WOMEN SHELLFISHERS AND FOOD SECURITY PROJECT

Technical Report

A review of mangrove and forestry co-management in Ghana and The Gambia

May 2024

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ACRONYMS

AFD	French Development Agency
AGFP	All-Gambia Forestry Platform
CAPED	Community Action Platform for Environment and Development
CBFM	Community Based Forest Management
CBNRM	Community-Based Natural Resource Management
CCM	Centre for Coastal Management
CEC	CREMA Executive Committee
CF	Community Forestry
CFA	Community Forest Association
CFCs	Community Forest Committees
CFM	Collaborative Forest Management
CFMA	Community Forest Management Agreement
CFMP	Community Forest Management Programme
COD	Certificate of Devolution
CRC	Coastal Resources Center
CREMA	Community Resource Management Area
CRMC	Community Resource Management Committee
CSLP	Coastal Sustainable Landscapes Project
CSO	Civil Society Organization
CSSIR	Council for Scientific and Industrial Research
DAA	Development Action Association
DCFMP	Densu Co-Management Fishery Management Plan
DoF	Department of Forestry in The Gambia
DOPA	Densu Oyster Pickers Association
DPWM	Department of Parks and Wildlife
EbA	Ecosystem-based Adaptation
FAO	The Food and Agriculture Organization

FC	Forestry Commission
FSD	Forest Services Division
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFMC	The Gambia Forest Management Concept
GMW	Global Mangrove Watch
HIPC	Highly Indebted Poor Country
ICCA	Indigenous Community Conservation Areas
ICRAF	World Agroforestry (International Centre for Research in Agroforestry)
JFM	Joint Forest Management
JFPM	Joint Forest Park Management
MECCNAR	Climate Change and Natural Resources
MOFAD	Ministry of Fisheries and Aquaculture Development
MTS	Modified Taungya System
NEMA	National Agricultural Land and Water Management Development
NFAP	National Forest Action Plan
NFPDP	National Forest Plantation Development Programme
NGOs	Non-Government Organizations
NRM	Natural Resource Management
NTFP	Non-timber forest products
PAs	Protected Areas
PFM	Participatory Forest Management
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SoS	Secretary of State
SwS	Sea Water Solutions
TRY	TRY Oyster Women's Association
TWNP	Tanbi Wetland National Park

UCC	University of Cape Coast
UNEP	United Nations Environment Program
URI	The University of Rhode Island
USAID	United States Agency for International Development
WABSA	West African Bird Study Association
WACA	West Africa Coastal Areas management program

1. INTRODUCTION

1.1 Activity Background

The Women Shellfishers and Food Security project seeks to address the need for greater attention to food security for women shellfishers and their families while improving biodiversity conservation of the ecosystems on which their livelihoods depend. The project goal is to foster the adoption and scaling-up of an integrated approaches to the conservation and restoration of mangrove and estuarine ecosystems in West Africa to provide cross-sectoral benefits in terms of gender equality and women's empowerment, economic development and household food resiliency (CRC, 2022).

World Agroforestry (ICRAF) is contributing to the implementation of project work components under Objective One to demonstrate the biodiversity and socio-economic value of integrated rights-based, co-management of mangrove shellfisheries and proximate landscape food ecosystems in two countries in West Africa: Ghana and The Gambia. Objective 1.3 of the project focuses on mangrove co-management in the two countries, through mangrove restoration and management best practices (Objective 1.3.1) and developing the mangrove community of practice (Objective 1.3.2). More specific to this report is Objective 1.3.3 which focuses on reviewing mangrove and forestry co-management plans in Ghana and The Gambia. This report documents the results of a desktop review of country management plans in Ghana and The Gambia, and key informant interviews to document the past and current mangrove co-management plans and associated efforts in the forestry sector, lessons learned from these efforts, and recommendations.

2. MANGROVE AND FORESTRY CO-MANAGEMENT PLANS

2.1 Overview of Mangrove and Forestry Ecosystems

Forest and mangrove ecosystems provide multiple ecosystem services that support livelihoods and lives globally. Forest refers to an area with woody trees and/or bamboo with a 10% minimum crown cover (FAO, 1995). They provide services and functions such as atmospheric carbon sequestration, climate regulation, production of timber, and recreational purposes, fuel wood, food, fiber, and medicine for millions of people (Muller et al., 2018; Felipe-Lucia et al., 2018; Jenkins and Schaap, 2018). In addition, forests provide revenue for countries. On the global scale, the sector contributes more than US$ 1,298 billion to the world Gross Domestic Product (GDP), employs over 18.21 million people, and offers direct and indirect support to over 45.15 million jobs (Li and Linhares-Juvenal, 2019). Forests are vital natural capital assets that play a crucial role in supporting the global environment. Over 1.6 billion peoples' livelihoods depend on forests. Besides, forests serve as global carbon sinks, natural air conditioners, habitats for biodiversity, and provide other essential ecosystem services such as carbon sequestration and climate regulation (Dampha et al., 2017; Harris et al., 2012; Houghton and Hackler, 2006; Le Quéré et al., 2018).

Mangroves are salt-tolerant plant species that thrive in areas found between the sea and land where floods mainly occur in times of high tides and as well become exposed in times of low tides (inter-tidal zone). Mangroves, as unique terrestrial life forms, offer several environmental, social, and economic functions making their existence critical. Most coastal communities are protected from cyclones, coastline erosion, and tsunamis (Saenger, 2002; FAO, 2007; Aheto et al., 2016) due to the presence of mangroves. Mangrove forests are distributed throughout the globe's tropical and sub-tropical coastal areas (Ho and Mukul, 2021).

Globally, mangrove habitat areas cover nearly 147,358.99 km^2 (GMW, 2021) and provide a range of ecosystem functions such as coastline protection (Hochard et al., 2019), habitat provision for wildlife and marine species (Friess et al., 2020), and carbon storage and sequestration (Donato et al., 2011). Subsistence coastal fishers derive their source of livelihood from mangroves (Kairo et al., 2009; Aheto et al., 2016). In addition, within an area of one hectare, a catch of 600 kg of fish is possible (Melana et al., 2000; Aheto et al., 2016) making it economically viable for onshore fishing. According to FAO (2020), mangrove ecosystems produce a wide range of wood and non-wood forest products, help protect coastal areas and coral reefs, perform essential functions in the life cycles of many marine species, and conserve biodiversity. Mangroves also provide socio-economic benefits like support to livelihoods (e.g., ecotourism; Spalding and Parrett, 2019), aqua-silviculture, and forest products (Orchard et al., 2016).

Despite the numerous functions that forests and mangroves offer, the continuous supply of these tangible and intangible benefits is threatened by degradation resulting from human activities. Global Forest Resources Assessment (FAO, 2020) and the Global Forest Goals (United Nations, 2021) indicate that the world forest cover is about 4.06 billion hectares, while the natural forests cover 3.7 billion hectares. Globally, the mangroves area declined by 1.04 million ha between 1990 and 2020 (FAO, 2020). The loss rate has more than halved over the three decades, from 46,700 ha per year in 1990–2000, to 36,300 ha per year in 2000–2010, and 21,200 ha per year in the most recent decade. However, even though mangrove loss rate has slowed down, it is not enough to sustain increasing livelihood demands of coastal communities (Romañach et al., 2018).

Currently, Ghana's forests are estimated at 7,986,000 ha, a decrease from 9,924,000 ha in 1990. Similarly, national data on the total mangrove area in Ghana revealed a downward trend from 17,000 ha in 1990 to 11,000 ha in 2010 (FRA, 2010). With regard to these, forest fringe communities and coastal dwellers, resource users, governmental institutions and other relevant stakeholders in Ghana have in recent times adopted the concept of co-management as a means of conserving and managing the available natural resources. Ghana lost about 2,378 ha of mangrove area between 1996 and 2016, owing to multiple factors such as population growth, economic drivers, and natural factors. In The Gambia, the rapid population growth, unmanaged bushfires, firewood collection, overgrazing, expansion of farmland and human habitation pose severe threats and pressure to forest and mangrove resources (FAO, 2020). The Gambia is ranked 120th globally out of 172 countries on the Forest Landscape Integrity Index, with a mean score of 4.56/10 (Grantham et al., 2020). The Gambia has experienced a net gain of 78km^2 (7800 ha) of mangrove area between 2000 and 2020 (Duguma et al., 2022; Liman et al., 2023). However, different patches have recorded net mangrove loss due to different human and natural factors. The growth is attributed to restoration investments from different stakeholders.

2.2 Forestry and Mangrove Ecosystems Management

Mangrove and non-mangrove forests are threatened by degradation associated with human activities. These resources have deteriorated in both size (deforestation) and quality (degradation) over the past century. Deforestation for timber, cropland, fuelwood, pasture, urbanization, and commercial industry has had a profound impact on rural communities. Loss of forests further exposes critical watersheds, accelerates soil erosion and sedimentation of rivers and reservoirs, exacerbates flooding, and leads to reduced land's capacity to regenerate and sustain productive functions.

Forest resource control among politicians, private business interests, government agencies, and local communities is therefore an important theme in several countries including Ghana and The Gambia. Management of most forest reserves in Ghana has been an exclusive right of state forestry departments whereas in The Gambia it is a mixture of state and community responsibilities. Forest management systems since the nineteenth-century colonial era, are premised on models of unilateral,

centralized state control. Governments still possess sole legal rights on natural forests even though agencies entrusted with forest protection and development often face serious human resource and capital constraints. The failure to stem forest degradation in many parts of Sub-Saharan Africa indicates that forest departments alone are incapable of such an unrealistic mandate. With rapid expansion of human populations and the transformation of national politics and economies, the Africa continent has changed dramatically. Communities and Indigenous peoples have growing political power to demand rights to manage and benefit from sustainable management of local forest resources which they depend on.

Some of the management approaches have nonetheless involved centralization of resource governance, authoritative legislative strategies, and management attitudes and practices borrowed from developed countries (Schmithüsen, 1997). Forest management challenges are therefore rooted in historical processes through which state forestry institutions have evolved over the last century. Attempts to tighten bureaucratic controls over national forests, often lead to conflict among users and further degradation, rather than conservation and sustainable use. In several countries, community involvement is proving to be a cost-effective, socially just, and environmentally sound approach to stabilizing use of natural forests and other biodiversity resources.

A summary of key issues driving community forest management interests with implications for national and global policies include:

i) Communities are increasingly concerned about forest degradation and resource scarcities.
ii) Mistrust of forestry department staff and fear that large private sector timber interests will further degrade already threatened and eroding natural forest resources.
iii) Communities are increasingly organizing and taking operational steps and political action to gain greater authority over local forest resources.
iv) Drive to build on traditional institutions and environmental values while integrating new planning skills and management practices in evolving forest protection systems.
v) Forestry departments are under political and financial pressures to involve communities in public forest management.
vi) National policies and programs supporting community forest management initiatives are encouraging them to develop and spread.
vii) Community involvement in forest protection is leading to a stabilization of degraded ecosystems, enabling natural regeneration.

Overall, communities in Ghana and The Gambia, use and manage their forests in diverse ways - use rights and management responsibilities vary widely, depending on historical factors, social and political contexts, and national policies. Management of most forest reserves in Ghana is the exclusive right of state forestry departments whereas in the Gambia it is a mixture of state and community responsibilities. It therefore is useful to identify major contexts and strategies in which communities participate in forest management. The current challenge is to facilitate devolution of greater authority

to forest-based communities while minimizing conflicts and supporting new partnerships among communities, government, and the private sector to ensure meeting of community needs, forest resource conservation and sustainable use. Clarifying forest use rights and responsibilities and creating adaptive policies and programs that allow for intensified access controls can lead to more sustainable forest management. This requires appropriate institutional arrangements to shift authority over forest resources back in the direction of local forest-dependent community groups and Indigenous peoples.

The contribution of stakeholders (resource users, government, NGOs, etc.) towards management of forests through co-management plans is therefore crucial in the maintenance of forest resources in the long term. Information on the challenges and success of current co-management plans on forest and mangrove resource is however lacking. The purpose of this review therefore is to help identify existing forest resource co-management systems in Ghana and The Gambia to inform policy formulation on mangrove and non-mangrove forest conservation and use.

2.3 Purpose of the Review

This review is part of the USAID supported Women Shellfishers and Food Security Project goal to demonstrate the biodiversity and socio-economic value of more fully integrated rights-based co-management of linked shellfish - mangrove and proximate landscape food ecosystems in Ghana and The Gambia (CRC, 2022). The project goal is to foster the adoption and scaling-up of an integrated approach to conservation and restoration of mangrove and estuarine ecosystems in West Africa that provides cross-sectoral benefits in terms of gender equality and women's empowerment, economic development, and household food resiliency (USAID, 2022). ICRAF is contributing to the implementation of this objective through a review of mangrove and forestry co-management policies and plans in Ghana and The Gambia.

The aim is to identify the existing co-management systems in Ghana and The Gambia to inform decision-making essential for policy formulation on forest conservation and use. This is intended to help inform mangrove co-management at selected project sites documenting past and current mangrove and forest co-management plans and associated efforts, their status, lessons learned, and recommendations.

3. METHODOLOGY

3.1 The Co-management Concept

The concept of co-management or community/stakeholder involvement in management of natural resources is to ensure conservation and sustainable development of forest resources for maintenance of environment quality and flow of benefits to society. Co-management includes rule-making and rule-enforcement through local government units that are close to the resource management area (Aheto et al., 2016). Co-management has been defined as a pathway to conserving forests by overcoming problems related to governance and unsustainable harvesting and supporting the application of community customary knowledge and joint forest monitoring (Gnansounou et al., 2022; Berkes et al., 1991). It is simply an approach where government shares authority, responsibilities, and functions with resource users (Barletti & Rolando, 2024; Aheto et al., 2016;).

The emergence of co-management, where various government and non-government actors work together, is an important governance mechanism for natural resource management. Recent forestry policies advocate for various types of forest management approaches involving communities to manage forest resources. These range from village forestry and communal forests/woodlots. They include three broad types - Community-Based Natural Resource Management (CBNRM), Joint Forest Management (JFM), and Community Based Forest Management (CBFM), which are common in The Gambia. The CBNRM incorporates resources other than forests and is common approach in Ghana that combines forest and wildlife management. The JFM plans have been applied in India and other developing countries. They involve communities managing forests in partnership with central or local governments. The terms Collaborative Forest Management (CFM) and Participatory Forest Management (PFM) also refer to JFM initiatives. The CBFM is the management of forests exclusively through the efforts of local communities, and at times with limited extension advice from the government. CBFM is as an umbrella concept covering a wide range of activities that links rural people with forests, trees, and the benefits that can be derived from them.

