trees. Myself as the Village Executive Officer (VEO) in collaboration with the village chairperson and other village leaders, we monitor and supervise all activities for these groups. We have also created committees for environment and resources, although it was doomed, but now it is very active and it supports this program. We agreed about its responsibilities during the village council meeting and that we borrow Beach Management Unit boat for patrol.

[KII with VEO, Village B, 30 March 2016]

Despite being a lucrative initiative during the planting phase stemming from the financial incentives, barely two years after program inception, there are grievances associated with implementation. Some villagers, especially in Mchinga village, complain that the activities of planting trees and clearing the climbers popularly known as *nyanganjila*, are mostly carried out by groups from Nyamisati village, even in areas in Mchinga's vicinity. The following FGD participant emphasized:

> *[T]his exercise is very biased. The council officials normally bring members of groups from Nyamisati to plant mangrove trees and clear nyanganjila. They pay 10,000 per day after very tough work. Imagine, in our village we have ten groups but only two groups have ever participated in this exercise. This is not fair at all.*
>
> [FGD with young men, Village, B, 30 March 2016]

The Mchinga ward executive officer dismisses the allegations. However, village members support them. Some villages have expressed a preference for administering project funds

Table 8. Community mangrove rehabilitation groups in Rufiji North Delta

	Kikale Village	Mchinga Village	Mfisini Village	Nyamisati Village
No. of Groups	5 groups	7 groups	9 groups	10 groups
Total number of members/ village	91 members	190 members	270 members	147 members
Group Names (# members)	• Tupendane Group Kikale (30 members) • Amani Kikale (15) • Nguvu Kazi Kikale (15) • Kikale Ujamaa (15) • Zamil Group (Upendo) (16)	• Kikundi cha Mkukara (22) • Kikundi cha Shukran (20) • Mshikamano Mchinga (30) • Jiwezeshe Nyafugwa (30) • Dangati (28) • Uaminifu (30) • Mshikamano Group (30)	• Jitegemee Group (30) • Standard Group (30) • Azimio Group (30) • Mikoko Family Group (30) • Juhudi Group (30) • Mshikamano Group (30) • Nguvu Kazi (30) • Tujitegee Group (30) • Umoja Mshikamano Group (30)	• Tumsa (15) • Himasa (15) • Mjengea (15) • Kajificheni (15) • New Group (15) • Sanaa (15) • Maendeleo (15) • Nguvu kazi (16)) • Boresha Mazingira (15) • Mshikamano (11)

Source: KII with district project coordinator

themselves, instead of payment from the district council's financial officer. The program coordinator explained that his office is aware of complaints from Mchinga village and indicated that all groups will eventually be involved in the activities.

A major weakness of such programs from a tenure perspective is that they may result in short-term planting of hundreds of thousands of seedlings, but rarely do the programs consider the longer-term management responsibilities associated with these "rehabilitated" forests. In many cases, the households or communities that were previously involved in cultivating the degraded areas return to start using the area again for agriculture.

4.5.3 Mangrove Forests Co-managed by the State and Local Communities through JFM Agreements and CBFM

JFM and CBFM are the two approaches to devolution of forest management under the Tanzanian PFM program. The main difference between the two is that under JFM arrangements, the state retains forest ownership rights, with communities living in and around the forest reserves involved in management, while under CBFM arrangements, the state devolves full rights including ownership to the village and the forest is managed as a village land forest reserve. PFM in mangrove forests takes the JFM approach, since all mangrove forests are managed as forest reserves in Tanzania.

JFM as a PFM approach was first introduced in the National Policy (1998), with legal authority established by the Forest Act (2002) and detailed implementation guidelines provided in PFM guidelines (2001, revised in 2007). However, lack of guidelines on benefit-sharing agreements between the government and participating communities hampers its actual implementation in both mangrove and terrestrial forests. JFM benefit-sharing guidelines were finalized in 2013 (in English), and simplified and translated into Kiswahili in October 2015 for ease of understanding by forest communities. TFS used these recently finalized guidelines to introduce the JFM approach to managing mangroves in the Rufiji delta. This clarification of benefits may allow for collaboration between the state and local communities to be tested more effectively.

The guidelines detail a step-wise approach that begins with formation of a VNRC that will collaborate with the TFS zonal office and district forest office in developing village forest by-laws and village forest management plans. TFS and district councils provide legal, technical, and financial support to ensure that participating communities adhere to the guidelines. Formation of the VNRC and development of village forest by-laws and village forest management plans have to be approved at regular village assembly meetings attended by all adult villagers (18 years and above). The VEO submits the by-laws and management plans to the full council (meeting of all ward councilors in the district) for deliberation and approval. Thereafter, the by-laws and management become legally binding to the specific village and TFS will use them in drafting the JMAs between TFS and villages. Once finalized, implementation begins, following the approval of the village forest management plans.

So far, TFS has started this process in four delta villages including two covered in this study: Mchinga and Nyamisati. VNRCs have been formed, and village forest by-laws and village forest management plans drafted and approved through village assembly meetings. Next, these documents will be presented to the full council before TFS can apply them in implementing JFM in the four villages.

The VNRC is the most important structure for village participation in the making and application of specific mangrove management interventions. The JFM guidelines stipulate that a VNRC should be composed of 10 members including at least four women. The village council proposes a list of possible VNRC members to an open village assembly, whereby villagers use criteria stipulated in the guidelines to approve or reject the proposed candidates through both open discussion and open voting. The approved VNRC then assumes power for the period of five years concurrently with the village government.

In general, forest by-laws and forest management plans combine regulated use and strict protection of mangrove forests. The plans accommodate existing legal village use of mangroves such as obtaining building poles, timber, firewood, and non-timber products for domestic consumption, but not for commercial purposes. During execution of these management activities, VNRC and the village government work collaboratively with the district council, whose responsibilities include offering technical expertise, and mobilizing community members for proper utilization of land and natural resources; helping the committee solve administrative problems; and advising the community living close to, or surrounding, the forest on activities performed outside the mangrove forest.

The management plans under the JFM approach legally provide several management and use rights to delta residents. These include permission to obtain a specified amount of building poles, timber, and firewood for domestic use only. The FGD with older men in Nyamisati village revealed that the promised amounts of different

forest products is sufficient for domestic uses, such as enough poles and timber for finishing a large house, and firewood is not limited—as long as it does not involve felling live trees. They further noted that there is plenty of dry wood in the forests to meet the villagers' firewood needs. Moreover, residents will not be limited in using mangrove forests for other non-extractive activities, such as beekeeping projects and aquaculture activities, among others. However, implementation of JFM through these management plans involving local residents will imply increased monitoring by the locals themselves.

Box 3. The JFM process at the village level

Overview of the six basic stages in planning for Joint Forest Management

Stage One: Getting started

This takes place at the district or forest level, with the selection of forest area and the surrounding villages, together with briefing of district staff and the formation of a team of staff with different skills to do the work. At the village level, you meet with the village council and assembly, and facilitate the establishment and orientation of the Village Natural Resource Management Committee (VNRC).

Stage Two: Assessing and management planning

This is where together with members of the VNRC, you confirm, agree, and mark the boundaries of the forest as well as the internal village forest management areas (VFMAs), if the forest is to be managed on a village-by-village basis. The forest is then "assessed," and if it is to be utilized for timber or other forms of harvesting, the trees measured to calculate sustainable harvesting levels. Based on this, a management plan is developed for the VFMA.

Stage Three: Formalizing and legalizing

This is where you provide communities with the legal basis for management. A Joint Management Agreement (JMA) is prepared that defines how management costs, benefits, and responsibilities are to be shared. The JMA is negotiated based on the broad management objectives set out in the forest management plan for the VFMA, and where it exists, the forest reserve itself. The village assembly discusses the draft JMA and forwards it to the Forest and Beekeeping Division (or the district council) for comments. Based on comments received, the Forest and Beekeeping Division / district council and the village council finalize and sign the JMA. By-laws are developed to support the enforcement of the JMA. Once the JMA has been signed, the villagers can start implementing their management plan.

Stage Four: Implementing

This is where you help the community put the systems needed to manage the forest in place: appoint and train the patrol team, start records, make sure the rules are known, and so on. You need to visit frequently, keep an eye on progress, and assist with problem solving. After a few years of implementation, it may be necessary to make some changes in the plan or by-laws.

Stage Five: Revising

After three years, or so, the management plan can be reviewed to see if any changes need to be made, such as harvesting levels, rules, fines, and so on.

Stage Six: Expanding to new areas

It is likely that other villages will start requesting JFM in their villages. It is during this stage that you plan and budget for expanding into new areas.

(Source: Ministry of Natural Resources and Tourism, 2013)

The *Guidelines for Joint Forest Management* provide a framework for defining responsibilities and the resulting community benefits (2015). In the case of mangrove forests, TFS is the forest owner and therefore initially controls revenue. Emerging evidence from other participatory forest management cases, as well as wildlife management in Tanzania, suggests that sharing the revenue down to the community level remains inconsistent. While it is commendable that responsibilities and benefits have been clearly articulated, there is a real risk that benefits may not be adequate to meet the needs of local communities (or members of the community) who may choose not to participate in the JFM responsibilities. Given that the Tanzania Forest Fund is not fully operational, it is unclear whether each village forest will be expected to be self-sufficient from an income-generation perspective.

