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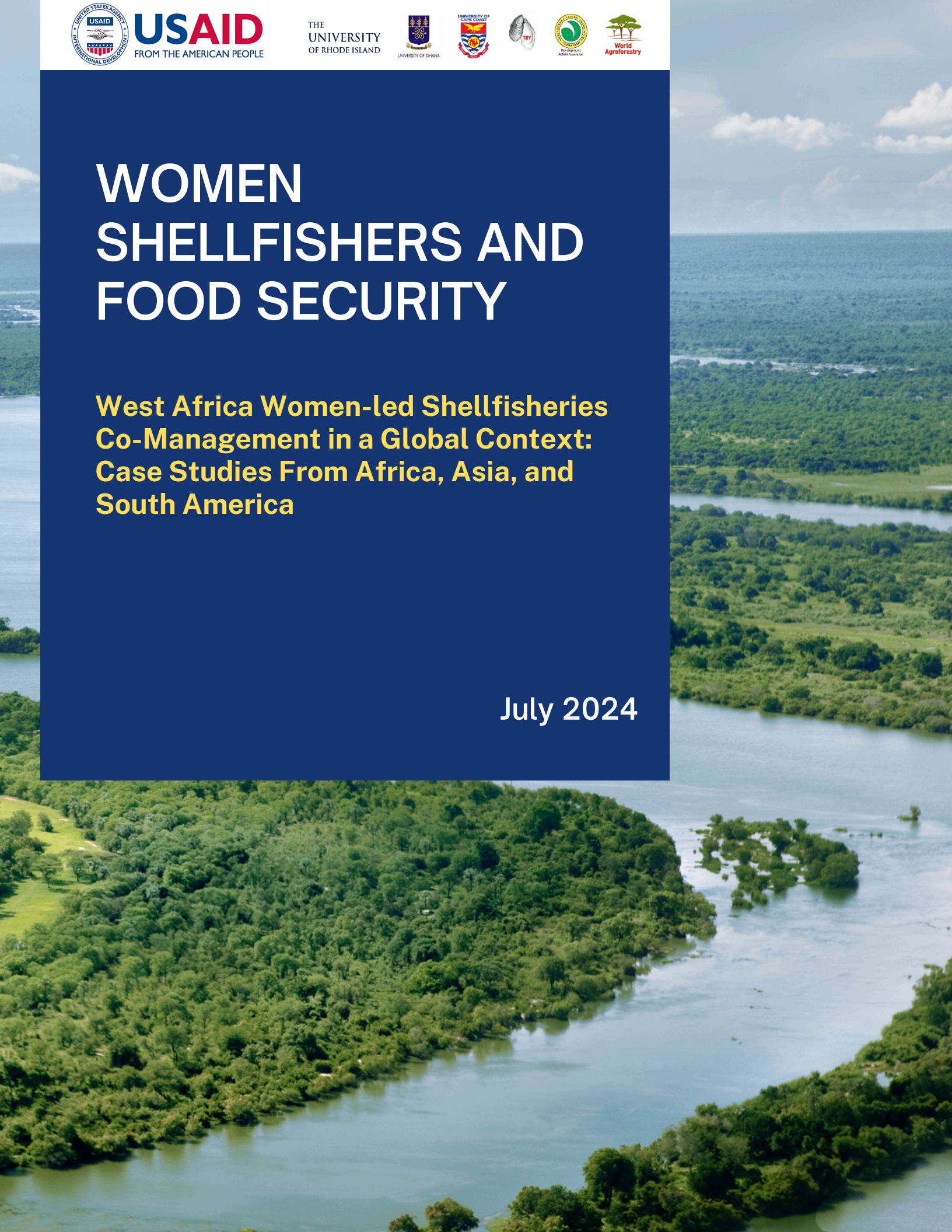
THE
UNIVERSITY
OF RHODE ISLAND



WOMEN SHELLFISHERS AND FOOD SECURITY

**West Africa Women-led Shellfisheries
Co-Management in a Global Context:
Case Studies From Africa, Asia, and
South America**

July 2024



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USAID Development Experience Clearing House: <https://dec.usaid.gov/dec/content/search.aspx>

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Citation: Women Shellfishers and Food Security (2024). West Africa Women-led Shellfisheries Co-Management in a Global Context: Case Studies From Africa, Asia, and South America. University of Cape Coast, World Agroforestry (ICRAF), TRY Oyster Women’s Association, Development Action Association, and Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. Narragansett, RI, USA. 62 pp.

Authority/Disclaimer:

Prepared for USAID under the BAA-AFR-SD-2020 Addendum 01 (FAA No. 7200AA20FA00031) awarded on August 12, 2020, to the University of Rhode Island and entitled “Women Shellfishers and Food Security.”

This document is made possible by the support of the American People through the United States Agency for International Development (USAID). The views expressed and opinions contained in this report are those of the Activity team and are not intended as statements of policy of either USAID or the cooperating organizations. As such, the contents of this report are the sole responsibility of the authors and do not necessarily reflect the views of USAID or the United States Government.

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ACRONYMS

CCM	Center for Coastal Management
CIDA	Canadian International Development Agency
CFA	Community Forestry Association
CRC	Coastal Resources Center
DAA	Development Action Association
DOPA	Densu Oyster Pickers Association
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Clam development and harvesting groups in Tunisia
ICRAF	World Agroforestry (International Centre for Research in Agroforestry)
KEMFSED	Kenya Marine Fisheries and Socio-Economic Development
KFS	Kenya Forest Service
KMFRI	Kenya Marine Fisheries Research Institute
LMIC	Low- and Middle-Income Country
MER	Marine Extractive Reserve
MPCO	Mikoko Pamoja Community Organization
MSC	Marine Stewardship Council
NCIP	National Commission on Indigenous Peoples
POT	People of the Tides project in Brazil
SES	Stakeholder Empowerment Score
SFMP	USAID/Ghana Sustainable Fisheries Management Project
ToC	Theory of Change
TRY	TRY Oyster Women's Association
UCC	University of Cape Coast
URI	University of Rhode Island
USAID	United States Agency for International Development
WMA	Women-Managed Area



Executive Summary

Lack of documentation on the role of women in small-scale fisheries and women's lack of participation in decision-making and governance for small-scale fisheries has been identified globally as a key challenge for gender equality, sustainable fisheries management, ecosystem stewardship, and positive development outcomes. Two cases of women-led shellfisheries co-management in West Africa are recognized as rare examples of women's leadership as fishers in small-scale fisheries governance. In both cases, the Tanbi Wetlands National Park in The Gambia and the Densu Estuary in Ghana, nationally approved oyster and cockle fisheries co-management plans delegate exclusive use rights and responsible management authority for these fisheries to women's harvester associations. The Women Shellfishers and Food Security project has focused on these examples to better understand the potential for scaling of a women-led, rights-based approach to shellfisheries co-management in West Africa.

The objective of this desk study is to examine links between West Africa women-led shellfisheries co-management approaches, research and findings and other initiatives that address similar gender-based themes in coastal resource management around the globe in low- and middle-income countries. It highlights cases that explore links between women-led shellfisheries co-management in estuarine mangrove ecosystems and biodiversity conservation, gender equity, climate change adaptation and mitigation, sustainable small-scale fisheries, and food security. The report's target audience is practitioners involved in promoting the management and conservation of estuarine shellfisheries and habitats for gendered livelihoods support.

In addition to The Gambia and Ghana, five cases from the Philippines, Ecuador, Brazil, Kenya, and Tunisia are highlighted with key takeaways for practitioners from each. Overarching key takeaways for practitioners based on the findings from the portfolio of cases are as follows:

A top-down, regulatory framework and evidence-based decision-making is likely not sufficient to incentivize the behavior change needed throughout the value chain for sustainable management of small-scale shellfisheries dominated by vulnerable women harvesters.

National policies or laws that promote co-management of mangroves and/or shellfisheries provide enabling conditions that can lead to widespread scaling of locally managed shellfish and mangrove areas. Such policies and laws, however, require governments to also commit resources for their implementation and to achieve widespread scaling.

A participatory, rights-based approach incentivizes the behavior change that is needed for responsible fisheries management and habitat stewardship. But a focus on and

significant investment in local ecological knowledge, resource user empowerment, capacity building of resource user associations and government are critical—in addition to scientific knowledge and technical fisheries considerations.

Governance arrangements and management plans that require or facilitate strong links between resource user co-management entities and technical assistance, facilitate co-management success.

Socio-economically vulnerable actors (women) within economically vulnerable communities can participate in and lead natural resource co-management if priority needs and livelihood diversification options are integrated into co-management initiatives.

Exposure to co-management planning processes in different communities and geographies in a variety of fisheries enables stakeholders to understand the principles of the co-management approach more clearly—as distinguished from the specifics of a given community, geography, or fishery. This perspective builds capacity for adaptive management within co-management plans and for scaling the co-management approach.

Limited documentation and the infrequent and isolated nature of current cases of women-led rights-based shellfisheries co-management found in this study highlights the need to work towards a critical mass of adopters and generate a virtuous cycle of support for the approach. This can be facilitated by continuing to provide insights on the lessons learned from existing cases, equipping practitioners, and establishing the linkages that empower scaling.



1. INTRODUCTION

Lack of documentation on the role of women in small-scale fisheries and women's lack of participation in decision-making and governance for small-scale fisheries have been identified globally as the key challenges for gender equality, sustainable fisheries management, ecosystem stewardship, and positive development outcomes.¹ Development partners, including, the United States Agency for International Development (USAID), the Foods and Agriculture Organization of the United Nations (FAO), the United Nations Development Program (UNDP), and the Women Shellfishers and Food Security project consortium, recognize that two cases of women-led shellfisheries co-management in West Africa are rare examples of women's leadership as fishers in small-scale fisheries governance.^{2,3,4} In both cases—the Tanbi Wetlands National Park in The Gambia and the Densu Estuary in Ghana—nationally approved oyster and cockle fisheries co-management plans delegate exclusive use rights and responsible management authority for these fisheries to women's harvester associations.^{5,6}

The Women Shellfishers and Food Security project has focused on these examples to better understand the potential for scaling of a women-led, rights-based approach to shellfisheries co-management in West Africa through a West Africa regional assessment that highlights the presence of women-led shellfisheries and enabling conditions for co-management.⁷ The project has also sought to improve the evidence base on women-led shellfisheries by documenting the linkages between the approach demonstrated in The Gambia and Ghana cases and women's empowerment, biodiversity, and food security outcomes. In the research at these sites, the project is now also exploring the potential for improved outcomes when a broader mangrove management and landscape food systems approach is integrated with women's empowerment and shellfisheries co-management.

This study further contributes to the information available for practitioners, putting the West Africa work in a global context by identifying and examining cases from low- and middle-income countries of women-led shellfisheries and/or mangrove ecosystem governance that provide insights on rights-based, ecosystem-based shellfisheries co-management by women.

2. OBJECTIVE

The objective of this desk study is to examine links between West Africa women-led shellfisheries co-management approaches, research, findings and initiatives that address similar gender-based themes in coastal resource management around the globe in low- and middle-income countries. It highlights cases that explore links between women-led shellfisheries co-management in estuarine mangrove ecosystems and biodiversity conservation, gender equity, climate change adaptation and mitigation, sustainable small-scale fisheries, and food security.

The target audience for this report are practitioners involved in promoting the management and conservation of estuarine shellfisheries and habitats for gendered livelihoods support.



3. METHODOLOGY

Selection and compilation of case studies was conducted as a qualitative desk study, employing a literature search supplemented by key informant interviews. The following are criteria used for case selection, with the first criteria considered “essential” and other criteria considered “desired”:

1. Estuarine shellfisheries livelihoods (bivalves favored)
2. Continental representation in low- and middle-income countries (Asia/Southeast Asia, Central/South America, Africa)
3. Community-based gender sensitive shellfishery co-management (rights-based favored)
4. Women shellfishers’ empowerment, including building shellfisher association capacity
5. Mangrove co-management or mangrove community-based restoration work
6. Integration of adjacent landscape food production systems
7. Findings related directly to the Women Shellfishers and Food Security project Phase I and Phase II Theory of Change and hypotheses detailed in Annex 2
8. Enabling conditions

The literature search used key words from the above criteria and included published peer reviewed papers as well as non-peer reviewed published documents, reports, and media. Cases were tabulated in a spreadsheet against the eight criteria. During two review sessions, the Women Shellfishers and Food Security project partners reached consensus on selection of the final cases. Final selection included consideration of geographic balance and priority themes addressed. A key constraint was the availability of more substantive documentation on many cases that were highlighted anecdotally in online blogs, on organization and project websites, or as the subject of reporting by journalists. Cases with documented information on governance arrangements and analysis of outcomes over time were favored.

The project team conducted key informant interviews for selected cases. Interviews ranged from one to five per case. Key informants provided written feedback on a draft in the cases of Brazil, Ecuador, and Tunisia.

4. WEST AFRICA REFERENCE CASES

4.1 The Gambia: Tanbi Wetlands National Park Oyster and Cockle Fishery Co-Management Plan



Figure 1: Oysters on mangrove roots in the Tanbi Wetlands National Park (left). TRY Oyster Women's Association member selling oyster meat with shells piled behind (right). (Source: Karen Kent).

In 2012, the Ministry of Fisheries, Water Resources and National Assembly Matters in The Gambia granted **exclusive use rights** and management authority to the oyster and cockle fisheries in the Tanbi Wetlands National Park to the TRY Oyster Women's Association in a fisheries co-management plan.¹ This was the first case in Sub-Saharan Africa of a national government delegating fisheries use rights to a women's association. The total management area for the cockle and oyster resources covers 6,304 hectares (Figure 2). TRY includes more than 450 women members from 12 communities in the Tanbi. In the Tanbi, shellfish gleaning is considered a dangerous, low economic return activity and is practiced by socio-economically marginalized women of the Jola ethnic group who have limited livelihood options. The women are often single heads of household, most are not literate, and are primarily in the 35-75 years age group. Development and approval of the management plan was the result of a three-year participatory stakeholder engagement and capacity strengthening process including women oyster harvesters and their communities, local administrative and traditional authorities, the Department of Fisheries and three other government entities—the Department of Parks and Wildlife Management, the Department of Forestry, and the National Environment Agency. The process was supported by the USAID/BaNafaa project (2009-2014)² that continued through implementation and included

training and stakeholder capacity building on the co-management approach; organizational capacity development; participatory appraisal of the oyster fishery and local ecological knowledge; oyster value chain assessment; water quality testing; a shoreline sanitation survey and improvements; action research; peer-to-peer study tours; leadership and advocacy training; literacy and numeracy training; hygiene and handling training; value chain improvements; aquaculture pilots; supplementary livelihoods and life skills training for harvesters and their daughters; savings and loan groups; mangrove planting and stewardship; and health services access.