Concepts such as community forestry, social forestry, common property forest management, collaborative forest management, joint forest management, and participatory forest management, are often used in literature to imply management of forest reserves to obtain maximum benefit to a nation and its people. However, even though the approach is recognized for yielding positive results and impacts, it can fail to produce the expected results if not well implemented (Nunan et al., 2015). Success therefore relies on synergy among various stakeholders involved in the management of the resource and especially willingness of the local communities to adhere and support the process (Gnansounou et al., 2022; Kepe, 2008).

Considering the increased mangrove degradation in West Africa in particular, decision-makers are open on involving local communities in forest management through the co-management approach

(d'Aquino & Bah, 2013). Literature on conservation science has also documented the use of the co-management approach to effectively conserve natural resources.

3.2 Principles of Forest Co-management

Co-management in forest management as a collaborative approach that involves both local communities and the state in the management of forests aimed at ensuring sustainable and equitable use of forest and mangrove resources. Some of the principles pertinent to effective co-management include:

- Sustainable Use: The goal of co-management is to ensure the sustainable use of forest resources. This means balancing the needs of people who depend on forests for their livelihoods with the need to conserve biodiversity and maintain ecosystem services.
- Equitable Benefits: Co-management also aims to ensure that the benefits from forest resources are shared equitably among all stakeholders. This includes local communities, the state, and other stakeholders such as conservation organizations and private sector entities.
- Shared Responsibility: Co-management is based on the principle that both the state and local communities share responsibility for managing forests. This includes decision-making, implementation, and monitoring of forest resources.
- Participation: A key aspect of co-management is the active participation of local communities in all stages of forest management. This includes planning, decision-making, implementation, and monitoring.
- Conflict Resolution: Co-management also provides a framework for resolving conflicts over forest resources. This includes conflicts between different user groups, as well as conflicts between conservation goals and livelihood needs.
- Local Knowledge and State Authority: Co-management combines local knowledge and state authority. Local communities often have a deep understanding of the forest ecosystem, while the state has the legal authority and resources to manage forests.

3.3 Study Approach

This review involved two approaches. These included desktop reviews on mangroves and forestry co-management in Ghana and The Gambia – including policies, strategies, reports, and publications analysis. In addition, key informant consultations (both formal and informal) were conducted with multiple stakeholders and interest groups in both countries. These included the officials from line ministries and departments, and community heads involved in the implementation of co-management plans.

Desk work sought to shed light on the current status of forest and mangrove ecosystems, historical and contextual operationalization of forest management systems, evolution of policy provisions and

legislation covering different types of forest management regimes involving communities as well as state and non-state actors.

Analyses focused on how co-management has been implemented in practice, principles of forestry co-management, forest tenure factors, and progress on the establishment of community-based forestry in Ghana and The Gambia. In addition, the review describes benefits, challenges and barriers faced on implementation of the various co-management strategies. Important governance features such as inclusiveness, legitimacy, transparency, fairness, and accountability, vital for implementing forest co-management plans are highlighted (Mollick et al., 2021). Stakeholder roles, institutional arrangements, and historical policy and legislative frameworks supporting co-management plans in Ghana and The Gambia forestry contexts were also assessed.

The desk review for Ghana focused on relevant published and grey literature on the general status and management regimes of forestry and mangrove resources, co-management policies and programs including collaborative approaches leading to the development of community-based strategies and interventions for joint development and management of forestry and mangrove resources in Ghana. It also covered governance systems for reservation, protection and exploitation of forestry and mangrove ecosystems resources; factors motivating co-management, lessons from successful forestry and mangrove collaborative initiatives, as well as challenges and opportunities. Documents reviewed that specifically enumerate aspects of forestry and mangrove management (Annex 1) include:

- Ghana Forest & Wildlife Policy (2012)
- Forestry Development Master Plan (2016-2036)
- Ghana Forest Plantation Development Strategy (2016-2040)
- The Wildlife Conservation Act of 1971 (Act 76)
- Fisheries Act of 2002 (Act 625)
- Collaborative Resource Management Strategy (2001)
- Collaborative Wildlife Management Policy (2004)
- National Wetland Management policy (1999)
- Wetland Management Regulation (1999)

Field-level consultation of key informants of identified stakeholder groups were conducted through face-to-face interviews to solicit for information on operation/dynamics of on-going mangrove co-management initiatives being executed by non-governmental and governmental institutions with coastal communities particularly, the Wildlife Division of the Forestry Commission, Metropolitan, District Assemblies and others.

The review for The Gambia also followed a multi-disciplinary approach, involving stakeholder consultation and review of relevant documents (policies, strategies, reports and publications). Key informant consultations were held with multiple stakeholders from the Ministry of Environment,

Climate Change and Natural Resources (MECCNAR), Department of Forestry, Department of Parks and Wildlife Management, Ecosystem-based Adaptation (EbA), other related project staff and community-based organizations - at different tiers of forest resource management in the country.

The following documents were reviewed:

- National Forest Policy (2023 – 2032)
- Gambia Forest Management Concept (2001)
- National Forestry Strategy (2019-2028)
- National Forest Action Plan – NFAP (2019 – 2028)
- Forest Act (2018)
- Tanbi Wetland National Park Management Plan (2016)
- Kiang West National Park Management Plan
- National Adaptation Program of Action on Climate Change (2007)
- National Climate Change Policy (2016)

Collated information has been synthesized and presented in text in the following sections.

4. MANGROVE AND FORESTRY ECOSYSTEMS CO-MANAGEMENT IN GHANA

Ghana's forest products are the fourth largest source of income for local people after agriculture, fishing and mining (Boon et al., 2009). The sector contributes about 4 percent to GDP (Ghana Statistical Service, 2010). The country's current forests cover is about 7,986,000 ha, a decrease from 9,924,000 ha in 1990. On the other hand, remaining mangrove forest area was about 204 Km^2 (20,400 ha) only in 2016. Between 1996 and 2016, there was a reduction of 23.78 Km^2 (2378 ha) (Duguma et al., 2022). Available data shows the extent of the global mangrove loss was 5245 Km^2 (52,4500 ha) between 1996 and 2020 (3.4 percent) (Bunting et al., 2022).

Ghana has developed several legal frameworks and ratified international treaties and conventions to manage and protect its forestry and wetland resources including mangroves. The Forest and Wildlife Policy of 2012 is aimed at managing and enhancing the ecological integrity of forest, savannah, wetlands and other ecosystems by strengthening the legal framework to give permanency to gazetted forest reserves and Protected Areas (PAs), and to conserve representative samples of major ecosystems and species (biodiversity) in the country. This, together with the Forestry Development Master Plan (2016-2036) and the National Forest Plantation Development Strategy (2016-2040), broadly specify major strategies and actions that have been designed to ensure sustainable use, development, and management of forest and mangrove resources.

The Wildlife Conservation Act of 1971 (Act 76), the Fisheries Act of 2002 (Act 625) are the key legislative instruments governing the conservation of mangrove ecosystems (Acheampong et al., 2019) as well as The National Wetland Policy of 2016; and the Wetland Management (Ramsar Sites) Regulation of 1999, among several others. These policies, legislation and Acts prohibit illegal logging, land reclamation, and unsustainable fishing practices within mangrove areas, contributing to their preservation. Highlights on relevant policies, legislation, plans and their respective measures and actions towards sustainable use, development, and management of mangrove and forestry resources in the country are provided in Annex 1.

Although several governmental institutions (The Wildlife Division of The Forestry Commission, The Fisheries Commission, The Environmental Protection Authority, Metropolitan and District Assemblies, Ministry of Food and Agriculture, Survey and Meteorological Services Department, the Universities, Council for Scientific and Industrial Research (CSIR) as well as NGOs, among others) are responsible for ensuring the protection and conservation of coastal ecosystems, their operations have not been effective in managing such resources. As a result, local communities, government, policymakers, and relevant stakeholders have begun to join efforts to promote and ensure effective management, utilization, and conservation. The concept of co-management is being embraced as a means of

conserving and managing the available natural resources (Aheto et al., 2016). This process promotes sharing the power, responsibility and function of coastal resource management with resource users as partners. Decisions concerning resource access and utilization, as well as rules and institutional arrangements, are outlined by participating the organizations.

Community efforts to replant and restore mangrove habitats have been welcomed by the Government and supported by development partners. Success of community-based participatory mangrove and coastal ecosystem restoration from the Eastern Volta estuary, the Densu estuary, the Pra Estuary, and the Western Amanzure coastline are highlighted in Section 4 of this report. So far, experience reveals a need for shared responsibilities between the local communities and authorities to manage restoration activities effectively and sustainably. Other experiences argue that local communities can be constrained to manage coastal ecosystems alone due to limited research capacity, territorial scope, budgetary shortcomings, and local political interests (Sorensen and McCreary, 1990).

Co-management success therefore depends on the form of partnership formed to meet long-term objectives determined from the outset. Joint management arrangements can involve governments, user organizations, non-governmental organizations, and academic institutions. Drafting and enforcement of rules through local government units (e.g., District Assembly) close to resource management areas have been identified as a crucial part of the initiatives (Aheto et al., 2016).

Community-based, participatory mangrove and coastal ecosystem restoration interventions have been implemented by communities from the Eastern (Volta estuary) to Western (Amanzure) coastline of Ghana with the support of public and private sector institutions.

The Anyanui Mangrove Planters and Fishmongers Association is a community-based organization in the Volta estuary registered by the Keta District Assembly in 1991, to collectively put an end to degradation of mangroves while replanting and restoring degraded mangroves areas. Local customary regulations were instituted and effectively enforced with institutional arrangements to mediate mangrove exploitation and conservation (Aheto et al., 2016).

The association has a constitution and leadership structures for its management. It acquired 2.4 ha of land on leasehold basis for mangrove planting. This is in addition to 0.4 to 0.8 ha of land secured by individual members, collectively totaling to 31.6 ha of mangroves grown for sale for commercial purposes.

Customary agreements have been reached between the association, landowners, and chiefs for exclusive rights to mangrove forests established by the association. Members are rewarded with monetary incentives for participation in mangrove seedling collection/production, planting, and maintenance activities. The association has an arbitration committee that resolves internal conflicts among members. A benefit sharing agreement has been instituted between the association and chiefs, as well as between the association and the landowners. A third of the total mangrove wood harvested

calculated in cash or stumps (i.e., wood) is paid to the chief or landowner and two-thirds taken by the association.

The Wildlife Division of the Forestry Commission (FC) assisted coastal communities in the Volta estuary with seedlings to restore degraded mangrove lands. Additional support covered strategies on capacity building, enforcement of rules and regulations, public awareness, monitoring and collaborative resource management. In collaboration with SNV Netherlands, Ghana and Friends of the Earth (an NGO), restoration of community degraded mangroves in Galo-Sato in the Volta estuary was supported. SNV signed a 10-year contract with the Galo-Sato community ending in 2023, to distribute sewing machines and provide seed capital to some residents to engage in other businesses to avoid the over dependence on mangroves for their livelihood. The effectiveness of this livelihoods approach on reducing dependence has not yet been evaluated.

Sea Water Solutions (SwS) Ghana, a UK based NGO operating community-led adaptation project in the Volta estuary has planted over 100,000 mangrove seedlings at Fiaxor, one of its project sites within the Keta Ramsar area in the Volta estuary. SwS partnered with communities in coastal areas to restore mangroves that had been over exploited for commercial purposes to build communities' resilience against the impacts of climate change. The Fiaxor community is partnering with SwS Ghana to establish a woodland system to provide alternative sources of fuelwood for household and commercial purposes to support livelihoods as a measure to safeguard mangrove restoration efforts (Boateng, 2022).

A Rocha Ghana (an NGO) has assisted communities in replanting mangroves on 7.5 ha out of 30 ha of degraded areas along the shore of the Muni lagoon in the Pomadze area of the Central Region of Ghana. The aim was to restore the site's ecological integrity as bird migratory route, turtle nesting site, and fish spawning ground. Beneficiaries were trained and equipped with alternative livelihood ventures to reduce over dependence on mangrove resources. Community awareness on impact of livelihood activities on resource conservation was raised using radio, community durbars, and traditional authority engagement.

Hen Mpoano (an NGO) has implemented mangrove restoration projects in the Western Region since 2014 with a target of 200,000 seedlings planted over 50 ha of degraded mangrove forest lands within the Greater Amanzule Wetlands by 2022. The goal of the project is to sequester 1.8 million mega gram of Carbon in the long term. Communities' capacities on sustainable mangrove harvesting practices have been enhanced (Hen Mpoano, n.d.). The initiative is a collaborative effort between Hen Mpoano and the Coastal Sustainable Landscapes Project (CSLP).

The World Bank through the West Africa Coastal Areas management program (WACA) plans to undertake mangrove protection and reforestation to serve as a buffer to inundation and sea-level rise, and/or sand fill to restore shorelines between communities and the sea along the coast of Anyanui-Agbledomi-Dzita in the Volta estuary as well as in the Pra river estuary. The project will support

interventions for social development and economic recovery based on the needs of affected coastal communities. Emphasis will be placed on opportunities for marginalized groups, including women and indigenes of the area. The project is expected to support participatory activities via social sub-projects to collaborate with communities on nature protection and conservation and alternative livelihoods for an estimated 20-30 communities (World Bank, 2019).

The World Bank in 2022 approved $246 million in financing for the WACA Resilience Investment Project 2 (WACA ResIP 2) that will benefit The Gambia, Ghana, Guinea-Bissau, and the WAEMU to manage coastal erosion, flooding and pollution. The project, financed by the International Development Association, includes a $5m recipient-executed PROBLUE grant for Ghana that supports a pilot mangrove blue carbon deal financed by the Danish energy company Ørsted, marine spatial planning, and marine plastics pollution management.

