



**USAID**  
FROM THE AMERICAN PEOPLE

THE  
UNIVERSITY  
OF RHODE ISLAND



**WOMEN SHELLFISHERS AND FOOD SECURITY PROJECT**

**PARTICIPATORY ASSESSMENT OF SHELLFISHERIES IN THE  
ESTUARINE AND MANGROVE ECOSYSTEMS OF  
THE GAMBIA**



September 2021

This publication is available electronically in the following locations:

*The Coastal Resources Center*

<https://web.uri.edu/crc/projects/>

*USAID Development Clearing House*

<https://dec.usaid.gov/dec/content/search.aspx>

**For more information** on the Women Shellfishers and Food Security Project, contact:

USAID Women Shellfishers and Food Security  
Coastal Resources Center  
Graduate School of Oceanography  
University of Rhode Island  
220 South Ferry Rd.  
Narragansett, RI 02882 USA  
Tel: 401-874-6224 Fax: 401-874-6920  
Email: [info@crc.uri.edu](mailto:info@crc.uri.edu)

**Citation:** Saine, D., Janha, F., Chuku, E. O., Abrokwah, S., Kent, K., and Crawford, B. (2021). Participatory Assessment of Shellfisheries in the Estuarine and Mangrove Ecosystems of The Gambia. Centre for Coastal Management (Africa Centre of Excellence in Coastal Resilience) University of Cape Coast, Ghana and Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. Narragansett, RI, USA. 26 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 Project 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.

**Cover photo:** Oyster culture on racks

**Photo credit:** Dawda Saine

## Detailed Partner Contact Information

Karen Kent	Project Director, CRC	Email: <a href="mailto:karenkent@uri.edu">karenkent@uri.edu</a>
Kirstin Siex	AOR	Email: <a href="mailto:ksiex@usaid.gov">ksiex@usaid.gov</a>
William Akiwumi	AAOR	Email: <a href="mailto:wakiwumi@usaid.gov">wakiwumi@usaid.gov</a>
Jaime Raile	AO	Email: <a href="mailto:jraile@usaid.gov">jraile@usaid.gov</a>

URI Depart. of Nutrition and Food Science  
Fogarty Hall  
Kingston RI 02881 USA  
Brietta Oaks: [boaks@uri.edu](mailto:boaks@uri.edu)

TRY Oyster Women's Association  
Opposite the New Market, Old Jeshwang,  
Western Division, Gambia  
Fatou Janha: [tryoysters@gmail.com](mailto:tryoysters@gmail.com)

World Agroforestry (ICRAF)  
United Nations Avenue, Gigiri  
PO Box 30677, Nairobi, 00100, Kenya  
+254 20 7224000  
Lalisa Duguma: [l.duguma@cgiar.org](mailto:l.duguma@cgiar.org)

Centre for Coastal Management (CCM)  
University of Cape Coast,  
Cape Coast, Ghana  
+233 24 238 8605  
Ernest Chuku: [eobengchuku@ucc.edu.gh](mailto:eobengchuku@ucc.edu.gh)

University of Ghana  
Depart. of Nutrition and Food Science  
P.O. Box LG 134  
Legon, Ghana  
+233-28-951-9793/ +233-28-951-9794  
Seth Adu-Afarwuah: [sadu-afarwuah@ug.edu.gh](mailto:sadu-afarwuah@ug.edu.gh)

### For additional information on partner activities:

URI-CRC	<a href="http://www.crc.uri.edu">http://www.crc.uri.edu</a>
URI-DNFS	<a href="https://web.uri.edu/nfs/">https://web.uri.edu/nfs/</a>
ICRAF	<a href="http://www.worldagroforestry.org/">http://www.worldagroforestry.org/</a>
University of Ghana	<a href="https://www.ug.edu.gh/nutrition/">https://www.ug.edu.gh/nutrition/</a>
CCM/UCC	<a href="https://ccm.ucc.edu.gh/">https://ccm.ucc.edu.gh/</a>   <a href="https://acecor.ucc.edu.gh/">https://acecor.ucc.edu.gh/</a>

# TABLE OF CONTENTS

	<u>Page</u>
Detailed Partner Contact Information .....	ii
TABLE OF CONTENTS .....	iii
LIST OF TABLES .....	iv
LIST OF FIGURES .....	iv
ACRONYMS .....	v
Executive Summary .....	1
1. Introduction .....	4
2. Methodology .....	6
3. Status of Shellfisheries .....	7
3.1. Shellfish Exploitation .....	7
3.1.1. Estimated number of shellfishers .....	7
3.1.2. Insights on gender in shellfish exploitation .....	8
3.1.3. The shellfish value chain .....	10
3.1.4. Species harvested .....	11
3.1.5. Harvesting methods .....	12
3.1.6. Harvest volumes and value .....	12
3.1.7. Seasonality of harvests .....	12
3.2. Mangrove Ecosystem .....	12
3.3. Governance/Management Regimes .....	13
3.4. Climate Risk Mitigation .....	14
3.5. TRY Oyster Women’s Association Challenges and Successes .....	15
4. Conclusion and Recommendations .....	18
References .....	20

## LIST OF TABLES

Table 1: Male and female shellfishers in shellfish harvesting communities and ecosystems in The Gambia.....	9
Table 2: Uses of the meat and shells of shellfish.....	10
Table 3: People engaged in the shellfish value chain.....	11
Table 4: Shellfish species harvested in estuarine and mangrove ecosystems in The Gambia.....	11