Key Management Measures	Pre-existing Enabling Conditions
<ul style="list-style-type: none"> An eight-month, annual closed season for oysters from July to February 	<ul style="list-style-type: none"> Pre-existing conservation objectives and defined boundaries: The Tanbi Wetlands National Park was designated as a Ramsar site under the convention on wetlands of international importance in 2007.
<ul style="list-style-type: none"> A harvest size limit of six centimeters for oysters, 25 millimeters for cockles 	<ul style="list-style-type: none"> Legal frameworks: The Fisheries Act of 2007, Section 14 and associated regulations of 2008 provided the authority for the Ministry of Fisheries, Water Resources and National Assembly Matters to designate special management areas for the purpose of community-based co-management. The TRY Oyster Women’s Association was legally registered in 2007.
<ul style="list-style-type: none"> An axe must be used to remove oysters from mangrove roots to avoid harvesting small-size oysters and prevent cutting off the mangrove root to harvest the oysters 	<ul style="list-style-type: none"> A vertically integrated value chain—with women harvesters dominant at all nodes—enabled harvesters investing in sustainable management practices to benefit directly from improvements at any node, incentivizing responsible stewardship.
<ul style="list-style-type: none"> Exclusive harvest areas reserved for individual TRY member communities 	<ul style="list-style-type: none"> Dynamic champions of the women harvesters and the co-management approach were present and active.

Key Outcomes

- The annual closed season, size restrictions, and gear use were consistently implemented for 14 consecutive years (2011-2024), starting before official approval of the co-management plan. Significantly, this management continued during the absence of a functional government throughout The Gambia's political transition in 2016/2017, a testament to the value of the co-management governance framework.
- Value chain improvements resulted in more than doubling of the price per kilogram for oysters by 2014 due to the larger size and improved hygiene, handling and marketing.²
- As of 2022, documented evidence indicated that the oyster fishery in the Tanbi was under-exploited, due in large part to the long-closed season.³
- Mangrove stewardship: Since 2011, TRY planted more than 33.5 hectares of mangroves.² TRY members consistently use gear to remove oysters without cutting mangrove roots. TRY also alerts authorities to instances of illegal mangrove cutting, encroachment for land development in the Tanbi Wetlands National Park, and issues such as damaging boat wakes. Documentation that mangrove cover in the Tanbi was somewhat stable over the last 5-10 years⁴ suggests that women shellfishers are contributing to maintaining a healthy and sustainable socio-ecological system.
- Water quality stewardship: The Department of Water Resources conducted water quality testing over three years. A shoreline sanitation survey was conducted, resulting in awareness and some site level improvements in waste dumping, piggery relocation, and investment in potable water and sanitation facilities at a few selected sites. Water quality zones were mapped, and a Gambia National Shellfish Sanitation Plan was proposed in 2014.²
- Oyster aquaculture was introduced and the capacity of women harvesting shellfish from the wild to produce their own oysters in aquaculture farms was built. Development of economically sustainable oyster aquaculture business models are on-going.
- Visibility of and investment in shellfisheries increased. In 2012, TRY won international recognition when it received the United Nations Development Programme Equator Prize for its work. In 2023, the FAO (Food and Agriculture Organization of the United Nations) FISH4ACP project¹⁰ and the Government of The Gambia built on the experience to date and developed a 10-year strategy for the sector. FAO support will continue through the end of 2025, including for the review and update of the oyster and cockle co-management plan in the Tanbi Wetlands National Park, development of the value chain, and facilitation of scaling of co-management and oyster aquaculture in The Gambia.

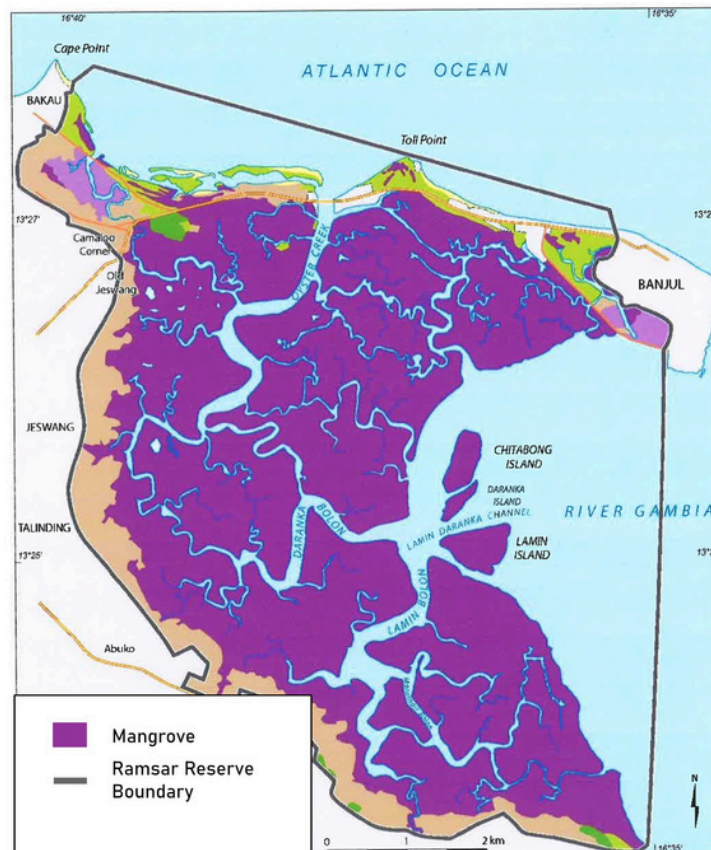


Figure 2: Boundaries of the Tanbi Wetlands National Park.

Key Challenges

- While growing in strength to advocate for, decide on, and implement collective shellfisheries management actions, the organizational capacity of the women shellfishers association is weak in leadership legacy and financial sustainability.
- TRY has exclusive rights to the oyster and cockle fishery in the Tanbi and has the ability to exclude non-members. Yet, the shellfishery remains open access as there have been few efforts to control “outsiders” who occasionally enter and harvest. If and how to effectively control access by non-members and by harvesters who are not trained in sustainable harvest practices is an issue of increasing importance.
- There has been inconsistent data collection and generation on landings, value, and status of the stock for use in management decision-making.
- The proposed Gambia National Shellfish Sanitation Plan was not further developed or adopted.
- Improvements in mangrove area coverage in the last decade—as shown by recent mapping—may not be capturing the degradation of the quality of that coverage, especially where mangrove conservation may conflict with community farming activities.⁴

Key Takeaways for Practitioners

Delivery of integrated programs that respond to multiple, interdependent needs of vulnerable women shellfishers facilitates their capacity to implement management measures that require reduced fishing effort.

Early joint management actions at the community level before management agreements are formalized empowers resource users to participate in and lead co-management, creates buy-in as early results are realized, and informs the eventual official plan.

Once the government delegates use rights and a resource user association has sufficient capacity, the need for government support is minimized and can be more efficiently targeted, reducing the risk that government inaction or delayed action becomes a barrier to sustainable management of shellfisheries.

4.2 Ghana: The Densu Delta Oyster Fishery Co-Management Plan



In 2020, the Fisheries Commission of the Ministry of Fisheries and Aquaculture Development in Ghana granted **exclusive use rights** and management authority to the oyster fishery in the Densu Delta to the Densu Oyster Pickers Association (DOPA) in a fisheries co-management plan.⁵ The total management area for the oyster fishery resources and mangrove habitat restoration covers 1,800 hectares (Figure 3). DOPA includes approximately 300 members from three communities. Development and approval of the management plan was the result of a four-year participatory stakeholder engagement and capacity strengthening process including women oyster harvesters and their communities, local administrative and traditional authorities, the district and national level Fisheries Commission, Development Action Association (a local nongovernmental organization), and the University of Cape Coast, among others. The USAID/Ghana Sustainable Fisheries Management Project (2014-2021) supported the process, which included training and stakeholder capacity building on the co-management approach; organizational capacity development; participatory appraisal of the oyster fishery and local ecological knowledge; oyster biology training; water quality testing and training of women; action research; peer-to-peer study tours; leadership and advocacy training; literacy and numeracy training; value chain improvement training; voluntary savings and loan groups; and, mangrove planting and stewardship.

Key Management Measures

- A five-month annual closed season from November to April in addition to a one-month pause in August for a traditional celebration (Homowo)
- A harvest size limit of seven centimeters for oysters
- Planting of mangroves for habitat restoration
- Returning shells to maintain oyster reefs

Pre-existing Enabling Conditions

- Pre-existing conservation objectives and defined boundaries: The Densu Delta was designated as a Ramsar site under the convention on wetlands of international importance in 1992.
- Legal frameworks: The Fisheries Act No. 625 of 2002; The National Gender Mainstreaming Policy for the Fisheries Sector of 2016.⁹ The Densu Oyster Picker's Association was legally registered in 2018. The Co-Management Policy for the Fisheries Sector of 2020 was both informed by and further enabled co-management.⁸
- A vertically integrated value chain—with women harvesters dominant at all nodes—enabled harvesters investing in sustainable management practices to benefit directly from improvements at any node, incentivizing responsible stewardship.
- Dynamic champions of the women harvesters and the co-management approach were present and active.
- The Densu Delta shellfishery co-management process benefitted from lessons learned and the opportunity for peer-to-peer exchange and technical assistance from The Gambia.



Figure 3: Map of the Densu Delta oyster fishery management area—red line.⁵

Key Outcomes

- The annual closed season was consistently implemented for seven consecutive years (2018-2024), starting two years before official approval of the management plan.
- Oyster shells were returned to the estuary annually (Figure 4).
- As of 2022, documented evidence indicated that the oyster fishery in the Densu Delta was under-exploited, due in large part to the long closed season.³
- Total landings in 2023 were estimated at 103 metric tons with an estimated value of \$41,029. Catch per unit of effort ranged from 100 to 300 kilograms per person, per day, with the number of harvesters ranging from 2 to 33 per day during 63 active harvest days over a 179-day open season.⁶
- Mangrove stewardship: Since 2017, DOPA planted 42.77 hectares of mangroves.⁶
- Shellfishery sector visibility increased: DOPA has an annual audience with the Minister of Fisheries and is included in stakeholder consultations for new initiatives in the Densu Delta.

Key Challenges

- While growing in strength to advocate for, decide on, and implement collective shellfisheries management actions, the women shellfishers association has very weak

organizational capacity in recordkeeping, financial and administrative management, and financial sustainability.

- Rainy season flooding and release of water from the Weija dam upstream, which supplies Accra's drinking water supply, poses a threat to shellfishers' safety and livelihood by reducing harvest days and potentially reducing the survival and growth of shellfish and planted mangrove seedlings.
- Located on the outskirts of the capital of Accra, this peri-urban area suffers from encroachment by housing development and landfilling, exacerbating flooding issues. The delta has been largely deforested of mangroves—with little mangrove forest remaining.⁴ Mangrove resources are fragmented, with significant areas under mudflats and wetland plants.⁷ Financial and logistical resources and governance arrangements—all needed to stop further degradation and fully restore the mangrove systems—have been inadequate to date.
- Men cut mangrove branches to create estuarine “brush parks” to catch fish. Yet, there has been limited effort to involve these men in mangrove reforestation. The brush parks keep expanding and pose a threat to the bottom oyster beds on which the women's fishery depends. Today, men are starting to become more involved in mangrove reforestation, following the women's lead, and understanding the need for a sustainable supply of wood for brush parks.

Key Takeaways for Practitioners

Ongoing institutional support from external actors has been a factor driving the success of the oyster shellfishery community-based management regime in the Densu Delta.

Local nongovernmental organization and academic institutional support from Development Action Association and the University of Cape Coast played an important role in organizational capacity strengthening of the shellfishers association and its ability to function effectively as a co-management entity.

Restoring highly threatened and degraded mangrove ecosystems like that of the Densu Delta is beyond the scope of the positive contributions that women shellfishers with shellfishery use rights can accomplish on their own. The positive example of women shellfishers' visible actions and shared experience as mangrove stewards can, however, be an entry point to leverage the broader community of mangrove stakeholders to engage in mangrove restoration. DOPA found that their replanted mangrove areas may be less vulnerable to human exploitation than wild areas due to social pressure not to exploit trees planted by others. Another reason is that the red mangroves that have been planted are not the species used by brush park fishermen. The USAID Women Shellfishers and Food Security project is working to provide additional lessons learned and tools for practitioners through site-based research on community action planning for mangrove management and

the integration of proximate landscape food ecosystems to address the need for engagement of a broader group of stakeholders and more comprehensive food systems than just shellfisheries to protect mangrove ecosystem services, including food security.⁶

Local resource users, even with minimal support from the responsible government agency, can successfully manage shellfish harvests at sustainable levels and contribute significantly to improving mangrove health. The Fisheries Commission has been supportive by approving the co-management plan in the Densu Delta and having numerous officials attend key events such as closings and openings of the oyster fishery. However, they have not been the leading institution providing support for mangrove reforestation, capacity building, or data monitoring and analysis—support needs that have been filled by other external actors.