The effectiveness of JFM will also depend on local-level situations. These situations include the capacity of VNRCs to execute their duties effectively in a way that is perceived as locally legitimate and fair. Currently, the process for selecting VNRC members does not make it an impartial structure. The village council, particularly the VEO and village chairman, nominates a list of 10 to 15 people, of whom 10 will be selected through an

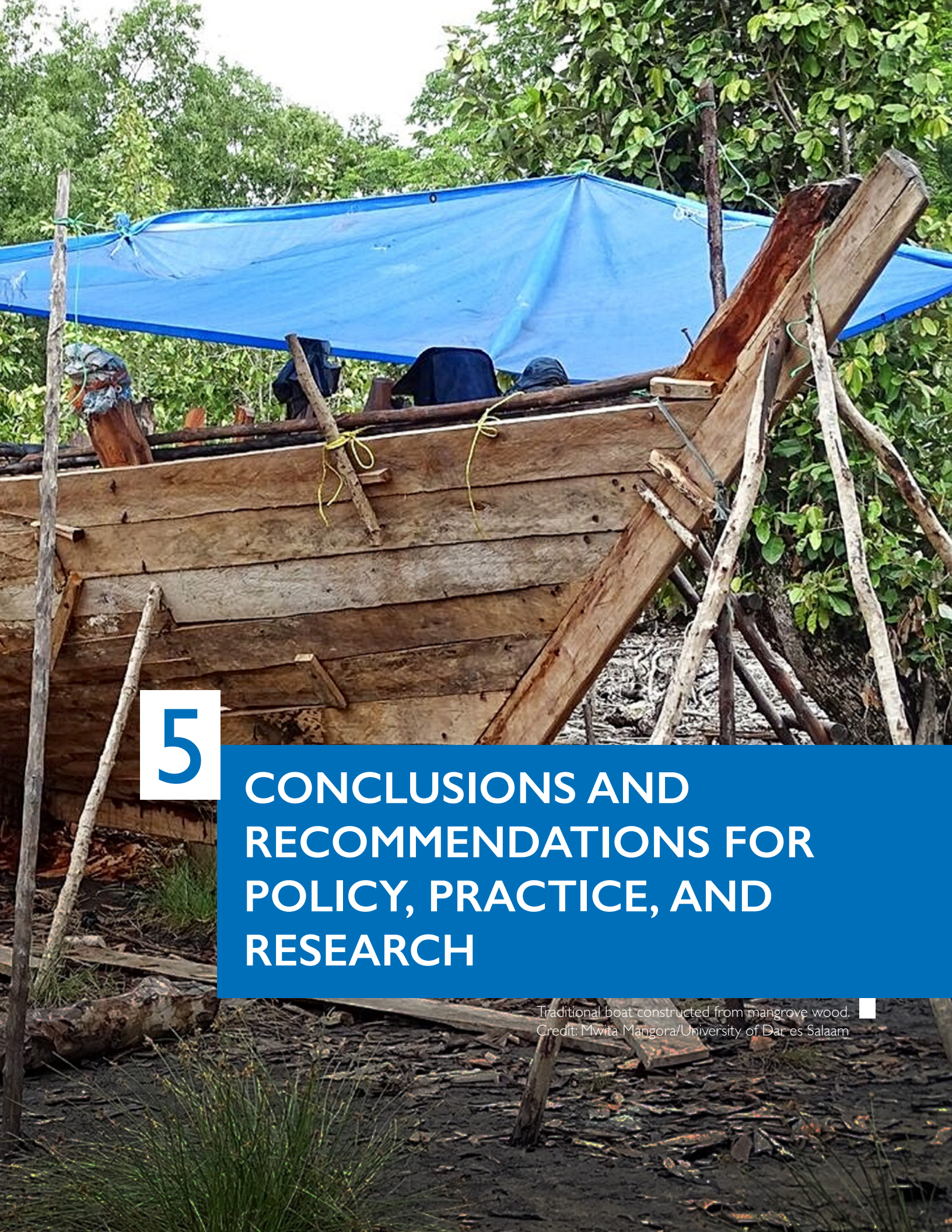
Table 9. Community responsibilities and benefits associated with mangrove management

Productive Forests (Terrestrial and Mangrove)	
Community Responsibilities (Conditional on receipt of benefits)	**Community Benefits (Conditional on fulfilment of responsibilities)**
Participate in preparation and implementation of the JMA	41% of profit gained from carbon is paid to the communities, the remaining part is paid to the forest owner
Patrol and enforce laws stipulated in the forest management plan	32% of fines retained in the village from offences committed in the VFMA, the remaining part is paid to the forest owner
Plant enriched, appropriate, and favored timber species	19% of timber royalty fee is paid directly to village government and the remaining is paid to the forest owner
Conduct village meetings to discuss general forestry issues arising from quarterly and monthly VNRC meetings	46% of the net revenue from confiscated forest products goes to village government and the other 54% goes to Tanzania Forest Fund/district council; the confiscated equipment and tools are remitted to relevant forest authorities
Submit quarterly implementation and monitoring report to the forest owner	Employment opportunities in various forest activities
Prevent, control, and fight fires in VFMA	Access to forest for beekeeping activities using appropriate technology
Supervise harvesting operations including identification of harvesting areas and resource assessment	Access to forest for collection of vegetables, mushrooms, medicinal plants (without damaging the plant), fibers, thatching and fodder grass collection, dead fuel wood, and fruits. Also right of way, attending ritual areas, bamboo wine taping, and water access for irrigation and domestic use basing on regulations governing the forest use
Manage tree nurseries and plant trees in their farm lands	Access to fishing and hunting will be granted in accordance with relevant laws and regulations and any benefits accrued from these activities
Report on revenue collection and expenditure to the village assembly quarterly	35% of research, entry, camping, installation of transmission towers and filming (permits) fee goes to the village government and the revenue goes to the forest owner
Prepare and keep proper forest management records	
Participate in protecting and controlling illegal activities along water sources and environment inside and outside the forest	
Participate in all meetings related to forest management	
Ensure forest boundary beacons and signs are not removed or destroyed	

Selected harvesting of mangrove poles.
Credit: Mwita Mangora/University of Dar es Salaam

open voting process at a village assembly. Usually, these nominated villagers have close associations with the village councils. Some villagers expressed their suspicions that the village chairman and VEO have nominated their friends, who will likely ensure that they benefit more at the expense of the rest of the community.

Based on the legal descriptions, JFM appears as though it will strengthen government recognition of existing *de facto* rights of the community to use forest resources for non-commercial purposes. However, it places a substantial administrative burden and management responsibility on the community, without introducing new benefits. These communities did not highlight sustainable harvest opportunities for commercial purposes or other income-generating activities that would result in increased benefit distribution; however, such commercial incomes are likely to be necessary to support the administrative and enforcement costs associated with implementing JFM.



5 CONCLUSIONS AND RECOMMENDATIONS FOR POLICY, PRACTICE, AND RESEARCH

Traditional boat constructed from mangrove wood.
Credit: Mwita Mangora/University of Dar es Salaam

Tanzania's coastal mangroves are threatened by several interacting factors operating at the local, national, and regional scales. These include mangrove forest clearing for paddy rice farming and salt evaporation pans; growing demand and unregulated harvesting of mangrove products such as poles, timber, and charcoal; increasing land competition; lack of cross-sector coordination and collaboration; and inadequate financial and technical capacity for effective management of mangrove forests.

It is clear that providing stronger forms of security over land and forest tenure for local communities will be a central component of improving mangrove conservation within a dynamic delta ecology such as the Rufiji (Mwansasu, 2016). Realizing the rapid, recent destruction and degradation of mangroves and working under a situation of limited resources, the Government of Tanzania has introduced new approaches to mangrove management. These approaches expand beyond historical strict protection to incentivize local communities to engage in mangrove protection either through the extension of rights and responsibilities, or through direct payments for rehabilitation activities. While these approaches are not widely applied yet, they combine conservation and regulated use in the Rufiji delta. Lessons from them, specifically considering the dynamic ecological context of the delta's mangroves, can inform mangrove management across the country. Allowing Rufiji delta residents regulated access and use of mangroves is likely to influence sustainable management and use of mangrove resources among local residents. However, several factors hamper the success of these management approaches for continued survival of mangrove ecosystems, and are summarized in this chapter alongside recommendations for policy, practice, and research on mangrove management.

5.1 REVIVE THE NATIONAL MANGROVE FORESTS MANAGEMENT PLAN AND ADOPT A LANDSCAPE APPROACH

Currently, there is no specific legislation or policy on mangroves in Tanzania, although the Forest Act (2002) and other policies and legislation have been applied to mangrove forests. In 1991, the government developed a mangrove management framework (relying on community-based approaches) which, due to the absence of an enabling institutional framework and inadequate financial and technical resources, was not implemented. Following recent developments, both in terms of changing threats and the status of mangroves, as well as the introduction of new policies and legislation in relevant sectors (forestry, wildlife, fisheries, land, and agriculture) that directly affect mangrove forests, it is imperative to revive and update this strategy at the national level and apply it through local plans at the sub-national level. A national mangrove management plan will fill the vacuum resulting from the lack of mangrove-specific policy and legislation and provide coherence to mangrove conservation and management.

At the sub-national level, such as in the Rufiji delta, such plans should take a landscape approach to include processes that take place outside the delta area but impact delta mangroves. In doing so, it is important to systematically document the impediments to the implementation of the 1991 management plan to improve upon the new approaches recently set into motion. Indeed, this type of holistic approach is reflected in current efforts. For example, the national parliament commissioned a special task force to review the situation in the Rufiji River floodplain area and propose recommendations to reconcile the range of competing land demands. The task force review provided a holistic consideration of various significant land and development issues in the Rufiji delta such as mangrove conservation, the relocation of pastoralists, the relocation of delta people, large-scale and medium-scale land-based investments, and human settlements. While the report has not yet been publically released, there is some evidence that the government has begun adopting its recommendations that focus on facilitating the identification of land for investments in the Rufiji delta. However, its recommendations that have direct implications on mangrove conservation and management (such as addressing the pastoralist problem and seeking land to relocate delta residents outside mangrove areas) remain unimplemented. Therefore, any attempt at reviving and updating the national mangrove management plan should take into account the task force findings and recommendations as it provides a sound basis for a landscape approach to mangrove management.

5.2 INTEGRATE WOMEN'S ROLE INTO MANGROVE DECISION MAKING, MANAGEMENT, AND BENEFIT SHARING

Existing laws and guidelines, particularly JFM guidelines, have clear provisions on women's participation in village leadership and in the distribution of benefits from mangrove forests, stating that more attention should be accorded to women given the unique sociocultural and religious context of coastal communities in Tanzania.