## LIST OF FIGURES

Figure 1: Mapping of shellfish landing sites covered by the assessment. Note: Kamalo, Wencho, and Faji Kunda are in the Tanbi Wetlands adjacent to the 4 sites clustered there.....	7
Figure 2: Mangrove cutting (left). Municipal waste pollution (right).....	16
Figure 3: Oyster culture (left). Mangrove replanting (right).....	16
Figure 4: Value chain improvement (left). Savings and Credit (right).....	17
Figure 5: Skills training of daughters of TRY Members (handbag weaving and tie & die).....	17

## ACRONYMS

CCM	Centre for Coastal Management
CRC	Coastal Resources Center
UCC	University of Cape Coast
URI	University of Rhode Island
USAID	United States Agency for International Development

## Executive Summary

Basic Contextual Information	
Country	The Gambia
Total land area	11,295 km <sup>2</sup>
Population	2.28 million (2018)
Percentage population living in/near the coast	-
Gross Domestic Product (GDP)	1.633 billion USD (2018)
Human Development Index Rank	0.466 (174 out of 189)
Length of coastline	80 km
Fish consumption (as a percent of animal protein)	40%
Anemia prevalence	<a href="#">57.5% among women of reproductive age (15 - 49)</a>
Estimated mangrove cover	59,717 ha (2016)
Estimated estuarine and mangrove ecosystem-based shellfish harvesters	2,042
Estimated women shellfish harvesters (percent)	1,817+ (89%+)
Estimated direct household shellfish beneficiaries	26,199
No. of coastal systems with mangrove-based shellfishing	4 (Tanbi, Niumi, Baobolong, Alahein)
Shellfish management regulations	<a href="#">Oyster and Cockle Fisheries Co-Management Plan for the Tanbi Wetlands Complex</a>
Mangrove management regulations	-
Coastal ecosystems with shellfisheries identified as Ramsar sites	Tanbi Wetland National Park (TWNP) (2007) (6400 ha)



	Niimi National Park (2008) and <a href="#">Management plan 2011.</a> (4,940 ha) Baobolon Wetland Reserve (1996) (20,000 ha)
--	---

*Source: Chuku et al. 2020, Global Mangrove Watch, Ramsar Sites Information Service (RSIS)*

The USAID Women Shellfishers and Food Security Project aims to document opportunities to replicate and expand shellfish livelihoods based in mangrove ecosystems, which can provide income and a cheap source of protein and micronutrients to coastal dwellers across West African coastal countries and drive sustainable management of coastal ecosystems. This country assessment is aimed at gathering data on the scale and scope of shellfisheries and shellfish-based livelihoods associated with mangrove and estuarine ecosystems in The Gambia.

The Gambia borders the Republic of Senegal and the Atlantic Ocean with a coastline of about 80 km. Women dominate the shellfisheries (about 89% of shellfishers). According to the survey of resource users, women and men are engaged in harvesting oysters, but cockles, crabs, and welk are exclusively harvested by women. The role of men in the oyster value chain ranges from sucking to boat repairs, offloading during landing, and help in fuelwood hewing/fetching for processing.

Women shellfishers are largely concentrated within the 6,304 hectare Tanbi Wetland Complex where there is a [Cockle and Oyster Fishery Co-Management Plan for the Tanbi Special Management Area](#) developed with the support of the USAID/BaNafa project and gazetted in 2013. This plan delegates exclusive use rights to the oyster and cockle fishery in the Tanbi to TRY Oyster Women’s Association. Other shellfishery areas include the Alahein River Estuary on the border with Southern Senegal and mangrove ecosystems in the Niimi National Park on the North Bank, as well as Gambia River estuarine mangrove ecosystems further up the river (i.e., Bullock and Bintang). Despite the co-management plan with an annual 8 month closed season and other measures, excessive harvesting during open season has been prevalent over the years in Tanbi and Alahein. There are no daily harvest quotas set, harvesting is not monitored, and the number of harvesters is continually increasing with no plans to reduce the harvesting effort. This has resulted in decline in stocks and migration of some harvesters to other less populated oyster harvesting sites where there is no overexploitation. The lack of monitoring in The Gambia’s shellfisheries raises concern as there is no evidence to determine whether harvest strategies are sustainable and there are no harvest control rules in place.

All resource users interviewed were engaged in harvesting, processing, and trading, as well as consumption (100%). About 98% of the total number of shellfishers estimated in each community (of which 98% were female) were said to engage in harvesting, processing, trading, and consumption. This indicates a highly vertically integrated value chain with women harvesters dominating almost exclusively at every node. This implies that value chain improvements at any node can directly benefit women harvesters and creates an opportunity to incentivize behavior change for sustainable resource management.



Oyster catch value per harvester operating within the Tanbi Wetland Complex is much higher than those operating in the hinterland. A cup of oyster meat (63 grams) within the Tanbi costs fifty Gambian dalasi (D50.00), approximately one US dollar (US \$1.00), while in the hinterland a cup of oyster meat costs D30.00, approximately US \$0.60 cents. Cockle harvesting is dominantly undertaken within the Alahein river estuary, specifically in Kartong where catch value is estimated between US dollars \$5.00 and \$15.00 per person per day.

Shellfishers in The Gambia face challenges such as reduced catches, reduced income, unhygienic conditions of work at landing sites, lack of value addition, and limited capacity building on management, conservation, and financial management.

