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WOMEN SHELLFISHERS AND FOOD SECURITY PROJECT

PARTICIPATORY ASSESSMENT OF SHELLFISHERIES IN THE ESTUARINE AND MANGROVE ECOSYSTEMS OF TOGO



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Cover photo: Oyster fisher shucking oysters

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ACRONYMS

APCP	Prefectural Association for the Conservation and Promotion of Resources of the Lagoon System
BAD	African development bank
CCM	Centre for Coastal Management
CEDEAO	Economic Community of West African States
CoGes-DLT	Local Management Committee of the Lake Togo Delta
CPDD	Prefectural Committee for Sustainable Development of Lakes
CRC	Coastal Resources Center
CVD	Village Development Committee
CVG	Village Management Committee
DE	Directorate of Livestock
EEZ	Exclusive Economic Zone
FEM	Global environment fund
FFEM	French funds for world environment
HCM	High Level Advisory Council for the Sea
IUCN	International Union for the Conservation of Nature
MCN	Ministry of Cooperation and NEPAD
MEOR	Forest Landscape Restoration Opportunities Assessment Methodology
MERF	Ministry of environment and forest resources
NGO	Non-Governmental Organization (French: ONG)
UCC	University of Cape Coast
URI	University of Rhode Island
USAID	United States Agency for International Development
UTF	Unilateral Trust Fund of FAO
WACA	West African Coastal Areas Management Program
WACA-ResIP	Regional Coastal Zone Resilience Investment Project in West Africa

EXECUTIVE SUMMARY

Basic Contextual Information	
Country	Togo
Total land area	56,785 km ²
Population	7.889 million (2018)
Percentage population living in/near the coast	21% - 42%
Gross Domestic Product (GDP)	5.592 billion USD (2019)
Human Development Index Rank	0.513 (167 out of 189)
Length of coastline	56 km
Fish consumption (as a percent of animal protein)	40%
Anemia prevalence	70.9% with 2.6% of severe anemia and among these children 48.9% among women of reproductive age (15-49)
Estimated mangrove cover	112.53 ha (2018)
Estimated estuarine and mangrove ecosystem-based shellfish harvesters	283+
Estimated women shellfish harvesters (percent)	130 (46%)
Estimated direct household shellfish beneficiaries	2,358
Estimated percentage of shellfish harvesters at all nodes of the value chain (vertical integration)	

No. of coastal systems with mangrove-based shellfishing	1 (the lagoon system)
Shellfish management regulations	Local agreement for management of the lagoon system in southern Togo (2018) Prefectural fisheries management committees and a fisheries management plan for the Togolese lagoon system (2015/16)
Mangrove management regulations	Forestry code (2008) National Forest Action Plan (PAFN, 2011) National REDD + Strategy (2010) National Program of Reforestation of Togo (PNR, 2017-2030) National Biodiversity Strategy and Action Plan (NBSAP) 2014 National strategy for the conservation, restoration, and sustainable management of mangroves (2007) National Action Plan for the Sustainable Management of Marine and Coastal Ecosystems (2014)
Coastal ecosystems with shellfisheries identified as Ramsar sites	Togo's entire coast (591,000 ha). Shellfisheries area within this estimated at 215.23 ha

Source: Chuku et al. 2020, FAO, Ramsar Sites Information Service (RSIS).

The participatory assessment of shellfisheries in the estuarine and mangrove ecosystems of Togo revealed that the lagoon system is the only area with a shellfish fishery in Togo. It has an area of approximately 6,400 ha and is located in the Wetlands of the Coastline in the ecological zone V corresponding to the Maritime Region also called "Coastal Zone of the South or the Coastline" (<http://www.ramsar.org/ris/>).

Four species are exploited: *Crassostrea tulipa* (oyster), *Tagelus adansonii* (razor clam), *Tympanotonus fuscatus* (snail), *Senilia senilis* (cockle) and *Stramonita haemastoma* (snail). The sector contributes to the country's food security, and it is also a source of income for the various actors. More than an estimated 283 people work in the sector. Villages surveyed indicated at least 137, with men constituting the majority of actors (54%). In addition to children and students (31 people aged 10 - 20 years and 74% male), the adult women harvesters (56 people) and the adult men harvesters (50 people) employ helpers who are the members of their household. These aids are estimated at three on average per household. Considering that all adult women harvesters are married and that husbands are also

shellfish harvesters, the number of helpers from shellfish harvesting is estimated at 168 people. The helpers do not receive a salary.

There are five shell processing units linked to animal feed mills. They employ around 30 people. In shellfish marketing, there are, in addition to women shellfish harvesters and their helpers, about 20 women and men.

The incomes of actors at each value chain node are low. The average monthly income for shellfish operators varies from US \$40 to US \$60 for women and from US \$100 to US \$200 for men. Actions have been carried out to protect, conserve, and restore mangroves, although no action has been taken by the government to regulate the exploitation of shellfish. The actors are not organized and are not members of networks relating to the shellfish industry.

In terms of governance, local management systems have been put in place for the sustainable management of mangroves and fishery resources. Indeed, three prefectural fisheries management committees in the lagoon system (Lacs, Vo, and Zio) were set up in 2016, three Prefectural Associations for the Conservation and Promotion of Lagoon System Resources (APCP-SL) have been set up in 2018, and a local Lake Togo Delta Management Committee (CoGes-DLT) made up of 30 members including 12 women has been established in 2020. In addition, a management plan for the fisheries of the lagoon system was adopted in 2015, as well as a local management agreement for the lagoon system of South Togo adopted in 2018.