However, existing sociocultural and religious norms undermine the implementation of JFM guidelines because they prevent women from active participation in leadership roles and decision-making processes that occur in public spaces. Special women's groups or committees, where women can discuss their issues and make decisions, are one way to achieve meaningful participation. The pilot for this approach in northern Dar es Salaam (Kunduchi area) in the early 2000s is thought to have been successful in promoting women's participation in mangrove restoration programs but requires systematic investigation to draw out lessons. However, the development of alternative, women-only structures and spaces should be managed to safeguard against isolating women from broader community engagement. Furthermore, guidelines for gender integration in mangrove management and rehabilitation that draw lessons from mangrove projects and from the forestry sector would be helpful in supporting gender integration.

Women's exclusion from participating in mangrove decision making is not unique to Tanzania but rather is a broader challenge in the global management of mangroves (Rotich, Mwangi, & Lawry, 2016). Increasing women's participation in decision making and strengthening their rights to forests and trees is achievable under certain conditions that have been elaborated for terrestrial forestry in similar settings. For example, Using the "Adaptive Collaborative Management" approach, CIFOR researchers and partners have demonstrated that building leadership capacity, providing mentoring support, adopting decision rules that favor consensus, and ensuring men's support for women's leadership can reduce gender bias due to cultural norms and indeed create opportunities for women's leadership and benefits capture (Evans et al., 2014).

5.3 PAY SPECIAL ATTENTION TO RELATIONS BETWEEN LONG-TERM DELTA RESIDENTS AND OUTSIDERS

Human activities resulting in mangrove forest clearance is performed both by people residing in the delta area on a long-term basis and by people from outside the delta area from neighboring communities or who travel a great distance. Relationships vary between outsiders and residents, based on a range of factors including kinship and purely economic transaction. Additionally, it is often difficult to distinguish between an outsider and a long-term resident due to the evolution of these relationships. TFS adopts a punitive solution when trying to establish the identity of the outsiders clearing mangroves or supporting illegal logging. This approach is counterproductive as it builds resentment among residents and thwarts any possibility of cooperation. Residents have tended to be reluctant to expose the identity of outsiders who may be funding activities in the delta. Instead of repeatedly punishing non-cooperating residents, TFS may consider investing in understanding motivations and designing ways and means of addressing the issues that drive residents' reluctance to reveal the identities of outsiders or participate more actively in mangrove management. In addition, the TFS should also consider implementing interventions that offer alternative and sustainable livelihood options for local residents that reduce their dependence on mangroves. Diversifying local income base from mangroves can offer a pathway out of relying on payments from non-residents' illicit exploitation of mangroves.

5.4 IMPROVE TFS CAPACITY TO MANAGE MANGROVE FORESTS

TFS urgently needs additional resources to manage mangrove forests effectively in the country. For instance, there are only three full-time forestry officers covering an area of about 22,000 ha using one small boat, with a limited budget for fuel and fieldwork. As a result, monitoring for both legal and illegal harvesting of mangrove forest products is simply not possible. There is also a need to expand the human resource base to have more staff with knowledge and experience in community forestry mechanisms. The establishment of JFM agreements in four villages, formation of 31 community rehabilitation groups, and numerous individual contracts with farmers requires a larger pool of staff with diverse skill sets beyond technical forestry. While these initiatives are successful elsewhere in Tanzania and show great promise in the delta, limited financial and human resources hamper their effectiveness in the future. The Tanzania government is best placed to identify mechanisms for strengthening TFS's management capacity.

5.5 IMPLEMENT BOTH JFM AND CBFM APPROACHES IN MANGROVE FORESTS

Now that benefit-sharing agreements have been finalized and four villages have started the process of establishing village land forest reserves under JFM agreements, it is imperative that TFS and partners undertake measures to build local residents' capacity

for effective co-management of their forests. TFS and district councils can work in close collaboration with the central government and NGOs in supporting community forest management projects in the delta area. Using lessons learned from JFM and CBFM implementation in terrestrial forests, community mangrove forest management has the opportunity to avoid mistakes from elsewhere and adopt appropriate best practices. Areas in need of immediate support include (1) technical aspects, including appropriate species selection in rehabilitation schemes; (2) financial management, particularly equitable distribution of benefits and cost of mangrove management among community members; (3) management and enforcement capacity to ensure that villages are capable of regulating legal harvests; and (4) effective enforcement of rules both within and outside the community.

In the discussions undertaken in this study, a number of participants, including government officials and NGO representatives, also recommended that the government transfer ownership rights to communities in some areas and establish CBFM projects. As CBFM grants more rights and powers to communities, they recognize that CBFM may be a better option than JFM, as it has the power to heal historical and current enmity between local people and state forest conservation authorities. A review of this policy to expand community rights to include ownership would not only be consistent with forestry practice in Tanzania but would also align local incentives with sustainable use and management priorities.

Lessons from terrestrial forests should be taken into account to ensure that mistakes reported elsewhere are not repeated in the mangrove forests. At present, there are two initiatives that offer the most experience on participatory forest management, the Mpingo Conservation and Development Initiative in Kilwa District, which has been operational since 2005; and the Tanzania Forest Conservation Group participatory forest management projects in several districts across the country, including Lindi District. For example, in cases where decisions affecting forests are made at the individual, household, and community levels, delivering benefits only at the community level may not be adequate. Individual-level payments and community-level benefits may be considered, as have been implemented in Lindi district under a REDD+ project.

Additionally, it is important to ensure that formal processes of deliberation are accessible to all and that the majority accept the decisions reached. Experiences from Kilwa and Lindi reveal that participation in public spaces and processes for forest management is not always accessible to all community members for various reasons. The decisions may be legal, but democratically illegitimate. Additional alternative participatory processes may be necessary to ensure all groups within the community participate meaningfully in decision making. This is often the case with respect to women's cooperation. In addition to these lessons learned for effective implementation of a CBFM approach, engagement in mangrove forests would require policy changes that allow community ownership of mangrove forest areas.

5.6 ADDRESS POLITICAL INFLUENCE AT THE NATIONAL AND LOCAL LEVELS

Statements and actions of elected and appointed officials at the village (chairman and members of village council), ward (ward councilors), district (district commissioners), constituency (parliamentarians), and national (president and ministers) levels play crucial roles in enabling or constraining effective mangrove forest management in Tanzania. In the Rufiji delta, politicians at various levels have issued statements that encourage unsustainable use of mangrove forests and mangrove clearance for paddy rice farming to gain residents' political support, particularly during election times. This creates mixed messages from the government, where politicians promote mangrove clearance, but the civil service continues a strict protection approach.

To turn political influence from a hindrance to an enabler of effective mangrove forest management, special communications campaigns are needed to diffuse current conflicts by targeting local people and politicians while involving other actors such as bureaucrats/technocrats and civil society representatives. The campaign should aim to increase the awareness of politicians and other actors of practical and sustainable ways of using and managing mangroves as well as the local, national, and global values of mangroves. Such a campaign could turn some politicians from advocates of mangrove destruction to champions of win–win strategies that have the potential to achieve both environmental and livelihood outcomes sustainably and equitably. This approach would need to be implemented alongside a clear policy or land use planning process that tries to reconcile the threats facing mangroves and the legitimate rights and needs of local residents.

5.7 STRENGTHEN COORDINATION BETWEEN FOREST AND FISHERIES MINISTRIES AND AGENCIES

Coordination has been a challenge at both the policy and practice levels, with the Fisheries Department generating tools and guidance on mangrove fisheries with limited input from forest officers, and a lack of ability of enforcement officers to collaborate on the ground. TFS complained about the situation of limited resources (boats and fuel) to patrol and apprehend illegal loggers. Fisheries officers at the district described situations when they encounter dhows full of mangrove poles sailing to Zanzibar from Rufiji, but they cannot inspect or make arrests since these are two separate jurisdictions. TFS explained that, since mangrove products are transported by sea, coordination with fisheries units would be very useful. TFS would assist in arresting illegal fishers on land, and Fisheries Departments would assist in apprehending illegal loggers at sea, as it was before the two ministries were separated. In other countries, this has been achieved through memoranda of understanding between enforcement agencies, as well as instruments that allow local communities to act on behalf of these multiple ministries.

5.8 CONDUCT FURTHER RESEARCH

While this assessment has contributed to understanding governance of coastal mangroves in Tanzania, additional research is required to improve understanding of various aspects of mangrove forest management. At present, it is not clear that the land and forests tenure conditions and the range of *de facto* historical rights held by residents are fully considered by the government in mangrove management. To reconcile the history of animosity and conflict, comprehensive socioeconomic studies are needed to understand people–mangrove interactions and interdependencies, particularly how such interactions have changed over time and space, and the multiple factors that have influenced transformations in people–mangrove relations. This social context should inform the design and adaptation of management strategies.

In addition to social conditions, there is a need to better understand the dynamics of mangrove deforestation and degradation and identify the causes for changes in mangrove coverage and condition through localized analyses. Such analyses would seek to understand where different drivers are most pronounced and how they interact. The results of this study would have benefited from a complementary analysis of forest cover change, and indeed the total area degraded in these areas of the Rufiji delta remains unclear even as actors introduce rehabilitation schemes.

REFERENCES

Alongi, D. M. (2014). Carbon cycling and storage in mangrove forests. *Annual Review of Marine Science*, 6, 195–219.

Adams, M. E. (1992). Participatory management of Tanzania's mangroves. ODI-Rural Development Forestry Network Papers 13 e-i- Research reports and studies. Retrieved from https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/1032.pdf

Beymer-Farris, B. A. & Bassett, T. J. (2012). The REDD menace: Resurgent protectionism in Tanzania's mangrove forests. *Global Environmental Change*, 22, 332-341.

Brockington, D. (2007). Devolution, community conservation and forests. On local government performance and village forest reserves in Tanzania. *Society and Natural Resources*, 20 (9), 835-848.

Brown, I., Mwansasu, S., & Westerberg, L. (2016). L-band polarimetric target decomposition of mangroves of the Rufiji Delta, Tanzania. *Remote Sensing*, 8(2), 140.