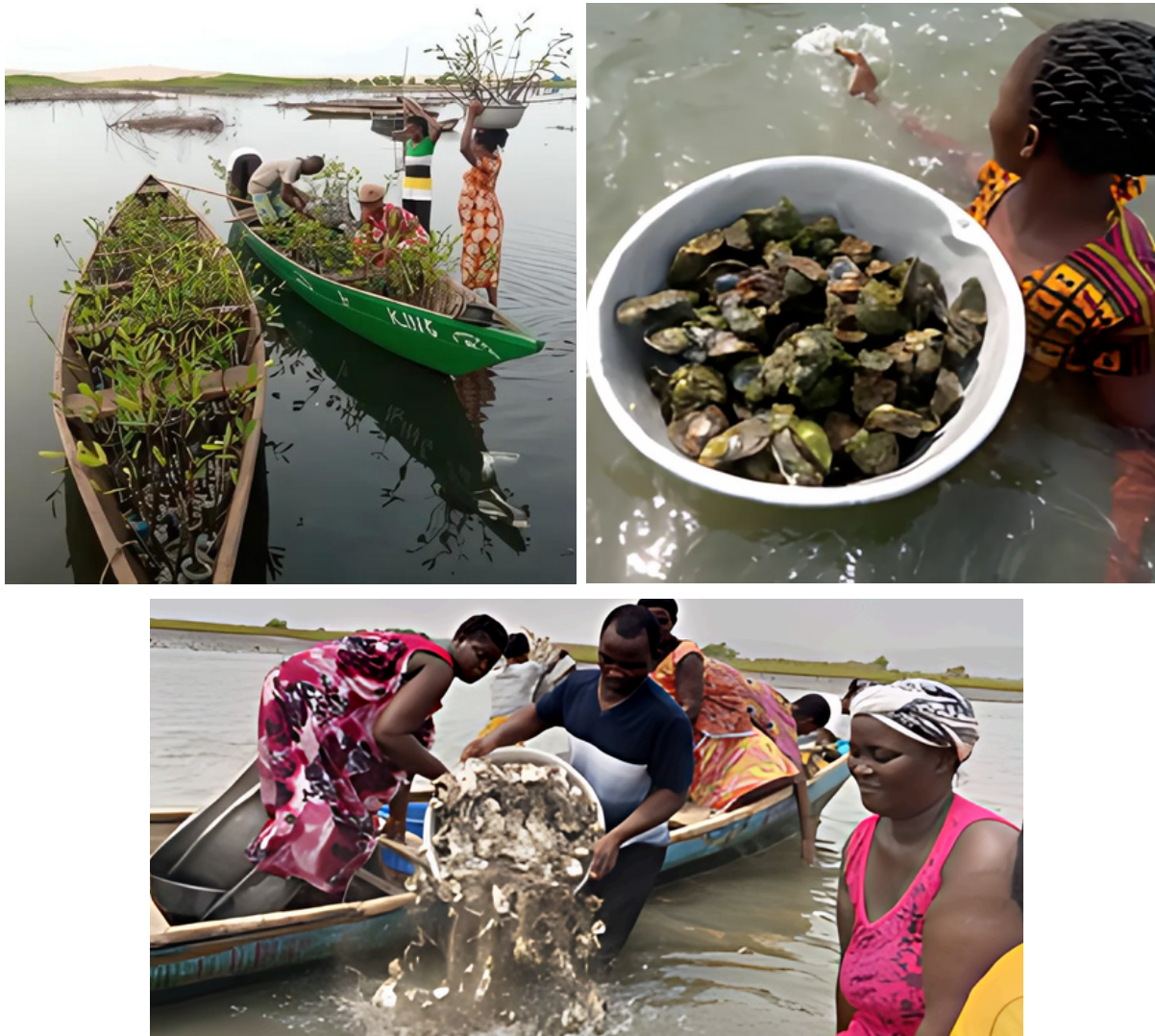


Figure 4: Mangrove planting (left), oyster harvest (right), and return of shells (bottom) conducted by DOPA in the Densu Delta (Source: Development Action Association).

5. CASES ACROSS LOW AND MIDDLE-INCOME COUNTRIES

Table 1 provides an overview of the selection criteria addressed by each case presented in this study.

Table 1: Overview of the selection criteria addressed by each case.

Selection Criteria	Philippines: Women- Managed Area	Ecuador: Concheras of Northern Ecuador	Brazil: Venus Clam Co- management	Kenya: Kwale County Mangroves and Mariculture	Tunisia: Women's Clam Fishery
Estuarine shellfisheries livelihoods					
Continental representation					
Community-based, gender sensitive shellfishery co-management					
Rights-based management					
Women shellfishers' empowerment					
Shellfisher association capacity building					
Mangrove co-management					
Integration of adjacent landscape food production systems					
Findings related to USAID Women Shellfishers and Food Security Phase I theory of change hypotheses					
Illustration of enabling conditions					

5.1 Philippines: Calait Island Cachipay Oyster Women-Managed Area



Figure 5: Calait Island Cachipay Oyster Women doing surveillance of the women-managed area.

In 2010, the government of the Philippines designated legal guardianship and **exclusive tenure rights** to the marine and terrestrial resources of Calait Island in the Calamianes Island Group in Palawan Province to the indigenous Tagbanwa tribe. In 2020, the local authority of elders of the tribe approved the Cachipay oyster management area in Calait as a women-managed area (WMA) with a WMA management plan to be implemented by the women Cachipay harvesters (Figure 5).¹ The WMA covers 146 hectares (Figure 6; see also Key Management Measures). The Cachipay oyster has a special significance to the Tagbanwa tribe of Calait, who use this local name to distinguish the species *Placuna ehipium* and *Placuna placenta* (Figure 7), which are referred to simply as “clams” on neighboring islands.² Cachipay are collected from mudflats that border mangrove areas.²

Approximately one-fifth of all Calait households (21 out of 115 households) collect Cachipay oyster, which is sold for subsistence and also used directly for food.³ A gender analysis of the Calamianes Island Group found that although harvest is done mainly by women, nearshore resources including Cachipay are perceived to belong to and be controlled by both women and men.⁴ Prior to the establishment of the WMA management plan, mudflat areas in Calait were open access and nearshore resources were perceived to be in decline.²

Development and approval of the Calait Cachipay WMA and management plan was the result of a participatory stakeholder engagement and capacity strengthening process starting in 2018. The women of Calait organized themselves and formed a legally

registered labor group.⁵ The group mobilized to self-select a leadership team and partner with their wider community, the local government unit, nongovernmental organizations, and relevant national agencies to draft a resolution to formally designate the Cachipay oyster WMA and develop and lead implementation of the WMA management plan. The USAID Fish Right Program supported a biophysical assessment of the mudflat within the designated management area, trained the women harvesters on oyster biology and ecology, and strengthened their economic empowerment through targeted interventions including financial literacy training, access to financing, and diversified livelihood opportunities.⁴ Young women in particular were engaged to lend their technological, research and writing skills, and their access to technology to help in drafting the plan.

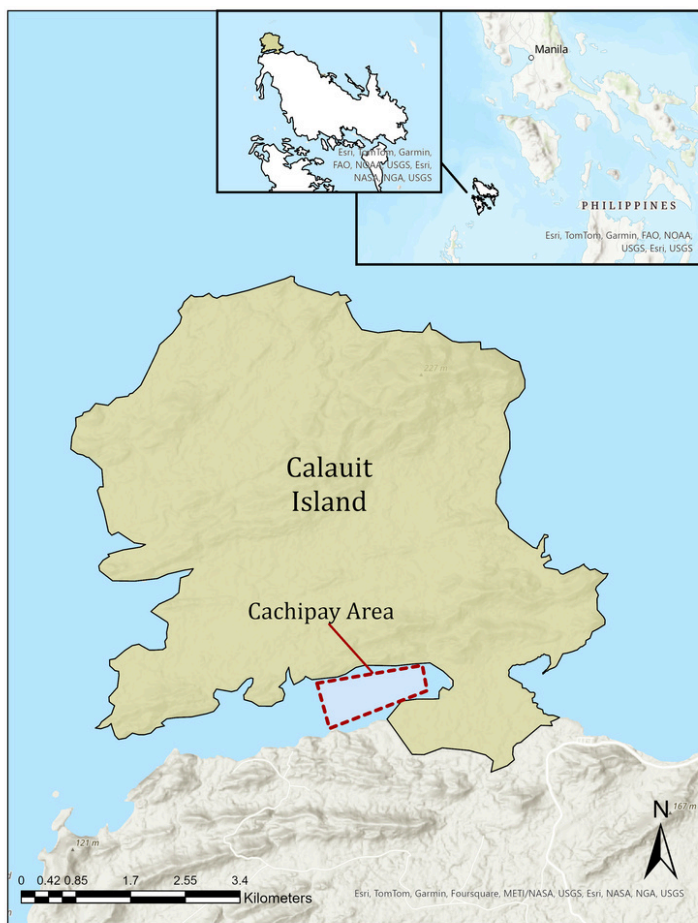


Figure 6: Map of Calauit Island and designated Cachipay oyster area.



Figure 7: “Cachipay” is a local name which the Calauit community uses to refer to both the *Placuna placenta* (top) and *Placuna ehippium* (bottom) species of bivalve (image adapted from Carpenter and Niem, 1998).

Key Management Measures

The 146-hectare WMA is divided into the following zones:

- 19.6 hectares under strict protection, meaning no-take and no-entry with the exception of monitoring and research activities;
- 28.5 hectares of coral reef and seagrass bed habitat conservation area with non-extractive recreation activities permitted, boat speed limits, and limited access in terms of the number of people in the area;
- 18.2 hectares of managed resource area with gear restrictions and fishing effort limits in terms of the number of fishers granted access;
- 79.7 hectares zone with limited entry for other use (e.g., dugong conservation area, pearl farming, fish aggregating devices).

Pre-existing Enabling Conditions

- Legal frameworks: As an indigenous people of Calait Island, the Tagbanwa tribe are designated legal guardians of their ancestral domain and hold exclusive tenure rights to their terrestrial and marine resources, as codified by a Certificate of Ancestral Domain Title issued by the Philippines Government in 2010. The Calait community has an Ancestral Domain Sustainable Development and Protection Plan supported by the National Commission on Indigenous Peoples (NCIP). A Magna Carta of Women Act of 2009 and Implementing Regulations of 2010.⁶
- A favorable starting point for strengthening gender equity: In Calait, the nearshore part of the ecosystem and the associated species are seen as the domain of both men and women. Although men have traditionally controlled shellfish harvesting, there is a more equitable division of control over nearshore resources across genders as compared to the Calamianes Island Group as a whole.³ In Calait, the women also have majority control of the mangroves and seagrass beds, where they collect seaweed, salt and tamilok (woodworms), a local delicacy.⁷ This has resulted in higher acceptance by men of women playing leading roles in fisheries management.
- Women in the Calait community have a well-established, informal communication network referred to as “tsismis.”⁴ Although sometimes characterized negatively as a channel for gossip, it serves as an effective network for identifying, discussing, and even resolving issues within the community. This is true for fisheries issues as well.

Key Outcomes

- In a patriarchal and male-dominated traditional Tagbanwa culture, the Calait women are now in charge of managing the Cachipay oyster, including defining acceptable harvest practices and setting the harvest schedule.⁸
- Young women have been engaged in the conservation of their nearshore habitats and resources, presenting an opportunity to instill environmental stewardship values with the next generation.⁴
- Women brought to the decision-making table previously neglected considerations in fisheries management, including household economics, family concerns, community cooperation, and engaging the youth.² Management decisions are now more inclusive and more informed of potential barriers to their implementation.
- When women were brought into the discussion, issues received more serious attention and tended to be discussed more deeply than when only men were present.⁴
- The Calait women tapped into long-held skills in balancing conflicting interests and consensus-building from their place within the community and were able to reach agreements around management measures more deftly than the men.⁴ This was true of the establishment of the WMA itself, which some community members were initially opposed to before being convinced by early advocates among the women of the personal and community benefits of an WMA.
- Since 2018, the WMA model first demonstrated in Calait has been scaled across the Philippines, with at least nine WMAs established across the country at the time of this study. These WMAs have unique objectives based on their specific ecological contexts, but many have championed protection and reforestation of local mangrove areas.⁹

Key Challenges

- In recent years, the Tagbanwa community has claimed that poaching of Cachipay oysters in the WMA by outsiders (presumably non-Indigenous individuals from nearby communities) has increased substantially.¹⁰ This has led to the perceived collapse of the Cachipay oyster population and a cease in harvesting.
- Despite promising milestones such as the inclusion of women on the Indigenous committee board of directors, barriers to women's leadership and decision-making persist in what remains a traditional, patriarchal culture in Calait.

Key Takeaways for Practitioners

The new positioning of women in nearshore management decision-making roles is seen as a non-threatening power shift. This owed to the pre-existing division of control over nearshore resources across genders, the continued control by men of higher-value

(e.g., fish, squid, giant clams), and the care that was taken during the development of a women-led management approach to not exclude men.² This served the dual purpose of further decreasing the perceived threat to men of increasing women's leadership roles and also working with them to break social norms that discouraged women's participation in fisheries management.

Economic empowerment has been demonstrated as a critical enabling condition for women's participation in fisheries management in Calait.² Women in this community experience extremely high burdens of both productive (i.e., income-generating) and reproductive (i.e., family and household care) responsibilities, and in the past, this has prohibited them from engaging in fisheries management and other community matters—even where there are organized women's groups dedicated to these issues. Through targeted interventions including financial literacy training, access to financing, and diversified livelihood opportunities, women were able to improve their household's financial position, free up time, and gain the confidence to engage in fisheries management decisions.

Empowerment of women in Calait has endured despite a perceived resource decline. WMA establishment led to an initial period of optimism for Cachipay harvesting but was followed years later by substantial threats from poaching which the community says has depleted the stock. Despite this, recognition by the community (including traditional elders) of the capacity of women to manage these resources has not changed. Further, the local Indigenous Peoples' Organization in Calait now has two women that sit on its board of directors, when previously local leaders viewed traditional rules as not allowing women to hold such positions.¹⁰

5.2 Ecuador: National “*Custodias*” Policy and the “*Concheras*” Women Cockle Harvesters of Northern Ecuador



Figure 8: The Muisne Island mangrove ecosystem (Source: Farias, et al., 2020).¹⁵

In 2000, a ministerial agreement allowed local communities of artisanal fishers to set up long-term 10-year leases or concessions of mangrove areas called “*custodias*”. This followed a 1999 executive decree that officially recognized **ancestral rights** of mangrove dependent artisanal fishers.¹ This was viewed as a means of stopping the illegal spread of shrimp ponds inside mangrove forests, a situation that started to explode in the 1970s and 1980s. As much as 40 to 50 percent of remaining mangrove areas in Ecuador are now community-based concessions of artisanal and ancestral communities, and their harvesters.³ From 2000 to 2015, 66 agreements for sustainable use and custody of mangroves had been issued to fishermen’s organizations in five coastal provinces. As of 2017, 59,208 hectares were under “*custodias*” arrangements by 47 communities.² These “*custodias*” require a management plan to be developed and allow for **exclusive community rights** for harvesting cockles. They also come with responsibilities to protect and rehabilitate mangroves. The “*custodias*” application requires that communities organize into formal groups legally recognized by the state and must be accompanied by a technical assistance agreement with a university, research institute, nongovernmental organization, or governmental institution.^{3,2}

The “*custodias*” law was established to protect livelihoods that were being impacted due to the mangrove losses from shrimp pond development. Cockle harvesting (*Anadara* spp.)

is one of these important artisanal fishery livelihoods along the coast of Ecuador, with approximately 3,000 people involved in the fishery.³ After a national ban in 1978 on conversion of mangroves to shrimp farms failed to halt mangrove destruction, artisanal fishers and nongovernmental organizations started to organize resistance movements to protest shrimp farm expansion into mangrove ecosystems.⁴

In the municipality of Muisne, part of the Province of Esmeraldas, in Northern Ecuador, (Figure 9), shrimp farming was promoted for economic development of the area—as economic opportunities had declined, along with a several-decades-long decline in agriculture in the region. At first, shrimp farming brought jobs for local men and women, who helped clear mangroves to build the shrimp ponds. However, once the ponds were established, labor from outside the community was brought in to manage the ponds, and economic opportunities for locals, especially women, dried up. Although cockle harvesting in this area has been considered a traditional livelihood activity conducted mainly by women “*concheras*,” men do participate in the fishery in Muisne and dominate the fishery elsewhere in Ecuador. Women often reach intertidal areas by walking or via canoes to access the mangrove forests where the cockles are collected among the roots of mangrove trees. These women often bring their children as no child day care facilities are available. It is one of the few income-generating activities available to women—who have few alternatives. As well, these women have deep cultural ties to the mangrove forests and cockles that provide their livelihood.⁵ Many are descendants of African slaves that settled along the Pacific coast of Northern Ecuador and Colombia.

