WOMEN SHELLFISHERS AND FOOD SECURITY PROJECT

PARTICIPATORY ASSESSMENT OF SHELLFISHERIES IN THE ESTUARINE AND MANGROVE ECOSYSTEMS OF **GUINEA-BISSAU**

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

Citation: Mancali, N., Adotey, J., Chuku, E. O., Josephs, L., Kent, K. and Crawford, B. (2021). Participatory Assessment of Shellfisheries in the Estuarine and Mangrove Ecosystems of Guinea-Bissau. 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. 2**6** 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: João Landim shellfishing community visited during field surveys.

Photo Credit: Nua Mancali

Detailed Partner Contact Information

Karen Kent	Project Director, CRC	Email: karenkent@uri.edu
Kirstin Siex	AOR	Email: ksiex@usaid.gov
William Akiwumi	AAOR	Email: wakiwumi@usaid.gov
Jaime Raile	AO	Email: jraile@usaid.gov

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

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

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

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

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

For additional information on partner activities:

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

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

CCM	Centre for Coastal Management
CIPA	Centre d'Investigation Appliquée des Produits Halieutiques (Centre for Applied Fisheries Research)
CRC	Coastal Resources Center
F CFA	West African CFA Franc
GDFPA	General Directorate of Artisanal Fisheries
NGO	Non-governmental Organization
UCC	University of Cape Coast
URI	University of Rhode Island
USAID	United States Agency for International Development
USD	United States Dollar

Executive Summary

Basic Contextual Information	
Country	Guinea-Bissau
Total land area	36,125 km^2
Population	1.874 million (2018)
Percentage population living in/near the coast	60%
Gross Domestic Product (GDP)	1.44 billion USD (2019)
Human Development Index Rank	0.461 (178 out of 189)
Length of coastline	350 km
Fish consumption (as a percent of animal protein)	35%
Anemia prevalence	68% among under-five children 43.8% among women of reproductive age (15-49) 51% among pregnant women
Estimated mangrove cover	257,169 ha
Estimated estuarine and mangrove ecosystem-based shellfish harvesters	836
Estimated women shellfish harvesters (percent)	74%
Estimated direct household shellfish beneficiaries	8,596
Estimated percentage of shellfish harvesters at all nodes of the value chain (vertical integration)	-
No. of coastal systems with mangrove-based shellfishing	10+
Shellfish management regulations	Decree-Law No. 10/2011 - Basic Fishing Legislation Decision No. 21/92 - Regulating Fishing Activity into Exclusive Economic Zone (EEZ) Decree No. 24/2011 - Artisanal Fisheries

Mangrove management regulations	Forest Law - Articles 10-11, 14, 18, 26, 35, 46, 55 Protected Areas Decree - Articles 3, 24, 26-29, 34
Coastal ecosystems with shellfisheries identified as Ramsar sites	Rio Cacheu Mangroves Natural Park = 88,615 ha Archipel Bolama-Bijagós = 1,046,950 ha

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

This report details results from a participatory assessment of the scale and scope of shellfisheries and shellfish-based livelihoods as they relate to mangrove systems and coastal water bodies in Guinea-Bissau. This includes demographic and socioeconomic information on shellfish harvesters and other shellfish value chain actors, the nature of shellfishery engagement of these individuals, the status of shellfisheries and mangrove systems, and any existing governance and management regimes. Ten shellfishing communities were identified in the coastal region of Guinea-Bissau and of these, four were surveyed for this participatory assessment. The field survey team was only able to achieve participation from four resource-users, and as such assessment results should be considered a glimpse into shellfishing livelihoods in the country rather than a comprehensive assessment.

A conservative estimate of 836 persons, the majority of which are females, are engaged in shellfisheries livelihoods in Guinea-Bissau. An estimated 8,569 persons are direct household shellfisheries beneficiaries. Further estimates of those surveyed through this participatory assessment indicate that the numbers may be much higher, as high as 2737 persons. According to local key informants, shellfisheries in Guinea-Bissau are women dominated and multi-tribal. The shellfishery sector includes almost all the country's ethnic groups, with highest representation from the Mandingo and the Fulani ethnic groups. The Bijago, Balanta, Beafada, Manjack, Mancanhe, and Nalu groups of Guinea-Bissau are also commonly known to practice shellfishing livelihoods. Shellfish harvesting is traditionally considered a women's activity in Guinea-Bissau and accordingly, women have traditionally been the majority stakeholders in the sector. However, in recent times, more men have become involved in the industry as a secondary or tertiary occupation. Shellfish harvesters in Guinea-Bissau range in age from 13 to 60 years for both genders. The shellfisheries surveyed are harvested using small axes, cutlass, and by hand picking. Oyster was reported the most popular product and the most demanded by consumers, thereby generating the most income for producers.