Many difficulties and constraints undermine the development of the shellfish industry in Togo. Among these constraints, the most important are:

- gradual depletion of oysters.
- overexploitation of shellfish.
- lack of regulation of the shellfish industry.
- non-availability of shells throughout the year for processing units.
- lack of monitoring of the chemical and microbiological parameters of the lagoon system.
- lack of organization of actors.
- low level of professionalization of shellfish operators.
- lack of statistical data on the sector.

Opportunities to address these challenges include the following actions:

- Improve management of wild stocks.
- Monitor the sector.
- Regulate shellfisheries.
- Build capacity of Actors.
- Revitalize local management bodies.
- Raise awareness of stakeholders.
- Monitor the water quality of the lagoon system and of shellfish intended for consumption.

- Improve the productivity of the shellfish lagoon system.
- Diversify activities.
- Promote oyster farming.

1. Introduction

1.1. Description of Togo

Located between longitude 001 ° 38 E and 001 ° 12 E and latitude 06 ° 144 N and 002 ° 51 N, Togo is bounded to the north by the Republic of Burkina Faso, to the west by Ghana, to the east by Benin and to the south by the Atlantic Ocean. It has a coast that stretches 50 km long and 23 km wide at the limit of the 100 m Isobath.

The coastal zone of Togo is endowed with very productive but fragile ecosystems, such as lagoons, lakes, mangrove forests and swamps. These wetlands are teeming with biological diversity including fish, birds, reptiles, amphibians, crustaceans, shellfish, and mangroves. This richness in biodiversity has meant that the entire coast of Togo with a total area of 591,000 hectares was designated as a Ramsar site in 2007, identifying it as a wetland of international importance for conservation and sustainable use.

Among the fishery resources, fish are the most numerous, especially pelagics. According to various campaigns carried out in Togo's EEZ, the annual exploitable potential of pelagic species is 19,000 tons against 800 tons for demersal species.

Togo, like other countries in the sub-region, is faced with a decrease in its marine fishery resources and a continuous degradation of coastal environmental resources such as mangroves. This alarming situation is due in large part to the pressure of human actions on coastal and marine ecosystems. In addition, the Togolese coast is strongly threatened by erosion leading to the destruction of habitats.

The coastal zone records the highest temperatures in February and March around 28°C and 30°C. The Togolese coast receives less than 1000 mm/year precipitation with a minimum annual evapotranspiration of 1,455 mm and maximum of 1,639 mm. This phenomenon has been accompanied by a drop in rainfall in recent decades. The shellfish industry contributes to food security and job creation and is one of the main sources of income for many people, especially women in Togo. However, in recent years, shellfish resources have been threatened with extinction due to increased anthropogenic pressure associated with environmental degradation. The gradual decrease in shellfish stocks therefore constitutes a serious threat to the food security of households, whose incomes depend on it.

The actions to sensitize communities on the conservation and protection of mangroves undertaken by the Government and NGOs have been beneficial so far since mangroves are recently under less anthropogenic pressure.

1.2. Objective of the study

This assessment of shellfisheries in Togo is part of the implementation of the USAID project "Women Shellfishers and Food Security".

The objective of the study is to provide information on the scale and characteristics of shellfisheries in Togo to decision-makers and to propose highlight opportunities for measures of good practice, good governance, and support for the sustainable development of the sector in Togo. This study complements a [Literature Review](#) covering shellfisheries in each of the 11 coastal West Africa countries from Senegal to Nigeria. The specific objectives are 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. Methodological Approach

In the context of this study, the methodological approach used included several phases: a scoping meeting, a literature review, collection of information, processing and analysis of information, and preparation of the provisional country report. The study was conducted in Togo by a national Focal Person contracted by the University of Cape Coast in Ghana.

2.1. Scoping meeting

The study began with a virtual meeting between the project focal point and project experts based at the University of Cape Coast in Ghana. This meeting provided an overview of the objectives and expected results of the study. Also, it allowed the focal point to understand the terms of reference (ToRs), to better define the tasks to be carried out and to address the practical arrangements of the mission.

2.2. Literature review

This review was devoted to researching information relating to actions carried out at the level of the lagoon system on the organization and support for fishermen and shellfish operators, on the mangrove as well as on legal aspects. This documentation was done through travel, telephone interviews, SMS or electronic messages to key players, namely: public services, project coordination (WACA-ResIP, UTF/FAO, FFEM), NGOs involved in mangrove management, FAO, research structures, town halls, chiefdoms, village development committees (VDCs), etc. During meetings with these stakeholders, discussions focused on the objectives and results of the study, the difficulties and relevant information on the sector as well as proposals for actions for its development.

2.3. Data collection

Data was collected in the town of Anèho and in the villages where shellfish harvesting, selling of processed oysters and shell processing units occur. The focal person carried out a census of shellfish exploiters with the help of village chiefs, Village Development Committee (CVD) presidents, and resource persons from March 16 to April 07, 2021. Before the start of the survey, appointments were made with each respondent. The information collected during the census included the names, telephone contacts, location as well as the age and sex of the respondents in nine communities.