The destruction of mangroves and the threat to their livelihood motivated local resource users to protect the area. A network of fisher associations in Muisne was established, which comprises five legally constituted artisanal fishermen's associations. The associations have a Mangrove Sustainable Use and Custody Agreement issued by the Ministry of the Environment, Water and Ecological Transition.⁶ Its 232 members come from across the five organizations, where 50.4 percent are represented by women and 49.6 percent by men. Several other “*custodias*” were established in the area: Bellavista Tourist Services Association (ASOSERTUVISTA), with 72 hectares of mangrove; Bunche-ASOPESBUNCHE Fisheries Production Association, with 81 hectares of mangrove; and San José de Chamanga Fishing Production Association (ASOPESANJOCHA), with 311 hectares of mangrove.¹⁶ In Bunche village, the association of shellfish harvesting women called Asociación de Mujeres Recolectoras de Concha Virgen del Carmen (Women mangrove cockle collectors of the Virgen del Carmen Association) has also been influential in advocating for mangrove protection and sustaining shellfish collection as a major livelihood activity. In addition, the area was declared a wildlife refuge in 2003⁶ with 3,173 hectares officially protected.

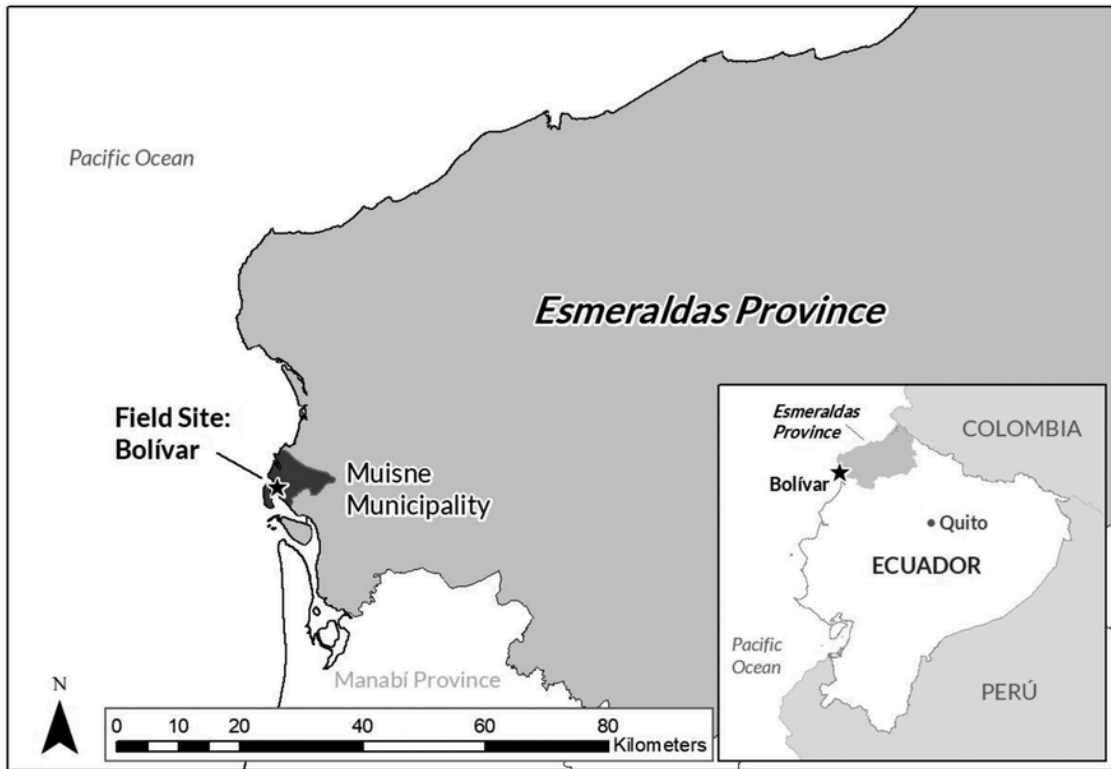


Figure 9: Muisne municipality (Source: adapted from Trevino, 2022).

Key Management Measures

- In all areas, harvest and commercialization of cockles less than 45 millimeters is prohibited in compliance with national regulations.
- Under “*custodias*” management plans, communities decide rotational closures, and/or set-aside reserve areas for spawning, and other measures deemed necessary.

Pre-existing Enabling Conditions

- Pre-existing conservation objectives and defined boundaries: The Muisne-Cojimies mangrove wildlife reserve of 3,173 hectares was established in 2003.
- Legal frameworks: A national ban on the conversion of mangroves to shrimp farms was declared (National Forestry Agency Decree 2939-B of 1978).⁷ An executive decree recognized ancestral rights of mangrove-dependent artisanal fishers (Decreto Ejecutivo No. 1102. Registro Oficial No 243, 1999). A national “*custodias*” ministerial agreement went into effect in 2000 (Acuerdo Ministerial No 172. Registro Oficial No 365, 2000). Presidential Decree 1391, in 2008, further strengthened the protection of mangroves and reforestation by requiring that a certain percentage of illegally constructed shrimp farms be reforested back to mangrove ecosystems.

Key Outcomes

- “*Custodias*” (community-based concessions) have stopped or slowed the wholesale destruction of mangroves in Ecuador.
- Evidence showed that in mangrove areas without “*custodias*” regimes, cockle resources tended to show signs of overexploitation, compared to “*custodias*” managed mangrove areas.⁸ These results suggest the new legislation promoting community-based management has been influential in protecting mangrove loss from shrimp pond development as well as more sustainable management of the associated cockle fishery.
- Cockle harvester income increased 19 percent in one location studied.⁹
- In Muisne, shrimp pond development led to a loss of 83 percent of the mangroves¹⁰—despite the area having been declared an estuarine wildlife refuge in 2003.

Key Challenges

- An estimated 28 percent^{11, 12} to 40 percent¹³ of Ecuador's mangroves have been lost with more than a quarter due to conversion to shrimp farming.
- While the establishment of “*custodias*” has contributed to slowing mangrove conversion to shrimp ponds, as of 2013, only 48 percent of those “*custodias*” established were still in force.¹¹ This number has continued to decline as of 2017.²
- The loss of mangrove was especially difficult for women who relied on cockle harvesting for their main source of income. Men had other economic opportunities, including in mangrove cutting for lumber and other uses prior to shrimp pond development. The loss of mangroves resulted in loss of these jobs as well, however. Men still have more alternatives than women—e.g., in income-generating livelihoods such as fishing, occasional labor on the shrimp farms, construction, etc.
- In Muisne, as opportunities dried up for men, they started to enter the cockle fishery along with women and could exploit areas traditionally harvested by women, putting additional pressure on the resources near settlement areas. Men also could work longer hours than women, who have childcare and household work burdens. Also, men can harvest areas further away, i.e., areas inaccessible to women.¹⁴ As access rights were granted through the “*custodias*” agreements, conflicts arose over access as non-members of the associations with the use rights were excluded from harvesting. In other cases, such as in Muisne, rights holders were reluctant to exclude non-association members from the community or relatives visiting from other areas for socio-cultural reasons.

Key Takeaways for Practitioners

Mangroves can be adequately protected from key threats (especially from the threat of conversion for shrimp farming) when national enabling conditions provide local communities and artisanal fishers, including men and women cockle harvesters, with delegated authority as the key stewards of the mangroves and associated resources that include exclusive rights for harvesting. Non-rights-based national laws and regulations meant to prevent mangrove conversion to shrimp ponds—such as a ban on cutting mangroves and the designation of Muisne as a wildlife refuge—failed to stop conversion of mangroves to shrimp ponds. Implementation of the “*custodias*” policies provided greater protection of mangroves and associated fisherfolk livelihoods where they were applied. Lack of universal application of this approach and a subsequent decline, as opposed to an increase in use after the first decade, means that it is not sufficient to fully protect mangroves. The “*custodias*” also do not necessarily protect women cockle harvesters specifically as both men and women harvest cockles in most areas. However, in the municipality of Muisne, in Bunche village, there is the association of shellfish harvesting women called “Asociacion de Mujeres Recolectoras de Concha Virgen del Carmen”, which has its own statutes and exclusive shellfish harvesting rights.¹⁶

When use rights are established, this can create conflicts for those excluded from harvesting in areas provided as concessions to associations and where only association members can legally harvest. However, as mentioned in the case of Muisne, exercising exclusive rights and excluding other community members and relatives can be difficult—for socio-cultural reasons and to avoid conflicts. At the same time, exclusion areas can create more harvesting pressure by pushing non-concession holders into areas not covered by concessions—i.e., areas that remain open access. In some cases, this can lead to enforcement problems as non-association/concession owners look for places to harvest or do not agree with use rights granted.

Address gender dimensions and equity and access in a mixed gender fishery as the benefits to existing women harvesters can be dissipated with extensive entry of men into the fishery. The case of Muisne demonstrates disproportionate impacts for women in what was once a female-dominated fishery and a main source of livelihood for women, after men with limited and declining livelihood opportunities increasingly entered the fishery as a supplementary livelihood.

Area management agreements delegating exclusive harvest rights to fisheries groups while mandating mangrove conservation and requiring these groups to partner with committed technical assistance organizations contributed to their success in protecting mangroves and in improved sustainable harvesting practices for cockle gatherers.²

5.3 Brazil: Venus Clam Co-management in Northeastern States

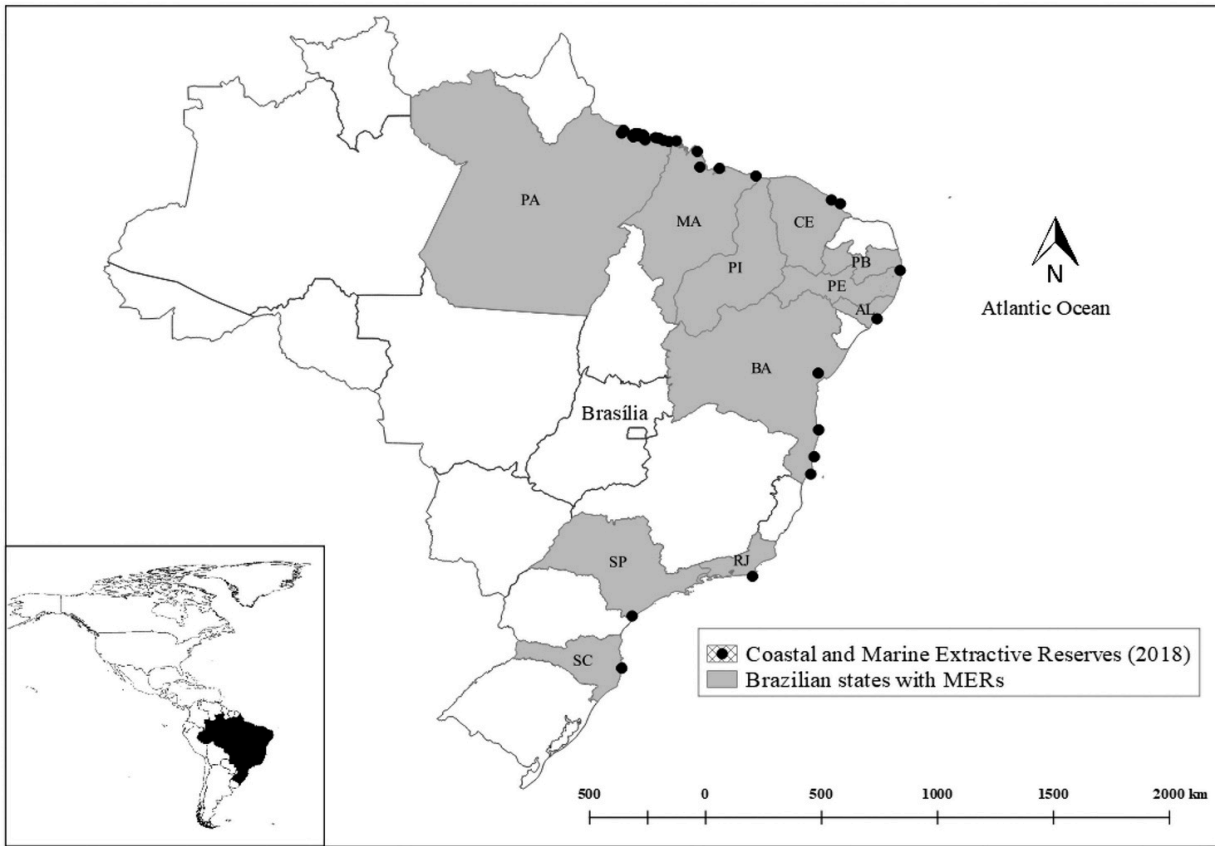


Figure 10: The location of Federal Marine Extractive Reserves (MERs) along the Brazilian coastal zone (n=28), showing that 11 out of the 17 coastal sites have at least one in their territory. Brasília, the national capital, is the home of the ICMBio headquarters, the Federal agency in charge of MERs (Source: Prado et al., 2020).¹