Information from field survey participants and key informants suggests that some women harvesters in Guinea-Bissau are active at every node of the shellfish value chain. This evidence of a vertically integrated value chain from harvesting through to consumption implies that value chain improvements at any node could directly benefit at least some women harvesters, creating an opportunity to incentivize behavior change for sustainable resource management.

Survey participants indicated that harvested shellfish is often sold in local community markets, although middlemen also buy and sell it to more distant and large markets. Aside from consumption, additional uses of shellfish products (i.e., shells) include paint making, construction, use in pavement and creating roads (particularly those leading to oyster landing sites), and the filling of potholes. It was observed that mangroves are exploited for cooking, smoking fish and shellfish, and making fences and roofs.

Resource users noted that mangroves are not exploited for income generating purposes, rather only dead/dry mangrove material is used as fuelwood, fencing, or other construction.

Several efforts by government, shellfish harvesters, and environmental organizations have been made within the country to minimize threats through mangrove afforestation and training in responsible and sustainable shellfish harvesting. The study showed that a few organised (formal and in-formal) associations exist to regulate the activities of shellfishers. Largely though, policies and laws regarding the management of fisheries and mangrove habitat at the national level are weak Shellfisheries and mangrove ecosystems in Guinea-Bissau contribute to employment creation, relatively cheap sources animal protein, income generation, food security, and poverty reduction.

1. Introduction

Guinea-Bissau is located on the west coast of Africa, bordering Senegal to the north, Guinea to the south and east, and the Atlantic Ocean to the west. Also part of the territory of Guinea-Bissau is the archipelago of Bijagós, formed by more than 80 islands. Nearly two-thirds (60%) of the country's population are living at or near the coast. A majority of the population is also living below the poverty line on less than $1.90 a day (World Bank, 2020). Life expectancy is one of the lowest in the world at 58 years in 2019 (World Bank, 2019).

Official information on the scale and scope of shellfishery activities in Guinea-Bissau is largely not available. In terms of other local natural resource livelihoods, agriculture is responsible for supporting more than 75% of the local labor force, and as an economic activity occupies 12% of the territorial area of Guinea-Bissau (Havik et al., 2018, World Bank, 2020).

National figures indicate that fishing broadly (not shellfishing specifically) is also an important component of the national economy, with shrimp being a substantial export product (CIA, 2019). According to the General Directorate of Artisanal Fisheries (DGFPA) (the institutional body tasked with managing natural resources in Guinea-Bissau's jurisdictional waters) the percentage of individuals with fishing as their primary livelihood exceed 50% of the total population in the regions of Bissau and Cacheu (see Guinea Bissau, 2014). In fact, the proportion for Bissau is 100%. In these areas, fishing is more profitable due to the proximity of higher value markets in Bissau and southern Senegal.

Migration is not considered to be an essential component of fishing livelihoods in Guinea-Bissau, suggesting that fishers are operating close to home. Most owners of Guinean fishing units are relatively old and fish with their children and other family members (Intchama, Belhabib, & Jumpe, 2018). Senegalese fishermen are known to contribute to the training of local Guinea-Bissau fishing crew members. Artisanal fishing in Guinea-Bissau is practiced in canoes, mainly in coastal areas and within channels that separate the different islands of the Bijagós archipelago. According to a stock assessment conducted in 2011 by the Centre d'Investigation Appliquée des Produits Halieutiques (CIPA), Guinea-Bissau hosts about 14,958 tons of shellfish (SRFC, 2021).

The regulatory and management environment pertaining to mangrove habitat and fisheries broadly is weak in Guinea-Bissau. Regulation of the use of the country's 'biological aquatic resources' including

fish, molluscs, and crustaceans, is outlined across various legislation such as the Basic Fishing Legislation (Decree-Law No. 10/2011), Regulation of Fishing Activity into Exclusive Economic Zone (Decision No. 21/92), and Regulation of Artisanal Fisheries (Decree No. 24/2011), though the details of this legislation is largely outside of the scope of shellfish harvest occurring in coastal and estuarine habitat. There are several components of both the national Forestry Law (Articles 10-11, 14, 18, 26, 35, 46, 55) and national Protected Areas Decree (3, 24, 26-29, 34) that extend regulations to mangrove habitat as a type of forest. Lack of knowledge or monitoring on the scale of fishing and shellfishing activity nationally is a concern among local management authorities, with only 8% of fishing village heads officially registered. At least one women shellfishers association engaged in management and habitat restoration efforts is known of within the Ilha Formoza community.