The USAID/Ghana Coastal Sustainable Landscapes Project (CSLP) (2013 to 2016) was implemented by the United States Forest Service and partners in six coastal districts namely, Shama, Sekondi-Takoradi, Ahanta West, Nzema East, Ellembelle and Jomoro Western Region of Ghana. The CSLP collaborated with existing Community Resource Management Area (CREMAs) bodies or similar entities to strengthen community based natural resource management and monitoring. The focus was on coastal landscapes, including mangroves, other wetlands, and forests and agricultural areas (within and outside protected areas) managed under a diversity of land tenure regimes. The CSLP sought to demonstrate and transfer effective agroforestry and reforestation methods (technology and practices) to restore native ecosystems (CSLP, 2014). Local partners included the Forest Services Division of the Forestry Commission and Ministry of Food and Agriculture. CSLP worked with 75 communities, mainly in areas where there were existing and functioning CREMAs, Community Conservation Committees and the like. Some relevant achievements reported include:

- Over 3,500 hectares under improved Natural Resource Management (NRM).
- Over 1,500 hectares of degraded wetland areas restored through replanting and improved management processes and 24 Wetland Conservation Committees formed to champion the co-management of wetlands and mangroves.
- Over 2000 smallholder farmers engaged in agroforestry, conservation and climate smart agriculture, and other diversified livelihoods with close to 70,000 trees planted in more than 600 farms.
- Capacities of local NRM groups (e.g., CREMA) and five coastal assemblies built to address climate change issues, wetlands awareness, and management.

4.1 Forestry Co-management Models

The Ghana Forestry Commission (FC) began piloting collaborative forest management arrangements with local communities in the 1980s. This has emerged from models touching on forest ecosystems management developed from the colonial era, such as the following:

1948: Policy on forest and wildlife protected areas: Forest and wildlife protected areas were delineated mainly to provide timber to colonial government (Oduro et al., 2011). The 1948 Forest Policy made some successes in protecting the forest resources but failed to live up to expectation due to the neglect of the rights of forest fringe communities (Derkyi, 2012). Local communities were regarded as not having the technical knowledge in managing forests, were not allowed entry into protected areas and as a result engaged in illegalities (Kotey et al., 1998).

1994: Revised forest and wildlife policy enacted with provisions of forest fringe communities in forest management through collaborative approach (Sasu, 2005; Brown and Amanor, 2006). To date, a total of 120,316 ha of degraded forests have been planted and co-managed by the Forestry Commission of Ghana and forest communities under various programs such as:

- The Community Forest Management Programme (CFMP),
- Modified Taungya System (MTS),
- Highly Indebted Poor Country (HIPC) Plantation, and;
- The National Forest Plantation Development Programme (FC, 2008).

2012: Forest and Wildlife Policy formulated. This policy seeks to employ scientific and traditional knowledge in managing the nation's forests and wildlife resources sustainably (Somuah et al., 2021). Engagements in forestry became popular after realization that formal forest management mechanisms had disenfranchised communities from benefiting from forest resources and at worst, had contributed to rapid deforestation. Communities have henceforth been engaged in sustaining forest resources while improving their livelihoods. The **1994 Forest and Wildlife Policy** facilitated the enforcement of existing domestic use rights to enhance local community participation in forest management. Two main categories of community forest management approaches have evolved over the past three to four decades varied by the extent of devolution of rights on access to use and development/management of forest resources. The co-management approaches are the **Collaborative Forest Management (CFM)** and the **Community Resource Management Area (CREMA)** models.

The CFM model encompasses partnership arrangements between the Government represented by the Forestry Commission (FC) and stakeholders in the private sector including communities with limited rights to forest use and management in natural and plantation forestry. The CREMA model offers a greater devolution of rights to communities for the use and management of natural forest resources, mainly wildlife. Details on these two approaches are described in the following sections.

4.1.1 Collaborative Forest Management (CFM)

CFM in Ghana refers to an arrangement by which stakeholders agree on a working partnership between the FC and the local people to ensure the management of all forest reserves is equitable and more efficient. It includes incorporation of community-based natural resource initiatives in national programs to promote rural development, wealth redistribution, employment, income and productive opportunities and infrastructure development (Osei-Mainoo, 2012). The FC, since the 1970's, partnered with communities in plantation forestry. Through the *Taungya* system, communities participated in the establishment of teak and *Gmelina arborea* plantations. In exchange for their labor on tree planting and maintenance, land was made available to farm food crops for one to three years before tree canopy closure.

In the 1980's CFM mainly engaged communities in managing forest reserves to sustain these resources while assisting communities to improve their livelihoods through trade in non-timber forest products. Subsequent initiatives from the 1990's, under different externally funded forest sector projects led to the formation of Community Forest Committees (CFCs) and Community Biodiversity Advisory Groups for the management of reserves and protected areas designated as Globally Significant Biodiversity Areas. About 100 CFC's had been formed by 2003. Community resource management groups were formed, and their capacity built by the Forest Services Division (FSD) of the FC to undertake routine forest management activities including silviculture, inventories, planning, reforestation and monitoring. Communities may be supported with alternative livelihood income activities in return for their labor. The FSD supervises and monitors operations.

From the 2000's the CFM evolved to include partnership with private stakeholders or firms for development and management of forests. This was, for example, implemented under CFMP-MTS, HIPC and NFPDP projects that engaged local forest communities and private sector companies in plantation forestry programs. These were also used for rehabilitation of degraded forest reserves under various arrangements. Where the government engages communities in plantation establishment work, a range of technical, material, and monetary incentives were provided more prominently via the *Taungya* approach. Communities undertake food crops cultivation in new planation stands and provide labor for maintaining trees and crops at their own cost and are entitled to 100% of food proceeds and 40% shares of standing value of timber at the end of the rotation, while the government takes the 60% share. This is referred to as the Modified Taungya System. Under this model, the FSD facilitates documentation of community participation for preparation of legal binding documents including a benefit sharing agreement to encourage forest protection and equitable flow of benefits.

CFM reported benefits to forest communities' livelihoods included: (i) food and income from intercrops in *Taungya* systems; (ii) access to non-timber forest products for sale (iii) paid labor (iv) some social cohesion (v) material incentives (vi) access to alternative livelihood opportunities. With respect to the environment, under CFM, some 27,900 ha of forest plantations were established

through public and private sector institutions and firms involving forest communities in various paid and *Taungya* activities in 2022.

The CFM model however encountered limitations or challenges. Akamani et al. (2015) found that CFM especially in the Ashanti region, was impeded by (i) institutional shortfalls during the design and implementation of CFM programs. This hampered the flow of incentives, capacity and opportunities for community to adopt the various programs; (ii) the lack of political will and lack of sustained interest by the FC to support community forest organizations established in the early days of the CFM projects; (iii) the process of selecting beneficiaries and the distribution of other benefits related to the CFM program appeared to be unfair and not transparent; (iv) limited incentives to participate in the program; (v) delays in the allocation of forest land, intermittent reductions in land allocations and inadequate land allocations to communities; and seed supply, and; (vi) challenges with group dynamics resulting in conflicts and sometimes ineffective execution of activities.

4.1.2 The Collaborative Resource Management Area (CREMA) Model

The CREMA is a community-based natural resources management model that seeks to encourage locals such as farmers and other land users to integrate the conservation into traditional land use strategies. It aims at helping forge a balance between conservation of natural resources and sustainable local livelihoods. CREMA targets geographical area endowed with sufficient resources or has the potential for enhancing the condition of the natural resources; and where the people are organized for the purpose of sustainable natural resource management and mutual benefits.

Ghana has 42 CREMAs located within 26 districts in seven administrative regions. About 34 CREMAs are fully operational and certified with Certificate of Devolution (COD). A COD is a certificate that empowers the local communities to manage their area based on their gazetted by-laws and management plans. The COD is approved when the Regional Local Government does not lodge any objections to the CREMA constitution and by-laws within 21 days of notice. The COD is drafted and certified by the Executive Director of the Wildlife Division of the FC and signed by the Minister of Lands and Natural Resources. The certificate then becomes ready for presentation to the CREMA Executive. Eight CREMAs have not yet received their COD and are at various stages of development (Murray et al., 2019).

Community livelihood activities associated with CREMA programs include beekeeping, community-based tourism, tree nurseries, afforestation, shea nut picking and processing, medicinal products, wood fuels, edible fruits, soap making, and animal husbandry (Baddianaah and Baaweh, 2021; Gilli et al., 2020). Activities are intended to promote household income diversification, ensure habitats are secured and endangered species are protected. In addition, communities and landowners obtain more secure rights to access and control use of their natural resources.

The constitution and by-laws set out by CREMA stipulate benefit-sharing arrangement by stakeholders. Benefits may include financial and non-financial resources such as, community

development projects, access to information and capacity building; agronomic resources, and scholarship funds (Asare et al., 2013). Some CREMAs have made tremendous progress in the implementation of their mandate and have received national and international recognition (Baddianaah and Baaweh, 2021); while others face challenges to exercise their authority, financial sustainability, transparency in governance and management, by-law and other regulations enforcement and compliance to promote sustainable natural resource management.

Policy and Legal Frameworks for CREMAs in Ghana

To strengthen the forest and wildlife sectors of Ghana, the Forest and Wildlife Policy (1994) and the Collaborative Wildlife Management Policy (2000) recognized the need to involve local communities in wildlife resources management and governance (Agidee, 2011). The legal basis of CREMA is provided under Section 1 of the Wild Animal Preservation Act, 1961 (Act 43). Section 1 gives the Minister responsible for Wildlife, authority to confer Game Wardenship to ordinary people of Ghana. This is the basis of the issuance of a Certificate of Devolution (COD) by the Minister for Lands and Natural Resources to CREMAs.

Based on this legal frame the Wildlife Division of the FC works on plans to involve local communities in wildlife resource management and governance in both Parks and Protected Areas and in off-reserve areas. The revised Forest Wildlife Policy (2012) currently provides the broad framework for managing forest and wildlife resources in the country. The policy objectives are (i) to promote good governance through accountability and transparency; (ii) enhance participation of communities and land owners in resource management; (iii) address issues of tree tenure and benefit sharing; (iv) promote small and medium forest and wildlife enterprises for job creation for the rural and urban poor; (v) increase biodiversity conservation; (vi) promote sustainable management of savannah woodland; (vii) promote ecotourism development; and (viii) secure sustainable financing for the forest and wildlife sector development among others.

The Forest Wildlife Policy 2012 envisages the development of sustainable and predictable financing instruments to support forestry sector activities. This is to be achieved by setting up a Trust Fund Board to manage grants and trust funds to provide flexible sources of funding for (i) communities to establish CREMAs, dedicated forests forums and similar opportunities; and (ii) advocacy organizations that hold government more accountable.

A CREMA is comprised of several communities. The structure (Figure 1) for managing CREMAs includes a Community Resource Management Committee (CRMC) which serves as a basic unit of the CREMA governance, and an Executive Committee. The CRMCs are formed at each community level and with no more than 13 community members from a particular community to constitute the CRMC. In some cases, two to three smaller communities (in terms of population size), can combine to form a CRMC. The number of members drawn from each community is based on consensus among the communities, but in most cases, population is the determinant. Representatives from each

CRMC are then nominated to form the CREMA Executive Committee (CEC), which represents the highest decision-making organ of the CREMA. The CEC should not exceed 15 core members (male and female) drawn from the various CRMCs. Other critical stakeholders that the CEC may deem appropriate, may be invited as ex-officio and/or co-opted (non-voting) members to support CREMA governance and management.

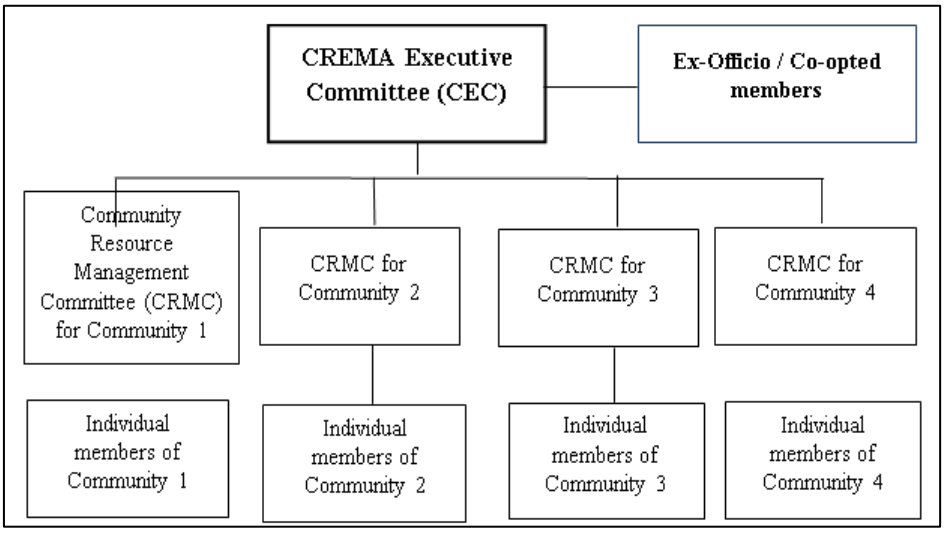

Figure 1. Governance structure of the CREMA.

The Executive Committee derives its management authority from the COD issued by the government through the Minister for Lands and Natural Resources. Currently, comprehensive provisions are captured in sections 16 – 18 of the draft Wildlife Resources Management Bill, yet to be passed by the Ghanaian Parliament (Agyare & Koumordzi, 2020). However, the provisions are applied *de facto*.

Benefits and Limitations of the CREMA model

Community livelihood benefits of CREMA programs include: (i) improved capacity to manage and govern own natural resources in protected areas for ecotourism and tangible products; (ii) improved supply of quality firewood and charcoal, religious, cultural and historical uses; (iii) better farmlands with increased crop production; and (iv) improved water supply and quality.

Some limitations (Agyare & Koumordzi, 2020) of the CREMA programs include:

- Poor group dynamics including conflicts.
- Weak external support from Government and investors to enhance sustainable livelihoods.
- Livelihood support is usually short term and does not provide firm ground to beneficiaries to grow the livelihood interventions.
- Stereotyping of livelihood options due to inadequate or viable alternatives.

- Inadequate or lack of coordinated mechanisms to grow fragile enterprise developments especially in cases where technical training in livelihood options is not backed with start-up financial and logistical support to trainees who may not have the capacity to start their businesses due to high cost of inputs.
- Unavailability of appropriate technological and technical knowledge to meet the demands of existing potential markets or to explore other possibly more viable sources of livelihood.
- Elite capture prevents those who need support from obtaining it, while the elite may dissipate the allocation.
- Weak knowledge in marketing of product and services accruing from CREMA.
- Complex land and resource tenure systems and failure of government to sanction offending traditional authorities and local elite who are agents of environmental degradation.
- Perceived low achievements regarding fodder for livestock, improved social infrastructure and access to credit.