Besides the census, two types of interviews were carried out, namely: semi-structured interviews with shellfish harvesters and key informant interviews with traditional chiefs, the presidents of the CVD, the traders of processed oysters, and those in charge of shell processing units. The information gathered through the interviews focused on production capacities, costs, income, difficulties, and prospects. Semi-structured interviews with the participation of 20 respondents and 10 key informant interviews were carried out. When collecting information from shellfish operators, weighing of shellfish in bags or piles for sale was carried out to assess their selling prices per kilo. The oyster shell sizes were also measured.

The objective of the survey was to collect information on the shellfish industry from the various professional categories involved. This information focused on the sizes of households, the challenges of shellfish consumption, the water bodies exploited, the shellfish species exploited, the activities carried out apart from the shellfish exploitation, the factors influencing the fishing activities, shellfish, tools for managing shellfish and mangrove stocks, governance, the relationships between shellfish exploitation and nutrition, and membership of actors in shellfish sector networks.

A total of 12 people were surveyed including one from the fisheries and aquaculture department, one from the environment department, one from the forest resources department, two teacher-researchers, one from an NGO, one from the marketing node and five from the harvest node. Among

the 12 interviewed, there are 6 women and 6 men (see table below). The ages of the people surveyed vary between 35 and 57 years. The list of interviewees is shown in Appendix 6.

Stakeholder category	Gender	Age (years)	
Government	F	50	3
Government	M	45	
Government	M	57	
Academia/Research	M	49	2
Academia/Research	F	51	
NGO	M	40	1
Resource User	F	50	6
Resource User	F	47	
Resource User	F	44	
Resource User	F	35	
Resource User	M	57	
Resource User	M	57	

Figure 1: Stakeholder category, gender, and age of the interviewees through the survey.

3. Status of Shellfisheries

3.1. Shellfish Exploitation

The lagoon system is the only shellfishery area in Togo. It is located in the Wetlands of the Coastline located in the ecological zone V corresponding to the Maritime Region also called "Coastal Zone of the South or the Coastline" (<http://www.ramsar.org/ris/>). It has an area of approximately 6,400 ha and is made up of Lake Togo extended to the east by a narrow lagoon which joins the Vogon Lagoon to the northeast and the Anèho Lagoon to the southeast. A natural channel that connects the Anèho Lagoon to the Mono allows its connection with the Beninese lagoon system. The lagoon system is supplied with fresh water by the Zio, Haho, Boko, and Mono rivers.

The low flow period of this body of water spans November to March corresponding with the major dry season, and that of flooding extends from April to July corresponding to the main rainy season. During the low flow period, high salinity levels favorable to the harvested brackish water molluscs are recorded. Thus, shellfish exploitation is almost non-existent during the flood period as well as in villages far from the mouth such as Badougbé, Togoville, and Sévatonou where salinity rates are low.