Brazil has a national system of protected areas which includes a category called Marine Extractive Reserves (MERs) (Federal law No. 9.985/2000). The MER establishment process is viewed as a co-management framework usually initiated by communities and working with nongovernmental organizations and government agencies to balance sustainable use and conservation objectives. These reserves are managed by a deliberative council made up of representatives of public bodies, civil society organizations, and traditional populations living in the area. The council approves MER management plans. Within these systems, artisanal fishers who are traditional resource users can obtain **use rights concessions** for the harvesting of marine resources. As of 2018, there were 28 MERs that encompass over one million hectares of coastal areas (Figure 10) and are mainly concentrated in the northern coastal states of Brazil.¹ More recent estimates place the number at 96 MERs.⁸

The venus clam (*Anomalocardia brasiliiana*, also known as *A. flexuosa*) is one of the prominent artisanal fisheries in these systems and is harvested by both men and women, using a variety of methods. This is in addition to other shellfish, molluscs and finfish. The

venus clam is used for subsistence and for income generation. While there are no good estimates of the overall volume of harvests of this species, there are approximately 50,000 people dependent on this fishery in the Northeastern region of the country² with an estimated 60 to 88 percent considering it their principal livelihood³ (Figure 11). In one community inside the Acau-Goiana MER, total annual catch of the venus clam was estimated at 5,430 metric tons.⁴

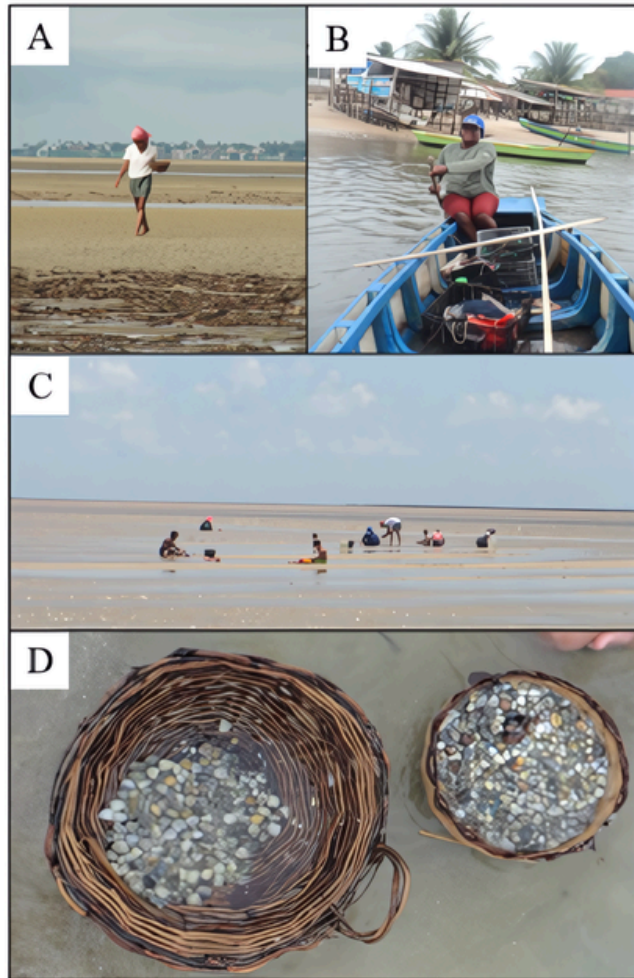


Figure 11: Shellfishers moving to the sand bank on foot (A) and with boat (B). Place for collecting shellfish exposed by the water column (C). Basket used for carrying the collected shellfish (D) (Source: da Silva Mourão et al., 2021).⁴

This case focuses on the development of co-management arrangements in four areas of the Northeast, where there are an estimated 1,300 women and 680 men involved in the fishery² in four states (Rio Grande do Norte, Pernambuco, Bahia, and Paraíba) and five protected areas covering 1,646 km of coastline (Figure 12). The Canadian International Development Agency (CIDA) supported this effort through the People of the Tides (POT) project from 2008 to 2011. The project promoted capacity building and institutional linkages to improve the quality of life of communities dependent on mollusc harvesting.²

In this project, women also demanded the project address occupational health and safety issues and improvements in the value chain. The planning process was highly participatory. Women also participated in harvest monitoring and had substantial representation on the co-management committees established.

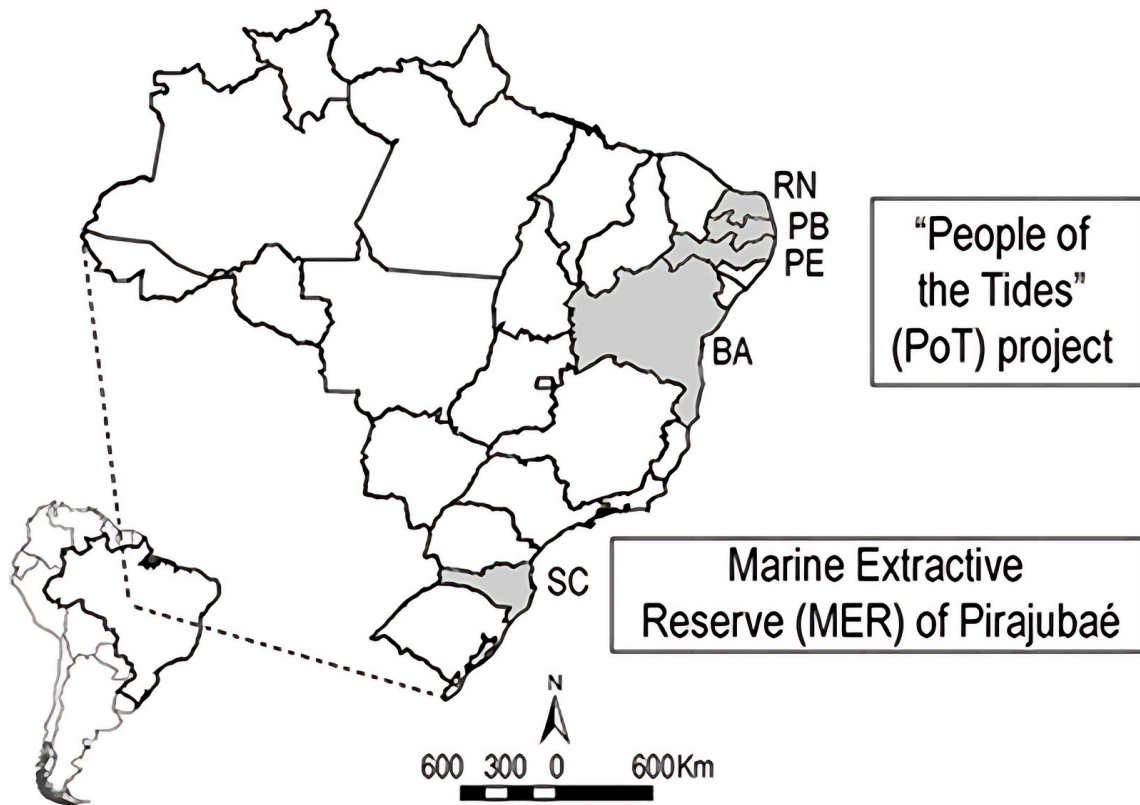


Figure 12: Location of Brazil’s two experiences in co-management of venus clam (*Anomalocardia brasiliana*): People of the Tides (POT) project, in the states of Rio Grande do Norte (RN), Pernambuco (PE), Bahia (BA) and Paraíba (PB), and the Marine Extractive Reserve (MER) of Pirajubaé, in the state of Santa Catarina (SC) (Source: Rocha and Pinkerton, 2015).²

Key Management Measures

For example, under the Acau-Goiana MER fishing agreement in Paraíba and Pernambuco states:⁴

- Venus clam harvest limited to local families only
- Harvest allowed only during low tide
- A minimum harvest size of 15 millimeters
- A quota of 300 kilograms per day per family nucleus
- Occasional users allowed to collect 25 kilograms per day per family nucleus
- Only a handle rake and dipnet (12-millimeter mesh size) allowed for harvesting

Pre-existing Enabling Conditions

- Pre-existing conservation objectives and defined boundaries: The Atlantic Forest Biosphere Reserve recognized by the [United Nations Educational, Scientific and Cultural Organization/Man and the Biosphere Programme \(UNESCO/MAB\)](#) in 1993 and completed in 2008 is the largest such reserve in the world. It spans 15 states and 3,000 kilometers parallel to the coast of Brazil, covering 29,473,484 hectares, including 16,149,934 hectares of sea.
- Legal frameworks: The Brazilian Constitution guarantees traditional fishing communities the right to fish for subsistence. Legislation allows for the creation of bottom-up MERs as requested by communities. A dedicated Ministry of Fisheries and Aquaculture was created in 2009. A Fisheries and Aquaculture Law was established and a National Plan on the Sustainable Development of Fisheries and Aquaculture (Law #11,959/2009).⁵
- The Bolsa Verde Green Grant Program (Law No12,512) was implemented from 2011-2018 under the Brazil Without Extreme Poverty Plan, based on a finding that existing policies did not offer financial incentives necessary to ensure environmental conservation, especially for the extremely poor. Bolsa Verde was a cash transfer program with environmental conditionalities administered by the Ministry of Environment to promote environmental conservation through productive inclusion and to raise income to improve the lives of families in extreme poverty.^{9,10} Bolsa Verde supported many families in the Northern states: Pará (59%), Amazonas (11%), Acre (3%) and in the Northeast (16%), with Bahia (9%) and Maranhão (3%). Beneficiaries received R\$300 (~US\$58) every quarter to develop activities for the sustainable use of natural resources in priority areas for environmental conservation—activities related to extractive reserves, national forests, federal sustainable development reserves, and environmentally-differentiated agrarian reform settlements. In the Acau community and MER in Paraíba state, only shellfish harvesters were qualified to receive this aid.³

Key Outcomes

- Recognition of women's role in the clam fishery increased. Clam fisherwomen began to identify themselves as professional fishers rather than housewives as the negative social stigma associated with clam harvesting was reduced and the project facilitated a positive national public profile for women clam fishers.⁵ The capacity of existing stakeholders improved. The women became effective national level advocates for women clam harvesters.
- Women's groups gained official recognition as professional fishers.
- Labs produced seeds for use in reseeded overexploited areas.
- Two states created networks of fisher families and women shellfishers.
- Exchanges effectively facilitated peer-to-peer learning and knowledge transfer.

Key Challenges

- Not all MERs have proven successful. One study estimated very few meet the high standards on environmental, socio-economic and governance dimensions, and few have the required management plan.⁴ Another report concluded that 51 percent of Brazilian protected areas are effective and 36 percent are only moderately effective² due to lack of government resources to support them.
- While the MERs provide for exclusive access rights in the POT project areas, access control and regulations were not always enforced.
- POT invested in capacity building of harvesters, but it was considered insufficient.
- Local elites, who are often not fishers or do not represent the interests of women, control fisherfolk associations. POT focused on fisherfolk organizations with strong women leadership to counteract elite capture.
- Lack of commitment and political will by local government and low capacity of national government institutions hampered successful promotion of co-management approaches.
- Barriers to co-management in POT included bureaucratic inertia, lack of continuity or duration of outside support, poor shellfisher organization, and limited ability of government to support implementation.²
- Although women do most of the shellfish collecting, in 2015, shellfishers in the Acau-Goiana MER in Pariba and Pernambuco states reported that men were becoming increasingly involved due to the introduction of gear (a large dipnet attached to a rake) used mainly by men because it requires more physical strength. One factor that may mitigate the entry of some men is that those who identify as lobster fishers are eligible for unemployment insurance during the lobster closure but lose eligibility if they engage in other economic activities during this period.³
- In the case of the MER of Corumbau, Bahia State, there was a need to better consider

the different needs of women and men in the management of the reserve and to consider issues of gender equity as well. Women tended to participate less in meetings due to household duties.⁶

Key Takeaways for Practitioners

National laws and regulations can provide the enabling conditions for exclusive rights being delegated to communities (e.g., MERs) but are not sufficient for success if management plans are not established and the government does not provide sufficient support to local communities for management of these plans.

Significant time and resource investments in capacity building and leadership of resource users are needed for success.

Government plays an important role and needs capacity development. While capacity development of fisherfolks and their associations is essential, the same is needed to build government support and the capability to implement co-management.

Outside projects must focus on local needs and often must consider more than just harvest control measures, necessitating integrated approaches for improved success.

Where both men and women participate in the harvesting and other aspects of the value chain, careful gender analysis is needed to ensure equitable rights and benefits for both the traditional male and female users. Men and women can use different harvesting methods and have different levels of dependency on the fishery and perceptions on how they should be managed, requiring consensus building on rules and regulations that are fair and equitable across genders.

Economic safety net and insurance programs can be linked to environmental conservation and sustainable fisheries management to achieve synergies towards both economic and environmental objectives for resource-dependent, vulnerable communities.

Integrating adjacent landscape food and provisioning systems in plans to maintain ecosystem services that coastal communities and fishers receive from mangroves can be important for the success of such plans. A study in a MER in the Curuçá region on the Amazon coast in Pará state, northern Brazil, found that: "Adjacent coastal upland habitats such as forests and croplands are important to support many provisioning ecosystem services to coastal villagers that would otherwise be obtained from mangroves, suggesting that protecting these connected habitats and supporting small-scale agriculture may help to avoid deforestation of mangrove forests." The findings may be relevant for the 80 percent of mangroves in Brazil managed as extractive reserves, including in the northeastern MERS highlighted here that support communities with socio-economic characteristics similar to the Curuçá MER.⁷

5.4 Kenya: Kwale County Women-Led Mangrove Conservation and Mariculture



In 2013, the Mikoko Pamoja project in Gazi Bay in Kenya’s Kwale County became the first-ever blue carbon initiative in the world to successfully sell carbon credits from mangrove conservation activities for community development.¹ (See map Figure 13). During the 20 years from 2013 to 2033, the project seeks to protect 107 hectares of natural mangrove forests and conserve 10 hectares of red mangrove plantation that were established in denuded areas in the early 1990s. This represents almost 16 percent of the ecosystem in the Gazi Bay.² **Community rights** and responsibilities in management of and benefit-sharing from these 117 hectares of state-owned mangrove forest are defined in a co-management agreement signed by the Kenya Forest Service (KFS) with Mikoko Pamoja through the Gogoni Gazi Community Forests Association.¹ According to a United Nations Development Program Equator Initiative Case Study of the project, Mikoko Pamoja is managed jointly by the Mikoko Pamoja Community Organization (MPCO), a government-registered community organization that coordinates community engagement, routine project activities, and benefit sharing to the 5,400 community member beneficiaries, the Mikoko Pamoja Steering Group (MPSG), and the project coordinator. The MPCO is governed by 13 elected volunteer office members—seven men and six women—from Gazi and Makongeni. Mikoko Pamoja is validated by Plan Vivo, an internationally recognized certification body, to sell at least 3,000 metric tons of CO₂-equivalent per year on the Voluntary Carbon Market through Plan Vivo Certificates. The financial benefits are transferred to Mikoko Pamoja. Use of the profits are decided through an inclusive democratic process of village “*barazas*” that all community members are mobilized to attend.¹ Mikoko Pamoja is based on two decades of community engagement and research with more than eight partners.¹ Over this time, there

have been ongoing efforts to support mangrove conservation through ecotourism initiatives such as the Gazi Women Mangrove Boardwalk established in 2006 with 200 women members^{3,4} alternative woodlots, and mariculture livelihoods for women and men.