4.2 Co-management of The Densu Estuary Oyster Fishery and Associated Mangroves

While the above discussions focused on forestry and mangrove co-management, estuarine fisheries management is also a contributor to mangrove management in Ghana. For example, with the support of USAID, the Ga South Municipal and Ekumfi District Assemblies have been involved in the preparation and implementation of co-management plans jointly developed with other stakeholders to sustain oyster fisheries by women shellfishers (Densu Oyster Pickers Association (DOPA) in the Densu estuary, and the newly registered Narkwa Oyster Harvesters Association in the Narkwa Lagoon. Mangroves are viewed as essential fish habitat for oysters and therefore their management and health is tied to the health of many oyster fisheries. For example, the Densu Co-Management Fishery Management Plan (DCFMP) incorporates an ecosystems-based approach that views mangroves as essential oyster habitat and therefore healthy mangroves and restoration as very important to maintain and enhance oyster fishery health. While the main goal is focused on the oyster fishery, it also addresses the extensive degradation and loss of mangroves in the estuary for fuelwood and housing. While this is not a mangrove management plan per se, and was approved under fisheries laws and regulations, it is an important example of how a women-led oyster fishery plan can be an effective mechanism and entry point to protect and restore mangroves in a given estuary. Hence it deserves special mention in this section of the report.

With the support of USAID, the DCFMP, a multistakeholder, community-based oyster fisheries management plan, was developed within the framework of the Wetland Management (Ramsar Sites) Regulation of 1999 and incorporated the concept of collaborative resource management in the Densu Delta. DOPA, the community-based organization comprising mainly women shellfishers, are the

primary stakeholders involved in the day-to-day implementation of the DOFMP and promotes oyster resource development through:

- A closed/ opened season from November-April every year to allow for the oysters to spawn and grow bigger over the period.
- Bans oyster harvesting during the closed season with violation of the ban resulting in fines.
- Oyster reef enhancement by returning oyster shells to the estuary.
- The maximum size of oysters that can be harvested during the open season is 7 cm.
- Mangrove restoration and conservation by planting, management and monitoring of mangroves to support development of oysters.
- Oyster farming.

The DOFMP was jointly designed by government institutions (i.e., by the Fisheries Commission, Forestry Commission, Universities, etc.), NGOs (namely DAA) and local communities (mainly oyster harvesters) to manage the Densu River Basin's oyster fishery and oyster habitat sustainably. The Densu estuary is highly degraded with recent mapping revealing extensive fragmentation of the resource (Carsan et al 2023). Even though Densu is classified as a Ramsar site, its management guide (Oteng-Yeboah,1999) had previously not identified oyster harvesters as crucial actors in the management of the estuary.

The aim of the oyster co-management plan is to help reverse overfishing, reduce pollution and habitat destruction, among other anthropogenic challenges. This plan is unique, and while it is not an ecosystem management plan, it is an oyster fishery management plan that incorporates an ecosystems-based approach, such as promotion of a healthy mangrove ecosystem as essential habitat for a sustainable oyster fishery (Crawford et al., 2022).

The goal of the co-management plan is to establish an ecologically and economically sustainable oyster fishery in the Densu area (MoFAD, 2020). Management of the estuary involves several stakeholders such as local communities and local government units. These stakeholders are:

- The Densu Delta Co-Management Committee. This committee is composed of direct resource users represented by the Densu Oyster Pickers Association (DOPA) from each of the local communities where the association members reside.
- Densu Delta Management Advisory Committee.
- Ministry of Fisheries and Aquaculture Development.
- Fisheries Commission.
- Local Government Units e.g., Ga South Municipal Assembly.
- Weija Dam Authority.
- Wildlife Division of the Forestry Commission.
- Universities and research institutions, especially The University of Cape Coast, Center for Coastal Management and the Department of Fisheries and Aquatic Sciences.
- Civil Society and Private Sector Organization, (e.g., Development Action Association (DAA).

The Densu Co-Management Fishery Management Plan delegates authority for the responsible and sustained management and conservation of the oyster fisheries and exclusive use rights to the oyster fishery in the Densu Delta to DOPA. The Co-Management Committee, made up of DOPA members, has an oversight responsibility for running the day-to-day activities and implementation of conservation measures as agreed to in the co-management plan. It is responsible for access control of the oyster harvesting areas and for adaptive management decision-making. The Densu Delta Management Advisory Committee includes non-oyster resource users such as policy makers, The Fisheries Commission, District Assembly, and others. The core mandate of the committee is to advise the Densu Delta Co-management Committee on management plan implementation and provide practical recommendations and technical support services.

The Ministry of Fisheries and Aquaculture Development (MOFAD) and Fisheries Commission role is supposed to lend support through the district, zonal and regional offices. They assist in the enforcement of community co-management rules and regulations through the district and regional representatives especially where the co-management committee experiences difficulty in sanctioning offenders.

The Ga South Municipal Assembly is tasked with following roles (i) to coordinate fisheries co-management activities and incorporate needs of fisherfolk into short and medium-term development plans such as maintenance of sanitary conditions and removal of solid waste at Densu Delta landing sites, enforcing restrictions of dumping of refuse and other pollutants into the Delta and its tributaries. (ii) support capacity building of the co-management committee and the Densu Oyster Pickers Association registration with the Municipal Assembly, and (iii) Funds allocation to support the co-management committee and implementation of the management plan.

The Weija Dam Authority is tasked to (i) provide up-to-date water spillage information to members of DOPA; and (ii) undertake controlled water spillage to the extent practical, to maintain normal water salinity downstream at the delta to reduce incidences of oyster die-off due to excessive and sustained discharge of fresh water.

The Wildlife Division, Forestry Commission role includes: (i) prohibition of construction of permanent structures within the RAMSAR core management area; (ii) ensuring sanitation (no dumping including solid and liquid waste); (iii) preventing removal of vegetation (mangroves and trees); (iv) assisting in mangrove restoration activities and by-law enforcement (v) train, educate and sensitize communities on importance of mangroves and other vegetation for oyster restoration, and; (vi) support livelihood diversification programs.

Universities and Research Institutions roles are envisaged as to: (i) conduct research to determine spat fall periods for the Densu River delta (ii) assist in the collection and interpretation of research data on water quality (ii) harvesting volumes and rate of decline or increases of the oyster resource, and: (iii) conduct action research with DOPA members on the potential of oyster culture in the Densu delta.

Civil Society and Private Sector Organization's mandate include: (i) support training and capacity building for the co-management committee and DOPA members; (ii) facilitate stakeholder engagement associated with implementation of the plan, (iii) provide additional logistics, human and financial resources and services in support of implementation of the plan, and; (iv) develop the means for post-harvest improvements of oysters that can provide value-added economic improvements for processors and harvesters, as well as a safe and healthy product for consumers.

The Densu Oyster fishery co-management has been highly successful in supporting reforestation activities with several hectares of mangrove planted by DOPA, seven years to-date of implementation of oyster closed seasons, size restriction and annual empty oyster shells returned to the waters to enhance oyster reefs even without external funding. By promoting alternative livelihood options such as those identified by the USAID Women Shellfishers and Food Security project involving oyster harvesting, fisheries and aquaculture, non-timber forest products, ecotourism, and development of proximate food portfolios can also help mitigate mangrove degradation (Duguma et al., 2022; Crawford et al., 2022).

Learnings from the broader ecosystem management approaches nonetheless show that similar constraints affect most plans and are relevant in this context.

- Lack of active participation of some communities in the co-management implementation process. This can lead to a lack of ownership and commitment to the plan. An example is land encroachment issues by communities who feel left out in the plans such as the Aplaku community in the case of the Densu (DAA reports).
- Inadequate funding to facilitate implementation of the co-management plan which requires significant financial resources. Innovative restoration ways implemented by DOPA shows commitments by communities even under constrained funding environment can help realize important successes.
- Inadequate capacity building towards enhancing the skills and knowledge among local communities for effective management of the natural resources in the designated areas.
- Inadequate monitoring and evaluation of the critical components of the co-management plan during its implementation to guide its implementation.

5. MANGROVE AND FORESTRY ECOSYSTEMS CO-MANAGEMENT IN THE GAMBIA

The area of mangrove habitat in The Gambia in 2020 was roughly 609.72 km^2 (60,972 ha), representing nearly 2.1 percent of the total mangrove cover in Africa (Bunting et al., 2022; Duguma et al., 2022). The four dominant species of mangrove in The Gambia are *Avicennia africana*, *Rhizophora racemose*, *Laguncularia racemosa* and *Rhizophora mangle*. The mangroves are mainly found along the River Gambia and the Atlantic Ocean coast, providing valuable ecosystem functions, including livelihood support for communities (Liman et al., 2023).

The mangroves are home to many local wildlife and marine species, such as fish, shellfish, sea turtles, birds, crocodiles, monkeys, etc. The habitat also serves as a prime nesting, breeding, and nursing ground for many shellfish, fish, and other wildlife. Among other functions provided by mangroves for local communities include a source of fuelwood for cooking and timber for construction. Further, mangroves perform various regulatory functions such as coastal protection and carbon storage (Ceesay et al., 2017; UNEP, 2007; Satyanarayana et al., 2012).

Despite a positive total net gain in mangrove areas over the past 25 years in The Gambia, various authors noted a decline over time in some site-specific contexts. For example, a six percent decline was estimated between 1973 and 2012 in Tanbi Wetlands National Park (Ceesay et al., 2017), mainly attributed to increased salinity, which negatively affects mangrove regrowth and rejuvenation. Furthermore, Bah (2019) estimated this decline to be 5.54 percent between 1984 and 1994, 7.18 percent between 1994 and 2007, and 22.02 percent between 2007 and 2017 in the Central River Region of The Gambia. This significant decline was attributed to increasing temperature and a decrease in rainfall. A recent study by Liman et al. (2023) showed a net increase of 4,000 ha in mangrove forests over the last two decades, corresponding to an annual rate of 200 ha. The growth is mainly attributed to solid policymaking, resulting in participative forest resource management through the national forest action plan.

Nonetheless, the net increase in mangrove forests should not mask the substantial degradation in some places across the country (Liman et al., 2023). While there has been a net gain of around 9,673 ha, a net loss of around 5,669 ha was reported for the period between 2000 and 2020, representing an overall increase of 4,004 ha in mangrove areas in The Gambia. The gains in mangrove areas occurred at the expense of the wetlands and riparian vegetation. There were relatively minor gains at the expense of woody savannas. The decline in mangrove areas at specific sites has essential implications for The Gambia's rural population.

Gambian forests are unevenly distributed throughout the country. Forests supply over 95 percent of the rural population as well as urban dwellers with raw materials such as firewood, charcoal, poles, timber, tool handles, and non-timber forest products, for example, game, fruits, barks, fiber, leaves,

resins, roots, and leaves used as food, forage and medicine (National Forest Policy, 2023 – 2032). They fulfill different ecological (wildlife habitats, biodiversity, soil protection, water retention, etc.) and economic (forest products, cattle browsing, tourism, etc.) functions; they grow on different sites and terrain; and vary in their conditions (dense forests, open woodlands, tree, and shrub savannah, etc.); are used differently by interest groups. Forest resources are central to the Gambian environment and economic development.

The Gambia's forest cover includes woodland, savannah woodland, tree and shrub savannah, and mangroves. These forest types are related to specific ecosystems. Forests offer a wide range of habitats for both terrestrial and aquatic biodiversity. Most terrestrial biological resources, in terms of quantity and diversity, are found in and close to the forests. The 1997 forest inventory in The Gambia registered 520,400 hectares as forest, while the 2010 Forest Assessment documented the total forest area at 423,000 hectares, representing a decline of 97,400 hectares of forest converted to other land use between the two national inventories. Assuming this trend of deforestation, estimated at five to seven percent continues, more than half of the forest woodlands will be lost in the next three decades.

According to the Global Mangrove Watch (GMW, 2021), The Gambia has experienced changes in its original mangrove forests. A net increase of 1.99 km^2 (199 ha) of mangrove cover has been registered between 1996 and 2020. Threats to mangrove ecosystems in The Gambia, nonetheless, include anthropogenic factors, including population pressure resulting from uncontrolled resource extraction (sand/gravel mining, mangrove cutting, industrial pollution, solid waste disposal) and natural factors (Duguma et al. (2022). Natural drivers primarily relate to climatic and hydrological variations (Alongi, 2008). Climate change resulting from declining rainfall and sea-level rise (changes in salinity) are the main drivers and threats to mangrove ecosystems.

Overall, The Gambia's forestry sector challenges relate to social, environmental, and administrative issues. The population has rapidly increased over the past couple of decades. Information from the GEF-7 Project Identification Form (PIF) for The Gambia, the county's "population for 2020 is estimated at 2.31 million with a density of 204 persons per km^2, making the country one of the most densely populated. Given the pervasive poverty and dependence on wood for more than 90 percent of domestic energy needs (National Forest Policy (2023 – 2032), the increased population has placed unprecedented pressure on the already degraded forest resources for fuel wood and charcoal supply. The demand for timber for construction has also increased, leading to extreme pressure on the forest and mangrove ecosystems. Furthermore, as a direct result of the increased population, there has been a spike in the demand for land for the expansion of existing settlements and the creation of new ones, especially through the rapid emergence of the real estate sector in the West Coast Region, leading to encroachment into existing forest areas and the conversion of abandoned agricultural space or fallow lands, which have potential to grow back into forest, to create new settlements. Without better land use planning, the forest resource will likely continue to degrade and diminish in area, potentially resulting in a significant loss in its environmental protection functions and placing the same population

at increasing risk of climate-related disasters, such as floods, drought, and diseases. The Department of Forestry (DoF) has been constrained by human and financial resource limitations. The National Forestry Fund, created to finance forest development activities is virtually exhausted. Another principal challenge that the Department faces is linked to conflicts of mandates between it and related sectors such as wildlife, lands, and agriculture, resulting from overlap of institutional responsibilities. While forest fires are a general threat in most inland forests, mangrove ecosystems are not affected by such threats.