The current study assesses the scale and scope of shellfisheries and shellfish-based livelihoods connected with mangrove systems and coastal water bodies in Guinee-Bissau 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.

2. Methodology

2.1. Study sites

Desk research was conducted to identify a tentative list of stakeholders in the shellfisheries industry. This was followed up by key informant interviews and stakeholder consultations to categorize stakeholders into government, resource users, academia/research institutions and civil society organisations. Dominant shellfishing communities were also identified. In total, 10 shellfishing communities were identified as a sample of those present across Guinea-Bissau's coastal region and are listed in Table 1. However, though 10 major communities and water bodies were pre-identified for the survey, it was difficult to access respondents during the survey because (i) it was a rainy season

which meant that they were busy with their livelihoods (ii) there was apathy among target communities to provide information due to the professional background of the interviewer (as a journalist) and misunderstanding of the purpose of the assessment. This greatly affected the number of respondents available for the survey. Ultimately, four of the 10 identified communities (see Table 1 and Figure 1) were represented among survey participants; these communities were Joao Landim, Fulacunda, Ilha Formoza, and Cafine.

Table 1: Shellfishing communities and associated water bodies in Guinea-Bissau.

	Community	Name of water body	Type of water body
1	Fulacunda	Estuario de Rio Grande de Buba	Estuary
2	Biombo	Rio Geba	River
3	Cacheu	Rio Cacheu	River
4	Cacine	Rio Cacine	River
5	Buba	Rio Grande de Buba	River
6	Joao Landim	Rio Mansoa	River
7	Cafine	Rio Cafine	River
8	Ilha Formoza	zona Insular	Island zone/Peninsula
9	Mansoa	Estuario de Rio Mansoa	Estuary
10	Bubaque	zona Insular	Island zone/ Peninsula