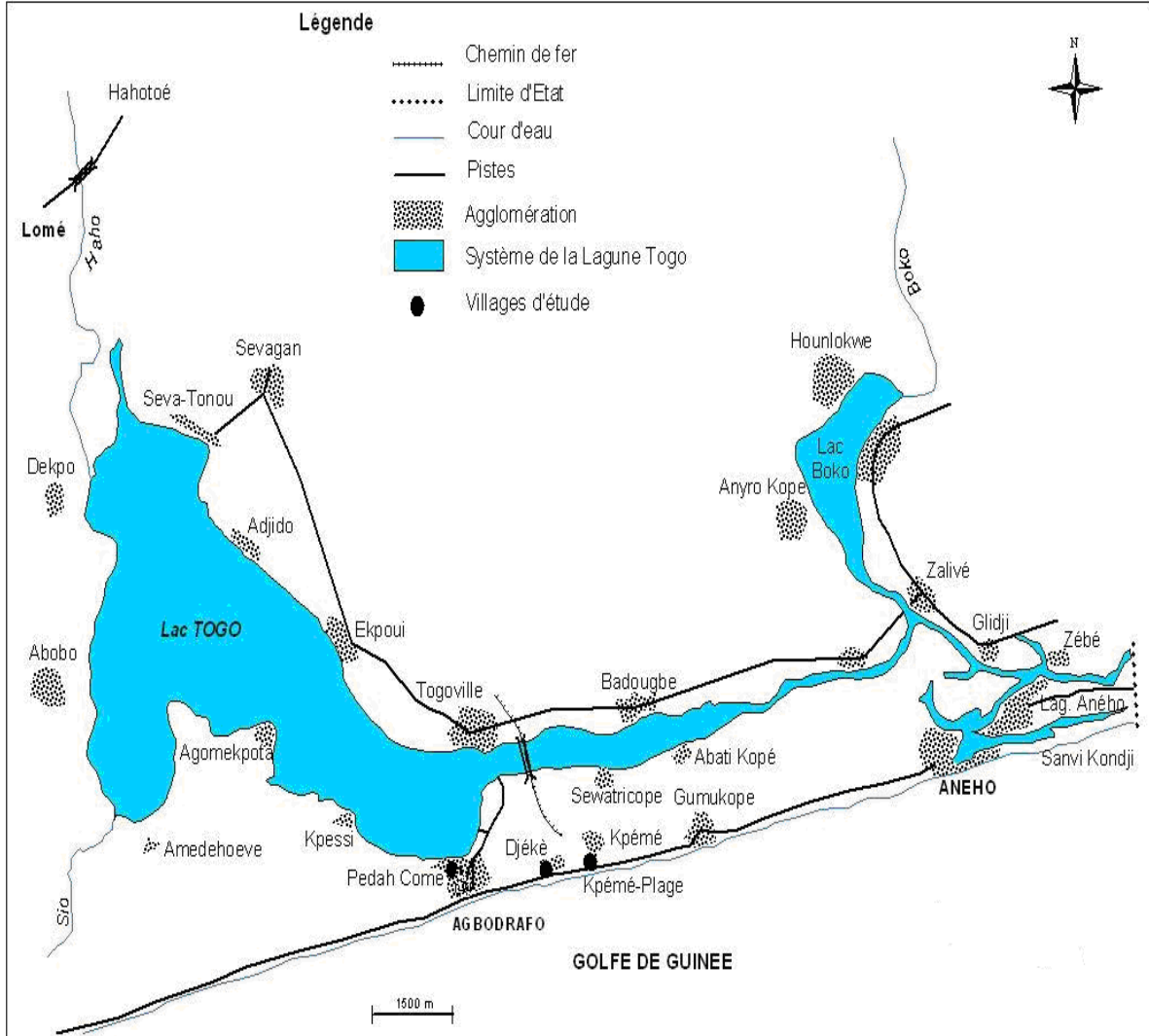


Figure 2: Map of the Togolese Lagoon System.

3.1.1. Estimated number of shellfishers

Information on the number of shellfish harvesters in Togo 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 283 persons, the majority of which are females, are engaged in shellfisheries livelihoods in Ghana.

An estimated 2,358 persons are direct household shellfisheries beneficiaries based on the findings of this study and an estimated average household size of 8.

In total, 137 operators were identified in nine sites including one town (Anèho) and 8 villages (Abatékopé, Glidji, Assoukopé, Zalivé, Djankassé, Koenou, Zizinkopé and Anyronkopé) (see Table 1 below).

Among these operators, 54% are male. There were 56 adult women, 50 adult men and 31 children (pupils and students). Among the children there are 7 females and 24 males. The village of Zalivé has the highest number of harvesters (71) as shown in Table 1 below. Besides collecting shells and harvesting shellfish, these actors also practice fishing. The adult harvesters employ helpers who are members of their household. These aids are estimated at three on average per household. Considering that all adult women harvesters are married and that husbands are also shellfish harvesters, the number of helpers from shellfish harvesting is estimated at 168 people. Operators ranged in age from 10 to 70 years.

Table 1: List of shellfish harvesting locations, the number of shellfish harvesters by sex and age groups.

	Name of community/estuary (water body)	Adult Males		Adult Females		Children/students	
		Number	Age range	Number	Age range	Number	Age range
1	City of Aného	7	21-63	1	30	15	10-13
2	Village of Zalivé	25	30-60	36	25-60	15	16-20
3	Village of Assoukopé	5	27-59	4	28-32	0	
4	Village of Glidji	3	21-44	4	38	1	20
5	Village of Anyronkopé	0		1	45	0	
6	Village of Zizinkopé	4	30-70	3	30-50	0	
7	Village of Koenou	4	25-32	7	28-45	0	
8	Village of Djankassé	1	45	0		0	
9	Village Abatékopé	1	65	0		0	
	TOTAL	50		56		31	

3.1.2. Insights on gender in shellfish exploitation

In Togo, the majority of shellfishers are men (54%). In the lagoon system shellfish harvesting requires a physical effort that makes it easier for men to do. Men collect oysters and *Pachymelania aurita* (sold to grinding mills for animal feed ingredients) more than women. This is one of the reasons why the monthly income of women from shellfisheries is less than half that of men (see section 3.1.7).

3.1.3. Shellfishing as a primary occupation

All the shellfishers also practice fishing. They practice more fishing during the period of low shellfish production to improve their income.

3.1.4. The shellfish value chain

The shellfish harvested in the lagoon system and consumed in Togo are *Crassostrea tulipa* (oyster) and *Tagelus adansonii* (razor clam). They contribute to food security even though their production volume is low. Communities in productive areas are the major consumers of these shellfish. Much of the Togolese population does not habitually eat these shellfish. Almost all the people surveyed from public administrations including the University claim to have never eaten the meat of these two shellfish. According to them, it is not for reasons of health risks but that they are not interested. None of the people surveyed who consumed these shellfish noted any health problems related to their consumption.

The common method of processing the flesh of the *Crassostrea tulipa* oyster is frying. It is the only shellfish that is consumed in Togo. According to information collected in the field and confirmed by weighing, the flesh loses about 1/5 of its weight during frying. The sale of fried oysters is carried out exclusively at the local level due to the small volume that is produced. These oysters are sold to consumers at a price of US \$2 to US \$4 in the localities where they are produced. But they are sold to wholesalers in 1kg bowls at a price of US \$10.

The Vodougbe toll booth at the entrance to the town of Anèho is a famous site for selling fried oysters. Ten women and twenty young boys sell fried oysters produced in Togo and in neighboring countries (Ghana and Benin) at this location. They are sold packaged in a plastic bag of average weight of 140g at a price of US \$2, so the price per kilo is estimated at US \$14. These women and young boys not only sell fried oysters, but also other food products, including fried shrimps and fried plantain and bananas. According to the information gathered, the women of this site have monthly incomes of US \$60 to US \$80. Young boys have monthly incomes of US \$20 to US \$40.