Recommendations are the following:

- Strengthen associations on organizational management and supporting informal ones to become formal.
- Create awareness on the legal instruments mentioned in the report.
- Review existing or former family oyster culture outcomes and make recommendations for more profitable and sustainable ventures.
- Train shellfishers in financial management, hygiene, and sanitation.
- Re-introduce credit and savings previously undertaken based on lessons learned as there was a lack of trust coupled with lack of knowledge on financial management reported by members.
- Strengthen the 8-month closed season.
- Support sustainable diversified and alternative livelihoods.
- Strengthen enforcement of the seasonal shellfish closure and other regulations to ensure compliance by shellfishers, fishermen, and commercial mangrove dealers.
- Empower shellfish harvesters to take control of shellfish and mangrove stewardship within their communities through co-management plans.
- Expand the oyster and cockle co-management plan to cover all shellfish landing sites and add other shellfish in the co-management plan.
- Promote annual mangrove regeneration and restoration.
- Train residents along mangrove areas on water quality management.
- Support construction of shellfish markets and provide preservation facilities to reduce post-harvest losses and selling at low prices.
- Develop a communication plan under this project to facilitate networking and skills transfer.
- Organize study tours locally and externally between project beneficiary countries.

# 1. Introduction

The Gambia lies between latitudes 13°N and 14°N on the West Coast of Africa bordering the Republic of Senegal and the Atlantic Ocean with a total land area of approximately 11,420km<sup>2</sup>, a population of about 1.9 million and a population growth rate of 4.2% per annum. The country's coastline is about 80 km, 25 km of which lies in the bay-shaped mouth of the River Gambia and the rest facing the Atlantic Ocean.

The Gambia is characterized by marine, brackish, and freshwater regimes which correspond with the three Fishery Administrative Areas of the country namely: Atlantic/Marine, Lower River, and Upper River Strata. The estuarine areas have a thick mangrove forest of 59,717 hectares ([Global Mangrove Watch](#) 2016) stretching up to 200km inland from the mouth of the River Gambia, which provides breeding and nursery grounds for commercial marine fish species, shrimps, marine mammals, shellfish, and other important aquatic animals (Mendy, 2009).

The Gambian mangroves are important and biologically productive ecosystems. They play a crucial role as nursery habitat for fish including many marine organisms. Mangrove roots are islands of habitat that may attract rich epifaunal communities. Their leaves, when they fall in the water from the parent tree, submerge and decompose to produce nutrients that enhance the productivity of the ecosystem. The mangrove species include *Avicennia africana*, *Conocarpus erectus*, *Languncularia racemosa*, *Rhizophora harrisoni*, *Rhizophora mangle* and *Rhizophora racemosa*.

Women dominate the shellfishery (about 89% of shellfishers) and are largely concentrated within the Tanbi Wetland Complex with its central coordinates of 13° 26' North and 16° 38' West. The complex is a mangrove swamp of 6,304 hectares that fronts the Atlantic Ocean to the North and the River Gambia to the East. Other oyster areas where predominantly women are the harvesters are the Alahein river estuary Bullock, and Bintang, among others. The mangrove serves as spawning, nursery and feeding grounds for fish, molluscs, and other aquatic animals.

Among the importance of shellfisheries for women are that they provide affordable and cheap protein intake, self-employment, income generation, food security, and poverty reduction. Several efforts have been made starting from harvesters organizing themselves into formal associations for the purpose of reaching common objectives and approaches to manage shellfish harvesting sustainably and protect the mangrove ecosystem to ensure continuity of their shellfisheries livelihoods that are reliant on healthy mangroves.

There are legal instruments governing the need for responsible harvesting, processing, and marketing of shellfish. These include the Biodiversity and Wildlife Act of 2003, the Fisheries Act of 2007, Fisheries Regulations of 2008, and the Food Safety Act. The Fisheries Act of 2007, Section 14 and associated regulations of 2008, explicitly provide the authority for the Minister of Fisheries to designate special management areas for the purpose of community-based co-management in the interest of conservation, management, and sustainable utilization of fisheries resources. The [Cockle and Oyster](#)

[Fishery Co-Management Plan for the Tanbi Special Management Area](#) developed with the support of the USAID/BaNafa project approved in 2012 and gazetted in 2013 relies on these authorities to delegate exclusive use rights to the oyster and cockle fishery in the Tanbi to TRY Oyster Women's Association. Among the contents of the plan is an annual 8 month closed Season (August – March), a minimum harvest size, and gear restrictions to protect mangrove roots and juvenile oysters. Mangrove regeneration is also promoted. Projects such as oyster culture and cockle transplanting have been implemented to develop options for increased production that support behavior change on unsustainable oyster harvesting methods and ensure stock replenishment. Some communities notably in Bullock would fine any member found cutting mangroves by confiscating and selling all harvested oysters with revenue paid into the association account. The Department of Parks and Wildlife Management has also established co-management structures purposely to ensure mangrove protection and conservation.

The current study assesses the scale and scope of shellfisheries and shellfish-based livelihoods connected with mangrove systems and coastal water bodies in The Gambia through a participatory approach. The main objectives were the identification of key stakeholders and assessment of the scale and scope of existing shellfisheries and shellfish-based livelihoods in mangrove systems or its related water bodies. This study complements a [Literature Review](#) covering shellfisheries in each of the 11 coastal West Africa countries from Senegal to Nigeria. The specific objectives were to:

- a) Identify types of mangrove/estuarine ecosystem-based shellfisheries, by species and location.
- b) Estimate catch per day/month/season, fishing calendar, seasonality of shellfisheries and harvesting methods, processing, and trading of shellfishes.
- c) Estimate revenue generated from mangrove/estuarine ecosystem-based shellfisheries.
- d) Determine the challenges and health-related conditions associated with the consumption of shellfishes.
- e) Assess mangrove exploitation, its uses, gender attributes in its harvest, condition, and protection status.
- f) Determine the governance/management regimes as applied to shellfisheries and mangrove systems.
- g) Determine the effect of climate risks on the livelihoods and food security of women who depend on coastal mangrove and estuarine systems.