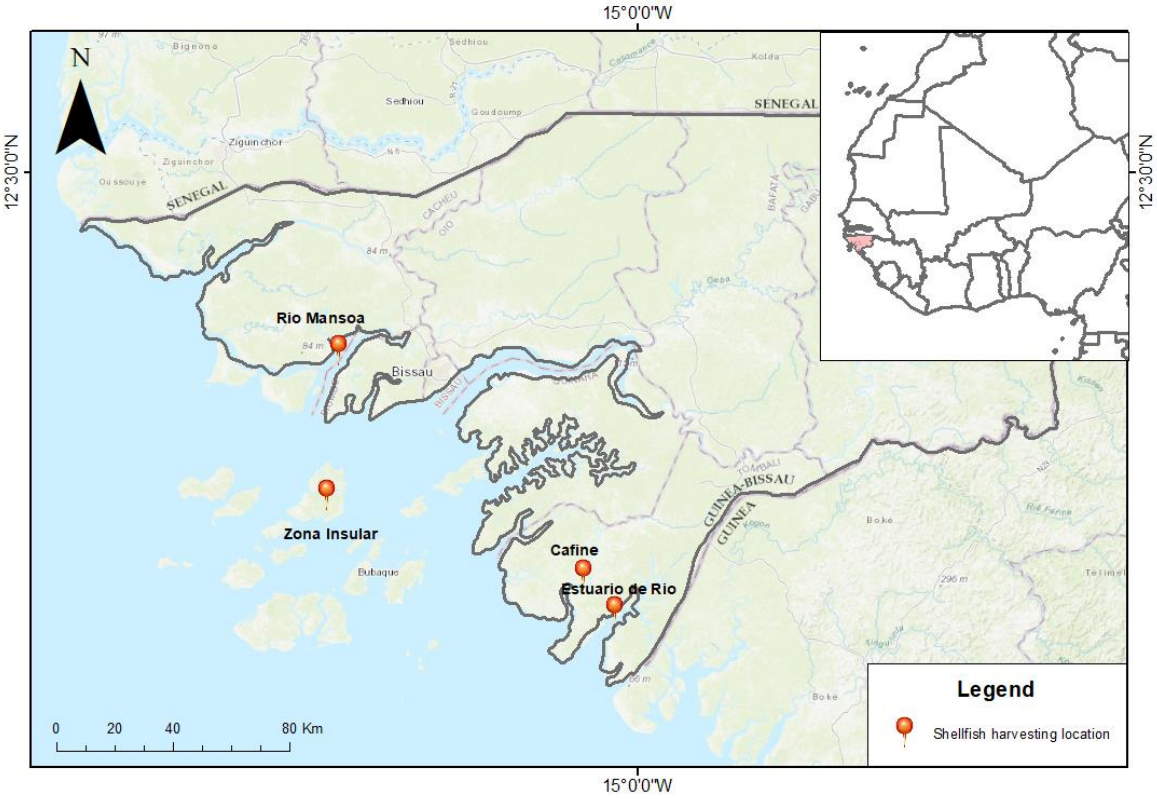

Figure 1: Map showing sampled shellfishing harvesting locations along the Guinea-Bissau coast.

2.2. Field survey/data collection

Data collection was carried out by participatory engagement of key stakeholders from May 2021 to August 2021. Stakeholders were categorized into two groups namely resource user and non-resource user as described in the section above. The non-resource user group was ultimately composed of only individuals from government institutions. In all, four shellfish resource users participated via semi-structured interviews during field surveys and two government officials participated via semi-structured interviews as key informants. The survey instrument is available in the regional summary report (Chuku et al, 2021).

2.3. Summarized background data

The four participating shellfish resource users were women, and the two government officials were men. The ages of the respondents ranged from 33-52 years. The government officials interviewed were (1) a marine biologist and former director of the CIPA (department within the Ministry of Fisheries responsible for quality control of fisheries products), and (2) a cold chain engineer and civil servant of the Ministry of Fisheries and Maritime Economy.

3. Status of Shellfisheries

3.1. Shellfish exploitation

Joao Landim, Fulacunda, Ilha Formoza, and Cafine communities (Figure 1) were sampled through field surveys, and it was confirmed that shellfishing activity takes place in each. Fulacunda, Fulacunda Sector, Quinara Region, is in the south of the country. This community is made up of 3 localities, namely Fulacunda, Dada 1, and Dada 2. Cafine is surrounded by different localities in the Quitáfine Sector, Tombali Region, in the southern part of the country. The João Landim, Safim Sector, Biombo Region is in the centre of the country. Here, the women shellfishers come from different localities and often camp along the Mansoa River. Most will camp throughout the different seasons, including the rainy season, during which they simultaneously shellfish and grow rice. Ilha Formosa is an island in the Bijagos archipelago, Canhabaque Sector, Bubaque Region. Of note within this community is that there exists a local women's association with members primarily selling shellfishing products that has received several trainings with the financial and technical support of a local non-governmental organization (NGO) (Tiniguena), including on methods of oyster farming and mangrove restoration.

According to local key informants, shellfisheries in Guinea-Bissau are women dominated and multi-tribal. The shellfishery sector includes almost all the country's ethnic groups, with highest representation from the Mandingo and the Fulani ethnic groups. The Bijago, Balanta, Beafada, Manjack, Mancanhe, and Nalu groups of Guinea-Bissau are also commonly known to practice shellfishing livelihoods.

3.1.1. Estimated number of shellfishers

Information on the number of shellfish harvesters in Guinea-Bissau 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.

A conservative estimate of 836 persons, the majority of which are females, are engaged in shellfisheries livelihoods in Guinea-Bissau. An estimated 8,569 persons are direct household shellfisheries beneficiaries based on average household sizes of shellfishers. These figures were derived from the regional summary report on shellfishing livelihoods in West African countries (Chuku et al., 2021). Further estimates of those surveyed through this participatory assessment indicate that the numbers may be much higher, as high as 2737 persons, and a detailed breakdown of these figures is presented in Table 2. These discrepancies are due to limitations in data collection systems for shellfisheries and the limitations of this survey to further cross-reference reported estimates. In general, shellfish harvesters come from large families with between 3 and 17 members in each family. According to the

information gathered during the field surveys, shellfish harvesting is practised by a population ranging in age from 13 to 60 years old for both genders, with a low percentage of adolescents (13 to 17 years old).

Table 2: Estimated numbers (n) and age ranges of shellfish harvesters.