5.1 Mangrove and Forestry Co-management in The Gambia

Mangroves in The Gambia are either under the Department of Forestry (categorized as mangrove forests) or Protected Areas (PAs)/national parks under the management of the Department of Parks and Wildlife Management (DPWM). There are nine Protected Areas and fourteen Indigenous Community Conservation Areas (ICCA) in The Gambia, totaling 89,851 ha and 4,858 ha, respectively[1]. The mangroves are tropical swamp forests growing in salt or brackish water. They are usually found in the tidal zone in sheltered places such as estuaries and coastal lagoons. In The Gambia, mangroves border the Gambia River up to Kaur, stretching 150 km upriver. This is about as far as the river is influenced by salt sea water. The largest protected area in The Gambia is the Bao Bolong Wetland Reserve which covers an area of about 29,650 ha. Other protected areas include Kiang West National Park (23,621 ha), Niumi National Park (7,758 ha), Tanbi Wetland Complex (6,034 ha), Tanji Bird Reserve (612 ha), River Gambia National Park (589 ha), and Abuko Nature Reserve (134 ha). Some of the PAs and ICCAs consist of estuaries, woodland savannah, salt marshes, and mangrove forests, which provide essential fish breeding ground and oyster production habitat.

The PAs are designated per Part 111, Section 14-32 of the Biodiversity and Wildlife Act, 2003, and managed by the DPWM. National Parks have been gazetted to manage the country's remaining biodiversity. Any conversion of a PA or parts of it into another land use or any alternation of the park border requires re-demarcation and re-designation.

The National Forest Policy (2023 – 2032) emphasizes the need to conserve and sustainable use of mangrove resources in The Gambia. The country has extensive mangrove cover from the mouth of the Gambia River. Mangrove forests provide protection for the coastal ecosystems, provide spawning ground for fishes and crustaceans, and sanctuary for birds and other marine and terrestrial life forms and play an important role as carbon sinks (Lovelock et al., 2022). Given these multiple functions, protection and management of mangroves calls for the collaboration of public and non-public sector interests.

This policy recommends the implementation of the following strategies:

[1] https://meccnar.gov.gm/information-protected-areas-gambia

- Establish and widely disseminate information on mangrove types, their areas and ecological functions for public awareness.
- Collaboratively develop and implement integrated management plans for the different mangrove ecosystems based on sustainable management concepts.
- Restore degraded mangrove areas in collaboration with fringe communities, CSOs, sector departments such as DPWM, Fisheries, Lands and other interested groups.
- Undertake regular monitoring of and reporting on the dynamics of the mangrove ecosystems. Seek international funding for mangrove management.

Local women, particularly resource users actively participate in all tiers of mangrove restoration in significant numbers. This has increased their awareness and understanding of the importance of forest conservation, thus creating opportunities for involvement in alternative income-generating activities.

5.1.1 Tanbi Wetland National Park Management Plan (2016)

The TWNP management plan was designed in November 2016 to guide the implementation process to ensure sustainable resource management. The plan is required to be reviewed and updated every five years. The preparation of the management plan was based on the findings of the Participatory Rural Appraisal with women farmers, fisher folks, youth groups, women/men groups, oyster harvesters, and palm wine tapers. Also, discussions were held with the site management committee of TWNP and the individual village committees of the four villages (Old Jeshwang, Talinding, Mandinary, and Lamin). Consultation meetings with stakeholder institutions including a desk review of relevant literature were done to complete the process of updating the management plan.

The Tanbi Wetland National Park (TWNP) is shared and bordered by 12 communities with a total area of 6,034 ha and has been declared a Ramsar site in 2006. These communities are the principal users of the wetland. It is co-managed by the government and the communities to maintain the biological diversity of the ecosystems to continue benefiting present and future generations whose livelihoods are/will be critically dependent on these resources. The wetland site harbors vulnerable species of mangroves which include the *Avicennia africana*, *Conocarpus erectus*, *Laguncularia racemosa*, *Annona glabra,* and the *Rhizophora*.

5.1.2 Kiang West National Park Management Plan (2020)

Kiang West National Park was officially declared as a national park in October 1987. It consists of woodlands, rangelands, mangroves, and creeks (bolongs), that support a diversity of life, especially the avifauna. The park also provides the local population with a wide range of environmental goods and ecological services such as essential wild food, herbs, and other subsistence commodities. The overarching objectives of the Kiang West National Park Management Plan are to help reverse the trend of natural resource deterioration and to ensure the conservation and restoration of natural habitats, species, and productive ecosystems to the social and economic needs of the local people through improved natural resource management practices and eco-tourism. To realize such noble

objectives, it is relevant to encourage cross-sectoral collaboration (including other government departments, and international, national, and local NGOs), as well as support the local communities and strengthen the DPWM.

5.1.3 The Oyster and Cockle Co-management Plan

In 2012, the Gambia government approved an 'Oyster and Cockle Co-Management Plan' for the Tanbi Wetlands National Park, as a special management area. Exclusive use rights on the use of shellfish resources, including oysters, within the designated area and authority over resource management were delegated from the government to the TRY Oyster Women's Association (TRY). The ecological benefits of maintaining healthy and functional mangroves are fundamental in protecting important habitats of oysters and other shellfish, as well as mitigating climate change through carbon sequestration. Oyster harvesters have been trained on sustainable oyster harvesting techniques, which help preserve the mangroves.

For the conservation of the mangroves, the communities are mandated to undertake joint monitoring, control and surveillance activities within the Tanbi Wetland National Park with the Department of Parks and Wildlife Management and engage in mangrove reforestation activities in areas where mangroves are being depleted. TRY complements this effort as well, as a key stakeholder. So far, vast areas have been restored through the initiatives of TRY in partnership with NGOs and other actors.

TRY was established in 2007 as a non-profit association to bring together women oyster and cockle harvesters based in the Tanbi wetland area. It has a membership of over 500 oyster harvesters from about 15 villages. Before TRY, women harvesting activities happened with no coordination and there was no regulation to manage the extent of harvesting in the wetland, which threatened the ecosystem and the future livelihood of the women dependent on these ecosystems. The association gained traction as more women began to focus on securing their future rather than only considering what could be obtained from the ecosystem today.

Consensus on management measures to reduce the harvesting season from six months annually to only four (March to June) to allow for oyster growth and reproduction has been realized. The association has helped harvesters gain a collective voice when marketing, and the longer closed season has resulted in larger oysters that receive a higher market price. Improved oyster harvesting techniques, such as a shift from cutting the mangrove roots using machetes, to using small knives targeting only the oyster, have also reduced destruction. Interventions have promoted biodiversity conservation through reduced destruction of mangrove forests from oyster harvesting and from unsustainable timber harvesting through value addition and income diversification. Through the association, many women shellfishers receive technical and material support for sustainable shellfisheries management, which include the need to maintain a healthy mangrove ecosystem for better productivity of shellfishing activities.

In summary, TRY complementary strategies to reduce the pressure on the ecosystem involves; (i) training women harvesters on better sanitation, ensuring women were able to sell their oysters at relatively better prices, reduces the need to cut down the mangroves for firewood; (ii) collective savings from good production and sale helped cushion women against economic vulnerabilities during closed seasons especially, and; (iii) awareness on the importance of the mangroves for the communities motivated women to restore degraded areas and engage their communities in these efforts. The association in several instances also alerted government authorities on illegal mangrove cutting by commercial operators, facilitating government in its' enforcement role.

Despite these achievements, reducing pressure on the Tanbi's shellfisheries and mangrove ecosystems while improving livelihoods remains a challenge. In addition, addressing the livelihood and needs of other mangrove resource users other than women shellfishers poses challenges.

5.2 Mangrove Restoration Initiatives

Increased awareness of the tropical mangrove ecosystem's protective, productive, and social functions has highlighted the need to conserve and manage them sustainably (Moudingo et al., 2019). Given the importance of mangroves in Gambia's seascape, different actors have implemented yearly restoration initiatives, including projects, community-based organizations, and development partners. The reasons for restoration may vary, but most are intended to rehabilitate degraded areas to improve ecosystem services. Globally, traditional mangrove rehabilitation initiatives mostly involve seed collection, nursery production, and transplanting to the desired location. However, collecting and directly transplanting propagules in mudflats is the most common and cheapest restoration method in The Gambia.

The mangrove restoration initiatives are also meant to contribute directly to the realization of the Gambia National Adaptation Program of Action on Climate Change 2007, a multi-sectoral national policy to address urgent and significant climate threats through actions. The major actors involved in mangrove restoration in The Gambia are discussed below.

5.2.1 The Ecosystem-based Adaptation Project

The Large-scale Ecosystem-based Adaptation (EbA) project has been actively involved in mangrove planting since 2018 in selected project intervention communities. The project is funded by the Green Climate Fund (GCF)– the financing mechanism of the United Nations Framework Convention on Climate Change, through the United Nations Environment Program (UNEP) as the Accredited Entity and the Ministry of Environment, Climate Change and Natural Resources (MECCNAR) as the Executing Entity, with technical support from the World Agroforestry (ICRAF). As of 2022, the project has planted mangroves (*Rhizophora spp.*) in nearly 27 communities in the Lower River Region, Central River Region North and South totaling 531 ha. The project has planted hundreds of thousands of mangrove propagules in partnership with local communities and community-based organizations, such as the West African Bird Study Association (WABSA) and the Community Action Platform for

Environment and Development (CAPED). Generally, the survival rates of the planted mangroves are high, mostly above 80 percent.

5.2.2 The Women Shellfishers and Food Security Project

The Women Shellfishers and Food Security project funded by USAID aims to strengthen the evidence base, increase awareness, and equip stakeholders to adapt and apply successful approaches to rights-based, ecosystem-based, participatory co-management of shellfisheries by women in mangrove ecosystems in West Africa. The project seeks to address the need for greater attention to food security for women shellfishers and their families while improving biodiversity conservation of the ecosystems on which their livelihoods depend. The project aims to Foster the adoption and scaling-up of an integrated approach to the conservation and restoration of mangrove and estuarine ecosystems in West Africa that provides cross-sectoral benefits in terms of gender equality and women's empowerment, economic development, and household food resiliency.

Project activities include promotion of women shellfisher use rights for shellfish resources; organizational development of women's shellfishing associations; livelihood development and household economic resilience for women shellfishers: e.g., selling oyster shells, other income generating activities for closed seasons, literacy, financial literacy, and village savings and loan associations, etc.; focused on shellfishing households for improved landscape food systems.

The gender sensitive shellfish co-management is focused on molluscs and bivalves, including oysters, cockles, and periwinkles, harvested predominantly by women in Ghana and The Gambia. Project activities seek to strengthen gender sensitive shellfish co-management in the Densu and Tanbi where approved shellfishery co-management plans delegating exclusive use rights to shellfisheries to DOPA and TRY Oysters women associations are in place. The project is helping develop new gender sensitive shellfishery co-management plans for Narkwa and Bulock using a toolkit on women's shellfisheries co-management.

Objective one of this project aims to demonstrate the biodiversity and socio-economic value of more fully integrated rights-based co-management of linked shellfish - mangrove - proximate landscape food ecosystems in The Gambia. This will be achieved through three main strategic approaches. Several response actions have been identified by the participating communities using a participatory rights-based shellfisheries co-management approach that empower and motivates women shellfishers to more actively steward the mangrove ecosystems on which their shellfisheries depend. In the Gambia, key activities by the project include development of community-based mangrove management plans to enable sustainable use of oyster and mangrove resources. Also, the project supports initiatives geared towards social fencing of conserved areas and supporting natural regeneration of the mangroves by providing technical support to the women shellfishers and other resource users.

The necessary level of various response measures to conserve the mangroves in The Gambia has been identified as summarized in Table 1 (Duguma et al., 2022).

Table 1: Typologies of responses to address mangrove ecosystem declines in The Gambia.

Responses	Details	Necessity of the proposed measures per site: High, Medium, Low or N/A		
		Tanbi	Bulock	Allahein
Policy responses	Enabling and promoting co-management and rights-based strategies with communities	High	High	High
	Facilitating mangrove restoration and management in community forestry and community protected areas	High	High	High
	Regulatory measures on environmental pollution.	High	Medium	High
	Regulatory measures about coastal reclamation through land use regulation	High	Medium	High
	Regulatory measures on mangrove ecosystem management and utilization (rational use)	High	High	High
	Land use/urban planning policies	High	Medium	High
	Aquaculture policies	Medium	Medium	High
	Awareness creation	High	High	High
Practice responses	Restoration of mangrove ecosystems	High	Medium	High
	Conservation of mangrove ecosystems	High	High	High
	Livelihood diversification (tourism, farming, etc.)	High	Medium	High
	Substitution for mangrove services (woodlots for fuel and construction, wood, etc.)	High	High	High
	Shellfishery management integrated with mangrove habitat protection	High	High	High
Governance responses	Legal protection (conservation status) of mangrove ecosystems.	High	Medium	High
	Management plan for mangrove utilization and conservation	High	High	High
	Management plan for shellfish utilization and conservation	High	High	High
	Institutionalization of community-based management strategies for mangroves	Medium	High	High

Responses	Details	Necessity of the proposed measures per site: High, Medium, Low or N/A		
		Tanbi	Bulock	Allahein
	Institutionalization of community-based management strategies for shellfisheries	High	High	High
	Cross-border resource management guidelines	Low	N/A	High
Behavioral response	Change of attitude for wise use of resources	High	High	High

Source: Duguma et al. (2022)

5.2.3 NEMA-CHOSSO

The National Agricultural Land and Water Management Development (NEMA), an IFAD-funded project (2012 – 2019), has invested in promoting viable and sustainable climate adaptation and resilience options in The Gambia. NEMA has received an additional component named "NEMA-CHOSSO,' which was additionally financed from IFAD's Adaptation for Smallholder Agriculture Programme with a grant of $5 million to optimize the effectiveness of NEMA interventions in the face of increasing climate-related threats to smallholder agriculture. Over the past years, some of the NEMA-CHOSSO's interventions for watershed development have included promoting mangrove restoration as both a productive resource and an important element in river management. The project has contributed to the restoration of nearly 1,400 ha of mangrove areas all over the country, benefiting around 160,000 people. In general, mangrove restoration by the project had been envisaged to generate several valuable ecological benefits, including carbon sequestration, nutrient and sediment retention, enhanced biodiversity habitats, reducing the risk and impacts of flooding, wastewater treatment, water supply, and recharge to improve local livelihoods and enhance biodiversity.