In Togo, there are five shell processing units. They are all located in the Prefecture of Lakes, including three in the town of Anèho, one in the village of Zalivé, and one in the village of Kéta Assoukopé. The COCO TRANS Company is the largest unit; it is based in Kéta Assoukopé. The daily production capacity of this unit is approximately 5 tons and that of the small units is 2 tons. However, the daily

production of these units are 2 to 2.5 tons for COCO TRANS and less than one ton for small units due to low demand. These units employ 5 to 10 people. The ground shells are packaged in 50 kg bags which are sold at US \$4.80 to wholesalers. The production is seasonal because it takes place only during the period of availability of the shells (January to May). The monthly income of COCO TRANS, the largest unit, is estimated at US \$600 and at US \$150 for smaller units.

The main customers of these units are feed mills, establishments selling food ration ingredients such as Establishment La Référence, AGROVET, Feed mill P.J and large poultry producers.

In Zalivé, there is currently a deposit of *Pachymelania aurita* mollusc shells (freshwater snails) which is highly coveted by shell processing units because of the claim that these shells contain a higher level of calcium than other shells. Shellfish operators residing in Zalivé and those in the surrounding villages exploit this deposit. Few women manage to pick up *Pachymelania aurita* shells at the bottom of water because it requires a lot of effort. Men use women as helpers in the sieving and bagging phases. As a result, men make more income than women in this activity. It should be noted that in Zalivé, fishing and shellfish exploitation are prohibited on Wednesdays and Sundays. According to the first notable of the chief of the village of Zalivé, this measure was taken to reduce pressure on the stocks of fishery resources and those of shellfish.



Figure 3 Storage on water of *Pachymelania aurita* bagged shells in the village of Zalivé.



Figure 4 Transport of *Pachymelania aurita* shells by canoe.

Additional photos of the shellfish value chain are shown in Appendix 2.

3.1.5. Species harvested

The species most exploited are: *Crassostrea tulipa*, *Tagelus adansonii*, *Tympanotonus fuscatus*, *Senilia senilis*, and *Stramonita haemastoma*. Photos of these species are in Appendix 1 of this report.

3.1.6. Harvesting methods

Crassostrea tulipa (oyster): *Crassostrea tulipa* is locally called “Adokoin”. To harvest live *Crassostrea tulipa* oysters or their shells, operators access the water body via foot or using a canoe. Many often get injured as few wear gloves or proper footwear before picking up live oysters. These oysters are also fished incidentally by fishermen using hawk nets¹.

¹ The hawk net is a small net that is thrown by one person. It appears in the water in the form of a circle. It is used in lagoons, lakes, rivers, and streams.

Stramonita haemastoma (gastropod/murex) and *Senilia senilis* (cockle): These two species of shellfish are called “Shell” in the vernacular. They do not contain meat when found. The molluscs *Stramonita haemastoma* and *Senilia senilis* are less exploited because they are generally found in the subsoil of water at great depths according to information collected in the field. They are processed for grinding as an ingredient mainly in poultry feed.

Tympanotonus fuscatus (periwinkle): *Tympanotonus fuscatus* is locally called “Totodjin.” Its flesh is used as bait for fishing and its shell is processed for grinding as an ingredient mainly in poultry feed.

Pachymelania aurita (periwinkle): *Pachymelania aurita* is called “Atakouzé” in vernacular. In the lagoon system, only the shells of this gastropod are found. They are found at the bottom of the water in large quantities, particularly in Zalivé village. They are dug up with shovels, washed, cleared of sand by sieving and bagged. Due to the shallow depth of the water at this site, the loaded bags are piled up on the water. These bags are conveyed to a sales site located 200 m from the deposit when the operators receive orders.

Tagelus adansonii (razor clam): *Tagelus adansonii* is called “Anani” in the vernacular. It is exploited for its shell and is rarely available in the lagoon system compared to other molluscs. Its flesh is used as bait for fishing and its shell is processed for grinding as an ingredient mainly in poultry feed.

3.1.7. Harvest volumes and value

All the shellfish operators interviewed were unanimous that there is a progressive depletion of oysters in the lagoon system and that the oysters harvested today are relatively small (3 cm to 13 cm). According to them, the scarcity of these oysters is due to the overexploitation of the stock.

In general, the average monthly income for shellfish operators varies from US \$40 to US \$60 for women and from US \$100 to US \$200 for men. Annually that amounts to US \$480 to US \$720 for women and US \$1200 to US \$2400 for men.

3.1.8. Seasonality of harvests

In Togo’s lagoon system, flooding extends from April to July corresponding to the main rainy season. Shellfish exploitation is almost non-existent during the flood period. During the low flow period, high salinity levels favorable to the harvested brackish water molluscs are recorded.

The species which are present only as shells (*Pachymelania aurita*, *Stramonita haemastoma* and *Senilia senilis*) are collected every month of the year, while *Crassostrea tulipa*, *Tympanotonus fuscatus* and *Tagelus adansonii* which are found alive are not present during the months of April to July corresponding to the period of significant amount of freshwater. All the other shellfish are rare or absent and collected every month of the year.