	Name of community/ Name of water body	Adult Males		Adult Females		Children	
		n	Age range	n	Age range	n	Age range
1	Fulacunda/Estuario de Rio Grande de Buba	23	20-50	67	18-55	30	14-18
2	Biombo/Rio Geba	86	19-55	269	18-60	56	13-18
3	Cacheu/Rio Cacheu	65	19-50	233	18-60	58	13-18
4	Cacine/Rio Cacine	115	19-50	354	18-60	79	14-18
5	Buba/Rio Grande de Buba	25	20-45	83	19-50	15	15-18
6	Cafine/Rio Cacine	45	20-48	158	18-50	56	14-18
7	Joao Landim/Rio Mansoa	25	20-50	122	19-55	21	15-18
8	Mansoa/Estuario de Rio Mansoa	21	20-48	66	19-50	17	14-18
9	Bubaque/Zona Insular	167	19-55	289	19-60	83	13-18
10	Ilha Formoza/zona Insular	27	19-60	71	19-58	11	14-18
	Total	599		1712		426	

3.1.2. Insights on gender in shellfish exploitation

Women are the majority stakeholders in the sector as shellfish harvesting is traditionally considered a female activity and women represent on average nearly three quarters (74%) of harvesters (Table 2). However, it was reported that in recent times more men have become involved in the industry as a secondary or tertiary occupation. There are few men in the harvesting sector of shellfisheries in Guinea-Bissau. Men are considered better equipped to transport shellfish as well as harvest and provide firewood for shellfish processing. Some men are reported to be involved in the commercialization of the shell products (e.g., as decorations). Overall, men are primarily just consumers of shellfish, whereas women are harvesters, processors, buyers/sellers, as well as consumers.

3.1.3. Shellfishing as primary occupation

In all the communities surveyed, shellfishing is not reported as the primary activity for either men or women, although it is very frequently practiced by some (particularly women) and is practiced occasionally by most men. It was observed that the women in the sector are horticulturalists and

almost all the men are farmers. Thus, shellfish fishing is commonly considered a secondary activity, although some people engage in it almost daily.

3.1.4. The shellfish value chain

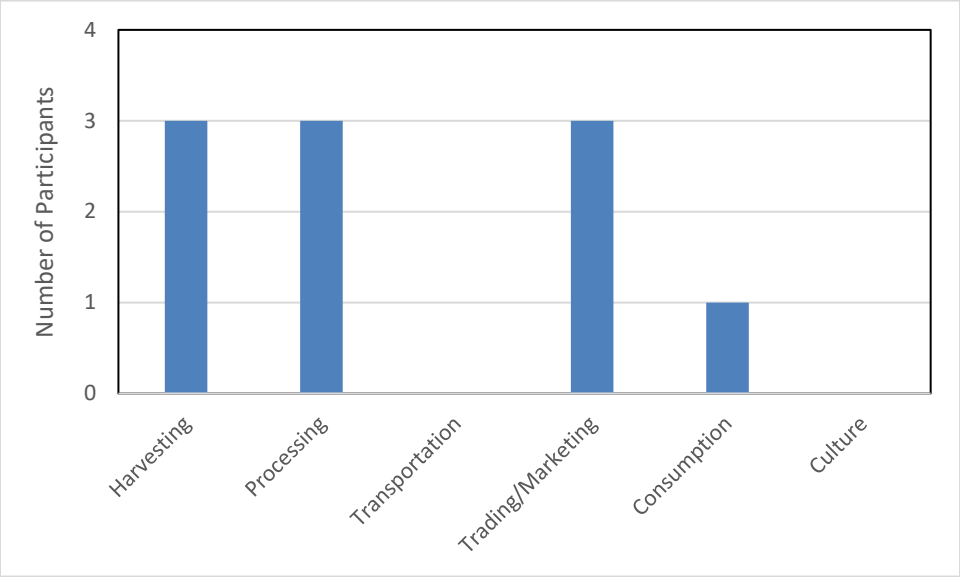

Figure 2: Number of survey participants (n=4) active at each node of the shellfish value chain in Guinea-Bissau.

Half of the small pool (n=4) of field survey participants reported being active throughout the shellfish value chain (harvesting, processing, and trading shellfish), while one respondent was slightly less integrated as a harvester and trader, and one respondent worked only in processing (Figure 1). The consensus from field surveys and key informant interviews was that women in Guinea-Bissau are mainly shellfish harvesters but also processors, sellers of bulk quantities, and retailers of smaller quantities in local markets, while men are more often transporters, buyers, and wholesalers. The role of children (13-18 years old) consists mainly of assisting their parents in the transportation, processing, and/or marketing of shellfish products. It was expressed that the withdrawal of men's support would not halt the harvesting of the shellfish entirely but rather would simply impede the productivity of the sector as it is currently structured. The removal of men from the value chain is seen to have the potential to slow the rate as well as the volume of production, but women are considered to be able to do everything from harvesting through to consumption. The evidence that at least some women harvesters are active at every node from harvesting through to consumption suggests that the shellfish value chain in Guinea-Bissau may be vertically integrated, implying that value chain improvements at any node could directly benefit at least some women harvesters and create an opportunity to incentivize behavior change for sustainable resource management.