5.2.4 FISH4ACP

FISH4ACP, a five-year (2020-2025) initiative of the Organization of African, Caribbean, and Pacific States (OACPS), is being coordinated by FAO with funding from the European Union and the German Federal Ministry for Economic Cooperation and Development to support sustainable fisheries and aquaculture development. It seeks to contribute to food and nutrition security, economic prosperity, and job creation by ensuring the economic, social, and environmental sustainability of fisheries and aquaculture value chains in Africa, the Caribbean, and the Pacific. The project works with twelve fisheries and aquaculture value chains from Africa, the Caribbean, and the Pacific to maximize economic returns and social benefits while minimizing the detrimental effects on natural habitats and marine wildlife. In the case of The Gambia, FISH4ACP aims to enhance the productivity and competitiveness of the mangrove oyster sector to improve food security and incomes for rural communities, increase exports, create jobs, and stimulate investment.

The upgrading strategy for FISH4ACP Gambia will be implemented in the years 2022–2025 (Macfadyen et al., 2023). "The upgrading strategy lays down an ambitious roadmap for the sustainable development of oyster production in The Gambia over the next ten years, extending well beyond the duration of FISH4ACP, which is set to close by end in 2025[2]." One of the outcomes of the strategy is to enhance the management of natural resources, including consideration for climate change. A key activity under Outcome 1 of the project entails the restoration of mangrove ecosystems in clearly defined priority areas. The implementation of this activity would require the support of the French Development Agency (AFD), the Department of Forestry, and value chain actors.

5.2.5 AFD/MECCNAR

The Ministry of Environment, Climate Change and Natural Resources (MECCNAR) in partnership with AFD is implementing a climate resilience project in The Gambia. To preserve the country's natural capital and help protect biodiversity and combat climate change, AFD is supporting The Gambia through a grant of €7 million to help in the preservation and restoration of mangrove ecosystems in the marine protected areas. This project is promoting the development of income-generating activities in the 100,000-hectare area it covers, and it is bolstering the legal framework and the capacities of The Gambian authorities so that they can better deal with climate change. Ultimately, the project will lead to a clear strategic and technical approach to strengthening the resilience of coastal communities and natural ecosystems.

The project also seeks to strengthen the national legal and improve governance and policy framework for enhanced climate adaptation and coastal resilience. Part of the key deliverables involves testing restoration techniques on 800 ha of mangrove areas under different contexts, which would ultimately result in the development of a national strategy and action plan for large-scale restoration of key areas within the mangrove ecosystems in The Gambia.

5.2.6 PROREFISH

The Climate Resilient Fishery Initiative for Livelihood Improvement in The Gambia (PROREFISH) is a new GCF-funded project (2022-2027) that aims to assist Gambian fisherfolk to build their resilience against climate change and improve their livelihoods. One of the key components of the project is to scale up adaptation measures to support the strengthening of the restoration capacity and community management of artisanal fisheries habitats, designed to reverse the degradation of mangrove ecosystems (which play a key role as breeding grounds and nurseries for fish and shellfish) by investing in restoration through replanting and assisted natural regeneration, coupled with support to sustainable ecosystem management. PROREFISH adopts a community-driven restoration approach, working together with the local populations, as well as investing in post-restoration activities designed to support sustainable mangrove management. Further, the project strives to invest in mangrove

[2] https://www.fao.org/in-action/fish-4-acp/resource-detail/en/c/1629784/

restoration of 2,350 ha (1,100 ha of degraded mangrove areas and 1,250 ha of assisted natural regeneration) in 10 areas prioritized during project preparation using local species that are particularly salt tolerant.

5..2.7 Conservation and Restoration of The Mangrove Ecosystem in The Gambia Through The REDD+ Mechanism

The Conservation and Restoration of the Mangrove Ecosystem in The Gambia Through the REDD+ Mechanism project (2022 – 2052), with an initial lifetime of 30 years, is an initiative supporting the restoration and conservation of mangroves in The Gambia. The project aims to mitigate climate change through carbon storage and enhance biodiversity to yield positive rural livelihood impacts, including enhanced oyster collection, fishing, and fiscal revenues to the participating communities. The Government of Gambia is the main project proponent through the Department of Parks and Wildlife Management (DPWM) under The Ministry of Environment, Climate Change and Natural Resources (MECCNAR). The DPWM leads the implementation of the project in partnership with three other Gambian NGOs - Sahel Wetlands Concern, West African Bird Study Association (WABSA), and Kombo Foni Forestry Association. The project collaborates closely with more than 60 communities adjacent to the mangrove areas who are also the key beneficiaries.

A Danish energy company, Ørsted Nature Based Solutions, is financing parts of the project and is responsible for the development of carbon certification and project documentation processes through the DPWM, which shall engage in programs and policies that will enable the development of a sustainable greener economy. As a carbon offsetting project, it is envisaged that emission reductions and removals generated based on mangrove restoration and conservation activities in the participating communities are closely monitored, verified, and reported through the Verified Carbon Standard Program. As such, part of the revenue from the carbon credits will be reinvested in climate and biodiversity initiatives in The Gambia to support local communities in sustainable development. So far, the project has planted at least 200 ha of mangroves. The estimated annual greenhouse gas emission reductions/removals of the project are 20,000 – 100,000 tCO_2e/year.

5.2.8 Enhancing Resilience of Vulnerable Coastal Areas and Communities to Climate Change in the Republic of Gambia

The UNDP-supported GEF-financed project was implemented by the National Environment Agency for the period (October 2013 – December 2018) with the main objective of reducing Gambia's vulnerability to sea-level rise and associated impacts of climate change by improving coastal defenses and enhancing the adaptive capacities of coastal communities. The project was implemented in five areas - Kotu, Tanji, Bintang, Darsilami, and Tendaba (Sobey and Bah, 2018). The terminal project evaluation report revealed that successful mangrove plantings were achieved at various sites, including eroded and bare tidal coast areas covering 1,197 ha (out of a target of 2,500 ha). At least 1,506

families directly benefitted from the project for their livelihoods, including fishers and oyster collectors/cultivators, who have received direct project support in equipment, including 433 women.

5.3 Community-based Organizations Involved in Mangrove Co-management

5.3.1 All-Gambia Forestry Platform (AGFP)

The All-Gambia Forestry Platform is a national program designed to support the implementation of The Gambia's National Forestry Policy and Act of 1998. The platform helps to strengthen participatory community forestry management throughout the country, with a set target to register robust sustainable forestry management in all regions. In 2018, All Gambia Forestry Platform in collaboration with the communities of Niro Jataba in the Lower River Region and some members of cross-border associations, planted over 500,000 mangrove saplings, where the project is piloted. Nema-CHOSSO supported the project under the Ministry of Agriculture. The project targeted to restore 50 ha of land within four communities, three of which are in the West Coast Region and one in the Lower River Region.

5.3.2 Community Action Platform on Environment and Development

Community Action Platform on Environment and Development (CAPED) is a grassroots initiative in The Gambia by a group of people focused on restoring degraded mangroves and forest areas geared towards improving the livelihoods of communities, with a particular emphasis on youth. CAPED works closely with communities through coordinated actions. Since 2009, CAPED has planted up to 3 million mangrove propagules covering over 570 ha in 14 communities across five different regions in The Gambia: West Coast, Lower River, Kanifing Municipality, Upper River, and Banjul.

5.3.3 West Africa Bird Study Association

The West Africa Bird Study Association (WABSA), a charitable non-profit organization was established in April 1994 by a group of Gambian youth. WABSA's main objective is to support governmental and non-governmental agencies in their conservation efforts, including the conservation of bird species and the protection of the environment, which play a vital role in the country's sustainable development.

A key aspect of WABSA's strategic goals is to support the restoration of mangrove forests in The Gambia. The association has previously implemented a Global Environment Facility (GEF) Small Grant Fund (SGF) for the 'Restoration of Ecological Function and Environmental Services of Niumi National Park' project. WABSA has planted mangroves in partnership with several projects such as Nema CHOSSO, EbA, and other CBOs. WABSA has previously planted mangroves along Jokadou National Parks of Tambana and Karantaba wetland in the North Bank Region to help restore the biodiversity and ecosystem.

5.3.4 Kanifing Municipal Council

In 2022, the Kanifing Municipal Council through its Environmental Transformation Program in collaboration with the Bakau Environment Movement planted 5,000 mangrove propagules in Bakau Cape Point, as part of its fight against climate change in the country. The project intended to plant 190, 000 native tree species over three years to improve resilience, biodiversity, air quality, and local livelihoods. The tree planting exercise is achieved through a participatory process involving local stakeholders including local residents, All Gambia Forestry Platform (AGFP), and youth groups interested in planting trees in the municipality.

5.4 Forestry Co-management in The Gambia

The late 1980s can be marked as the beginning of participatory forest management in The Gambia and most parts of Africa. In 1978, Senegal and The Gambia formed the Gambia River Basin Development Organization (which was joined by Guinea in 1980) to develop the river's natural resources. The project objectives were to increase agroforestry and pastoral output, rationalize extraction of the natural resources and improve infrastructures and social services of the project area. Post-colonial Government policies claim over forests further interfered with the traditional tenure systems. This resulted in shortcomings in managing and protecting forest resources even though forest had been recognized for economic development. A need for change in Forest Policies and Legislation was evident in order to allow people's participation in forest management. By the mid-1980s, awareness on the state of forests and the potential of natural forest management, was opening ways for a new approach. The Department of Forest realized its efforts would be futile without local communities' engagement. The long-term demand by local communities, accelerated change in government approach to respond to its citizens.

Participatory forestry is the main strategy of forestry management in The Gambia. Piloted in the early 90's with the technical support of the German Government through the Gambian-German Forestry Project, successful implementation led to the institutionalization of the Gambian Forest Management Concept (GFMC) and adoption of the New Forest Policy 1995.

The GFMC merges the models of natural forest management in forest parks and community forests. It is based on the nucleus concept where decentralized forest stations coordinate the management of all forest within the country. It also aims to create a common understanding among all actors in the field of natural resource management particularly the forestry development sector in The Gambia. The GFMC put rural people at the center of managing the Gambians' forest resources. Consequently, it follows participatory approaches with local people fully involved in planning, decision-making, organization and administration. It also provides a medium through which The Gambia government sought to alleviate poverty, by legalizing sustainable utilization of products and services by local peoples involved in forest management.

5.4.1 Gambia Forest Management Concept (GFMC)

The Gambia Forest Management Concept (GFMC) was introduced in 1995 in order to provide the framework for forest management in the country (Gambia Forest Management Concept, 2001). The objectives of the GFMC are to, "*conserve and improve forest resources of The Gambia in order to supply as much as possible of the country's demand for forest products through sustainable management of its forest resources*." GFMC merges the concept of natural forest management in forest parks with community forestry. It aims to create a common understanding among all actors in the natural resource management sector. It empowers the local people in the planning, decision-making, administration and organization of all aspects related to forest resource management.

The long-term vision of the GFMC is to ensure at least 30 percent of the land cover is gazetted as permanent forest cover and managed according to the objectives defined in the management plans. Generally, the forests are categorized into forest parks, community forests, private forests and protected areas. The GFMC assumes that the management of forests can only be successfully implemented if the interests and needs of the adjacent communities and the nation as a whole are adequately addressed. Under the GFMC, four different forest categories are managed:

i) **Forest Park:** The management responsibility of forest parks lies entirely with the Department of Forestry (DoF). Management models for state management have been developed and evaluated. The concept of joint forest park management with the adjacent population has been developed and introduced.

ii) **Forest Reserve:** FRs are state forests and as such under the management responsibility of the DoF. Since the DoF does not have the capacity of managing all FRs, the concept of "Community Controlled State Forests" was developed.

iii) **Community Forest:** Local communities based on a Community Forest Management Agreement (CFMA) manage community forests. The CF-concept is fully developed and is already institutionalized.

iv) **Private Forest:** The ownership of the land and trees is a private person or enterprise. Management is up to the objectives of the owner, but the provisions of the Forest Act need to be observed.

The DPWM is responsible for the management of protected areas. Therefore, they are not subject to the GFMC. Five different forest management options can be distinguished based on the degree of local people's involvement (Table 2).

Table 2: Management options based on the degree of local people's involvement.

Management Option	Forest Status	Degree of involvement
State management	Forest Park Forest Reserve	Minor
Joint forest park management (JFPM)	Forest Park	Consultative and co-operative, sharing of benefits and tasks, access to forest products based on mutually agreed conditions (e.g., cattle browsing, etc.).
Community controlled state forest management (CCSF)	Forest Reserve	Management function, but directed by DoF
Community forestry (CF)	Community Forest	Decisive
Private forest management	Private Forest	Decisive

(Source: *Gambia Forest Management Concept, 2001)*

State management applies only for portions of forest park for the purpose of research, development and testing of new technologies. All other forest park areas shall be managed in collaboration with the local people. Within one forest park both types of management options may be applied. Eventually there will be no more forest reserves. As such, Community controlled state forest management has to be seen as an intermediate step, which will ideally end either as a community forest or as a forest park that is jointly managed. Community and private forest management is entirely up to the decision of the owner. However, restrictions imposed by the Forest Act have to be observed.

5.4.2 Community Forestry (CF)

The concept of Community Forestry set up under the Forest Policy of 1995 and the Forest Bill of 1998 can be regarded as the hallmark of forest co-management in The Gambia. Community forest management promotes community empowerment and transfer of forest from the State to an interested community. Land and tree tenure anchored on customary rights were expected to motivate the people living near forests to protect and ensure sustainable management of forests as a permanent source of income and livelihood, that also supports poverty alleviation efforts by the Government of The Gambia.

The objective of the CF programme was to ensure that local communities recognize the value of trees and forests and gain a personal stake in their protection as a source of income and/or livelihood. The strategic goal being to contribute to the protection and maintenance of an adequate national forest cover and slow down and forest degradation. The purpose of the CFs was to make it an instrument for sustainable forest management and help contribute to economic rural development.

The management of CF in The Gambia is based on an approved forest management plan developed by the local management committee with the help of forest field staff. There are two types of forest management plans: the three-year preliminary management plan and the five–year community forest

management plan. These correspond to the preliminary and consolidation phases of the CF implementation process. The community's management performance is evaluated before the end of the preliminary phase. If the evaluation results are positive, the final agreement- the Community Forestry Management Agreement- is signed, leading to the community's permanent ownership of the forest. During this three-year period, the Forestry Department provides capacity building to the local forest management committee, with training in record – keeping and numeracy skills to enhance its financial management skills.