Burgess, N. D., Mwakalila, S., Munishi, P., Pfeifer, M., Willcock, S., Shirima, D., …Marchant, R. (2013). REDD herrings and REDD menace: Response to Beymer-Farris and Bassett. *Global Environmental Change*, 23, 1349-1354.

Diop, E. S., Gordon, C., Semesi, A. K., Soumare, A., Diallo, N., Guisse, A.,... Ayivor, J. S. (2002). Mangroves of Africa. In Lacerda L. D, (ed.), *Mangrove ecosystems: functions and management* (pp. 63-121). Berlin: Springer-Verlag.

Evans, K., Larson, A. M., Mwangi, E., Cronkleton, P., Marayanyika, T., Hernandez, X., … Banana, A. (2014). *Field guide to adaptive collaborative management and improving women's participation*. Bogor, Indonesia: CIFOR.

Fatoyimbo, T. E. & Simard, M. (2013). Height and biomass of mangroves in Africa from ICESat/GLAS & SRTM. *International Journal of Remote Sensing*, 34(2), 668-681.

Food and Agriculture Organization of the United Nations (FAO). (2005). *Global forest resources assessment 2005. Thematic study on mangroves: Tanzania country profile*. Rome: FAO.

Food and Agriculture Organization of the United Nations (FAO). (2014a). *State of the world's forests. Enhancing the socioeconomic benefits from forests*. Rome: Food and Agriculture Organization.

Food and Agriculture Organization of the United Nations (FAO). (2014b). *Strengthening forest tenure systems and governance.* Rome: Food and Agriculture Organization. Retrieved from http://www.fao.org/docrep/019/i3521e/i3521e.pdf

Giessen, L., & Buttoud, G. (2014). Defining and assessing forest governance. *Forest Policy and Economics,* 49, 1–3.

Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24, 105–112.

Kulindwa, K., Sosovele, H., & Mgaya, Y. (2001). *Socioeconomic dimensions of biodiversity loss in Tanzania*. Dar es Salaam: Dar es Salaam University Press.

Mangora, M. (2011). Poverty and institutional management stand-off: a restoration and conservation dilemma for mangrove forests in Tanzania. *Wetlands Ecology and Management*, 19(6), 533–541.

Mangora, M., Shalli, M. S., Semesi, I. S., Njana, M. A., Mwainuni, E. J., Otieno, J. E., … Stinger, C. S. (2016). Designing a mangrove research and demonstration forest in the Rufiji Delta, Tanzania. In C. E. Stringer, K. W. Krauss, & J. S. Latimer, (Eds.), *Headwaters to estuaries: advances in watershed science and management*. Proceedings of the Fifth Interagency Conference on Research in the Wetlands, March 2-5, 2015. Asheville, North Carolina: U.S. Department of Agriculture Forest Service, Southern Research Station.

Masalu, D. C. P. (2003). Challenges of coastal area management in coastal developing countries - Lessons from the proposed Rufiji delta prawn farming project, Tanzania. *Ocean and Coastal Management*, 46, 175-188.

Millennium Ecosystem Assessment (MEA). (2005). *Ecosystems and human well-being: synthesis*. Washington, DC: Island Press.

Ministry of Natural Resources and Tourism. (2013). *Joint forest management guidelines*. Dar es Salaam: Tanzania Ministry of Natural Resources and Tourism.

Muhando, C. A., & Rumisha, C. K. (2008). *Distribution and status of coastal habitats and resources in Tanzania*. Dar es Salaam: WWF□Tanzania.

Murdiyarso, D., Purbopuspito, J., Kauffman, J., Matthew, W., Sasmito, S., Donato, D., … Kurnianto, S. (2015). The potential of Indonesian mangrove forests for global climate change mitigation. *Nature Climate Change*, 5, 1089-1092. Retrieved from http://www.nature.com/nclimate/journal/v5/n12/full/nclimate2734.html

Mwansasu, S. (2016). *Causes and perceptions of environmental change in the mangroves of Rufiji delta, Tanzania. Implications for sustainable livelihood and conservation*. Stockholm: Department of Physical Geography, Stockholm University.

Nindi, S. J., Machano, H., & Rubens, J. (2014). *Remote sensing study of mangrove vegetation change in Rufiji Delta, Tanzania from 1990-2010*. Dar es Salaam: WWF Tanzania Programme Office.

Rabe, L. & Saunders, F. (2013). Community-based natural resource management of the Jozani-Pete mangrove forests: Do they have a voice? *Western Indian Ocean Journal of Marine Sciences*, 12(2), 133-150.

Rotich, B., Mwangi, E., & Lawry, S. (2016). *Where land meets the sea. A global review of the governance and tenure dimensions of coastal mangrove forests*. Bogor, Indonesia: CIFOR; Washington, DC: USAID Tenure and Global Climate Change Program.

Samoilys, M., Maina, G.W., Church, J., Mibei, B., Monjane, M., Shah, A., … & Pabari, M. (2013). Situation analysis for mangroves for the future: Understanding the resilience of coastal systems. *Cordio*, 18.

Sandilyan, S., & Kathiresan, K. (2012). Mangrove conservation: A global perspective. *Biodiversity and Conservation*, 21, 3523–3542.

Saunders, F., Mohammed, S. M., Jiddawi, N., & Sjöling, S. (2008). An examination of governance arrangements at Kisakasaka mangrove reserve in Zanzibar. *Environmental Management*, 41, 663-675.

Saunders, F., Mohammed, S. M., Jiddawi, N., Nordin, K., Lundèn, B., & Sjöling, S. (2010). The changing social relations of a community-based mangrove forest project in Zanzibar. *Ocean & Coastal Management,* 53, 150-160.

Semesi, A. K. (1991). *Management plan for the mangrove ecosystem of mainland Tanzania, Volume 11. Mangrove management plan for all coastal districts*. Dar es Salaam: Ministry of Tourism, Natural Resources and Environment, Forest and Beekeeping Division, Catchment Forest Project.

Semesi, A. K. (1992). Developing management plans for the mangrove forest reserves of mainland Tanzania. *Hydrobiologia*, 247, 1-10.

Spalding, M., Blasco, F., & Field, C. (1997). *World mangrove atlas*. Okinawa, Japan: The International Society for Mangrove Ecosystems.

Sunseri, T. (2009). *Wielding the ax: State forestry and social conflict in Tanzania*, 1820–2000. Athens, OH: Ohio University Press.

Taylor, M., Ravilious, C., & Green, E. P. (2003). *Mangroves of East Africa*. Biodiversity Series 13. Cambridge, UK: UNEP-World Conservation Monitoring Centre.

Van Lavieren, H., Spalding, M., Alongi, D., Kainuma, M., Clüsener-Godt, M., & Adeel, Z. (2012). *Securing the future of mangroves. A policy brief.* London: UNU-INWEH, UNESCO-MAB with ISME, ITTO, FAO, UNEP-WCMC and TNC.

Wagner, G.M., & Sallema-Mtui, R. (2016). The Rufiji estuary: Climate change, anthropogenic pressures, vulnerability assessment and adaptive management strategies. In S. Diop, P. Scheren, & J. F. Machiwa, (Eds.), *Estuaries: A lifeline of ecosystem services in the Western Indian Ocean, Estuaries of the World.* Doi 10.1007/978-3-319-25370-1_12

Wang, Y.Q., Ngusaru, A., Tobey, J., Makota, V., Bonynge, G., Nugranad, J., … Makota, V. (2003). Remote sensing of mangrove change along the Tanzania Coast. *Marine Geodesy*, 26(1–2), 1–14.

Zahabu, E., Eid, T., Kajembe, G., Mbwambo, L., Mongo, C., Sangeda, A., … Luoga, E.J. (2009). *Forestland tenure systems in Tanzania: An overview of policy changes in relation to forest management*. INA Fagrapport, No.14. Ås, Norway: Norwegian University of Life Sciences.

APPENDIXES

APPENDIX A. MANGROVE USES IN THE RUFIJI DELTA

Mangroves species (common Swahili name)	
Avicenia marina (Mchu),	Main: No substantial use Secondary: High-quality charcoal, boat paddles, oars, handcraft handles, axe handles, pounding poles, beehives, and traditional drums. Roots provide remedies
Bruguiera gymnorrhiza (Mkoko wimbi)	Main: Building material, roof supports, high quality firewood Secondary: High-quality charcoal, boat paddles, oars, handcraft handles, axe handles, pounding poles, beehives, and traditional drums. Roots provide remedies
Ceriops tagal (Mkoko mwekundu)	Main: Building materials, paddles, oars, medium quality firewood, charcoal, dyes (incl. tanning compounds), fishing traps
Heritiera littoralis (Msikundazi)	Main: Charcoal Secondary: Firewood, building wood, dhow masts
Lumnitzera racemosa (Mkaa pwani)	Main: No substantial utilization Secondary: Building wood, medium-quality firewood and charcoal
Rhizophora mucronata (Mkoko)	Main: Building wood, high-quality charcoal Secondary: High-quality firewood, dyes (including tanning compounds), medicines, ointments, bow-nets (using roots), fishing traps, weapons
Sonneratia alba (Mpira)	Main: Canoes, boat ribs, paddles, masts, pneumatophores used for floating fishing gears, window and door frames Secondary: medium-quality firewood and charcoal
Xylocarpus granatum (Mkomafi)	Main: Canoes, charcoal Subsidiary: The fruits provide remedies for stomach ache

Source: Taylor, Ravilious & Green, 2003

APPENDIX B. METHODOLOGICAL TOOLS

1: FGD Guidelines

Guidelines for Conducting Focus Group Discussions (FGD) at the Village Level

Province	:
District	:
Sub-District	:
Village	:
Group	:
Name of Participants:	

Date/Time	:
Facilitator	:
Note taker	:

1. Timeline exercise

- Ask participants to name the most important moments in the history of the village. Try to bring the focus mainly to the past 30 years. Prompt with questions, depending on what is appropriate (use your knowledge of the village), such as:
  - When was the village/community established? When did the first residents arrive?
  - When was the school/health post built?
  - When was the highway built?
  - When did other migrants move to the village?
  - Have there been any changes in the extent of out-migration over time? What is the status of out-migration from the village?
- Ask how livelihoods have changed over time. Use the events identified to establish time periods. What was the main source of income or livelihoods / main product harvested (etc.) in one period versus another? Ask about issues of out-migration too.
- Ask specifically about use of mangrove forest resources, and changes over time.
- Ask about mangrove condition, and change over time.
- Ask about changes in climate and climate-related events over time, for example droughts, dry and wet seasons, floods, beach erosion, etc.
- Ask about conflicts, especially with outsiders, companies, the government, and neighbor communities. How have these changed over time?
- Why did these changes occur? What were the drivers or causes of change? What were some of the effects of change on (a) livelihoods; (b) mangrove forest condition; (c) resilience/adaptability? For any negative changes mentioned it would be helpful to get a listing of what they did to try and overcome the negative aspects and their perception of success/or non-success.