The report details demographic information about shellfish harvesters, consumers, and institutions in The Gambia. It provides an overview of the socioeconomic aspects, nature, and type of shellfishery engagement including alternative livelihoods and harvesting methods of oyster, cockle, welk, and crab respectively. The governance regimes (Biodiversity and Wildlife Act 2003, Fisheries Act 2007 and its associated Regulations 2008, the Forestry Act 1998, the National Environment Management Act, 1994, and The Cockle and Oyster Co-management plan are outlined.

## 2. Methodology

Information for this report was acquired through a review of the following governance regimes: Biodiversity and Wildlife Act of 2003, the Fisheries Act of 2007 and its associated Regulations of 2008, the Forestry Act of 1998, and the National Environment Management Act of 1994.

Data collection was carried out by participatory engagement of key stakeholders categorized into two groups, namely resource user and non-resource user. The non-resource user group is composed of individuals from the government (staff from the Department of Fisheries and the Department of Parks and Wildlife Management), academic/research, NGO/CSO and traditional institutions.

Stakeholders were interviewed using a semi-structured interview guide. The resource user survey instrument is available in the regional summary report (Chuku et al, 2021). The questionnaires were tested at office level with field workers before embarking to oyster landing sites, institutions, local authorities, artisanal fisheries operators, and consumers. The questionnaires were focused on biographical information of the respondent, socioeconomic situation, nature and type of shellfishery engagement including alternative livelihoods, methods of harvesting of the different shellfisheries notably oyster, cockle, welk, and crab respectively, legal instruments and frameworks or plans.

A total of 14 shellfish landing sites were covered. The Tanbi Wetlands complex and the Alahein River estuary made up 9 of the 14 sites surveyed, while the West Coast and North Bank regions made up the remaining 5 landing sites. In all, 56 resource users were interviewed. Resource user respondents were mainly females (89%) and ranged in age from 20-65 years. The data on resource users surveyed is presented in Section 3 below.

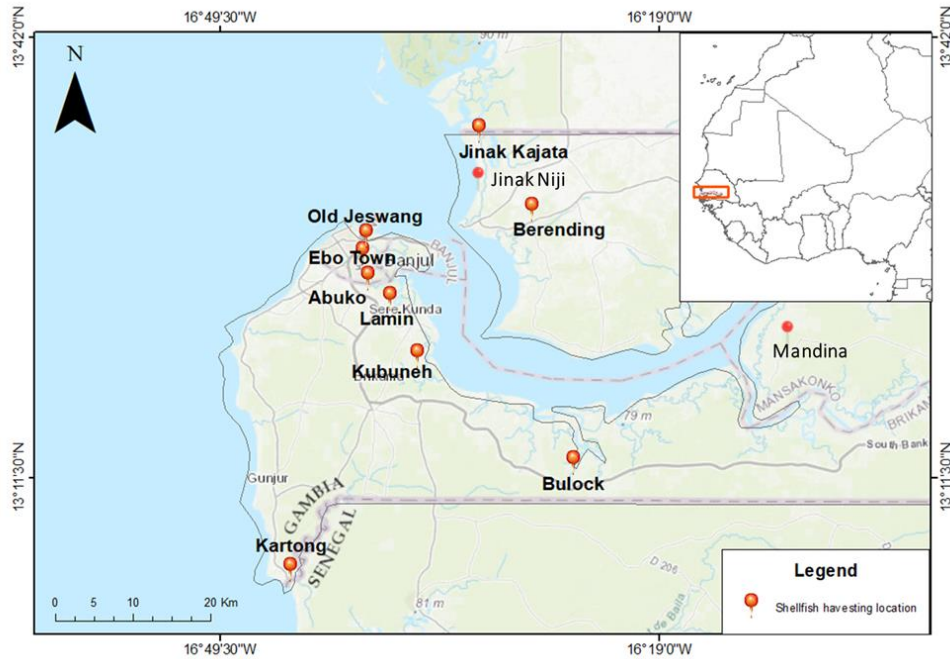


Figure 1: Mapping of shellfish landing sites covered by the assessment. Note: Kamalo, Wencho, and Faji Kunda are in the Tanbi Wetlands adjacent to the 4 sites clustered there.

### 3. Status of Shellfisheries

#### 3.1. Shellfish Exploitation

##### 3.1.1. Estimated number of shellfishers

Information on the number of shellfish harvesters in The Gambia is largely not available. In this participatory assessment, the resource users indicated the number of shellfishers in their communities and/or harvesting areas. Conservative estimates are made with the assumption that each respondent represents exclusively one harvesting area/community to moderately compensate for the shellfish harvesting sites not visited, while averaging obvious duplications for communities with large numbers. The estimates provided in this report represent a combination of information gleaned from available literature sources deemed reasonable from the perspective of ground

experience in the women-led shellfisheries sector as well as estimates from the participatory assessment conducted.

An estimated 2,042 persons, the majority of which are females, are engaged in shellfisheries livelihoods in The Gambia.

An estimated 26,199 persons are direct household shellfisheries beneficiaries based on an average of 13 people per household.

According to respondents, females form the majority in the household. There are between 4 to 20 individuals per household with an average household size of 13. It is estimated that between 10 to 15 are females and 2 to 5 are males.

The assessment revealed that most of the harvesters (women and men) are within the age range of 20-75. The men were between 37-55 years. The women were between 20 -75 years. Not all sites provided information about children assisting parents, but the information received revealed 110 assistants from shellfishing households with ages ranging between 8 -35 years.

The dominant ethnic group in the shellfishery is Jola, followed by Jola Arameh, Karoninka, and Mandinka respectively.

### *3.1.2. Insights on gender in shellfish exploitation*

Based on the resource users surveyed from the 14 shellfishery landing sites covered, 89% of resource users were women. Of 56 resource users interviewed 50 were women and 6 were men. However, as shown in Table 1, estimates of the number and sex of shellfishers in their communities indicates a higher percentage of females (98%).