3.2. Mangrove Ecosystem

The entire coast of Togo with a total area of 591,000 hectares (1,460,000 acres) was designated as a Ramsar site of international biodiversity importance in 2007. It is located at 6°34'N and 1°25'E. The Togolese mangroves are in the extreme south-east of the country around the lagoon system. There are two species of mangrove trees: *Rhizophora racemosa* and *Avicennia germinans* to which are associated *Drepanocarpus lunatus*, *Pterocarpus santalinoides* and *Acrostichum aureum*. With an area of 1,000 hectares in 1998 (Afidegnon, 1999), the Togolese mangrove area is currently estimated at around 112.53 ha, obtained from the managed classification of Landsat images of 2018 with 30m spatial resolution (FAO, 2019). In the past they occupied all the periphery of the lagoon system. These mangroves are subject to climatic (water deficit: less than 1000 mm of rain per year), hydro-chemical (seasonal and non-daily salinization) and anthropogenic constraints (overexploitation of resources).

Initiatives have been undertaken in the context of safeguarding and restoring Togolese mangrove ecosystems from 1991 to date. Actions include raising awareness of the importance of mangroves, reforestation, defenses, and the installation of nurseries. The township of Agouègan alone accounts for 43.24% of interventions. The other townships in the mangrove area such as Aynronkopé Aklakou and Glidji have received very little action (Mapping of the actors and mangrove ecosystems of the Togolese coast, FAO, 2019). The actions were carried out by local communities and civil society made up of NGOs and environmental protection associations with technical support from the ministry in charge of the environment and the Prefectural Committee for Sustainable Development of Lakes (CPDD).

Programs and projects relating to the protection and conservation of mangroves include the following:

- Strengthening the resilience of women and young people in the coastal zone of Togo faced with climate change through income-generating activities.

As part of the implementation of this GEF-funded project, three hectares of mangroves (15,000 linear feet of plantings over 6 km) are being restored in the coastal area, particularly on the edge of Lake Togo in the villages of Kouènou, of Djankassè, Kéta-Akoda and Abate-kopé, which covers about 3 ha. Apart from reforestation, other activities were carried out, namely: (i) sensitization of communities on the role, importance and utility of the mangrove, the causes and consequences of its degradation, restoration, and protection measures, (ii) the establishment of a local Lake Togo Delta Management Committee (CoGes-DLT) made up of 30 members including 12 women from the village communities concerned, (iii) the training of eco-guards to monitor restored mangroves.

- Coastal risk monitoring project and soft solutions in Benin, Senegal, and Togo.

This project is part of the West African Coastal Areas Management Program (WACA) of the World Bank. It is funded by the French Global Environment Facility (FFEM) for the period 2018-2022. The institutional set-up of the project has been completed and the activities are planned. These activities

are not yet carried out. As part of this project, the reforestation of 6 ha of mangroves around the Togolese lagoon system is planned.

- Regional Coastal Zone Resilience Investment Project in West Africa.

Within the framework of this regional project (WACA-ResIP) restoration of 500 ha of mangroves is planned. About 80 ha have already been reforested and sub-projects have been submitted in 2021 by NGOs for the restoration of the remaining 420 ha. Apart from the restoration of mangroves, a feasibility study is included in this project for dredging the lagoon system.

- PAPBio C1-Mangroves project, “Management of mangrove forests from Senegal to Benin”: prospective diagnostic report of the priority conservation landscape of Mono Volta (TOGO).

This study made it possible to identify areas suitable for mangrove restoration in Togo mainly in the Gbaga Channel area, the sites at the level of the Zanvé river which flows into the Ggaba channel at Tagbagan and Zalivé, sites at the level of Takpomè and Djéssitan in the swamp forest of Akissa (Prospective diagnosis of the priority conservation landscape of mono volta, FAO, 2020). Three restoration options were selected based on the ecological, topographical, edaphic, and hydrological characteristics of the sites. In addition to mangrove restoration sites, Areas behind the mangrove zones that can serve as a protection measure and can supply fuelwood to local communities have been identified. Based on the different models identified, the restoration options are as follows: defenses, restoration of mosaic types, and reforestation with a wood-energy objective.

3.3. Governance/Management Regimes

3.3.1. *Policies, strategies, and planning tools*

The management of natural resources including mangroves (habitats of brackish water molluscs) is one of the concerns of environmental policy in Togo. Several documents have been drawn up, including:

- Togo's national biodiversity strategy and action plan (SPANB 2010-2020).
- National environmental monitoring program in Togo (PNSET).
- National strategy for the conservation, restoration, and sustainable management of mangroves in Togo.
- Strategic investment framework for the management of the environment and natural resources (CSIGERN, 2018-2022).
- 2011 National Forest Action Plan.
- 2011 Forest Policy Statement.
- The National Development Plan (PND 2018 - 2022).
- Togo-2025 Presidential Roadmap.

In Togo there is not yet a policy document, a strategy, or a plan on the shellfish industry.