The Community Forests Committee (CFCs) in partnership with the Department of Forest jointly develop management plans for the CFs. The plans identify key activities to be implemented in the short (one year) and long term (five years). The key activities include enrichment planting in degraded areas, fire belt clearing, patrolling, early controlled burning, beekeeping, and tree nursery production.

Additionally, forest fire management plans are also developed to safeguard forest resources from fire damage. The process adopts a participatory approach with key stakeholders such as the Forest Department, local authorities, community-based organizations, civil society, and local people. Local communities can play a significant role in preventing and controlling forest fires in the local situations, which have a detrimental impact on their livelihood and the ecosystems.

CFs in the North Bank region of the country do have a significant share of mangrove cover. Among the CFs with considerable mangrove area include Ndanka CF, Kubandarr CF, Balengho CF, Bassick CF, Dibba Kunda CF, Jurunko CF, Sami Kuta & Koto CF, Karantaba CF and Suwareh kunda CF. CFs around Barrow Kunda (Jarra East district) also have large mangrove areas that are being managed within the community forestry framework. Similarly, community protected areas in Kiang West National Park also have significant parts of their vegetation managed by communities. In general, several CFs and CPAs in the North Bank Region, Lower River Region along the River Gambia and some community areas in the Central River Region have plots of mangroves within their boundaries or adjacent to them. Where degradation happened, some of the CFs have also begun restoring mangroves through planting to revive the ecosystem services generated by this vegetation type. For example, there is already an ongoing mangrove restoration activity happening in Bulock area as this area is among the numerous sites that depend on shellfishery activities which in turn strongly relies on the health of the mangrove vegetation (Duguma et al 2022).

5.4.2.1 Operationalizing Community Forests

The first community forestry interventions were implemented in 1990's in what was perceived as a process of confidence-building and a demand-driven response. Initiation with a pilot phase allowed elaboration of the CF concept and made it possible to adjust the program to concerns raised by the community and Forest Department. Community forests are owned and managed by the designated communities for the purpose of timber, firewood and non-wood forest produce production, forest grazing, protection and conservation (Forest Act 1998).

Implementation of CFs require each village to establish a Forest Committee, usually formed from existing village institutional structure, with representation of both male and female members of the community. Traditional leaders are involved from the start of the process. Their participation ensures customary ownership of the forest land by the community and helps in conflict resolution by different villages jointly managing community forests. Participating communities are required to undergo a training and are evaluated after a probation period. The ultimate aim is the preservation of the forest land as a gazetted CF.

The transfer of forest ownership from State to a community under The Gambia Forest Act 1998 involves the following steps:

- Preliminary Community Forest Management Agreement

Interested community group undergo this start-up phase by obtaining the Preliminary Community Forest Management Agreement and be registered with the Forestry Department. This step requires: formation of a committee, preliminary survey of the land, a statement from neighboring villages precluding other claim, and a preliminary three-year management plan.

- Community Forest Management Agreement (CFMA) and Gazette Procedure

To obtain this document the community undergo a three-year probation period to prove management capability to implement the preliminary management plan. Together with the Department of Lands and Survey, a final survey of the designated CF should be conducted, and a map produced. The Secretary of State (SoS) then publishes a notice in the government *gazette* specifying the forest land intended to be reserved as a CF. This notification is made known to all persons concerned. A lapse of three months period with no-objection to the proposed designation, results in signing of the CFMA and the SoS publishes an order to establish the land as legally reserved as CF. Following the conclusion of the CFMA between the Forestry Department and a Forest Committee, authority and ownership rights over forest land are transferred to the community.

5.4.2.2 Implications of Forest Ownership Transfer in The Gambia

The forest "tenurial factor" is highly regarded as a factor in the success of community forest management and is a crucial factor in the negotiations between government and forest communities. The success of Community Forestry regarding ownership transfers involves the following factors:

- Devolution of Authority

Following transfer of forest land ownership to the community, the agreement sets clear framework on forest management specified in the 'Rules.' The Rules define the community as the body that determines the management of forests by developing and implementing management plans. The limiting factor is the Forest Legislation, which can be specified by formulating by-laws. The Department of Forestry nonetheless controls the community-based forest management since the by-laws have to be endorsed by the local authority and the management plans approved by the DoF. Conditions of

the CFMA set by the DoF have not been developed at the administrative level and are often opposed by communities even though they evolved from the participatory pilot phase.

The DoF role in CF management changes from decisive to consultative by providing technical assistance and monitoring field activities with the increasing capability of the community. The DoF nonetheless never withdraws fully from CF management and is ideally left with controlling the management per the Rules. Being the authority, the community, gets fifty percent of all fines collected after a penalty for any offense in the CF specified in the by-laws payable on any forest produce removed or damaged.

- Tenure Security

Gazette notification and order guarantees indefinite ownership, "*as long as the laws and the agreements are observed*". Failure of participating community to fulfill their duties, can nonetheless cause the DoF to revoke granted rights following an evaluation of the committee's performance proving inappropriate management and a gazette procedure of de-reservation. Before this, the CF concept also foresees the "Statement of neighboring villages" which takes into account the customary side of the tenurial factor. The participating community has to confirm with the other forest-adjacent villages that they do not have any customary claim over the proposed land.

- Sustainable Management of the Resource

The CF has to be managed and utilized according to a five-year management plan, which is the base for annual work plans defined in detail by the activities. These guidelines are necessary since most rural population of The Gambia consists of farmers rather than forest managers. Even the idea that 'forest' might need real management instead of just protection is quite new to them. Apart from the formal requirements to ensure the sustainable management of the forest, the community should ideally be concerned with protecting and developing their property sustainably. Until the capacity of the participating communities is however built up, the DoF has a role to supervise the activities in the forest.

- Poverty Alleviation

The forest policy provisions assumes that establishment of community forest ownership will "ensure significant benefits are realized from the forest by the community". Field forest officers therefore need to advise interested communities on selection of valuable and promising sites to set up CFs rather than reserving land for farm cultivation. Following mindset change on forests from a simple source of firewood, fruits, and other products to an asset for the future, communities can be convinced to rethink their traditional way of land-use distribution.

5.4.3 Challenges

There are several challenges in managing forests in The Gambia. These include the following:

- Difficulty and slow process to create a sense of forest ownership among the villagers due to mistrust of government actions and policies. To create ownership, the use of financial or material incentives is avoided - No compensations are given to the villagers for the protection and plantation work accomplished in their forests. A task decided by the forest committee and executed by the villagers, without external support strengthens the perception that they are the real owners of their work and therefore of their forest.
- Following the CF process, many villages have passed the evaluation but remain at informal CFMA status. This implies the administration procedure towards the gazette order is constrained. Delays for approval are not just complicated by the DoF but also on the Attorney's General Chamber. The procedures are nonetheless essential to obtain tenure security by interested communities.
- Another crucial point is the balance between the community's authority and the involvement of the DoF. Although the community is trained during the probation period in all management skills, even after three years most of the villages still need close assistance from the DoF. It is a "core element" of the CF concept yet training of the villagers seems not to be sufficient.

5.4.3 Lessons

The long consultation process of the Gambian community forest management policy and legislation re-affirmed the need to return authority of forest management to local communities. This experience shows that empowerment of local communities and DoF on the management of forests can help strengthen decentralization of forest management in The Gambia. This in turn can contribute to improvements of economic revenues for local communities.

Unlike in the past, governments must involve communities in decision-making, and in designing and implementing programs. The 'bottom-up approach' shows the value of engaging people to work on their preference for resource management and institutions (Government, NGOs) to provide the technical assistance. The changes in forest management approach in The Gambia have demonstrated positive outcomes where political will exists for local community participation in management and use of forest resources.

The review of forest policies and implementation in The Gambia allowed the development of the community forest management CFM. This is one of the most advanced forest legislations in Africa. The regulations by the community authorities and controls by the DoF on designated forest land are well balanced to help address both, the people's needs today and, in the future, as well as the concern of the DoF to protect and develop the forests in The Gambia. In some cases, and a major achievement, is that communities have taken over management of designated forests.

5.5 Forestry Policies Related to Co-management in The Gambia

5.5.1 National Forestry Policy (2023-2032)

Gambia's National Forest Policy (2023 – 2032) seeks to, "*Promote an integrated approach to sustainable forest management through involvement of local councils, Civil Society Organizations (CSOs), women and youths as well as other non-state actors, and to harness Indigenous knowledge for the purpose*". The policy aims to foster integrated forestry management with multiple livelihood and ecological benefits. It superseded the Forestry Policy (2010-2019), which managed to place over 33,000 ha of forests under community control amidst a myriad of challenges. Among its policy targets is to "conserve and sustainably utilize mangroves resources" through inter alia increased awareness on mangrove benefits, development and implementation of integrated mangrove management plans, mangrove restoration, and regular monitoring of mangrove forests dynamics. The policy also establishes the need to promote, strengthen, and expand community-based and participatory forest management, through among others, strengthened community forest agreements, expanded joint forest park management, and multistakeholder and multisectoral approaches in co-managing the forests. The National Forest Policy objectives underscore the following forest management principles:

- The principle of good governance, accountability and transparency - Requires the Department of Forestry to ensure transparency in the implementation of forestry activities, such as forest management, development, good governance in management and administration of the sector, issuance of licenses, staff development, accountability for its actions, visibility of the sector, win public trust and maximize contribution of the sector to national economic development. The accountability principle also applies to communities and forest users.
- The principle of collaboration and cooperation for a multi-sectoral approach to integrated and sustainable forest management - Promote more collaboration and coordination by related sector departments, such as wildlife, agriculture, fisheries, lands, physical planning, police, and community development. This collaboration and coordination will increase inter-sectoral awareness of the limitations of each sector and enhance consultations before implementation of sector initiatives that have implication for forestry.
- The principle of equity and inclusiveness - This principle recognizes the rights of access and ownership of forest resources by communities. Monetary and non-monetary benefits derived from the utilization of forests are expected to reach communities in a manner that will sustain their interest in forest protection and conservation. It takes into account considerations of gender equality in forest management and the informed involvement of all stakeholders in forest-management-decision-making processes. It will consider cultural heritage, paying attention to traditional knowledge in forest/tree management practices.
- The principle of strengthening decentralization of forest administration - local government authorities and communities shall be involved in the management and administration of the forest resource.

5.5.2 National Forestry Strategy (2019-2028)

The strategy's vision is to have thriving forest ecosystem goods and services that fulfill ecological values and provide economic and social benefits for society. It established the need for enhanced participatory forest management through co-management approaches that are people centric. This strategy proposes further scaling of participatory forestry management to meet both the livelihoods and ecological needs through aspects of value-chain forestry programming, social development, and poverty reduction strategies. It also identifies enablers such as strong forestry governance, public-private partnership in forestry management, and empowered forest communities and social forestry for effective co-management.

5.5.3 National Forest Action Plan – (NFAP) (2019 – 2028)

The purpose of NFAP is to provide practical guidance on sustainable dryland forest management and restoration in line with the National Forestry Strategy. It revises the 2001-2010 NFAP which among others led to the introduction of joint forest park management, which accorded local communities more opportunities for forest co-management, more benefits and rights associated with forest use, and increased efficiency in forest management. The action plan establishes key areas of interventions, main activities, and desired outputs with timelines. Some key objectives include strengthening forest management plans, establishing and management of the planted forest, and continuously improving sustainable forest management.

5.5.4 Forest Act (2018)

The Act provides for the maintenance and development of the forest resources of The Gambia to enhance the contribution of forestry to the socio-economic development of The Gambia and for connected matters. The Act provides for the establishment of CFs, the creation of CF committees and management agreements, and power and revenue sharing from the benefits associated with the CFs. The Act also provides for the creation of community-controlled state forests, joint forest park management, and management of different categories of forests.

6. DISCUSSION

There is consensus that forest co-management between state and non-state actors offers important opportunities for sustainable forest use, restoration and conservation. Efforts have progressed extensively to review and enact enabling policies and regulations in both Ghana and The Gambia. These efforts have focused more on terrestrial forests and less on mangrove ecosystems often covered under wildlife and wetland policies. Though mangroves as forests fall under the authority of forestry departments, when they do not occupy large tracts of land, they are often left as part of the wetland systems which falls under the fishery or parks and wildlife departments. This unclear sectoral affiliation requires modified management to enable mangroves to get the attention of forestry, parks and wildlife or fisheries departments (Duguma et al 2022).

The promotion of the shellfish co-management in the Densu and Tanbi supported by the USAID Women Shellfishers and Food Security project has nonetheless helped demonstrate how mangrove restoration and conservation in Ghana and The Gambia can be supported by women-led shellfish work. These experiences are now being used to develop co-management plans for Narkwa (Ghana) and Bulock (Gambia). Reviews have shown that promoting alternative livelihood options such as oyster harvesting, fisheries and aquaculture, non-timber forest products, ecotourism, and development of proximate foods portfolios can help mitigate mangrove degradation (Duguma et al., 2022; Crawford et al. 2022).

The review of national forestry co-management models such as CREMA & CFM in Ghana, and CF & CFM in The Gambia, have revealed important elements relevant for the women led shellfish co-management plans for Ghana and The Gambia. These include:

- The need to be cognizant of tenurial security especially where land ownership in mangrove areas is not legally owned.
- Clear benefit sharing mechanism structures among actors including chiefs with power to allocate land and oversee arbitration on encroachment disputes.
- The need to appreciate critical division of labor issues regarding access to resources among mangrove user groups in addition to women shellfishers.
- The understanding that broader co-management models could offer additional investment opportunities e.g., several products supporting the various models.

The review was unclear on whether community groups operating under the national co-management models such as CREMA have greater claims on dedicated state technical support compared to groups granted specific resource user rights.

Overall, establishing clear frameworks on mangrove co-management—meaning identifying ownership, use, restoration, and conservation needs, while also underpinning peoples' socio-economic situation—requires a range of management tools to secure long-term benefits by communities dependent on them (Crawford et al., 2022). Communities living adjacent to mangrove forests are key beneficiaries

to the many goods and services they provide, but often do not have formal legal ownership of mangrove areas. Even where mangrove resources are within protected areas (such as Ramsar sites in the Densu in Ghana, and in the Tanbi in The Gambia), experience has shown that management of these sites can be poorly designed or enforced and fail to prevent mangrove loss and degradation within their boundaries (Diop et al., 2020). The ultimate goal of co-management is to promote sustainable use of forest resources. This means balancing the needs of people who depend on forests for their livelihoods with the need to conserve biodiversity and maintain ecosystem services. Co-management also aims to ensure that the benefits from forest resources are shared equitably among all stakeholders. This includes local communities, the state, and other stakeholders such as conservation organizations and private sector entities. In return both the state and local communities share responsibility for managing forests. This includes decision-making, implementation, and monitoring of forest resources.