2. Spatial extent of management and use rights and changes over time

Present the map drawn during the KII (map should already be available), showing all the areas that the community/village uses. The map should show areas of mangrove forests (identifying whether there is more than one forest area), agriculture, water sources, pasture or grazing, housing, garden, hunting. Verify the areas as established through the KII and their labels (a locally recognized name that people refer to). Contextualize the map if needed, indicating the name of neighboring communities/villages. You may use also an existing (official) map as a reference.

The purpose of this exercise is to understand, in all villages, the extent of management, use and rights and who makes which rules (local people, state agencies, NGO projects or private companies/corporations).

Note discrepancies among participants in regards to areas; boundary issues with neighboring communities; or conflict with external actors.

Remember that our primary interest is on mangrove forests; so if there are too many areas to discuss, focus the time on the forest areas, and the most important forest areas (note area affected in hectares: e.g., we need to know if we are talking about a very small area or a very large one).

3. Mangrove forest product harvesting

Product	Household Consumption: How much can be extracted? When can be harvested? Who decides this?	Where do they harvest refer to the community map? Who decides this?	Allowed to sell: How much are you allowed to sell? Who decides this?	User group: Differentiate whether within or outside the community	Do you need to ask for permission for harvest? To whom?	Changes over time? What caused this change?

Please remember to ask participants the extent to which mangroves contribute to their livelihoods. Are mangrove resources important in their livelihood portfolios? Who is not permitted to harvest mangrove forest products?

4. Management and exclusion rights

Decision-making rules:

- Who makes decisions about mangrove management practices (harvesting (including what, when, how much), sale of harvested products, tree planting, restoration, rehabilitation, conversion of mangroves to other land uses)?
  - How do village authorities participate in the definition of decision-making rules?
  - How do village members participate in the definition of decision-making rules (e.g., via communal assemblies)?
  - How does the state participate in the definition of decision-making rules around village forests? Are these decisions controlled by the state (e.g., forest agency). Define the level of autonomy of the village to define these type of rules. Which rules are made locally and which are made by the state?
  - How do other actors such as NGOs and private companies participate in the definition of decision-making rules around mangrove forests?
  - How do women participate in the definition of decision-making rules (e.g., in the communal assemblies, they have specific committees)? How do they feel about their participation? In particular, do they experience any constraints? What are they (if they don't mention anything, also ask whether lack of time to participate; inability to combine care work with forest management responsibilities; perceived effects of their participation on benefits shared, etc., also the constraints)? In their view, how can these constraints be alleviated? Have they tried to address these constraints? Please provide specific examples. Also, please mention if they feel women's participation has been adequate and the conditions that have enabled women's meaningful participation (e.g., location and timing of meetings, sensitivity to women's needs and priorities by leaders, NGO or state agency rules/facilitation, etc.). **It is important to note whether women have already been mentioned in the discussion prior to prompting these questions.**

- How do original vs. people that have joined the community by marriage or settlement (or any other customarily approved means) participate in decision making about mangrove forests? If outmigration is an issue, to what extent outmigration has been affecting participation of men and women in decision-making processes?
- Have any of these rules changed over time? Focus on approximately the last 20 years. Explain changes. What caused the changes?
- Have there been any conflicts over decision making? Please describe them including parties to conflict, causes of conflict and frequency. Were the conflicts resolved? By whom? Who is responsible for resolving decision-making conflicts? In your opinion are they effective? Do they resolve conflicts fairly?

Monitoring and compliance:

- Who enforces rule compliance about extraction and forest use and management practices in the village? Note: Refer to specific situations: What happens if I break the rules? Say I take too much timber… is there a sanction? Who enforces it? When was the last time someone was sanctioned? What was the reason, explain. How many people were sanctioned in the last year?
  - In case rules are not complied with, what type of sanctions exist?
  - Overall, do you think this sanctions are fair? Are they effective? Are they enforced fairly?
- Who has establishes sanctions for rule violations? Are the village regulations written (are there any by-laws)? Are village members aware of them?
- Who monitors rule compliance about extraction/forest management practices in the village?
- Can rights to forests (to extract products) be taken away? What kinds of circumstances prompt a reversal of rights?
- Has any external actor (e.g., government, private company, NGO) kept you from extracting products from mangrove forests? If yes, which external actor? For what products? What were the reasons for imposing these restrictions? What were your responses to these restrictions?
- Have any of these rules or sanctions on extraction changed over time (focus on the last 20 years)? Explain changes. What caused the change?
- Today, do you think community members follow the rules? (Always, frequently, not often, never) Which ones would you say are the most commonly followed/violated? Why?
- Have there been any conflicts over rule monitoring and enforcement? Please describe them including parties to conflict, causes of conflict and frequency. Were the conflicts resolved? By whom? Who is responsible for resolving conflicts over monitoring and enforcement? In your opinion, are they effective? Do they resolve conflicts fairly?

Alienation: lease, collateral, sale, inheritance.

- Are you allowed to lease mangrove forests areas to another member within the village/person outside the village?
- Are you allowed to use mangrove forest lands as collateral for credit?
- Are you allowed to sell forest lands to another member within the village/person outside the village?
- Are rights to mangrove forests transferable within the family (inheritance of rights)? To whom? What about to women (daughters, wives)?
- Have any of these rights changed over time (focus on the last 20 years)? For whom have rights changed? Explain changes. What caused the change?
- Have there been any conflicts over alienation rights? Please describe them including parties to conflict, causes of conflict and frequency. Were the conflicts resolved? By whom? Who is responsible for resolving conflicts over rights transfer? In your opinion, are they effective? Do they resolve conflicts fairly?

Overall satisfaction with rights

- If somebody threatens your rights, what can you do about it? Are there any grievances? Have you ever had to use them? What was the result?
- On a scale of 1 to 3, discuss and then vote individually your level of satisfaction with rights (voting should be kept secret). Refer to the following scale:
  - 1 = as a village, that you are very dissatisfied with the rights to use forest resources that you have currently and would like to see major changes,
  - 2 = somewhat satisfied but you would like to make some changes, and
  - 3 = you are very happy and would make no changes. (Where would you place this village?)
- If you want to make changes, what are the three changes you would like to make?

5. Tenure security exercise

By tenure security we mean "your confidence that the members of this village will continue to be able to use, at least for the next 25 years, the land and forests you now use and benefit from in that particular area."

- Going back to the map of the village/community ask participants to discuss for land-use areas identified in the map, rank whether they perceive their rights, as a village, to be secure or not, and why? What do you see as the threats (differentiate between external or internal) that prevent them from enjoying/exercising their right?
- Make sure to note the area in question (hectares) and the owner of that area.

A. Area (use name on map; note owner/hectares)	B. Secure/Insecure / not sure or cannot agree (both) / Don't know	C. Reason for security answer in (B). Provide three answers

- Do you think that the way we define tenure security (moderator should read this definition again) captures the experience of this community, or are there other things you would consider more important than effectively protecting/guaranteeing rights into the foreseeable future?
- For example, if the number of years were shorter (say 5 years) would you have answered the question differently?
- Has the security of your village rights changed over time (focus on approx. the last 20 years)? Explain changes. What caused the change?
- In villages where reform has taken place: how have reforms changed security?

6. Knowledge of existing laws that relate to mangrove areas

- Are you aware of any current formal laws (i.e., laws passed by government) related to your use and management of mangroves? Please describe the laws, the year they were passed (or when you got to know about them) and how they have affected your use and management of mangroves. For example, did the law restrict/improve access to products? Did the law require specific forms of organization among community members for management and decision making? Did the law require that women, youth and marginalized groups are more involved? Did the law require that benefits are distributed in a specific way?
- How did you get to know about this/these laws, i.e., who informed you about them and how (whether individually, in special meetings)?
- Did you have an opportunity to provide your opinion and participate in shaping this/these laws? Please explain.

7. Investments in mangrove improvements

- Have you participated in any activities aimed at improving mangrove forests in any way? For example, improving/enriching tree species, extending mangrove forest cover, increasing/enriching other important animals that reside in the mangroves or others you may name? Please describe the activities. For each activity, mention who initiated it (whether community, state agencies, NGOs, etc.), when you started it, when it ended or whether ongoing.
- In your view, did having tenure rights influence your decision to engage in the activity? If yes, please explain how. What other reasons did you have for engaging in the activity? Did you have any specific role or responsibility in the activity? Was there any specific focus on women's participation in the activity? Please describe.
- In your opinion, was the activity successful (or not)? What were/are the key factors for success (or failure)? What challenges did you face, and how did you (or how do you) overcome them?
- Were your efforts supported by external actors? Which external actors? What kinds of support did they offer?
- How does the nature of mangroves (sometimes underwater, sometimes not) affect how you approach improvements (like the ones you stated previously)? How does it affect your overall management practices?

8. Effects of climate variability

This section explores the most important climatic stresses in the past 20-30 years and resource users' experiences with them. Based on the discussions, these may include the frequency and magnitude of extreme climate events such

as droughts, floods, wave surges, strong winds and their impacts on mangrove forests and livelihoods. Resource users' responses to these stresses and how mangrove forests and related resources have helped or hindered coping with climate variability are to be discussed.