3.3.2. Institutional framework

The various public and private institutions and civil society organizations involved in the sector include the following:

- The Ministry of Maritime Economy, Fisheries and Coastal Protection (MEMPPC).
- The Ministry of the Environment and Forest Resources (MERF).
- The Ministry of Grassroots Development, Youth and Youth Employment (MDBJEJ).
- The Ministry of Social Action, the Promotion of Women and Literacy (MASPFA).
- The Department of Fisheries and Aquaculture.
- The Forest Resources Department.
- The Environment Department.
- The Universities of Lomé and Kara.
- The National Agency for Grassroots Development Support (ANADEB).
- The National Environment Management Agency (ANGE).
- La Marie de la Commune Lacs1.
- The Town Hall of the Municipality of Lakes 3.
- The Town Hall of the Municipality Vo2.
- Association of Togolese and Togolese Volunteers for Development (AVOTODE) (an NGO).
- Humanitarian Aid for Development Action (AHD) (an NGO).
- Togolese Association for the Conservation of Nature (AGBOZEGUE) (an NGO).
- Friends of the Earth –Togo (ADT-TOGO) (an NGO).
- The prefectural fisheries management committees (Lacs, Vo and Zio).
- Prefectural associations for the conservation and promotion of the resources of the lagoon system (Lacs, Vo and Zio).

These administrative institutions and NGOs intervene in the management and conservation of mangroves and/or the development of shellfish harvesting communities.

3.3.3. Legal framework

There are legislative and regulatory texts relating to the management of fisheries, the environment, and the quality of fishery products. The following legal frameworks are applicable:

- Law No. 2016-026 of October 11, 2016, regulating fishing and aquaculture in Togo.
- Law No. 2008-005 of May 30, 2008, on the framework law on the environment.
- Law No. 2008-09 of June 19, 2008, on the forestry code.
- Order No. 18 MAEP/CAB/SG/DEP of 22 January 2007 regulating fishing in inland waters.

- Order No. 043/MAEP/SG/DEP of April 20, 2007, establishing the conditions for the export, import, production, and marketing of foodstuffs of animal and fishery origin.
- Interministerial decrees No. 031/MME/MERF/2011 of May 05, 2011, and n ° 002/MME/MERF/2013 of January 15, 2013, prohibiting the collection of sand and the extraction of gravel and shells along the coast.

There are no specific laws and regulations on mangrove management or the shellfish industry. However, the fisheries law cited above created an inter-ministerial and inter-professional fisheries committee with the objective of promoting co-management of fishing and aquaculture activities.

3.3.4. *Organization of actors*

The shellfish harvesters are not organized in a cooperative or an association. They do not belong to any network of national, sub-regional, regional, or international shellfish operators. Actors from the various nodes in the shellfish industry value chain in Togo (harvesting, processing, marketing, etc.) are likewise not organized.

Fishing and shellfish activities are prohibited on Wednesdays and Sundays in a village bordering the lagoon system (village of Zalivé). This measure is taken with the aim of reducing the pressure on the stocks of fish and shellfish according to the first notable of the Chief of this village. The few conflicts noted between shellfish harvesters are encountered at the *Pachymelania aurita* deposit site in Zalivé. These conflicts often relate to the occupation of the space to be exploited and are settled by the Chief.

Management bodies made up of the various users of the Togolese lagoon system, including shellfish operators, have been set up and participate in the management of resources. This co-management approach in addition to awareness raising has now led to a better awareness of communities on the protection and conservation of mangroves and wildlife resources including shellfish.

3.3.5. *Local management mechanisms in the shellfish fishery in Togo*

There are local mechanisms for managing the lagoon system as follows:

- Local agreement for the management of the lagoon system in southern Togo.

As part of the Mono Delta Biosphere Reserve project, a local management agreement for the lagoon system in southern Togo was established in 2018. This convention applies to the populations of the villages of Abobo, Aneho, Togoville, Vogon, Sévagan, Anyrokopé, Agbodrafo, and Glidji as well as to users of natural resources of the lagoon system of south Togo. Three Prefectural Associations for the Conservation and Promotion of Lagoon System Resources (APCP-SL) were set up in 2018. Each

prefectural association is made up of village management committees (CVG) composed of 7 members each. The prefectural associations of Lacs, Vo, and Zio include 16, 14, and 5 villages respectively.

- Prefectural fisheries management committees of the lagoon system.

A fisheries management plan for the Togolese lagoon system was adopted in 2015 and includes management measures aimed at the sustainable exploitation of the resources of the Togolese lagoon system. As part of the implementation of this plan, three prefectural fisheries management committees in the lagoon system (Lacs, Vo and Zio) were set up in 2016. Their main missions are to ensure compliance with the regulations in force, to participate in decision making on management measures and to settle conflicts between users of the lagoon system.

3.4. Climate Risk Mitigation

The flooding of the lagoon system during rainy seasons sometimes causes flooding and lowers the salinity rate of the water. These situations negatively affect the productivity of shellfish. Also, the low rainfall recorded in some years affects the productivity of mangroves.

4. Conclusion and Recommendations

4.1. Conclusion

The study revealed that Togo's shellfish industry is limited to the southern lagoon system and involves slightly more men (an estimated 54%) than women (an estimated 46%). Many efforts have been made and others are underway for the protection and conservation of mangroves, but much remains to be done to restore the mangroves around the Togolese lagoon system. The production of shellfish, especially oysters, has been low especially in recent years because of constraints such as the low stock of shellfish and the inexistence of texts regulating the activity.

A summary of the strengths, weaknesses, opportunities, and threats in Togo's shellfisheries sector are presented in Table 2.

Table 2: Strengths, weaknesses, opportunities, and threats of shellfisheries sector.