Table 3: Methods of processing harvested shellfishes.

Shellfish name	Use (consumption/sale)	Method of preparation/processing
Oyster	Sale and consumption	Boiled, pre-cooked, then dried
Scallops	Sale and consumption	Boiled, pre-cooked, then dried
Giant hairy melongena	Sale and consumption	Boiled, then dried
Grooved razor clam	Sale and consumption	Boiled, then dried
Crab	Mainly consumption	Cooked

According to survey responses, the meat of shellfish is known to be tasty and nutritious. However, results showed that the small pool of participating shellfishers typically only consume shellfish once a week and instead focus more on selling shellfish products to meet family needs. Most shellfishes are exploited for consumption and selling (Table 4). There were no identified or reported adverse health conditions associated with the consumption of shellfish, it was reported that consuming shellfish is commonly regarded as promoting the health of the consumer.

Table 4: Common uses of shellfish.

Shellfish name	Meat	Shell
Oyster	Consumption and selling	-
Scallop	Consumption and selling	Decoration, pavement, dying
Giant hairy melongena	Consumption and selling	Decoration
Grooved razor clam	Selling	Decoration
Crab	Consumption	-

3.1.5. Species harvested

From field survey and key informant interviews, it emerged that the most fished species, in order of importance based on catch volume and availability, are:

i. The oyster *Ostrea edulis,* commonly called 'ostra' in Guinea-Bissau – this is by far the most common shellfish species in the country (see Table 5).
ii. Scallops, *Pecten maximus* called Concha de vieira in Portuguese or Combé – in some local dialects, the scallop is nearly as common as the oyster.
iii. Crab, *Bracyura* or Carangueijos in Portuguese – this crab species is present in almost all fishing areas.
iv. Giant hairy Melongena, *Pugilina morio* or Gandi in local language – this species is common but not as widespread as the previous three.

v. Grooved razor clams, *Solen Guineensis* or Lingueirão in Portuguese – this species is the least widespread within the top five most common species but is very abundant in certain localities.

Table 5: Common shellfish by ecosystem and their local, common English, and scientific names.

Fulacunda Estuary			
	Common Name (local)	Common Name (English)	Scientific Name
1	Ostra	Oyster	*Ostrea edulis*
2	Combé	Scallop	*Pecten maximus*
3	Gandi	Giant Hairy Melongena	*Pugelina Morio*
4	Lingueirão	Grooved Razor Clam	*Solen guineensis*
Ilha Formosa Island			
	Common Name (local)	Common Name (English)	Scientific Name
1	Ostra	Oyster	*Ostrea edulis*
2	Combé	Scallop	*Pecten maximus*
3	Lingueirão	Grooved Razor Clam	*Solen guineensis*
4	Gandi	Giant Hairy Melongena	*Pugelina morio*
Cafine River			
	Common Name (local)	Common Name (English)	Scientific Name
1	Ostra	Oyster	*Ostrea edulis*
2	Combé	Scallop	*Pecten maximus*
3	Gandi	Giant Hairy Melongena	*Pugelina morio*
4	Lingueirão	Grooved Razor Clam	*Solen guineensis*
5	Carangueijo	Crab	*Brachyura*
João Landim or River Mansoa			
	Common Name (local)	Common Name (English)	Scientific Name
1	Ostra	Oyster	*Ostrea edulis*
2	Combé	Scallop	*Pecten maximus*
3	Gandi	Giant Hairy Melongena	*Pugelina morio*
4	Lingueirão	Grooved Razor Clam	*Solen guineensis*

Cachéu River			
	Common Name (local)	Common Name (English)	Scientific Name
1	Ostra	Oyster	*Ostrea edulis*
2	Combé	Scallop	*Pecten maximus*
3	Lingueirão	Grooved Razor Clam	*Solen guineensis*
4	Gandi	Giant Hairy Melongena	*Pugelina morio*
5	Carangueijo	Crab	*Brachyura sp.*

Table 6: Habitats of common shellfish in Guinea-Bissau.