- What have been some of the most common climate-related events you have experienced in the past 20–30 years? These events can include drought, flooding, high waves, strong winds, etc. Please draw a timeline to illustrate when each event happened. Have these events been increasing in frequency or not? Have they been increasing in severity or not (e.g., rainfall more erratic, droughts lasting longer, etc.)?
- What were the impacts of these events on the cover of mangrove forest, availability of forest products (e.g., firewood, poles, fish stocks)? What were the impacts on other resources?
- What were the impacts of these events on your livelihoods (e.g., amount and type of food; overall income, including both cash related and subsistence)? Were these impacts the same for everyone or were some community members more affected? Who were the most affected?
- Did the extreme events in any way affect your rights and access to mangrove forests and resources or in your approach to managing the resources? For example, was there greater cooperation to ensure that products are available for all or did conflicts increase? Please provide examples with your explanation.
- What did you do to cope with any economic hardships that the event may have resulted in? Please describe what you did individually and as a group to cope with any hardships the events may have caused to you. Did any of these coping actions involve mangrove forests and related resources in any way?
- In your view, how important are mangrove forests in assisting you to overcome the effects of climate stress?
- Did you receive support from external actors such as NGOs or state agencies? What kinds of supports did they provide?

2: KII Guidelines

Guidelines for conducting In-Depth interviews with key informants at the village level

Province:
District:
Sub-district:
Village:
Name of respondent/occupation/age:
Role in the community/village/clan (e.g., village leader):
Role in forests (e.g., member of forest management committee):

Date/Time:
Interviewer:
Length of interview (Start/Finish):

Selection of key informants: Individuals to be selected from the following groups:

- **Official current village leaders** (at least one interview with one or two current leaders). Preferably top leadership or the most informed members of the leadership team. Combine these interviews with requesting village documents/archives for review.

- **Other village leaders** e.g., customary chiefs, clan heads (at least one interview in this category), respected persons, including religious leaders, as appropriate.
- **Head of the village women's committee** if there is one or if not a female leader (if 1-2 does not get any women).
- Other **elderly persons, at least one man and one woman,** these could be individual or small group interviews. When organized in small groups, it provides an opportunity for interviewees to help each other in recollecting certain historical events and generate a more complete story.
- Current and former **heads of forest committees / forest management teams** or of other user groups (formal or informal) such as loggers, charcoal producers, medicinal men/women, etc.

The interviewer need not administer all the questions to all the key informants. Some questions may be more relevant to some informants given their positions (past as well as presently).

At the beginning of the interview, the interviewer should obtain information about the respondents. This information becomes useful in determining which questions are most relevant to the particular respondent. Depending on time available for the interview, the interviewer may use this information to prioritize questions for discussion and obtain information on the other questions from other key informants.

Information on respondent

Ask questions to gather information on the interviewee background (gender/age/occupation), the leader's participation/ role in the community/village/clan (e.g., village leader) and in managing forests (e.g., member of forest management committee). Ask about their role in tenure reform implementation (if applicable).

- Background information about the village

  Some of this information can be collected from a review of literature and KII at the regional/district level. I**n cases where information gaps exist, specific questions may be asked to key informants. There is no need to repeat these questions to all of the KII,** once information is obtained, except to the extent that responses might vary, such as about sources of inequality. In addition, some of this information could be obtained prior to arriving in the village:

  1. Distance/travel time to nearest market, health center, school, etc.
  2. Population of the village members, including: changes between the population now and 10 years ago; and ethnicities represented (review census data available from official sources/health posts).
  3. Proportion of village that is literate, etc. (Census data).
  4. Main products most people take to sell to market (e.g., crops, timber, medicinal plants, etc.).
  5. Main economic activities of the village, farming, forestry, fisheries, as well as the estimated portion of families doing each.
  6. Main threats to the community? Main threats affecting the village rights to land and mangrove forests?
  7. Economic opportunities presented by activities such as aquaculture, timber, oil and gas extraction etc. Elicit whether these activities are viewed as an opportunity/threat.
  8. Main drivers of deforestation and main drivers of forest degradation.
  9. Key cleavages/areas of internal differentiation in the village. For example, who is considered 'village elite'? What are their defining characteristics? (Some options may include: migrants vs. autochthones, wealth distribution, main source of livelihood, levels of forest dependence, education and literacy, gender, ethnicity, etc.)
  10. Are there differences in land ownership among villagers, and are they small or large? Is inequality in land holdings increasing/decreasing/ not changing?
  11. In terms of wealth distribution would you say this village is very homogeneous (people have more or less the same level of wealth)? Rate on a scale of 1 (very homogenous) to 5 (very unequal)?
  12. In terms of existing conflict in the community would you say this village is peaceful and harmonious? Rate on a scale of 1 (very harmonious) to 5 (very conflictive)?

- Current mangrove forest resources and users in the village and how these have changed in time

Ask about changes over time and reasons for change. The changes include changes to the condition of mangrove forests and related resources, as well as changes concerning rights and access of communities, management practices, how communities organize themselves for management, the presence of external actors over time (e.g., which external actors, their objectives and activities, etc.). Probe to find out whether there are links between mangrove resources, tenure rights, management rights, external actors, etc.

Draw a map of the land and forest area used by the village (NOT the area to which it has formal rights, but ALL areas used). Then ask about each area.

The map only needs to be drawn once, then used in other interviews and in the FGD. *Information will be collected to elaborate a map before it is used in FGDs. If a map is already available at the village level, you may use it during interview to validate the information and cross check for any variations.*

What is each area used for and by whom? Note different land uses and proportions, e.g., Mangrove forests, agro forests, pastures, settlements. Gather information on areas for harvesting timber and non-timber forest products (NTFPs), clearing for farming, pasture or grazing, recreational and spiritual uses, hunting, gardening, housing, add other relevant categories as needed. **For future purposes use an ID code for each area identified in the map.** Remember our main interest is mangrove forest management. With regard to mangrove forests:

1. Who uses the forest/forest resources/forested landscapes for what, when, how, why?
2. What external actors use these areas, how and why?
3. Gather information on the spatial distribution of these uses (areas identified in map): For instance do they use different forests for timber and NTFP? Why? Gather information on the links between mangrove resources and other terrestrial resources.
4. Who is the formal owner of each area: (1) individual, some level of collective action around resources; (2) areas designated for the use of collectives; and (3) areas that are the property of the state?
5. In each of the areas identified, how has used changed over time, when and why? Ask questions about changes in mangrove forest uses, what triggered these changes and when. Allow respondents to recall several episodes of such changes if they can remember but try to at least cover major changes during the past 10–30 years. Focus on the most significance changes that respondents' recall.

- Which area on the map (in hectares and percent of total area used, percent of total area of village – if these are different) was affected by the change in use? What was the effect of the change in use on people's livelihoods and on the condition of mangrove forests and related resources?
- **How have men and women's rights to land and forest resources changed over time?**
- What were the key reasons driving changes in rights to mangrove resources? Who granted (or removed or modified) the rights (e.g., land agency, court, forest institute or ministry, regional government, village leaders; after long struggle by village, or by other organization, after conflict with neighbors, etc.)? Explain.
- How were local residents involved (or not) in rights changes?
- Did the changes involve the creation of new village organizations/committees and arrangements or strengthening of existing ones? Please explain. What is the composition of these village committees/organizations, roles and responsibilities?
- What are your overall perceptions of these changes? Have they improved how you use and manage mangroves? In what ways? Have they improved peoples' livelihoods? Have they improved the status and condition of mangroves?

How do women gain access to land and forest resources within the village?
- Do they have their own plots separate from men's?
- In regards to access to land and forest resources, what happens to women if they marry or their husband dies (or he leaves her)? How about single women?
- Are women involved in management and decision making? If yes, how? If not, why not?
- Has there been any change in women's rights and access?
- If women are involved in decision making, has this improved women's rights and access? Why or why not?

Based on each area identified on the map, what are the rules for forest use today?

- Who makes the rules for forest use? Think about doing this only in brief here with KI. Another option is to go in depth with 1–2 leaders on this, then use FG to verify.
- Are there any special rules that limit the activities carried out in the forests?
- **Maintenance/rehabilitation:** Are there efforts to eradicate invasive species, enhance regeneration, or build perimeter fences to prevent cattle wandering into the forests, etc.? If yes, explain. Who made these rules?
- **Harvesting of forest products:** Are there rules around products to be harvested, harvest time, quantity/year? If it exists, explain. Who made these rules?
- **Are there rules that restrict other activities?** Such as processing and sale of forest products? If yes, please explain. Who made the rules? Village or local government? Are the processed products for personal consumption or trade?
- **Who makes the rules regarding who is allowed to access which resources and for what purpose?**
- **Conflicts over mangrove forest resources.** What were the main sources of mangrove-related conflicts between this village and outsiders/external actors?
- How have these changed over time: type, source, degree and intensity?
- How did you resolve the conflicts? What were the main challenges faced in resolving conflicts?
- Did these conflicts affect how people use and manage mangroves?
- Have these conflicts affected overall forest condition?
- Are there legal guidelines for conflict resolution? How frequently are they applied in the event of conflict? For what kinds of conflicts are they usually applied? In your experience, are legal guidelines/statutory law the main way in which conflicts are resolved? If not, why not?

What are the main forest-related conflicts inside the village?

- How have these changed over time: type, source, and degree/ intensity?
- What were the challenges you faced when trying to resolve the conflict?
- Have these conflicts affected people's rights to forests e.g., access, use, management?
- Have these conflicts affected overall forest condition?
- Are there legal guidelines for conflict resolution? How frequently are they applied in the event of conflict? For what kinds of conflicts are they usually applied? In your experience, are legal guidelines/statutory law the main way in which conflicts are resolved? If not, why not?
- Are women's rights provided for in the forest or other related law? What are some of the main obstacles to enforcing women's rights at the local level? What, if any, is your role in ensuring that women's rights are protected? If none, please indicate whose responsibility it is to enforce women's right to land, forests and other natural resources?
- Over the last five years, what do you think of the level of conflict within the group (please explain)? Increased/Unchanged/Decreased? Interfered with daily activities? Channeled in ways that do not interfere with daily activities?
- Is there any grievance handling mechanism in relation to mangrove forests? If yes, please explain.