According to the survey of resource users, women and men are engaged in harvesting oysters, but cockles, crabs, and welk are exclusively harvested by women. The role of men in the oyster value chain ranges from sucking to boat repairs, offloading during landing, and help in fuelwood hewing/fetching for processing.

Table 1: Male and female shellfishers in shellfish harvesting communities and ecosystems in The Gambia.

Name of shellfishing community	Water body/Ecosystem of harvest	Number of harvesters	Males	Females
Kubuneh	River Gambia/estuarine/mangroves	33	1	32
Lamin	Tanbi Wetland Complex/ estuarine/mangroves	37	Nil	37
Abuko	Tanbi Wetland Complex/ estuarine/mangroves	31	Nil	31
Faji Kunda	Tanbi Wetland Complex/ estuarine/mangroves	28	Nil	28
Ebo Town	Tanbi Wetland Complex/ estuarine/mangroves	45	Nil	45
Old Jeshwang	Tanbi Wetland Complex/ estuarine/mangroves	60	Nil	60
Kamalo	Tanbi Wetland Complex/ estuarine/mangroves	39	Nil	39
Wencho	Tanbi Wetland Complex estuarine/mangroves	33	Nil	33
Kartong	Alahein River/estuarine/mangroves	31	Nil	31
Berending	River Gambia/estuarine/mangroves	18	4	14
Mandina village	River Gambia/estuarine/mangroves	57	2	55
Bullock	River Gambia/estuarine/mangroves	50	1	49
Jinak Kajateh	Niumi National Park/ estuarine/mangroves	24	Nil	24
Jinak Niji	Niumi National Park/ estuarine/mangroves	28	Nil	28
<b>Total</b>		<b>514</b>	<b>8</b>	<b>506</b>



### 3.1.3. The shellfish value chain

The shellfishes identified during the survey are processed by boiling, smoking, fermenting, and drying before consumption and sale. Marketing of shellfish is at local and distant markets, by the harvesters themselves, and to middlemen, especially when product is abundant and cannot be preserved. As shown in Table 2 below, oyster and cockle shells are also used for making lime for whitewash and paving roads.

Table 2: Uses of the meat and shells of shellfish.

Shellfish name	Meat use	Shell use
Oyster	Consumption	Painting (lime production) and pothole filling
Cockle	Consumption	Pothole filling and pavements in hotel and residential areas
Crab	Consumption	-
Welk	Consumption	-

All respondents consumed shellfish. Oysters are consumed daily, cockles, crabs, and welk are consumed weekly. According to respondents, the most consumed/purchased shellfish is the oyster, particularly during the Muslim Fast (locally Ramadan). Other shellfish, such as crabs and cockles, are cooked together in a local menu called “Ebbeh” and are mostly consumed by women. The welk is processed by drying and cooked with Jollof rice or white rice locally called “Mbahal”.

Some shellfish are inherently riskier than others based on factors such as nature of the environment, their feeding mode, the seasonal variations during harvesting, processing methods, and handling during sales and consumption. As such, a critical challenge is tissue contamination originating from run-off, marine pollution, and human sewage. Equally, shellfish may become contaminated during handling, processing, or preparation. Contributing factors may include storage and transportation at inappropriate temperatures, contamination by an infected food handler, or cross-contamination through contact with contaminated processing utensils.

The respondents reported no health-related conditions associated with shellfish consumption, specifically oysters. Consumption and health related challenges were not known to exist as the majority of the respondents said they have never witnessed nor been a victim. A few respondents did mention that they have heard people saying because oysters are filter feeders, they are poisonous to eat during the rainy season, noting experiences of some consumers who got sick (diarrhea) as a result.

All resource users interviewed were engaged in harvesting, processing, and trading, as well as consumption (100%). About 98% of the total number of shellfishers estimated in each community (of which 98% were female) were said to engage in harvesting, processing, trading, and consumption

(Table 3). This indicates a highly vertically integrated value chain with women harvesters dominating almost exclusively at every node. This implies that value chain improvements at any node can directly benefit women harvesters and creates an opportunity to incentivize behavior change for sustainable resource management.

Table 3: People engaged in the shellfish value chain.

Activity	Total number of people	Males	Females
Harvesting	514	8	506
Culture	60	0	60
Transportation	506	0	506
Processing	514	0	514
Retailing/Marketing	506	0	506
Consumption	514	8	506

Note: The same harvesters are engaged in all the activities mentioned in the table

Faced with many challenges such as reduced catches, reduced income, unhygienic conditions of work at landing sites, lack of value addition, limited capacity building on management, conservation, financial management, etc, the following remedial actions were proposed by respondents; diversified livelihoods, revolving loan scheme, construction of oyster market, training on hygiene and sanitation, resource and financial management.

#### 3.1.4. Species harvested

The most common shellfishes harvested by shellfishers in The Gambia are oyster, cockle, blue crab, and welk (Table 4). These shellfish inhabit mangrove roots, soft mud and fine sand, sandy muddy, and sandy areas.

Table 4: Shellfish species harvested in estuarine and mangrove ecosystems in The Gambia.

Scientific name	Common name (English)	Common name (local)	Habitat
<i>Crassostrea tulipa</i>	Oyster	Yahoos	Mangrove roots
<i>Senilia senilis</i>	Cockle	Pange/Bosso	Soft mud and fine sand
<i>Callinectes sapidus</i>	Crab	Nyankaro	Sandy muddy
<i>Galinia morio</i>	Welk	Toufa	Sandy

The presence of pearl oysters (*Pinctada* spp.) in West Africa is also documented for the first time with presence in The Gambia and Senegal.