A key aspect for the success of co-management is the active participation of local communities in all stages of forest management. This includes planning, decision-making, implementation, and monitoring. Mechanisms for resolving conflicts over forest resources is also crucial. This includes conflicts between different user groups, as well as conflicts between conservation goals and livelihood needs. The combination of local knowledge and state authority is key in achieving success. Often, local communities have a deep understanding of the forest ecosystem, while the state has the legal authority and resources to manage forests. Changes in forest management have further demonstrated positive outcomes where political will exists on local community participation in management and use of forest resources for example in The Gambia. Some other factors that motivate co-management work include:

6.1 Socio-economic Factors

Research has shown that local communities mostly engage in forestry and mangrove co-management because of socio-economic benefits. For example, a study by Wagner (2001) identified economic benefits as the underlying reason for community-based mangrove restoration and management. Also, in the Philippines, socio-economic benefits through collateral or selling of mangroves in times of financial need emerged as the leading factor for mangrove restoration and management (Walters, 2004). Aheto et al. (2016) have reported that monetary benefit from mangrove wood harvesting and sale is the main motivation factor for community-based mangrove co-management. This study identified access to loan and credit facilities, regular provision of fuel wood, and protection of relations with other community members as additional motivation factors driving mangrove co-management for the Anyanui community in the Volta Region of Ghana.

Co-management can also lead to improved awareness and productivity through local community training, leading to increased community cohesion (Ward et al., 2018). It also promotes a sense of Community access to use rights of such resources and creates a sense of ownership, responsibility,

and empowerment among the stakeholders, including the resource users, who are more involved in the decision-making, with equal priority given to their values, interests, and opinions.

6.2 Environmental Factors

Support and regulatory functions from forests and mangroves ecosystems are noted to drive community-level co-management. Mangroves serve as habitats for several aquatic and terrestrial life forms (Nagelkerken et al., 2008). Furthermore, most coastal communities are protected from cyclones, coastline erosion, and tsunamis (Saenger, 2002; FAO, 2007, Aheto et al., 2016) due to the presence of mangroves. Mangrove restoration has been associated with the restoration of habitat for fish and bees for honey production, and community protection against flooding, erosion, and heavy storms as additional motivation factors for Anyanui mangrove restoration and management.

Forests, on the other hand, harbor more than three-quarters of the world's terrestrial biodiversity which offers several ecosystem services. They play an active role in the biogeochemical cycle and serve as atmospheric carbon sinks, help in flood control and water purification (Kyere-Boateng and Marek, 2021). Co-management can therefore help enhance the effectiveness and efficacy of natural resource functions (Kilonzi and Ota, 2023).

6.3 Food Security Functions

Mangrove restoration and management promotes a continuous supply of oysters, tilapias, crabs, and clams (King, 2007) for household consumption and income. Mangroves create habitats for honey extraction and hunting wildlife for consumption (Aheto et al., 2016). As earlier stated, within a mangrove area of one hectare, a catch of 600 kg of fish is possible (Melana et al., 2000; Aheto et al., 2016) which adds up to household nutritional and monetary needs. On the other hand, forests offer livelihood support and food security for the world's forest-dependent population estimated at a quarter of a billion (Muller et al., 2018).

6.4 Energy and Other Subsistence Functions

Forests and mangroves are good sources of fuel wood, charcoal, building materials, timber, fodder, fiber, alcohol, poles, and medicines amongst others for household or commercial purposes (Aheto et al., 2016; Muller et al., 2018).

7. CONCLUSIONS AND RECOMMENDATIONS

The emergence of co-management, where various government and non-government actors work together, is one of the most important governance mechanisms for natural resource management. Prerequisites for successful co-management include: appropriate institutions, both local and governmental; trust between the actors; legal protection of local rights; and economic incentives for local communities to conserve resources.

The successes associated with the co-management of mangroves and forestry resources in Ghana (Forestry Commission (FC), 2008; Aheto et al., 2016) and elsewhere (Walters, 2004; Wagner, 2001), clearly show that the conventional means of managing natural resources that exclude multiple stakeholders' especially local communities from resource management and conservation will always often face challenges. In Ghana, it resulted in illegalities or irregularities and eventual degradation of forest resources until Collaborative Natural Resource Management approaches such as the CFM and CREMA were introduced. Similarly, several mangrove restoration and management initiatives have been facilitated and/or executed by IGOs (SNV, World Bank) NGOs (Arocha, Hen Mpoano, Friends of the Earth, Sea Water Solutions) and Wildlife Division of the Forestry Commission as well as District Assemblies with local communities in the volta and western estuary ecosystems under varied participatory and institutional arrangements. Gender and inclusivity approaches together with incentive schemes such as the provision of alternative livelihood activities were deployed as well as woodlots of alternative species to mangroves. The aim was to use nature-based solutions to restore and manage degraded mangrove areas, increase resilience, and provide alternative options for reducing pressure on mangrove resources towards their conservation. The CREMA forestry model, Anyanui community-based mangrove restoration and management strategy, and the Densu co-management system are worthy of emulation despite their limitations. There are indications that community-driven processes on mangrove ecosystem management and control are feasible where fringe communities' access and use such resources on an open-access basis under agreed regulations established with the support of relevant stakeholders & institutions (government, traditional authorities, research, and academia, NGOs) to sustain their livelihoods and the environment.

Lessons learned from implementation of community initiatives under the Densu co-management plan suggests that although co-management could have positive implications on management of forest and wildlife resources, its ultimate goals will be attained if communities are motivated to own and commit to sustain the process (Aheto et al., 2016). Experience on women led co-management in The Densu have also shown positive influence for instance on men dominated brush park fisheries with interest to restore white mangrove species used in this activity while the women restore the red mangroves for oysters. In addition, local capacities must be built for effective engagement among stakeholders to promote accountability and transparency to reduce conflicts. Conflict resolution strategies following internal arbitration must be instituted when they arise among members and benefit-sharing

mechanisms promoted for equitable distribution of gains to relevant stakeholders. Technical knowledge need be enhanced for the development and management of the resources towards sustainable use and conservation. Since most initiatives are project-driven, there is a need for a community-based commitment or sustenance covering social, financial, institutional arrangements and governance systems on restoration and/or co-management to ensure sustainability.

In The Gambia, even though progressive community forest management policies have been formulated and some community forests designated, mangrove forest resources co-management is still underdeveloped, leading to unsustainable resource use and management. Currently, the USAID Women Shellfishers and Food Security project is supporting the development of a co-management plan for shellfishery resource users in Bulock to ensure sustainable oyster utilization in the area.

It also appears that local stakeholders' understanding of forest co-management has been poorly understood. Forest and mangrove resources can be sustainably managed if local customary rules are enforced and institutional arrangements are put in place to ensure sustainable use and while seeking means to generate high economic returns for the users. The forest "tenurial factor" is however held in high regard as a factor for the success of community forest management and is a crucial factor in the negotiations between government and forest communities in The Gambia.

To ensure sustainable mangrove and forest resource utilization, the following recommendations are pertinent in The Gambia:

- Co-management of mangrove and shellfishery resources with communities in mangrove areas need to involve women as a key user constituent. The TRY women-led shellfish co-management in The Gambia demonstrate this opportunity.
- Co-management interventions need to be based on legally grounded forestry co-management models such as CFs so as to provide safeguards with regards to resource access and tenurial security such as land allocations for competing use.
- The local communities should be empowered to assume management of mangroves and/or shellfisheries through delegation of use rights and management responsibilities that enable resource users, their families, and their communities to benefit directly from responsible and sustainable natural resource management.
- Incentivizing good practices should also be promoted, such as sustainable oyster harvesting, and mangrove and forest restoration practices.
- Legal frameworks and policy regulations need enforcement to protect forest and mangrove ecosystems to reduce mangrove logging and clearance for domestic use.
- Strengthening governance systems and capabilities that drive positive outcomes in sustainable and equitable forest management is key.

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ANNEX 1: Policies, legislation, regulations, plans and actions guiding resource use and stakeholder involvement in forestry and mangrove resource management in Ghana

Policies, plans & legislations	Purpose, measures, strategies/actions towards development and management of forestry & mangrove resources.
Forest and Wildlife Policy, 2012	The overall aim with respect to stakeholder involvement is to promotes the development of the capacities of decentralized local institutions including the District/Municipal/Metropolitan Assemblies, Traditional Authorities, and civil society organizations in sustainable "off-reserve" timber resources and non-timber forest products management in forest, savannah and coastal ecosystems.
Forestry Development Master Plan (2016-2036)	Component 1 of the plan is to ensure sustainable management of forests, wildlife, wetlands, and savannah ecosystems to preserve vital soil and water resources, conserve biological diversity, and enhance carbon stocks for sustainable production of domestic and commercial products. Some specific measures include: Support natural regeneration and establishments of Community Resource Management Areas (CREMAs) in off-reserve forest and savannah areas. This is to ensure more active participation of the local communities, civil society groups and other stakeholders in wildlife management. Promote sustainable management of mangroves to safeguard the wetlands and protect endangered species like marine turtle by: Enacting legislation to support the implementation of the national wetland conservation strategy. Supporting the mainstreaming of wetland management into district and community level natural resource management systems including sustainable management of mangroves

Policies, plans & legislations	Purpose, measures, strategies/actions towards development and management of forestry & mangrove resources.
	Strategic actions and targets for the sustainable wetland management are to: Revise, map, inventory and document all potential wetlands of global significance in all the ecological zones of Ghana by 2025 Review and update/formulate for gazette, participatory wetland management plans for the RAMSAR site and other wetlands of national significance by 2025 Promote community mangrove reservation and rehabilitation of all degraded wetlands for mangrove restoration and marine protection using the CREMA governance system by 2025 The Wildlife Division of the Forestry Commission /MLNR is to enhance the CREMA concept, to create incentives for communities, farmers and landowners to retain wildlife resources naturally
Ghana Forest Plantation Development Strategy (2016-2040)	A 25-year strategic plan covering 2016-2041 aimed at to reforesting degraded forest lands by developing commercial forest plantations of recommended exotic and indigenous tree species by the government and private sector at an annual rate of 20,000 ha. 10,000 ha per annum will be developed through public/public-private partnerships and 10,000 ha for the private sector It is also estimated that 1,480 ha of forests will be planted annually and managed for environmental conservation purposes including an unspecified hectares of mangrove forest that are critical for the protection of mangrove ecosystems for sustenance of coastal fishery resources and livelihoods
Collaborative Forest Resource Management Strategy (2001)	Promotes partnership by which stakeholders in both public and private sector are engaged and agree to share responsibility with state institutions especially Forestry Commission to ensure the development, use and management of all forest resources is equitable and more efficient

Policies, plans & legislations	Purpose, measures, strategies/actions towards development and management of forestry & mangrove resources.
Wildlife Resources Management Bill, 2014	Consolidate and revise the laws relating to wildlife and protected areas; provide for the implementation of international conventions on wildlife to which Ghana is a signatory and to provide for related matters. Provides the framework for: Management of wildlife outside protected areas Establishment of Community Resource Management Areas (CREMAs) and purposes Defines the constituents and functions of a CREMA Executive Committee Defines role of traditional authorities in CREMAs, etc.
National Wetland Management/Conservation Strategy (1999)	Developed to protect and drive the sustainable use of wetland resources. Objective 6.4S of the strategy promotes effective local community and stakeholder capacity building, participation in wetland resource management, and sensitization on wise use of wetland resources, wetland site & species protection and restoration. Specifically, it is to: Promote the participation of local communities, traditional authorities, and other stakeholders in sound management and sustainable utilization of Ghana's wetland resources Maintain the ecological, cultural, recreational and aesthetic values of wetlands Ensure that national policies, local knowledge, regulations and activities contribute to the wise use and sound management of Ghana's wetland resources Ensure that national capacity-building, and appropriate legal and institutional frameworks are put in place for effective wetland conservation

Policies, plans & legislations	Purpose, measures, strategies/actions towards development and management of forestry & mangrove resources.
	Create awareness among the people of Ghana on the importance of wetlands and solicit their commitment to conservation and wise use. A participatory approach to wetland resource use and management is emphasized to involve all the concerned people and organizations in wetlands management, the Government of Ghana will co-ordinate a wetlands conservation programme that will facilitate popular participatory of traditional authorities, local communities, NGOs, women's groups, youth and private sector.
Coastal wetland management plans (1991) Ntiamoa-Baidu, & Gordon, (1991).	Provided the framework for the establishment and protection of the five most important coastal wetlands as Ramsar sites in Ghana. Namely Keta lagoon, Songor, Sakumo, Densu delta and Muni. Detailed management strategy for the selected or designated sites and defines institutional framework and mechanisms for the implementation of the conservation actions Establishment of Ramsar sites and provision of' necessary infrastructure and resources for effective protection of the sites Establishment of a zonation scheme to integrate wildlife management with traditional use of the sites and cater for the needs of the local people while maintaining the wildlife value of the wetland. Institution of appropriate programs for land, habitat and faunal management. Establishment of a conservation education and public awareness programs. Institute research and monitoring programs for established sites
Wetland Management (Ramsar Sites) Regulation, (1999)	A RAMSAR Site is a wetland set aside or designated for conservation because of its international importance according to set criteria. It is normally managed to provide maximum benefit to the local communities living within and around the designated area.

Policies, plans & legislations	Purpose, measures, strategies/actions towards development and management of forestry & mangrove resources.
	For effective implementation of Ramsar site conservation strategy, session 7(1) of the wetland management regulation specifies that "No person shall within a Ramsar Site" shall remove any woody vegetation or cultivate any portion in a core area except with the written consent of the Executive Director or his authorized representative given in consultation with the relevant committee. Specifically, regulation on mangrove protection/conservation within a Ramsar Site involves: Ban on harvesting of red mangroves for sale or fuelwood A fine when caught cutting the red mangroves Selective cutting of white mangroves when matured A fine when caught cutting matured white mangroves indiscriminately Monitoring of mangroves in Ramsar site every two weeks The regulation also encourages voluntary co-management of Ramsar sites.