Tenure security. Do you think that villagers rights to forest resources are secure or insecure and why? By "tenure security" we mean "Your confidence that the members of this village will continue to be able to use, at least for the next 25 years, the land and forests you now use and benefit from in that particular area."

1. What makes tenure secure/insecure? List three main reasons.
2. For whom is tenure secure/insecure: women, men, migrants, members of ethnic groups, elites, etc.?
3. How has tenure security changed over time?
4. On a scale of 1 to 5 where 1 is very insecure and 5 is very secure, where would you put this village currently?

- External support for mangrove forests/ forestry
  - Who are the most important actors (internal as well as external) to forest use/management/rights and access today in the village? How has this changed over time?
  - Do external actors provide financial support, how much, which activities are supported?
  - Do they provide technical support to forestry? Of what kind?
  - Do they provide support for women's groups? Of what kind?
  - How often have village organizations met with officials from the most important external organizations in the past year?
  - How many times in past year met with national forestry officials/district forestry officials; provincial level officials?
  - Have you requested an intervention related to forest tenure or forestry from district/provincial/national forestry? What was the intervention you requested for; whether it was granted; if happy/satisfied with it?
  - Are you satisfied with the range of services and effectiveness of services provided by external actors? Please explain. If appropriate, please indicate some of the things that can be done to improve interactions between external actors and your village
  - Was similar support available in prior times? Explain/ compare.

- Effects of climate variability
  - What have been some of the most common climate-related events you have experienced in the past 20–30 years? These events can include drought, flooding, high waves, strong winds etc. Please draw a timeline to illustrate when each event happened. Have these events been increasing in frequency or not? Have they been increasing in severity or not (e.g., rainfall more erratic, droughts lasting longer, etc.)?
  - What were the impacts of these events on the cover of mangrove forest, availability of forest products (e.g., firewood, poles, fish stocks)? What were the impacts on other resources?
  - What were the impacts of these events on villagers' livelihoods (e.g., amount and type of food; overall income – both income related and subsistence)? Were these impacts the same for everyone or were some community members more affected? Who were the most affected?
  - Did the extreme events in any way affect villagers' rights and access to mangrove forests and resources or the approach to managing the resources? For example, was there greater cooperation to ensure that products are available for all or did conflicts increase? Please provide examples with your explanation.
  - What did the village do to cope with any economic hardships that the event may have resulted in? Please describe what was done individually and as a group to cope with any hardships the events may have caused. Did any of these coping actions involve mangrove forests and related resources in any way?
  - Did the village receive support from external factors such as NGOs or state agencies? What kinds of supports did they provide? In your opinion, was this support adequate? What were some challenges in coordinating external support when these climate events occurred?

- Customary authority and mangrove management

  Questions for elders on customs and change. Refer to information described in 1 above as well as the information gathered during literature review for the existence of customary forest tenure systems – use this information in conducting this interview.
  - In the absence of introduced forest institutions (such as before colonialism or before de facto penetration of the state forest apparatuses in the village) how did/do people regulate their relations with forests? Here, probe on customary forest tenure systems and institutions such as informal rules, taboos, norms, myths, etc. (ask about rules pertaining to women specifically). How did people observe/respect/adhere to these traditional systems in the past? Are these systems still applicable currently? Note if some elements of those pre-existing systems still exist and which have been abandoned and why? Note also how those customary systems overlap/interact/conflict with introduced more formal management systems and institutions (if any).
  - Ask questions about traditional/customary forest management arrangements that existed in the past or are still in use.

APPENDIX C. ANALYSIS OF THE POLICY AND LEGAL FRAMEWORK ON MANGROVE GOVERNANCE AND TENURE IN TANZANIA

Assessment aspect/variable	Excerpts from laws and policy documents
(1) Rights, tenure, and security of tenure rights and their distribution among stakeholders	
1. Rights of tenure and use	The Land Act (1999) and Village Land Act (1999) are the key legislations providing legal backing to the Land Policy (1995). Each of these includes provisions on land tenure in the country. The Land Act (1999) • All land in Tanzania is public land vested in the president as trustee on behalf of all citizens (Section 3(1) and 4(1)). • General land means all public land which is not reserved or village land and includes unoccupied or unused village land (Section 2, Cap 113). • Reserved land includes that reserved for forestry, national parks, public recreation grounds, marine parks, and reserves, etc. (Section 2 and 6). Under the Village Land Act (1999): • Where the president is mindful of transferring any part of village land to general land or reserved land in the interest of the public, he may direct the minister to proceed (Section 4(1)). • Tanzanian communities can define and demarcate an area of (formerly unreserved) village land as a Village Land Forest Reserve (VLFR) (Section 32-38). The rights of tenure and use by local residents are usually affected by the difficulty of determining the category "general land." In most cases, the lack of clear boundaries between villages and the government viewing non-agricultural land as unproductive land has resulted in those lands being reclassified as general lands and taken from communities. General land has often been confused with village land to the detriment of villagers.
2. Tenure security	According to the Forest Act (2002), there are five main categories of forests. Mangrove forests can only be National Forest Reserves, which the central government owns and manages. Other relevant forest types (though not mangrove forests), include: • Local Authority Forest Reserves: These are forests managed by the district councils and are a source of revenue for the districts through timber and charcoal licensing. • VLFR: These are areas declared as forests by village governments on village land and could include naturally forested land or any land set aside for forestry. The National Land Policy sets a clear position that customary land shall not be allocated to non-citizens or foreign companies (Section 4.2.4 of the Land Act). Foreign nationals may therefore obtain title to general land only. Under the Village Land Act (1999), Village councils are required to divide village land into three categories: communal land, which is shared by a large number of individuals within the village and may include grazing, pastures, forests or other areas with natural resources; occupied land, which is used for housing, cultivation, businesses, etc. and managed by individuals or single families; and future land, which is set aside for future use by individuals of the community.

continued on next page

Appendix C table continued

Assessment aspect/variable	Excerpts from laws and policy documents
(2) Community participation including their knowledge, capacity, and conflict resolution	
3. Community participation	Community participation in mangrove management is stipulated in the National Forest Policy (1998) and Forest Act (2002), including: • To enable participation of all stakeholders in forest management and conservation, Joint Forest Management Agreements (JMAs), with appropriate user rights and benefits, will be established (Policy Statement 3). • Participatory Forest Management (PFM) is a strategy to achieve sustainable forest management by promoting community management (CBFM) or co-management (JFM) of forest and woodland resources. The Village Land Act (1999), under Section 8, requires the village council in its management of the village land consider the following: • The need to consult and take account of the views and where it is provided, comply with any public officer or public authority with jurisdiction over any matter in the village land area. • The need to consult with and take account of the views of other local authorities having jurisdiction in the village land area. The Tanzania Local Government (District Authorities) Act (1982) lists the village assembly as the most important avenue for community participation in making decisions about the village. With regard to mangrove forest management, formation of committees (VNRC) and institutions (mangrove forest by-laws) and other important decisions have to be deliberated by all eligible community members (18 years and above) at a village assembly. There are three types of village assembly meetings: annual, quarterly, and extraordinary village assembly. The National Environmental Policy (1997) outlines the importance of public participation in decision making. The policy states that one of the "fundamental prerequisites for the achievement of sustainable development is broad public participation in decision making, including the participation of individuals, groups and organizations in environmental impact assessment issues and in decisions, particularly those which potentially affect the communities in which they live and work." In Principle 10 of the Rio Declaration, the Heads of States and Government declared that: "Environmental issues are best handled with the participation of all concerned citizens; at the relevant level... each individual shall have appropriate access to information concerning the environment... and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available." The Forest Policy adopts a participatory approach to forest management by involving all stakeholders (including local and indigenous peoples) in management systems, demarcation of forest reserves, devising of mechanisms to ensure equitable sharing of benefits, and lease of forest reserves to private investors. Under the Forest Act (2002), communities are allowed to sign JMAs with government and other forest owners (commonly referred to as "Joint Forest Management" or JFM).

continued on next page

Appendix C table continued

Assessment aspect/variable	Excerpts from laws and policy documents
4. Community, customary systems and authorities	Under the Village Land Act (1999): • Most land in Tanzania is held under customary tenure arrangements. Within the village area, the village may decide to set aside land for communal purposes such as conservation, forest management, grazing or other common property objectives. • Recognizes the need to pay full, fair, and prompt compensation to any person whose right of occupancy or recognized long-standing occupation or customary use of land is revoked or otherwise interfered with to their detriment by the state (Section 3). • Provides that a customary right of occupancy is in every respect of equal status and effect to a granted right of occupancy (Section 18.1). • Upholds customary land tenure through devolving authority to local institutions such as the village land council. • Broadens the definition of "customary rights" to include the right of household owners, groups, or communities to hold commons (such as forests) as registered common property. The National Forest Act (2002): • A village council may recognize any association of persons as a group for purposes of managing a community forest reserve, provided it is not formed in accordance with customary law for the purpose of occupying, using, and managing a forest and forest resources on a communal basis (Section 43). • The participatory approach in forest management and conservation envisioned in all legislations and policies accommodates tradition and customary ways of conservation. • Under the Magistrates Court Act of 1884, if a dispute involves a communal land or land held under customary right of occupancy, the proper court is a Primary Court, which applies customary law and Islamic law, exclusively. The Land Act (1999): • Acknowledges that customary land rights are practiced in different ways by different ethnic groups all over Tanzania.
5. Knowledge and capacity	The Constitution of the United Republic of Tanzania (1977) provides that: • Every citizen has a right to be kept informed of developments in the country and in the world, which are of concern to the life of the people and their work and of question or concern to the community (Article 18(2)). The Environmental Management Act (2004): • Designates standing committees of economic affairs, works, and environment for municipalities, wards, villages, and sub-ward to coordinate environment management at these levels. • Every citizen of Tanzania has the freedom of access to publicly held information relating to the implementation of the Act (Section 172). National Forest Act (2002) includes the Forest Fund which aims to: • Promote awareness of the importance of the protection, development, and sustainable use of forest resources through public education and training. • Assist groups of persons and individuals to participate in any public debates and discussions on forestry, and in particular, to participate in processes connected with the making of an environmental impact assessment. The Marine Parks and Reserves Act (1994) includes in its objectives: • Promotion of community oriented education and dissemination of information concerning conservation and sustainable use of marine parks or reserves. • Facilitation of research and monitoring of resource conditions and uses within marine parks or reserves.