Species name	Habitat(s)
Oyster	Mangroves roots
Scallop	Mangroves and sandy substratum
Giant hairy melongena	Sandy-mud substratum
Grooved razor clam	Sandy-mud substratum or stones
Crab	Mangroves or sandy substratum

3.1.6. Harvesting methods

Harvesting methods used for some of the most exploited shellfish species in coastal and estuarine habitats in Guinea-Bissau are detailed in Table 7.

Table 7: Methods of harvesting common shellfish in Guinea-Bissau.

Shellfish Common Name	Method of Harvesting	Gender of Harvesters
Oyster	Cutlass and/or knife used to detach from the roots	Women and men
Scallop	Hand picking	Women (majority) and men
Giant hairy melongena	Hand picking or digging in the sandy-mud substratum	Women
Grooved razor clam	Hand picking on/in the stones	Women
Crab	Handpicking	Women

3.1.7. Harvest volumes and value

Survey participants indicated that harvested shellfish is often sold in local community markets, although middlemen also buy and sell it to more distant and large markets. The common oyster species *Ostrea edulis* was reported the most popular product and the most demanded by consumers, thereby generating the most income for producers. Large resellers or wholesalers buy shellfish in bulk quantities at the weekly markets to resell it in the sub-region (i.e., Guinea Conakry, Senegal, Gambia, Mali) – this is true of the scallop species *Pecten maximus*, which is highly desired and consumed by that area's population. It was also reported that a significant market for these oyster and scallop species exists among visiting European tourists. On the local market, the cost of oyster typically ranges from 800-1,200 F CFA ($1.6-2.2 USD) per kilogram of product. Scallop were reported to cost slightly less; between 800-1000 F CFA. Giant hairy melongena and grooved razor clams are similarly priced to oysters and scallops but are less available. Crab has similarly limited availability but prices for crab are lower than for other shellfish. In most communities, crab is harvested solely for home consumption. It was reported that some women harvesters can earn up to 3,500 F CFA ($7 USD) per day of fishing and between 40,000-70,000 F CFA ($65-125 USD) per season.

3.1.8. Seasonality of harvests

Fishing for molluscs and shellfish is practised almost throughout the year, except for giant hairy melongena, grooved razor clams, and scallops. These species are collected in shallow, rocky areas and if seasonal rains increase water levels beyond a managing range the harvest of these two species is suspended from August to roughly December or January (see Table 8). Oysters and crabs are reported to be harvested all year round. Harvest is reported to occur a minimum of once a week and a maximum of five times a week.

Table 8: Seasonality of shellfish harvesting.

Shellfish name	Yearlong/ Seasonal	Harvest months (if seasonal)	Frequency of harvest
Oyster	Yearlong		2 to 3 times a week
Scallops	Seasonal	From January to August	2 to 3 times a week
Giant hairy melongena	Seasonal	From January to August	1 to 2 times a week
Grooved razor clam	Seasonal	From January to August	1 to 2 times a week
Crab	Yearlong		4 to 5 times a week

3.2. Mangrove ecosystem

According to key informants, the various species of mangrove present in Guinea-Bissau are *Rhizophora racemosa*, *Conocarpus erectus*, *Rhizophora harrisoni*, and *Avicennia africana*. In some communities, hectares of mangrove habitat are being destroyed by coastal pollution and anthropogenic factors. Mangrove exploitation is carried out by both men and women in Guinea-Bissau's coastal communities.

Often, the harvested mangrove materials are used for cooking, smoking fish and shellfish for the purpose of marketing or personal consumption, or for making fences and roofs.

Survey responses indicate that people are not typically making any direct income from trading mangrove material. The consensus among participants was that are still large tracts of mangrove habitat and that these areas appear to be in good health. Additionally, there was a shared desire for increased commitment for the maintenance and conservation of the local mangrove ecosystem, seen as "an essential habitat for the reproduction of marine and river species" (Anonymous, 2021).

3.3. Governance/Management Regimes

At the government level, policies, and laws regarding the management of fisheries and mangrove habitat in Guinea-Bissau are weak. Some types of forest benefit from protection and conservation measures derived from ancestral beliefs in their regions, but this does not apply to mangroves. According to key informants, although seasonal closures (i.e., biological rest periods) are much discussed at the local stakeholder level, currently none such measures exist for any species.