### *3.1.5. Harvesting methods*

The tools utilized in harvesting are the small axe and cutlass for oysters and traps for crab. Cockles and welks are harvested by hand picking.

### *3.1.6. Harvest volumes and value*

Catch estimates range between 3 to 5 kilograms of oyster per person per day, 2 to 4 pans of 20 kilograms each of cockles per person per day, 1 to 3 pans of blue crab per person per day, and 1 to 2 kilograms of welk per day.

Oyster catch value per harvester operating within the Tanbi Wetland Complex is much higher than those operating in the hinterland. A cup of oyster meat (63 grams) within the Tanbi costs fifty Gambian dalasi (D50.00), approximately one US dollar (US \$1.00), while in the hinterland a cup of oyster meat costs thirty (D30.00) Gambian dalasi approximately US \$0.60 cents. Cockle harvesting is dominantly undertaken within the Alahein river estuary, specifically in Kartong where catch value is estimated between US dollars \$5.00 and \$15.00 per person per day. The catch value of the blue crab is estimated at between US dollars \$5.00 and \$10.00 per person per day within the Tanbi wetland and the Alahein river estuary. Welk harvesting is mostly concentrated in Kartong with a catch value between US dollars \$2.00 and \$5.00 per person per day.

### *3.1.7. Seasonality of harvests*

Oyster harvesting is seasonal for 4 months (March – June) within the Tanbi wetland and Alahein river estuary as per the Cockle and Oyster co-management plan. It is seasonal as well in other communities like Bintang, Bullock, Jinak Niji, and Jinak Kajateh where cockles, crabs, and welk are harvested 8 months from January to February and July to December. Despite a co-management plan, excessive harvesting during open season has been prevalent over the years in Tanbi and Alahein. This has resulted in decline in stocks and migration of some harvesters to other less populated oyster harvesting sites where there is no overexploitation, notably in Bullock, Kuloro, and the North Bank region. They establish camps in these locations, especially during the oyster closed seasons in the Tanbi and Alahein. Some members of the TRY Oyster Women's Association have suggested extending the closure of the Tanbi and Alahein to harvesting for a full year to allow regeneration of the stock. The suggestion was welcomed by a few, but efforts are underway to formalize the discussion to reach a common agreement, as per the adaptive management approach of the co-management plan.

## **3.2. Mangrove Ecosystem**

All respondents noted the important role played by mangroves, ranging from protection against erosion, habitat for a variety of aquatic organisms, spawning and breeding grounds for fish, salinity regulation, climate change mitigation, medicine, etc.

Despite their ecological significance, most of the respondents noted that mangroves are threatened by both natural and anthropogenic factors. Other mangrove uses are fuelwood, garden and working hut fencing, and house roofing. A few respondents noted medicinal usage, particularly fatigue relief. It was reported that most commercial mangrove exploitation is dominated by men. No direct income from mangrove trading was reported during the survey. Most respondents indicated that their locations have moderate and highly healthy mangrove vegetation.

### 3.3. Governance/Management Regimes

A co-management plan for cockles and oysters was developed and co-approved in 2012 by the Department of Fisheries, Department of Forestry, Department of Parks and Wildlife, National Environment Agency (NEA) and TRY Oyster Women's Association. Subsequently the plan was gazetted in 2013, delegating management responsibility and exclusive use rights to the oyster and cockle fisheries within the Tanbi Wetland Complex to TRY. The co-management plan establishes several management measures to ensure sustainability of the resources. This includes an annual 8-month closed season (July – February), a harvesting season from March – June annually, community exclusive zones, size limits of harvested species (6 cm minimum size for oysters), permanent and closed seasons in open access zones, gear restrictions to retain juvenile oysters and protect mangrove roots from being cut to harvest oysters, and penalties and fines for violation of rules.

Despite these restrictions, there are no daily harvest quotas set, harvesting is not monitored, and the number of harvesters is continually increasing with no plans to reduce the harvesting effort. The lack of monitoring in this fishery raises concern as there is no evidence to determine whether the harvest strategy is working and there are no harvest control rules in place.

The conservation, management and development of shellfisheries is a multi-institutional responsibility between the Department of Fisheries, the Department of Parks and Wildlife Management, the Department of Forestry, and the National Environment Agency as evidenced in their legal instruments and policies. The Fisheries Act of 2007, Section 14 and associated regulations of 2008, explicitly provide the authority for the Minister of Fisheries to designate special management areas for the purpose of community-based co-management in the interest of conservation, management and sustainable utilization of fisheries resources.

As a National Park of ecological importance, the Tanbi Wetland Complex was established in 2001 and declared a RAMSAR site in December 2007. The Management of the Park has been assigned to the Department of Parks and Wildlife Management. The complex covers a total area of about 6,300 hectares (of which mangroves make up 4,800 hectares). Under the oyster and cockle co-management plan, co-management committees were created to support the protection, regeneration, sustainable harvest and culture of oysters and cockles, and policing of mangroves from irresponsible exploitation and waste dumping. It is important to note that the complex is not designated as a no-go zone/area. Only sustainable shellfishery harvesting and fishing is allowed.

Despite the creation of these institutions, the shellfisheries for many years have not received adequate attention to support shellfishers, including social and economic factors, data collection and analysis (environmental, biological, and socio-economic) to inform decision-making on the degrading fishery situation, no officially designated shellfishery landing sites, lack of oyster markets, improper or no hygiene and sanitation facilities, particularly in communities outside Tanbi and Alahein, where some investments in water and sanitation at shellfish sites were made by USAID.