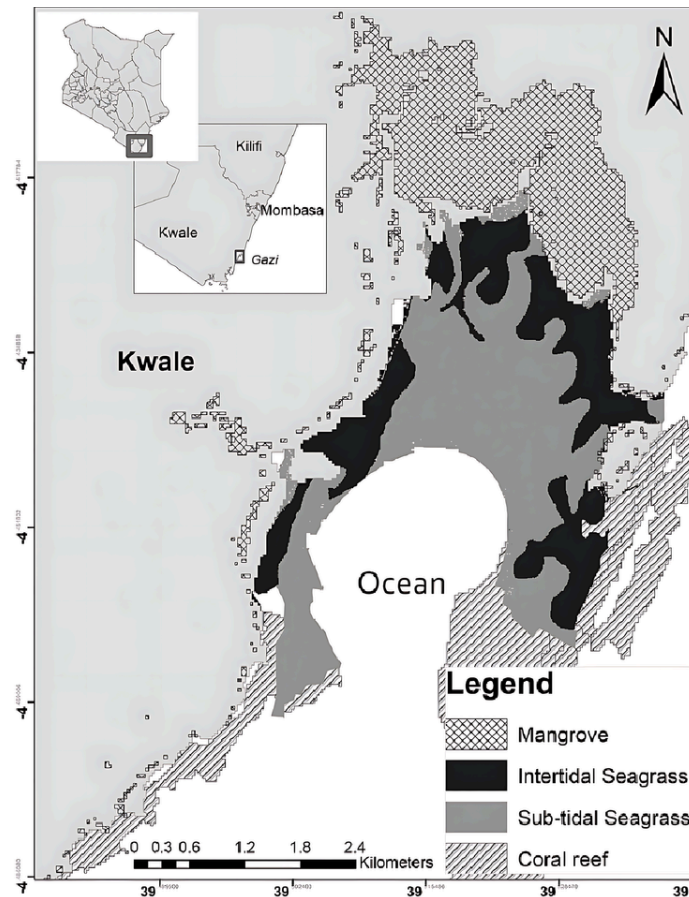


Figure 13: Map of Gazi Bay (Source: Survey of Kenya Map sheet 201/3).¹⁴

The health of Gazi Bay’s and Kwale County’s mangrove ecosystems is threatened. Mikoko Pamoja was a response to Gazi Bay losing about 20 percent of the mangrove forests to timber harvesting as of 2010.⁵ In 2017, the Government of Kenya reported that 45 percent of the mangrove area in Kwale County required rehabilitation.⁶ In the county, mangrove health is strongly linked to the health of fish stocks and fisheries livelihoods. Gazi Bay hosts one of the major fish landing sites in Kenya and coastal East Africa. Crustaceans and molluscs are also caught.¹ This includes women’s shellfisheries—although women shellfishers are not the focus of the co-management model of the Mikoko Pamoja project case presented here that is meant to highlight the innovative example of carbon credits for community-led mangrove conservation. A recent study⁷ found that while the mollusc fishery in Kenya has traditionally been conducted by both women and men, for women shellfishers, it is more frequently their primary livelihood. Representing one of the few remaining economic options to sustain livelihoods and contribute to food provisioning in their

households, women were found to be joining the fishery more than men, particularly during lean seasons. Income from mollusc fishing was found to be inconsistent and modest, and a higher proportion of women than men who are engaged in mollusc fishing live below the extreme poverty line of US \$2.15 a day. The study concludes that declining mollusc populations may exacerbate existing gender inequalities and recommends reducing income dependence on mollusc fishing and diversifying livelihoods for women and men.

In addition to carbon credits from mangrove conservation, community-led, women-led mariculture initiatives were developed to reduce pressure on mangroves and fisheries, while empowering women and improving their livelihood opportunities in Kwale County (Figure 14). Milkfish farming is practiced in intertidal mangrove flats which are government lands. The KFS delegates user rights in intertidal mangrove flats for aquaculture as a strategy to improve mangrove management while developing the aquaculture sector.²⁹ Following an environmental assessment, five mariculture ponds of 1,200 meters square were constructed at the Makongeni Fish Farm in Makongeni village between 2013 and 2016. Each holds up to 3,600 milkfish fingerlings. The ponds are stocked with wild milkfish fingerlings from the mangrove channels. Farmers, including the Baraka Women Conservation Group, received training on how to formulate feed locally with fishmeal (and more recently blood meal as an alternative protein source), maize bran, and cassava flour.^{8,9} The women also raise mangrove seedlings that they plant and sell. Some coastal communities involved in mangrove restoration activities supported by the KFS in Kwale County have also increasingly engaged in seaweed farming since it was first developed by the Kenya Marine Fisheries Research Institute (KMFRI) in the early 2000s. Around 90 percent of seaweed farmers in Kwale County are women, with up to 70 percent sometimes assisted by their husbands.¹⁰ The Kibuyuni Seaweed-Self-Help Group in Shimoni grew from 113 to 240 members from 2010 to 2023. They farm six blocks, each with a capacity of 300 seaweed planting ropes, growing two species, *spinosum* and *cottoni*, that are harvested in about 30-45 days.¹¹ Mwazaro Beach Management Unit Self-Help Group, in a neighboring village has 168 members and learned from the Kibuyuni group.

Pre-existing Enabling Conditions

- Pre-existing conservation objectives and defined boundaries: the Diani-Chale Marine Reserve includes part of the Gazi-Bay mangrove ecosystem, but it is the only National Marine Reserve in Kenya that is not operational.¹⁵
- Legal frameworks: The national constitution in Kenya (2010) requires that 30 percent of all party positions and public appointments must be held by women. The Kenya Forest Act of 2005 and the Kenya Forest Conservation and Management Act of 2016 established a framework for community participation in forest conservation through Community Forest Associations (CFAs) authorized to sign management agreements with KFS that give CFAs rights and responsibilities in the management of and benefit-sharing from forests under a management plan.¹⁶ The Mikoko Pamoja Community Organization is one of 11 user groups under the Gogoni Gazi Community Forests Association.¹ In 2018, a national ban on cutting mangroves was established. The National Mangrove Ecosystem Management Plan of 2017-2027 was both informed by and further enabled rights-based mangrove co-management.⁶



Figure 14: Gazi Bay woman participating in mangrove forest monitoring (left).¹² Kibuyuni Seaweed Group members with seaweed ropes (bottom) (Source: FAO/A. Menezes). Baraka Women's Conservation Group members inspect their fish ponds (right).¹³

Key Outcomes

- Mikoko Pamoja has issued 20,095 Plan Vivo Certificates between 2013-2023, representing abatement of 20,095 tons of carbon dioxide. The revenue generated totals US \$183,007 and has enabled mangrove restoration, equal employment opportunities for local people, the construction of schools and hospitals, and facilitated clean water access for over 7000 community members in Gazi and Makongeni villages.¹⁷ Dr. Kairo, project developer and chief scientist at KMFRI, called the Mikoko Pamoja project a 'triple win' for climate, community, and biodiversity.¹⁸
- Women's empowerment and livelihood opportunities.
 - Women mariculture groups in Makongeni have been (and continue) changing taboos on women's involvement in fisheries and aquaculture for a living. They generate revenue from the sale of milkfish, milkfish fingerlings, and mangrove seedlings. Women are able to engage in these nearshore activities without the risks

of going to sea and remain close to their household responsibilities, while men fish in intertidal areas away from the mangroves.⁸

- Seaweed farming has significantly improved the lives of coastal women in southern Kwale County by providing consistent income from this activity with a one- to two-month harvest cycle throughout the year. Over 80 percent of household earnings in Kenyan rural coastal communities was consistently provided by seaweed farming compared to marine fishing, reducing women's dependence on income from men's fishing activities.¹⁰ In Kibuyuni Village, annual income from seaweed farming increased from US \$2,000 in 2012 to over US \$11,000.¹¹ While the impact of seaweed farming on fishing effort, abundance, and habitat is mixed^{20,21}, in 2023, the governor of Kwale County noted that the daily presence of seaweed farmers at sea has helped in reducing illegal fishing activities.²²
- Scaling. Based on the success of Mikoko Pumoja, carbon credit initiatives for mangrove conservation are preparing to expand the area covered in Gazi Bay. It is also being replicated in other parts of Kwale County through the Vanga Blue Forest project in Vanga Bay, among other initiatives.²³ Seaweed farming has also been scaled to reach more communities since its introduction. The Mwazaro Beach Management Unit Self-Help Group, whose members learned from the neighboring Kibuyuni group, is one example.¹¹
- This case adds to the evidence base that inclusive, mangrove management will reduce threats and improve (or prevent degradation of) mangrove habitat, and that stakeholder empowerment (mangrove users) improves mangrove health—hypotheses that the Women Shellfishers and Food Security project also aims to inform.

Key Challenges

- Some illegal cutting of mangroves for construction poles continues in the Mikoko Pamoja area. Mangrove deforestation in some sections of the bay led to severe coastal erosion, washing coconut palms in adjacent agricultural fields out to sea. Flooding of inland areas during storms has also increased.¹ Increased sedimentation from the Mkurumudzi River and eroded sand from mangrove deforestation that has moved up-current have negatively impacted healthy mangroves.
- New carbon projects and existing project expansion halted in Kenya in 2023, while the Government decided on the policy for a percentage of project income to be claimed by government.¹⁷ The government has since released the Kenyan Climate Change Act Amendment in September 2023²⁷ and Climate Change Carbon Markets Regulations in May 2024. The amended law mandates creation of a national registry, which may reduce the high transaction costs in the carbon credit market. The law also specifies that 40 percent of earnings from annual carbon trading on land-based projects and 25 percent from non-land-based projects must go to local communities.²⁸

- Milkfish aquaculture has experienced predation by birds, theft of fish by other community members, a lack of fingerlings, conflicts in groups, and a high dependence on technical support.
- Seaweed farming experienced a lack of availability of scientific data about best practices that was improved through collaboration with KMFRI and an exchange visit to Zanzibar. Postharvest infrastructure, such as drying racks, storage, and value-added processing space, was lacking. Farmers also experienced limited technical and financial support, poor marketing of seaweed, and reliance on one irregular buyer. These factors were partially mitigated by farmers adding value to some of the seaweeds through the manufacture and retail sale of soap, shampoo, baking ingredients, etc.
- If the unequal distribution of domestic labor is not addressed, promoting women's involvement in seaweed farming could add to women's workload and compromise more complete empowerment.¹⁰ The National Environment Management Authority requested public comment on an oyster mariculture project by a private company along the continental shelf of Gazi Bay—a project that would require seaweed farm relocation of at least one women's group.¹⁹

Key Takeaways for Practitioners

“Good science, community buy-in, and government support have been identified as building blocks of the Mikoko Pamoja project that could be replicated in other mangrove areas in Africa and Latin America.”¹

Implementing community-led sustainable natural resource management actions prior to official approval of co-management plans can be strategic. A study of the implementation of Kenya's participatory and rights-based forestry laws at the community level found that, in some cases, forestry officers permitted community-based forest activities before formal approval of a CFA management plan. Such actions were strategically designed to encourage community engagement in forest protection, filling the gap left by the lack of KFS rangers and helping to capture donor funding opportunities.¹⁶

Direct benefits for a critical mass of community members incentivizes conservation. For example, Mikoko Pamoja funded the purchase of learning materials and sports uniforms for 700 children, and over 70 percent of the Gazi Bay community is benefitting from clean water as a result of investments from the sale of carbon credits.¹

Equitable benefit sharing is critical for incentivizing co-management. While the Mikoko Pamoja case illustrates a successful process, the new 2023/2024 law and regulatory requirements that institutionalize benefit sharing in co-management plans between CFAs and the KFS for earnings from carbon trading are an important step.²⁴

Sources of income for mangrove conservation other than the voluntary carbon market should be identified. While the voluntary carbon market is more flexible for smaller scale initiatives, it is less dependable than the compliance market. Also, Mikoko Pamoja’s accreditation period is temporary (20 years, with only 10 years left). Finally, carbon trading should only be a temporary measure if international targets for reducing carbon emissions are achieved. Sources such as blue bonds insurance companies interested in disaster risk reduction could be an option.^{1,25}

Socio-economically vulnerable actors (women) within economically vulnerable communities can participate in and lead natural resource co-management if priority needs and livelihood diversification options are integrated into co-management initiatives. Kwale county has a poverty gap (which shows the depth and incidence of poverty) of 41.8 percent, compared to a national average of 12.2 percent according to the Kenya National Bureau of Statistics. 26 Investments in education and clean water; revenue streams from ecotourism, food kiosks and crafts; sales of carbon credits, mangrove seedlings, milkfish and milkfish fingerlings, seaweed, seaweed seeds, and the retail sales of processed seaweed soaps and foods—among other activities—all contributed to supporting women and men in Kwale county to implement the mangrove conservation measures in co-management plans.

Women appreciate the support they receive from men in women-dominated livelihoods but want to retain the leadership role they have in the sector. This was the perception of women seaweed farmers in Kwale county.¹⁰

External partnerships, funding, technical assistance, and government support over more than two decades has contributed significantly to positive sustained outcomes. This includes outcomes from KFS and KMFRI, and a World Bank-funded Kenya Marine Fisheries and Socio-Economic Development project, among others.