According to field survey participants, some shellfish harvesters at Ilha Formosa belong to a women's association. The group is said to focus on selling shellfish products from the island and has received several trainings with the financial and technical support of local NGO Tiniguena including on methods of oyster farming and mangrove restoration. The association brings together not only the women sellers, but also the women and men of the island who are involved in different nodes of the sector value chain. There are reportedly other formalized groups in Fulacunda and Cafine. At Fulacunda, members belong to a legalised group called NAAFI (meaning “We have the benefit” in the Mandinga dialect) and the river that serves as their fishing ground is the Rio Grande de Buba. In Cafine, the majority of both women and men who participate in the shellfishery have membership in the legalised QUITAPESCA (meaning “fisheries development” in the Biafada dialect) Association. These groups together with civil societies in the communities work to engage stakeholders on the importance of conserving mangroves and shellfisheries.

3.4. Climate Risk Management

Sea level rise and rainfall were reported as the major climatic factors driving seasonality and feasibility of shellfisheries livelihoods in coastal Guinea-Bissau. According to survey participant responses, livelihoods derived from shellfishing and mangrove exploitation in these areas are not considered by local communities to substantially affect the climate.

4. Conclusions and Recommendations

4.1. Conclusions

Ten shellfishing communities were identified in the coastal region of Guinea-Bissau and of these, four were surveyed for this participatory assessment. The field survey team was only able to achieve participation from four resource-users, and as such assessment results should be considered a glimpse into shellfishing livelihoods in the country rather than a comprehensive assessment.

Survey participants are mainly exploiting oysters as the most economically important species. Women are the majority stakeholders in the sector as shellfish harvesting is traditionally considered a female activity. However, in recent times more men have become involved in the sector through secondary or tertiary occupations. Harvesters across communities were reported to represent an age range of 13-60 years for both genders.

It was observed that mangroves are exploited for cooking, smoking fish and shellfish, and making fences and roofs, and that communities do not make any direct income from trading the mangrove material. The assessment showed that a few organised (formal and informal) associations exist to regulate the activities of shellfishers.

4.2. Recommendations

It is recommended that the following activities are implemented to improve shellfishing livelihoods in Guinea-Bissau:

i. More comprehensive assessment of the scale and scope of shellfishing livelihoods with higher participation from resource users.
ii. Construction of preservation facilities to reduce post-harvest loss in shellfishing product.
iii. Strengthened markets for more rapid evacuation of shellfishing product.
iv. Protective materials and equipment for harvesters.
v. Support for strengthening associations regarding organizational management and support for formalizing currently informal associations.
vi. Promotion of capacity in shellfish culture and farming in harvesting communities.
vii. Training in financial management, hygiene, and sanitation.
viii. Creation of, or increased access to, credit and savings institutions.

References

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

Central Intelligence Agency. (2019). *Country Profiles: Guinea-Bissau.* The World Factbook. Available online: https://www.cia.gov/the-world-factbook/countries/guinea-bissau/ (accessed on November 29, 2021).

Guinea Bissau. (2014). *Fifth national report to the Convention on Biological Diversity* (Issue October, p. 164). Secretary of the state for Environment and Tourism.

Havik, P. J., Monteiro, F., Catarino, S., Correia, A. M., Catarino, L., & Romeiras, M. M. (2018). Agro-economic transitions in Guinea-Bissau (West Africa): Historical trends and current insights. *Sustainability (Switzerland)*, *10*(10), 1–19. https://doi.org/10.3390/su10103408

Intchama, J.F., Belhabib, D. and Jumpe, R.T. (2018). Assessing Guinea Bissau's legal and illegal unreported and unregulated fisheries and the surveillance efforts to tackle them. Frontiers in Marine Science: 5.

SRFC. (2021). *Guinea Bissau: State of the resources*. Sub-regional Fisheries Commission. Available online: https://spcsrp.org/en/guinea-bissau (accessed on November 29, 2021).

World Bank (2020). *Poverty and equity brief: Guinea-Bissau* (Issue September, pp. 47–48). World Bank Group.

Appendices

Appendix 1. Visits to Shellfishing Communities

Photo A.1: Shellfish processing centre at João Landim community.

Photo A.2. Men waiting to help women in transporting their shellfishes at Cafine community.

Photo A.3. Canoes used for harvesting shellfish at Cacheu community.

Photo A.4. Mangroves fringing shellfish a harvesting site at Cacheu community.

Appendix 2: Contact Information of Women Shellfishers

(Spreadsheet)

Appendix 3: Non-Resource User Key Informant Participants

(Spreadsheet)