Oyster harvesters are organized into associations with some found outside the Tanbi being informal, while those within the Tanbi are legally registered with the Attorney General Chambers, Ministry of Justice. TRY was formed as an apex body to coordinate the activities of affiliated members beyond the level of individual communities, at the ecosystem level (i.e., the Tanbi), and nationally, however, due to limited capacity to respond to demand, TRY membership does not currently include communities from all shellfish harvesting areas in the country.

Aside from the oyster and cockle co-management plan for the Tanbi, communities outside the Tanbi have set up management rules for the conservation, management, and protection of oysters and mangroves. These rules are supported by village heads (Alkalos) and local government authorities like Councilors.

Two other national parks of ecological importance designated as Ramsar sites in The Gambia, the Niimi National Park and the Baobolon Wetland Reserve, together total about 25,000 hectares. These provide an opportunity for coordination among government institutions like what was instituted in the Tanbi to support management of shellfisheries and mangrove ecosystems through co-management governance frameworks with shellfish harvesting communities to achieve mutual objectives.

### 3.4. Climate Risk Mitigation

Most respondents noted that rainfall and drought are the major climate induced factors that affect the life and functioning of shellfish. This is the result of deforestation (terrestrial and mangroves) which leads to shortage of rainfall. These trees hold the ground water, prevent it from evaporation, and attract rainfall. In Kartong deforestation of mangroves for construction of an Immigration Post and private fishing gear shops, as well as the fishmeal plants cause losses to soil capacity to hold water. The same scenario also applies to Tanbi Wetland complex where the presence of mechanical car garages and huge residential presence leads to pollution effluents into the mangrove ecosystem. Use of inorganic fertilizer in agriculture near water bodies also causes pollution. The above threats reduce production of dissolved oxygen and alter the water chemistry, reducing distribution and reproduction of shellfish, causing mangrove die-back, and lead to migration of shellfish harvesters, etc. Concerning impacts of climate change on shellfisheries and mangrove livelihoods, the majority of respondents noted lack of knowledge.

Respondents noted measures to prevent drought, including planting more trees, mangrove regeneration, reducing/preventing water pollution, conducting periodic water quality monitoring and

organizing information, education, and communication programs for shellfish harvesters, their communities, and local government authorities so that the ecosystems are responsibly and sustainably conserved and protected. Most respondents are aware that irresponsible harvesting, particularly cutting of mangroves, suffocates aerial roots, prevents gas exchanges, and consequently causes mangrove die-back.

The climate change mitigation and adaptation measures employed by shellfishers and their communities are mangrove protection, mangrove replanting, mangrove restoration, cockle ranching (or transfer from one location to another for grow out), oyster culture, reduction in human (anthropogenic) behaviors such as cutting down mangroves, as well as enforcement of legal instruments and giving authorized powers to shellfishers' and communities.

### 3.5. TRY Oyster Women's Association Challenges and Successes

This section of the report provides a brief overview of the genesis and challenges of the TRY Oyster Women's Association and the strategies and activities that led to its successes at national, regional, and international levels.

TRY was created in 2007, tasked with responsibility to coordinate the activities of its members. Its members comprise (shellfish) harvesters such as oyster, cockle, crab, and welk. Its focus is to ensure environmental stewardship for sustainability of the livelihood of its members.

Weak affiliated associations, poor working conditions, low-income returns, irresponsible oyster harvesting methods and techniques, threatened habitat (cutting of mangrove for commercial fuelwood), pollution at processing sites, overexploitation of resources (oyster rush) are challenges faced by TRY.

TRY strategies to improve the above conditions included development of the Oyster and Cockle Fishery Co-management Plan with defined social, economic, biological, and ecological objectives. The plan specifies the several key management measures such as an 8-month annual closed season, a minimum size restriction (an oyster must be bigger than 6 cm to be harvested), and specified gear (use of small axe to remove mature oysters from the mangrove root to leave the root and juvenile oysters intact).

Flagship activities of TRY are oyster culture, mangrove replanting, value chain improvements, savings and credit (microfinance), etc. Over the longer term, the microfinance was unsustainable because of lack of knowledge/understanding by some members about the importance of financial management, and unlike traditional village savings and loan associations, the members of a shellfishers savings and loan group were not all from the same village.





Figure 2: Mangrove cutting (left). Municipal waste pollution (right).



Figure 3: Oyster culture (left). Mangrove replanting (right).





Figure 4: Value chain improvement (left). Savings and Credit (right).



Figure 5: Skills training of daughters of TRY Members (handbag weaving and tie & die).

TRY also conducted training for girls and women in health and adult literacy. Study tour visits were conducted notably in Benin, Ghana, and Senegal for exchange of skills and experience to build capacity for sustainable and adaptive shellfish and ecosystem management. There are also pilot family oyster farming activities in Old Jeshwang, Lamin, and Kartong. Creation of a TRY youth wing is on-going as a preparatory strategy for transferring responsibility for future stewardship of the shellfishery to the next generation. This youth wing has benefited from training by scientists from the University of Cape Coast in Ghana in oyster biology, physio-chemical data collection, and the use of water quality equipment. This training was funded by the USAID Women Shellfishers and Food Security Project. A few of these youths are now assigned data collection of processed oysters in Lamin, Kartong, and Bullock.

The achievements of the TRY Oyster Women's Association are significant, including exclusive use rights to the oyster and cockle fisheries in the Tanbi Wetlands complex institutionalized in a co-management plan by the government, 6,300 hectares of oysters and protected mangroves better

managed, increased income for TRY members, value chain improvements (a more than fourfold increase in the price per cup of oysters, 15 daughters of TRY members trained in a 2 year skills program, improved social cohesion, solidarity and conflict resolution around management of the oyster and cockle fishery, and in 2012 TRY was awarded the United Nations Development Program (UNDP) Equator Prize for its contribution to environmental protection and management.