continued on next page

Appendix C table continued

Assessment aspect/variable	Excerpts from laws and policy documents
6. Conflict resolution	Issues of land and forest conflicts and resolution mechanisms are stipulated in different pieces of legislation in the country. Below is a summary of the key ones. The Constitution of the United Republic of Tanzania (1977) article 107 states: The Judiciary shall be the authority with final decision in dispensation of justice in the United Republic of Tanzania. Land Disputes Court Act (2002): • A range of courts have jurisdiction to hear and determine land disputes, namely, the village land council, ward tribunal, district land and housing tribunal, High Court, and Court of Appeal of Tanzania (Section 3(2)). Ward Tribunal Act (1985) • Encourages resolution of disputes including natural resource conflicts (involving land and forests) through amicable resolution methods, in particular mediation. Village Land Act (1999) • Sets out the village land council as a body for settlement of land disputes through amicable resolution-mediation (Section 60). Land Act (1999) • Section 34(3) provide for removal or relocation of customary landowners in favor of granted right of occupancy. Land Disputes Court Act of 2002, the Land Act and the Village Land Act recognize the jurisdiction of informal elders' councils, village councils, and ward-level tribunals. Village councils can establish an adjudication committee, with members elected by the village assembly. The primary mode of dispute resolution in these forums is negotiation and conciliation.

continued on next page

Appendix C table continued

Assessment aspect/variable	Excerpts from laws and policy documents
(3) Benefits, costs, and incentives including financing mechanisms for sustainable mangrove management and allowed legitimate uses of mangrove forests	
7. Mangrove forests legitimate use	Under the Forest Act (2002): • Authorized forest officers stationed in the districts normally issue licenses for harvesting and transporting forest products. • Part VI provides details on permits and licenses. • Part VII provides details on Trade in Forest Products while Part XI provides details on offenses and penalties. Within the JFM guidelines on benefit sharing: • Village forest by-laws and village forest management plans describe how the forest is used, managed, and protected. Where there are opportunities for utilization of the forest, it will describe how much timber or forest product can be harvested and from which areas. Local Government (District) Authorities Act (1982) provides legal authority for villagers to propose by-laws (including on protection of mangrove forests) to be adopted by village assembly before being approved by the district council.
8. Benefits distribution	National Forest Policy (1998): • Explicitly recognizes the contribution made by forests to poverty reduction and human welfare. The overall goal of the National Forest Policy is to "enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of her natural resources for the benefit of present and future generations." The Forest Act (2002) has the objective: • To promote, and enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of natural resources for the benefit of present and future generations. Though JFM benefit-sharing guidelines were released in 2013 (English Version and 2015 Kiswahili Version), JFM has been implemented for over a decade in several hundred villages. Its implementation has been affected by lack of clarity on how forest conservation costs and benefits are to be shared between participating communities and the central government. In 2013, the Minister for Natural Resources and Tourism issued these guidelines, which are being applied in four villages in the Rufiji River delta. The guidelines specifically mention mangrove forests under productive forests and provide details on the distribution of benefits. The National Environment Policy (1997): • Emphasizes that biological diversity services and their commercial enterprises could be visualized as the biggest source of foreign exchange in the future, helping alleviate poverty. The National Forest Policy (1998): • Recognizes that trade in wood and non-wood forest products offer considerable potential for increased economic development through income and employment generation as well as export earnings. The Beekeeping Policy (1998): • Beekeeping has an important role in the economy of small-scale farming households in the forests of Tanzania.
9. Financing/incentive for conservation and sustainable use/management	The National Forest Act 2002: • Establishes a fund to be known as the Tanzania Forest Fund that is managed by the Forest Fund trustees who shall be appointed by the minister, with the objective and purpose of promoting and assisting in the development of community forestry directed toward the conservation and protection of the forest resources of the country through the making of grants and providing advice and assistance to groups of persons wishing to form themselves into a group.

continued on next page

Appendix C table continued

Assessment aspect/variable	Excerpts from laws and policy documents
(4) Institutional coordination among key government departments and agencies, including integration of biodiversity	
10. Cross-sectoral coordination	Major sectoral policies that have a bearing on the forest sector include those related to environment, livestock, energy, land, beekeeping, wildlife, minerals, agriculture, water, health, and gender. In Tanzania, the Office of the Vice President is responsible for the environment. The complexity and inter-relatedness of environmental problems have necessitated the involvement of almost every sector in environmental protection. Forest Act: • One of the objectives of the act is to promote coordination and cooperation between the forest sector and other agencies and bodies in the public and private sectors in respect to the management of the natural resources of Tanzania (Section 3(g)). Environmental Management Act: • Each ministry has a duty to establish a sector environmental section, which shall ensure compliance with the requirements under the Environmental Management Act (Section 30 and 31). National Environmental Policy: • Recognizes other sector contributions and roles in management of the environment and clarifies the governance and rights issues as they relate to other sectors and their involvement.
11. Sustainable conservation and management of mangrove resources	For decades, mangrove forests in Tanzania have been managed as central government forest reserves. The recent completion of JFM benefit-sharing agreements provides a mechanism for sustainable conservation and management of mangrove resources in collaboration with communities living in and around mangrove areas. National Forest Policy (1998) and National Forest Act (2002) aim to enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of natural resources for the benefit of present and future generations. Other relevant legislation that highlight sustainable conservation and are implied to extend to mangroves include the Tanzania Investment Act (1997), Marine Parks and Reserves Act (1994), and World Heritage Convention (WHC).
12. Maintaining and increase of mangrove forests	National Environmental Policy (1997): • Recognizes the need for taking actions or measures that will promote sustainable use of biological resources for the benefit of both the present and future generations. • Emphasizes the collection and generation of information on biodiversity, and implementation of programs that will reduce biodiversity loss. Forest Act (2002): • Aims to encourage and facilitate the active participation of the citizens in the sustainable planning, management, use, and conservation of forest resources, and will ensure ecosystem stability through conservation of forest biodiversity, water catchments, and soil fertility (Section 3). • The law gives powers to the minister to declare certain trees be categorized as reserved (Section 65). Such reserved trees may include mangrove trees and other important coastal tree species. • The act prohibits any person from burning vegetation on any land outside of his own house or compound or willfully or negligently kindle or cause to be kindled any fire which he has reasonable cause to believe may spread to destroy or damage property of any other person or the state (Section 70). • Offenses and penalties for violations of the act (Sections 84-100).

continued on next page

Appendix C table continued

Assessment aspect/variable	Excerpts from laws and policy documents
13. Biodiversity conservation and preservation of ecological integrity	Tanzania is a party to several international conventions and participates in other international programs that designate areas for conservation focus. Tanzania ratified the Convention Concerning the Protection of the World Cultural and Natural Heritage in 1977, as well as the Convention on Biological Diversity (ratified 1996); Ramsar Convention on Wetlands, 1971 (ratified 2000); United Nations Fish Stocks Agreement (UNFSA); Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (Nairobi Convention) (adopted 1985, put in force in 1996). Relevant laws include National Parks Act; Wildlife (Conservation and Management) Act (2009); Ngorogoro Conservation Area Act Cap 284 (2002); Fisheries Act, Marine Parks and Reserve Act (1994); Water Resources Management Act, 2009.

continued on next page

Appendix C table continued

Assessment aspect/variable	Excerpts from laws and policy documents
(5) Gender equality/equity	
14. Gender equality/equity	Gender equality is covered in detail in several policies and legislations affecting mangrove forest governance. Land Act (1999): • Every woman has the right to acquire, hold, use, and deal with land (Section 26). Forest Policy (1998): • Private and community forestry activities will be separated through harmonized extension services and financial incentives. The extension package and incentives will be designed in a gender-sensitive manner (Policy Statement 7). • Local communities will be encouraged to participate in forest activities. Clearly defined forest land and tree tenure rights will be instituted for local communities including men and women (Policy Statement 39). • Women and men will be supported in tree-growing and other activities aimed at promoting sustainable use of forests. It also requests a gender policy be established for forestry sector development, including the recruitment of women in extension and other forestry services. The Forest Act (2002): • Where a village land forest management committee is established, it shall be informed with due regard to gender balance (Section 33(2)). National Environmental Policy (1997): • Women are the natural resource managers in our society. Their knowledge, experience, and traditional skills in the management of resources stocks and households should be tapped for increased environmental action. The role of women in environmentally related activities will be recognized and promoted with a view to achieving increased women's involvement and integration in all environmental management areas (Para 43). • Empowerment of women is a critical factor in the eradication of poverty and effective participation of women in environmental activities (Para 44). The Constitution of United Republic of Tanzania (1977) has several articles and sections emphasizing human dignity, human freedoms, equality, and discouraging any form of discrimination. The Village Land Act (1999): • Requires that the village council treat all applications equally, regardless of the gender of the applicant, and forbids the council from adopting discriminatory practices or attitudes toward women applying for a certificate of customary right of occupancy. • The village adjudication committee or officer must treat the rights of women and the rights of pastoralists to occupy use or have interest in land equally to those of men or agriculturalist (Section 57). • Prohibits villagers from assigning their right of occupancy if it would interfere with the right of any woman to occupy land under a customary right of occupancy, a derivative right, or as a successor in title to the assignor. • In determining whether to grant a derivative right to village land, a village council must also take into account "the need to ensure that the special needs of women for land within the village [are] and will continue to be adequately met." • Renders invalid any customary practice that discriminates against women (Section 20.2). Land Disputes Act (2002) established land tribunals whose composition must include not less than 43% women.


USAID
FROM THE AMERICAN PEOPLE