5.5 Tunisia: Gulf of Gabes Clam Fishery

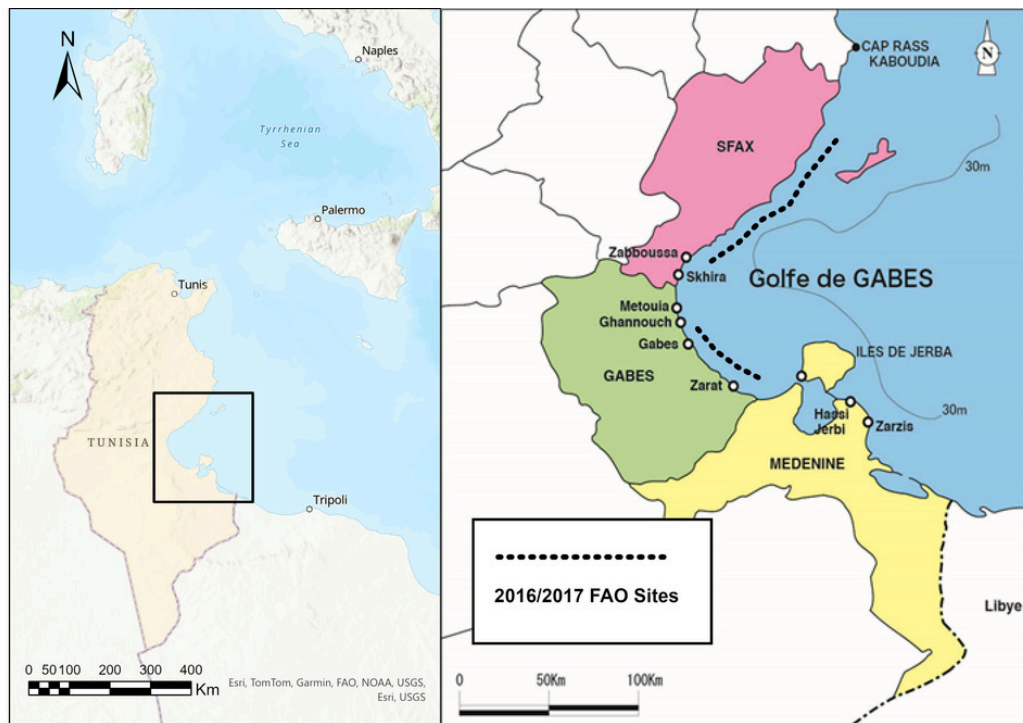


Figure 16: Map of Tunisia³ (left), the Gulf of Gabes (right).³

In 1994, the Government of Tunisia instituted a top-down national fisheries law-driven management framework for the Gulf of Gabes clam fishery that is dominated by women gleaners.^{1,2} The framework employed evidence-based decision-making following international technical standards for sustainable fisheries management and resulted in an annual closed season and licensing of harvesters. The Gulf of Gabes grooved carpet shell clam fishery (*Ruditapes* or *Venerupis decussata*) provides 98 percent of Tunisia's clam production in this export-oriented fishery that serves the European market (see map Figure 15). The management framework was largely in response to the newly formed European Union (EU) market requirements. Morocco and Tunisia are the only two African countries authorized to export fresh or processed bivalves to the EU. Women harvesters number more than 4,000 in about 50 sites. Direct hand-gathering of shellfish is conducted in intertidal areas mainly by rural women living a marginalized existence (Figure 16). Women harvesters do not dominate the post-harvest nodes of the value chain. Due to cultural norms, only men can trade in shellfish and seafood.

Clam development and harvesting groups (GDP) were set up in 17 production areas starting around 2004 and onwards.^{5,2} The GDP are responsible for the management of the fishery, distributing licenses, and assisting the General Directorate of Veterinary Services with the control of water quality (sanitary measures) with the support of accredited laboratories. It is mandatory to procure clams exclusively from representatives of the harvesting groups that

provide product from a safe area, and certified depuration and dispatch centers.² GDPs were intended to be community-driven, but no women participated in the GDPs. A Tunisia/FAO technical cooperation project provided training in proper clam digging and handling techniques and assistance to empower women and improve working conditions. Around 2011, consultation with women harvesters, the formation of a women’s harvester association, and a peer-to-peer study tour to Morocco where Tunisian women learned group leadership skills from Moroccan women shellfishers started changing women’s engagement to be part of the GDPs.⁶ In 2015, a Marine Stewardship Council (MSC) environmental sustainability assessment of the Tunisian clam fishery in the Sfax production area considered it to be moderately exploited and provided a favorable rating for the potential of the fishery to meet MSC standards, while also concluding that certification would be relatively ambitious considering the shellfish harvester’s precarious situation². A project supported by FAO in 2016 and 2017⁷ aimed to empower women clam harvesters in the post-harvest value chain, increase and secure financial benefits at their level, and incentivize sustainable harvesting focused on two of the 17 harvesting areas, one each in Sfax and Gabes (Figure 14). The support resulted in a 2017 fair trade agreement between: the Association of Continuity of Generations, representing the Tunisian Association of Women Clam Collectors and Development; the Prince Export Centre for Clams, a depuration and export establishment; and the Italian importer Pesca Pronta. A fixed price set in advance guaranteed the predictability of payments and receivables for the women harvesters and the importer throughout the harvest season. Mandatory cash payments were paid by on-site purchasers (representatives of the depuration center) to the women harvesters. A premium fee, to be received by the women harvesters, would reward them for only taking larger-sized clams.⁷ The project also supported women clam harvesters with health caravans and capacity strengthening on financial and administrative management, women’s and workers’ rights, and supplementary livelihoods such as making and marketing fishing nets, embroidery and crafts. However, the clam fishery and the fair-trade agreement were not sustained in the following years.



Figure 17: Grooved carpet shell clam (*Ruditapes* or *Venerupis decussata*) (left). Women harvesting clams (right).⁴

Key Management Measures

- An annual 4.5 to 6 month closed season (since 1994)
- Individual harvesters licensed
- A minimum harvest size of 3.5 centimeters diameter²
- A ban on the use of any fishing gear other than the sickle (shown in Figure 16)
- Clam harvesting was suspended for three years. By order of the Minister of Agriculture, Water Resources, and Fisheries No. 3500 dated November 16, 2020, the clam harvesting seasons 2020–2021, 2021–2022, and 2022–2023 were suspended based on the environmental and biological data available.⁸

Pre-existing Enabling Conditions

- Some pre-existing conservation objectives and defined boundaries: There are nine Ramsar sites in the Gulf of Gabes, covering a total of 122,779 hectares. One of these, the Kneiss Islands, covering 22,027 hectares, is being established as a marine protected area.⁹
- Legal frameworks: The Ministry of Agriculture and Hydraulic Resources Law No. 94-13 of January 31, 1994 set the period authorized for the collection of clams, and an order issued on September 20, 1994 implemented it. Tunisia achieved EU marketing requirements accreditation and was registered on the list of countries allowed to export to the EU in 1998. Law 2009-49 of 20 July 2009 on Marine and Coastal Protected Areas and implementing decrees created conservation areas. The Constitution of 2014 and the laws of the Republic of Tunisia ensure basic services, just and equitable revenue for work, social security, health insurance, and retirement pensions, and the right of expression and membership in civil society organizations.¹⁰
- Tunisia’s strong investment in veterinary science in higher education may be a factor that enabled the country to establish, operate, and sustain the sanitary systems needed to meet the standards for export of shellfish to the EU.

Key Outcomes

- Due to the Tunisian women clam harvesters' privileged access to the high-value EU market under the Pesca Pronta fair trade agreement, the price of one kilogram of clams immediately rose from 8 TND (US \$3.30) to 18 TND (US \$7.60) for the entire collection season.¹¹ Buyers not in the agreement started proposing even higher prices to compete. Development of the agreement also facilitated the following results:
 - A transparency provision was mainstreamed in the 2016/2017 ministerial circular for the first time in the history of these institutional circulars published each season in the country. This is especially true for the traceability of the product from the landing, weighing, and purchase of clams, to the delivery to the clam exporters¹¹ (Figure 17).



Figure 18: Example of traceability documentation of Gulf of Gabes clams.⁴

- A label was developed (although not currently implemented) for these Tunisian clams to inform consumers of production practices relating to sustainability, gender inclusion, and quality of the products.⁷
- Clam production dropped 95 percent from 1,825 tons in 2015/16 to 84 tons in 2019/2020 in the three main harvesting areas.⁸ As a result, the Ministry of Fisheries suspended clam harvesting for three years. This was in spite of the top-down efforts of the government in evidence-based management since 1994, greater community participation through GDPs starting in 2004-2011, and more recent efforts to secure gender equity/harvester equity during the 2011-2018 period.¹¹
- Evidence on the biodiversity impacts of shellfishing is mixed. The 2015 MSC assessment relied on a 2008 study that stated: “The study of the Kneiss management plan explored all potential impacts on the ecosystem within that area and none were given to shellfish pickers’ activity.¹²” A later study¹³ concluded: “This study on the Gulf of Gabès intertidal zone shows that grooved carpet shell clam harvesting leads to a decrease of the target species population, as well as a reduction of the taxonomic

richness and abundance of the surrounding macrofauna...that...plays a crucial role in the food web. Therefore, high anthropogenic harvesting pressure could have consequences on the availability of benthic preys... Intensive clam harvesting and human trampling (more than 400 fishers per day on a limited area over the eight months of the authorized harvesting period).”

Key Challenges

- Limited empowerment of women resource users:
 - Illiteracy, lack of any form of guidance or training, and traditional gender roles were key factors in the exclusion of women from GDPs.^{5,14}
 - A value chain that is not vertically integrated by women harvesters led to non-harvester intermediaries, who were always men and sometimes family members, making large profits compared to vulnerable women harvesters. Even after the three-year closure, such intermediaries facilitated illegal harvesting for pay.¹
 - The 2017 fair trade agreement also faced challenges of dependency on transporters, but eventually broke down when the relationship between the associations representing women clam harvesters and the export/deputation center failed.
- Overexploitation of the clam fishery occurred due to a significant and sustained increase in fishing effort and illegal fishing activities outside the fishing season in the absence of control and monitoring measures since the revolution in 2011 and the instability of the country during this period.
- Habitat degradation:
 - Illegal fishing and unregulated “kiss” trawling nearshore has increased, while traditional artisanal fishing that preserved marine biodiversity is disappearing.¹⁵
 - Pollution by hydrocarbon, chemical, and plastics industries threatens habitat and shellfishery health.⁸
 - Climate change impacts of seawater temperature rise and acidification threaten shellfishery health.

Key Takeaways for Practitioners

A robust, top-down regulatory framework and evidence-based decision-making is likely not sufficient to incentivize the behavior change needed throughout the value chain for sustainable management of small- scale shellfisheries dominated by vulnerable women harvesters, especially when non-harvesters control and do not equitably share benefits from processing and marketing to high-value, export-oriented markets. The Tunisia clam fishery illustrates the case of a technically designed management regime that followed relatively sound and widely accepted good practices but was slow to recognize the need

to invest in an equally sound governance regime with inclusive, participatory, rights-based, benefit-sharing practices.

A fair trade/price equity agreement between vulnerable women clam harvesters, exporters, and an importer firm in the high-end foreign market demonstrated an initially successful approach for securing equitable benefit-sharing for women harvesters and incentivizing sustainable harvest practices and traceability in an export-oriented value chain that is highly specialized. Such approaches could be adapted and piloted in other contexts, noting the strong need for capacity development and empowerment of women harvester associations over time and the importance of understanding power relationships among stakeholders in the value chain.

Initiatives to address the current situation of grooved carpet shell clam overexploitation should continue to highlight solutions that invest in local organizations that can provide inclusive governance to facilitate sustainable management and equitable benefits rather than framing solutions as purely technical in nature. Initiatives suggested in recent literature include: develop a management plan for the grooved carpet shell clam and new species, such as razor clams; create grow-out facilities licensed to the female harvesters for undersized clams and razor clams; take actions to address pollution and invasive species including the blue crab; promote alternative/supplemental livelihoods, such as in agriculture and livestock and making traps for blue crabs; issue drivers licenses for the women harvesters; and develop sustainable ecotourism.⁸

6. FINDINGS AND DISCUSSION

6.1 General Findings



Empowered women shellfishers: Well-documented cases of rights-based, women-led shellfisheries co-management—beyond brief mentions in other reports and media—are difficult to find. Even where such cases and mentions exist, the governance documents and managements plans in effect are rarely accessible online.

Associated mangrove management: Some cases were found on the contribution of women shellfishers to mangrove and estuarine ecosystem stewardship, or mangrove management in places where shellfisheries are also active.

Carbon markets based on mangrove conservation in places where shellfisheries are also active: This is an emerging area, especially related to equitable benefit-sharing to the community level and to women.

Integrated landscape food systems with women-led shellfisheries co-management and mangrove management: The project team did not identify cases that demonstrated this integration. The site-based research on such an integrated approach under the Women Shellfishers and Food Security project may be unique.

Resources of interest which consolidate related case studies globally (although not specific to shellfisheries) included the following:

- Community Conservation Research Network SSF-stewardship examples by world region: <https://ssf-stewardship.net/interactive-ssf-stewardship-map/>
- Women’s experiences in influencing and shaping small-scale fisheries governance (Galappaththi, 2022) <https://onlinelibrary.wiley.com/doi/full/10.1111/faf.12672>

6.2 Similarities Across Cases



The exclusive use rights provided to community-level resource users by national governments in the cases identified mainly delegated rights to mixed gender or male-dominated resource user groups. In some cases, the community level rights holders have delegated authorities to women-led sub-groups (i.e., Philippines and Kenya), and there is one women-led cockle harvesting group in Muisne, Ecuador, which had rights but difficulties in excluding males. The shellfisheries co-management plans in The Gambia and Ghana still appear to be rare examples of national governments delegating fisheries exclusive use rights explicitly to women-led resource user organizations.

In Brazil, Ecuador, and the Philippines, communities designated legally as “Indigenous” or “traditional resource users” had a legal framework for spatially defined terrestrial and marine natural resource exclusive use rights. Within this framework, communities had the authority to further designate women-led shellfisheries or mangrove management arrangements. In the Africa cases highlighted in this study (The Gambia, Ghana, Kenya, Tunisia), “Indigenous peoples” as an entry point for natural resource management use rights is not a prevalent feature of the legal framework, especially for coastal communities.

Women-dominated shellfisheries and habitats that were in decline before co-management was established and implemented seemed in most cases to show some positive documented outcomes. The positive outcomes of participatory co-management included empowering women, shifting decision-making power to resource users, securing benefits at the resource user level, mitigating shellfishery and habitat degradation, improving shellfish stock, and delivering other positive socio-economic benefits.

Challenges to the success of co-management were both internal to the process and external.