STRENGTHS	WEAKNESSES
<p>Existence of public institutions responsible for the advancement of women</p> <p>Existence of a national institution responsible for the organization and capacity building of actors in all speculations (ANADEB)</p> <p>Existence of the ministry in charge of fisheries</p> <p>Existence of the ministry responsible for the environment</p> <p>Existence of the Incentive Mechanism for Agricultural Finance based on risk sharing (MIFA S.A.)</p> <p>Existence of local management bodies for the lagoon system</p> <p>Existence of projects involved in the restoration of mangroves</p>	<p>Lack of organization of actors</p> <p>Low level of professionalization of shellfish operators</p> <p>Lack of statistical data on the sector</p> <p>Gradual depletion of oysters</p> <p>Overexploitation of shellfish</p> <p>No availability of shells throughout the year for processing units</p> <p>Lack of monitoring of the chemical and microbiological parameters of the lagoon system</p> <p>Siltation of the lagoon system</p> <p>Mangrove degradation</p> <p>Lack of legal texts on the exploitation of shellfish</p> <p>Lack of water quality control</p> <p>Lack of product traceability</p>
OPPORTUNITIES	THREATS
<p>Growing number of poultry farmers</p> <p>Availability of sub-regional external market</p>	<p>Climatic changes</p>

The SWOT analysis clearly shows that the sector benefits from strengths but also has many weaknesses, particularly the scarcity of shellfish, which is the primary constraint to its further development. The main current constraints of the sector by value chain node are presented in Table 3. There are currently no plans and strategies and there is a lack of human and financial resources for the development of the shellfish industry in Togo.

Table 3: Constraints of the sector by value chain node.

Value chain nodes	Constraints
Harvest	Limited availability of shellfish Dangerous working conditions
Processing	Unavailability of shells year-round for processing units
Marketing	Limited number of customers for the shell processing units

4.2. Recommendations

The following actions were proposed by stakeholders participating in this assessment:

- Improve management of wild stocks. Strengthen management regimes, including with a more robust evidence-base and associate management measures for sustainable yields. Since the shellfish stock is low, action research should be undertaken on seed cultivation and seeding juveniles from high spawning areas into the bottom substrate.
- Monitor the sector. The shellfisheries sector must be the subject of regular monitoring to generate the information necessary for planning and the appropriate measures to be taken.
- Regulate shellfisheries. Regulatory texts or management measures should be developed to regulate the exploitation of shellfish.
- Build capacity of actors. The organizational and technical capacities of industry players should be strengthened, in particular those of shellfish operators. Capacity development should cover, among other things, literacy, provision of appropriate materials and work equipment, and training in shellfish management and culture (oysters and other molluscs).
- Revitalize local management bodies. The prefectural fisheries management committees and the prefectural associations for the conservation and promotion of resources set up around the lagoon system must be revitalized. The necessary resources must be made available to them to enable them to effectively implement their specifications.
- Raise awareness of stakeholders. Raising awareness among residents of the lagoon system on the preservation of natural resources (mangroves, fishery resources, shellfish, etc.) should be prioritized.
- Monitor the water quality of the lagoon system and of shellfish intended for consumption. A water quality monitoring program in the lagoon system must be established and a quality control system for shellfish intended for consumption put in place.
- Improve the productivity of the shellfish lagoon system. Management of sand deposits in certain parts of the lagoon system is necessary to create a suitable environment for the

development of shellfish. The restoration of mangroves should be continued and measures to protect them strengthened.

- Diversify activities. To improve the incomes of shellfishers and value chain actors, industry professionals, especially shellfish harvesters, should be encouraged and supported to practice other income-generating activities.
- Promote oyster farming. As the shellfish have so far been harvested and not cultivated, one opportunity that should be further explored is oyster farming. This initiative would help promote female entrepreneurship.

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APPENDICES

Appendix 1: Species of molluscs present in the Togolese lagoon system

	
<p><i>Crassostrea tulipa</i>/Adokoin</p>	<p><i>Tagelus adansonii</i>/Anani</p>
	
<p><i>Tympanotonus fuscatus</i>/Totodjin</p>	<p><i>Pachymelania aurita</i>/Atakouze</p>



Senilia senilis



Stramonita haemastoma

Figure 5: Species of molluscs present in the Togolese lagoon system.

Appendix 2: Photos of interviews and field observations



Interview of shellfish operators in Village of Zizinkopé



Interview of shellfish operators in the Village of Zalivé



Oyster harvesting



Treatment of oysters



Pile of oyster shells in the village of Zizinkopé



Digging up and bagging of *Pachymelania aurita* in the village of Zalivé



Storage on water of *Pachymelania aurita* shells in the village of Zalivé



Site of sale of *Pachymelania aurita* shells in the village of Zalivé



Shell processing unit in the village of Keta-Assoukopé



Oyster processing unit in City of Aného



Fried oysters



Sale of oysters at the Vodougbe/Aneho toll



Harvesting of *Pachymelania aurita* shells



Processing of oysters



Transport of *Pachymelania aurita* shells by canoe



Mangroves of water body

Figure 6: Photos of interviews and field observations.

Appendix 3: List of stakeholders
(Spreadsheet)

Appendix 4: List of stakeholders contacted/interviewed
(Spreadsheet)

Appendix 5: List of women, their locality of residence and the types of shellfish exploited

(spreadsheet)

Appendix 6: List of interviewees through the survey
(Spreadsheet)

Appendix 7: List of shell harvesters
(Spreadsheet)