## 4. Conclusion and Recommendations

The information gathered during the consultations and field visits undertaken confirm that in The Gambia oyster harvesters are residing close to mangrove areas which are suitable for oyster harvesting and spawning and are breeding grounds for fish and other aquatic animals. Employment, cheap animal protein intake, income generation, food security and poverty reduction are important components in the shellfishery, in which women are the dominant actors at all value chain nodes.

Despite the important role played by the shellfish habitats (mangrove ecosystems), potential threats to these areas are both anthropogenic and natural. The most relevant threats identified include illegal and irresponsible mangrove cutting, overharvesting, waste dumping (liquid and solid), including oil by vehicle mechanic garages specifically within Tanbi.

Several efforts by government, shellfish harvesters, and environmental organizations have been made to minimize these threats through development of management plans, creating co-management structures, mangrove afforestation, oyster culture, and training in responsible and sustainable shellfish harvesting.

Support is required to strengthen existing organizations in organizational management and leadership, and to support other harvesters to formalize their associations. This includes associations in Gibanack, Pirang, Bintang, Kuloro, and Bullock, among others.

Existing organizations should be supported to fully exercise the authorities already delegated to them. The aim would be to find ways to more effectively finance association operations and address open access shellfisheries. While management measures in place in the Tanbi may be slowing the pace of decline of the shellfisheries, current measures may not be reversing degradation trends, especially with additional pressure on the resources due to the COVID-19 pandemic over the last year. This process would be greatly facilitated by basic data on the shellfishery sufficient to establish and monitor simple and realistic reference points for harvest control rules based on the health of the shellfisheries.

Water, hygiene, and sanitation should be a priority, particularly for sites outside the Tanbi. This will boost health conditions of women and ensure hygienic shellfishery processing and marketing. Lack of preservation facilities and market space for shellfish harvesters is a concern, compelling them often during peak harvests to sell finished products to wholesalers at low prices. Working gear such as canoes, protective equipment and alternative livelihoods should also be given high priority.

The selected recommendations are the following:

- Strengthen associations on organizational management and supporting informal ones to become formal.
- Create awareness on the legal instruments mentioned in the report.
- Review existing or former family oyster culture outcomes and make recommendations for more profitable and sustainable ventures.
- Train shellfishers in financial management, hygiene, and sanitation.
- Re-introduce credit and savings previously undertaken based on lessons learned as there was a lack of trust coupled with lack of knowledge on financial management reported by members.
- Strengthen the 8-month closed season.
- Support sustainable diversified and alternative livelihoods.
- Strengthen enforcement of the seasonal shellfish closure and other regulations to ensure compliance by shellfishers, fishermen, and commercial mangrove dealers.
- Empower shellfish harvesters to take control of shellfish and mangrove stewardship within their communities through co-management plans.
- Expand the oyster and cockle co-management plan to cover all shellfish landing sites and add other shellfish in the co-management plan.
- Promote annual mangrove regeneration and restoration.
- Train residents along mangrove areas on water quality management.
- Support construction of shellfish markets and provide preservation facilities to reduce post-harvest losses and selling at low prices.
- Develop a communication plan under this project to facilitate networking and skills transfer.
- Organize study tours locally and externally between project beneficiary countries.

## References

- Biodiversity and Wildlife Act 2003. <http://extwprlegs1.fao.org/docs/pdf/gam158129.pdf>
- Chuku, E. O., Adotey, J., Effah, E., Abrokwah, S., Adade, R., Okyere, I., Aheto, D. W., Kent, K., Crawford, B. (2021). The Estuarine and Mangrove Ecosystem-Based Shellfisheries of West Africa: Spotlighting Women-Led Fisheries Livelihoods. USAID Women Shellfishers and Food Security Project. Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. Narragansett, RI, USA. 67 pp.
- Chuku, E. O., Abrokwah, S., Adotey, J., Effah, E., Okyere, I., Aheto D. W., Duguma, L., Oaks, B., Adu-Afarwuah, S. (2020). Literature Review for the Participatory Regional Assessment of the Shellfisheries in 11 Countries from Senegal to Nigeria. USAID Women Shellfishers and Food Security Project. Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. Narragansett, RI, USA. WSFS2020\_05\_CRC. 102 pp. [https://www.crc.uri.edu/download/WSFS2020\\_05\\_CRC\\_FIN508.pdf](https://www.crc.uri.edu/download/WSFS2020_05_CRC_FIN508.pdf)
- Fisheries Act. (2007). [https://www.ilo.org/dyn/natlex/natlex4.detail?p\\_lang=&p\\_isn=87116&p\\_country=GMB&p\\_court=44](https://www.ilo.org/dyn/natlex/natlex4.detail?p_lang=&p_isn=87116&p_country=GMB&p_court=44)
- Fisheries Regulations. (2008). <http://extwprlegs1.fao.org/docs/pdf/gam177699.pdf>
- Forestry Act. (1998). <https://www.ecolex.org/details/legislation/forest-act-1998-lex-faoc019052/>
- Gambia Government, Ministry of Fisheries, Water Resources and National Assembly Matters, Gambia. (2012). Cockle and Oyster Fishery Co-management Plan, for Tanbi Special Management Area, the Gambia. 37 pp. [https://www.crc.uri.edu/download/Oyster\\_Plan\\_Jan\\_2012\\_508\\_Signatures.pdf](https://www.crc.uri.edu/download/Oyster_Plan_Jan_2012_508_Signatures.pdf)
- Mendy, A. (2009). Overview of the Gambia Fisheries Sector.
- National Environment Management Act, 1994. <https://www.ecolex.org/details/legislation/national-environment-management-act-1994-act-no-13-of-1994-lex-faoc006275/>
- TRY Oyster Women Association, attendance register.