- Internal challenges included: weak capacity of resource user groups and government to fully execute their co-management roles and responsibilities, lack of provisions to secure women-dominated shellfisheries livelihoods (that are their primary livelihood) as men enter the fishery to supplement earnings.
- External challenges included threats to shellfishery and mangrove resources beyond the scope of women-led shellfisheries co-management efforts to address directly or to effectively influence, even as the power of women shellfishers to advocate as a constituency increased in most cases. These challenges included pollution, settlement and agricultural encroachment, and shrimp pond development, among others. Cultural norms about gender roles were also a strong external factor in most cases.

In cases of exclusive use rights to a fishery delegated to women's associations, the use of these rights to exclude non-members (i.e., closed access to the fishery) or to establish a revenue stream based on permitting by the women's association is not evident. In Tunisia, license fees are used to fund monitoring of the landings and marketing, although in this case women harvesters share membership on the governance structure with men—who dominate these structures and the other value chain nodes.

When there are significant external market opportunities, community-based and inclusive approaches resulted in more favorable outcomes for conservation of the managed natural resource and equitable resource user/community benefits. The case of the voluntary carbon market for mangrove conservation in Kenya demonstrates this. There is a cautionary tale in the case of the EU export-oriented Tunisia clam fishery harvested by socio-economically marginalized women under a top-down, locally managed, but male-dominated regulatory scheme and marketed exclusively by intermediary non-harvester men.

Rights-based co-management inspired and contributed to policy development in several cases. An example is the case of the Densu Delta oyster fishery co-management plan, which demonstrated successful application of the approach as it was being institutionalized at the national policy level. This was also the case for Mikoko Pamoja's experience and achievements, which informed the 2017-2027 National Mangrove Ecosystem Management Plan.

Multiple cases benefitted from the successful approach of implementing early actions at the community level; demonstrating good practices in inclusive, consensus-based natural resource management; conflict resolution; and benefit-sharing even before official co-management agreements and supporting legal arrangements were formally in place (The Gambia, Ghana, Kenya). These early actions served to build the confidence, solidarity, and credibility of resource users taking responsible management actions, catalyze community and government buy-in, and inform and improve eventual formal legal arrangements and policies.

Co-management processes resulted in women entering non-traditional roles in fisheries. In Brazil, when co-management of a fishery was promoted, it increased women's ability to access the resource so more women entered the fishery as fishers. In Kenya, women began milkfish aquaculture and seaweed farming due to mangrove co-management. In Tunisia, as women harvesters organized and participated in GDPs (clam fishery management bodies), they were in a position to acquire more power and greater benefit-sharing in post-harvest nodes of the value chain—in which they previously had no role—through a temporarily successful fair trade agreement.

Existing co-management cases do not seem to explicitly protect women's roles in shellfisheries livelihoods from men entering and increasingly dominating in harvest activities where women historically dominated and considered it their primary livelihood (Ecuador, Brazil).

Shellfisheries co-management facilitated shellfishers' contributions to mangrove conservation, rehabilitation and stewardship in many cases (The Gambia, Ghana, Philippines, Ecuador, Brazil). In Kenya, ecotourism, seaweed, and milkfish farming by women provide diversified livelihoods and revenue that enable them and their households to engage in mangrove conservation and co-management rather than in livelihoods contributing to mangrove degradation.

Scaling of co-management was largely driven by rights-based governance frameworks applied nationally and implemented locally throughout the country in the cases of Ecuador, Brazil, and Tunisia. In Kenya, The Gambia, Ghana, and the Philippines, locally driven, place-based initiatives that relied on existing national legal frameworks—but piloted its application in an innovative way in one or very few places—has driven replication and scaling at additional sites. That scaling, however, remains limited and driven by donor projects—unlike in Ecuador and Brazil where “*custodias*” and MERs respectively cover large areas of mangrove and estuarine ecosystems.

6.3 Unique Findings



Cases of women-dominated shellfisheries under various management regimes ranged from those harvested exclusively for subsistence (The Philippines), to those focused on income generation from commercialization in very local domestic markets (Ecuador, Brazil, Kenya, The Gambia, and Ghana), to an export-oriented shellfishery (Tunisia). The subsistence and export-oriented cases were clearly the rare cases in a global low- and middle-income country context.

Women in the Calait community in the Philippines have a well-established, informal communication network referred to as “*tsismis*” that is effective for identifying, discussing, and resolving issues within the community. This is true for fisheries issues as well (Castro et al., 2021). Such informal communication networks among women may exist but are not recognized in other contexts as an asset for community-based fisheries management.

7. KEY INSIGHTS FOR PRACTITIONERS



A top-down, regulatory framework and evidence-based decision-making is likely not sufficient to incentivize the behavior change needed throughout the value chain for sustainable management of small-scale shellfisheries dominated by vulnerable women harvesters.

National policies or laws that promote co-management of mangroves and/or shellfisheries provide enabling conditions that can lead to widespread scaling of locally managed shellfish and mangrove areas. Such policies and laws, however, require governments to also commit resources for their implementation, and to achieve widespread scaling. Capacity development of lead national agencies and other supporting institutions (e.g., nongovernmental organizations and universities) to support and develop local user groups is also necessary for effective scaling.

A participatory, rights-based approach incentivizes the behavior change needed for responsible fisheries management and habitat stewardship, but a focus on and significant investment in local ecological knowledge, resource user empowerment, capacity building of resource user associations and government are critical—in addition to scientific knowledge and technical fisheries considerations.

Governance arrangements and management plans that require or facilitate strong links between resource user co-management entities and technical assistance, facilitate co-management success. In Ecuador, these links were a required criteria for *custodia management plans*.

Socio-economically vulnerable actors (women) within economically vulnerable communities can participate in and lead natural resource co-management if priority needs and livelihood diversification options are integrated into co-management initiatives. The socio-economic profile of women shellfishers in the cases highlighted in this study were relatively similar in that they are among the most vulnerable and economically marginalized, often had low levels of formal education, fell into older rather than younger age groups, had high household labor burdens, and lacked access to more lucrative livelihood opportunities. Support for co-management processes in these cases must recognize this context and prioritize an integrated approach to address the needs of stakeholders that is tailored to their situation in order to enable their engagement in the process and support management measures that may require reduction of fishing effort.

Exposure to co-management planning processes in different communities and geographies in a variety of fisheries enables stakeholders to understand the principles of the co-management approach more clearly— as distinguished from the specifics of a given community, geography, or fishery. Women shellfishers in The Gambia and Ghana cases were empowered by the contrast with concurrent co-management processes in more complex fin-fisheries of higher value with management units that were less local. The shellfishers were able to apply the same co-management planning principles, similar types of co-management measures, and similar institutional arrangements within a more localized stakeholder group and a smaller management area, resulting in more immediate success. Due to the nature of mollusc fisheries, they experienced a relatively rapid (within one season) visible impact of new management measures on fishery health. In most of the cases presented in this study, peer-to-peer exchanges within the country (or internationally) exposed shellfishers to others implementing similar co-management principles in women-led shellfisheries and reinforced the value of the principles in a variety of situations. This perspective builds capacity for adaptive management within co-management plans and for scaling of the co-management approach.

Limited documentation as well as the infrequent and isolated nature of current cases of women-led, rights-based shellfisheries co-management found in this study highlight the need to work towards a critical mass of adopters and generate a virtuous cycle of support for the approach. This can be facilitated by continuing to provide insights on the lessons learned from existing cases, equipping practitioners, and establishing the linkages that empower scaling.

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ANNEX 1: THEORY OF CHANGE AND RESEARCH FINDINGS TO DATE

PHASE I (2020 – 2022)

The theory of change model put forth by this project was: IF women’s shellfish livelihoods in coastal mangrove and estuarine ecosystems in The Gambia and Ghana are improved through gender and nutrition sensitive co-management and linkages made to community based forest management in the land/seascape, THEN mangrove and estuarine biodiversity will be improved, AND IF approaches for sustainable food producing livelihoods within the coastal mangrove land/seascape contribute to a nutritionally balanced local food supply, THEN household resilience, sustainable food systems, and nutrition will improve.

There is existing evidence that co-management of mangroves and fisheries are effective good practices as well as evidence that improved mangrove habitat can increase fisheries yields. Less evidence exists on the impacts of improving proximate landscape food systems on food security and biodiversity conservation, and nutritional benefits from shellfish consumption for women shellfishers.

The theory of change was further broken down in the program description into several testable and interlinked hypotheses and the conclusions drawn as documented in the project’s multivariate analysis technical report (https://pdf.usaid.gov/pdf_docs/PA00ZMND.pdf) and as summarized below.

Hypothesis 1: Improved and gender equitable management of shellfisheries increases shellfish yields, which increases shellfish consumption and income of those engaged in shellfishing.

There was evidence in this study that co-management and women’s empowerment leads to improved shellfish stocks. There was little evidence that healthier shellfisheries result in higher shellfish consumption among women shellfishers, improved income, or lower poverty. There is no evidence that improved livelihood diversity improves shellfisher household income. Concerning the later conclusions, the cross sectional rather than time series research design, data collection methods, indicators used, and the small number of sites sampled in this study may have led to these negative findings. We recommend that those hypotheses not confirmed, regarding income and poverty, be further examined in subsequent studies. Other exogenous or local factors also may play a more important role.

Hypothesis 2: Shellfisher mangrove management actions improve mangrove habitat which in turn improves the health of shellfish stocks.

There was no evidence in this study that shellfisher protections or legal site protections (RAMSAR sites in these cases) improve mangrove health. This suggests potential weak or non-existent implementation of RAMSAR plans and that shellfisher efforts at protection are not sufficient to see changes in mangrove health at the site level. Qualitatively, there was weak evidence that where pressures and threats were lower, mangrove health was higher. This aspect of the theory of change deserves further investigation. We recommend more detailed analysis and weighting for measuring severity of threats. The USAID guidelines for rating direct threats may provide a useful approach (USAID, 2017). We found no relationship between mangrove health and shellfish health even though the existing scientific literature suggests a relationship between mangroves and fish yields (Aburto Oropeza, 2008; Hutchison et al., 2014; Anneboina and Kumar, 2017). Again, future studies can improve the measures used in our study by factoring in overall mangrove area in relation to the number of shellfishers per unit of mangrove area and harvests per shellfisher, measures not used in this study. In addition, while mangroves may play a role, fishing effort, exploitation levels, and shellfish governance factors may be the overwhelmingly main drivers regardless of mangrove health. For example, Densu has few mangroves but a healthy and well-managed shellfishery. Tanbi has an abundance of mangroves and a healthy and well-managed shellfishery as well. Extent of mangrove habitat in an estuary may be more related to the overall potential total of shellfish yields at the site 5 rather than have any impact on exploitation levels. We did not assess this relationship in our study, but it has evidence in the scientific literature (Anneboina and Kumar, 2017).

Hypothesis 3: High consumption of shellfish and increased income from shellfishing contributes to lower prevalence of anemia in women of reproductive age and improves other nutrition variables. Shellfish consumption is a main contributor to reduced anemia compared to other factors such as geographic factors or household and individual characteristics.

There was no evidence in our study that increased shellfish consumption decreases anemia levels. Low consumption levels of oysters by women shellfishers being the main reason. While oysters are a good source of iron and zinc, consumption levels would have to increase by a large amount to have any real impact. However, Adu-Afarwuah et al. (2022) advised not to promote increased consumption due to substantial health risks from heavy metal contamination in oyster tissues in Ghana sites, most notably of mercury. Government agencies should identify local sources of contamination and work to reduce heavy metal loading into the estuaries. This study did suggest that increased household income and

greater wealth improves food security and having adequate dietary diversity, but unrelated to shellfish income. However, Adu-Afarwuah et al. (2022), using a different approach (Poisson regression and assessing each country separately), showed opposite results not supporting this hypothesis. Given the conflicting evidence depending on approach used, this hypothesis is worthy of further study.

Hypothesis 4: Enriching landscapes around mangrove-shellfish estuaries systems with complementary food and nutrition sources reduces the extractive pressure on the mangroves thereby improving mangrove health and improves shellfisher household income and household food security.

There was no evidence from our study that improving proximate landscape livelihoods reduces pressure and threats to mangroves or improves mangrove health. Our study suggests that increasing proximate landscape livelihoods increases household income but decreases per capita food expenditures due to more reliance on locally grown food and reducing the need to purchase food. Household characteristics can also influence nutrition, household income, and food expenditures. There was no evidence that higher household income or per capita food expenditure in shellfishing households improves MAHFP or dietary diversity. This is confusing with findings in hypothesis 3 which showed household income and wealth influenced other nutrition measures - the HFIAS score and being food secure. While the wealth measure was related to dietary diversity, household income and shellfisher income were not. Hence, while there were mostly negative findings on dietary diversity measures (except when using the wealth-poverty score) in the hypothesis 4 analysis, there was supporting evidence for the food security measures in the hypothesis 3 analysis. Chegini et al. (2021) have shown that food security in rural areas of Iran has complex associations with income, household welfare, and other household characteristics that are similar to our findings. Given the mixed results and complexity of relationships, more in-depth research is needed with respect to shellfishing household income, wealth, various nutrition measures, and other potential factors, with some factors having more influence than others.

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PHASE II (2023-2025)

The Theory of Change revised for Phase II site-based work was: IF implementation of women shellfishers empowerment, shellfishery and mangrove co-management, and adjacent landscape food production systems is integrated, THEN shellfishery and mangrove health, dietary diversity, and shellfisher livelihood resilience will improve.

Hypotheses which are considered priorities for research that can be reasonably assessed in the extension period are documented in the project's monitoring and evaluation plan for site-based work https://pdf.usaid.gov/pdf_docs/PA00ZW58.pdf and summarized below.

1. Gender sensitive shellfish governance will result in improved shellfish health/yields. (low priority)
- 2. Improved shellfish health will result in improved income from shellfishing. (medium priority)**
- 3. Inclusive mangrove management will reduce threats and improve mangrove habitat and biodiversity. (high priority)**
4. Stakeholder empowerment (shellfishers) improves shellfish health. (low priority)
- 5. Stakeholder empowerment (mangrove users) improves mangrove health. (high priority)**
6. Improved mangrove habitat will improve shellfish health and yields. (low priority)
- 7. Improved proximate landscape livelihoods and food systems will improve dietary diversity. (medium priority)**
- 8. Improved proximate landscape livelihoods and food systems will increase shellfisher livelihood resilience. (high priority)**

CRC (2022). Monitoring and Evaluation Plan for Site Based Activities in Furtherance of the Research Agenda. Centre for Coastal Management, University of Cape Coast; World Agroforestry; and Coastal Resources Center, University of Rhode Island. Narragansett, RI, USA. 48 pp. https://pdf.usaid.gov/pdf_docs/PA00ZW58.pdf