Food and Agriculture Organization of the United Nations

FISH4ACP
Unlocking the potential of sustainable fisheries and aquaculture in Africa, the Caribbean and the Pacific

ANALYSIS AND DESIGN REPORT

# The mangrove oyster value chain in the Gambia

February 2023

german cooperation
DEUTSCHE ZUSAMMENARBEIT

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## Disclaimer

# Abbreviations and acronyms

| | |
|---|---|
| AFD | French Development Agency |
| AI | actor interview |
| ATM | automated teller machine |
| BMZ | Federal Ministry for Economic Cooperation and Development (of Germany) |
| $CO^2$ | carbon dioxide |
| CP | collector/ processor |
| CPR | collector/ processor / retailer |
| DPWM | Department of Parks and Wildlife Management |
| EC | European Commission |
| ECOWAS | Economic Community of West African States |
| FAO | Food and Agriculture Organization (of the United Nations) |
| FGD | focus group discussion |
| FSQA | Food Safety and Quality Authority (of the Gambia) |
| FTE | fulltime employment |
| GDP | gross domestic product |
| GMD | Gambia dilasi |
| ha | hectare |
| ILO | International Labour Organization |
| ISRAD | Institute of Social Research and Development |
| KMC | Kanifing Municipal Council |
| Kg | kilogrammes |
| KII | key informant interview |
| LoA | letter of agreement |
| LRR | Low River Region |
| m | metres |
| MECCNAR | Ministry of Environment, Climate Change & Natural Resources (of the Gambia) |
| MFI | microfinance institution |
| MoFWRAM | Ministry of Fisheries, Water Resources and National Assembly Matters (of the Gambia) |
| MoU | memorandum of understanding |
| MSC | Marine Stewardship Council |
| MSY | maximum sustainable yield |

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|---|---|
| NBR | North Bank Region |
| NPO | national professional officer |
| OACPS | Organization of African, Caribbean and Pacific States |
| ODK | open data warehouse |
| OSAC | Oyster value chain Stakeholder Advisory Committee |
| OV | observational visit |
| OVP | Office of the Vice President and Ministry of Women's Affairs |
| POS | point of sale |
| PPE | personal protective equipment |
| R | retailer |
| SFVC | sustainable food value chain |
| SPS | sanitary and phytosanitary |
| TWNP | Tanbi Wetlands National Park |
| UCC | University of Cape Coast (Ghana) |
| URI | University of Rhode Island (USA) |
| USD | United States dollar |
| VA | value added |
| VC | value chain |
| VCA | value chain analysis |
| VCA4D | value chain analysis for development |
| WCR | West Coast Region |

## Exchange rates

USD 1: GMD 59,62 (December 2022)

# Glossary

| | |
|---|---|
| **Aquaculture** | Aquaculture is the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated. Definition |
| **'Tin' or 'Cup'** | Traditional unit of measurement for oyster sale. Empty condensed milk tin, which contains about 125 grams of shucked oyster meat. |
| **Biosecurity** | Biosecurity refers to measures aiming to prevent the introduction and/or spread of harmful organisms and/or harmful biological or biochemical substances. |
| **Carbon footprint** | Calculated as the kg $CO^2$/year per at actor level, functional level, core VC level, and per kg of end product |
| **Clean renewable energy** | Refers to renewable energy that is produced through methods that do not release greenhouses or other pollutants such as solar or wind power. |
| **Competent authority** | The government authority or official body authorized by the government that is responsible for the setting of regulatory food safety requirements and/or for the organization of official controls including enforcement. |
| **Contribution to GDP (of VC)** | 100 * (total value added over national GDP), expressed as a percentage (%) |
| **Depuration** | Placing shellfish in tanks of seawater for a minimum of 42 hours to purge any microbiological contamination they may have bio-accumulated while in the environment . |
| **Direct value added** | The sum of net profits (after taxes) for the companies, net wages for their workers, and government revenue in the form of taxes and fees. |
| **Electricity use** | Calculated as the kWh/year at actor level, functional level, core VC level, and per kg of end product |
| **Fishing pressure** | Refers to the level of fishing efforts (active fishing licenses or boats, number of days fishing, number of hooks a day, yield per day, etc.) that the fish stock is subject to. |
| **Food loss and waste** | Refers to the quantitative and qualitative loss of aquatic products that have been intended for human consumption but have either suffered due to, e.g., poor transportation and processing practices, and are thus no longer fit for human consumption, or have been discarded by different actors based on, e.g., consumer preferences and demands. To |

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| | measure food loss, the quantities of aquatic products lost along the value chain, from production up to, but no including, retail are calculated. Food waste refers to the aquatic food lost in the retail and consumption functions of a value chain. |
| **Food safety** | The assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use. |
| **Full-time equivalent (FTE) jobs** | The total number of 8-hour working days divided by 230 (days) |
| **Fuel consumption** | Calculated as MJ/year at actor level, functional level, core VC level and per kg of end product |
| **Good hygienic practice** | Fundamental measures and conditions applied at any step within the food<br>chain to provide safe and suitable food. Codex GHP |
| **Gross Domestic Product** | The total value of goods produced and services provided in a country during one year. |
| **Indirect value added** | The cost of the domestic goods and services that the VC actors purchase from outside of the core VC |
| **Inorganic waste** | Inorganic waste is a type of waste that does not contain organic compounds, and therefore are difficult to decompose by microorganisms. |
| **Maximum sustainable yield** | The highest theoretical equilibrium yield that can be continuously taken (on average) from a stock under existing (average) environmental conditions without significantly affecting the reproduction process. Also referred to sometimes as Potential yield |
| **Net impact on balance of trade (of VC)** | Calculated by deducting imports from exports (in USD) for all products related to the VC, including both the VC's products and the inputs/services used in the VC. |
| **Net impact on public funds** | The net impact on public funds is expressed in USD and equals taxes plus fees minus subsidies. |
| **Non-native species** | A non-native species is a species that originated somewhere other than its current location and has been introduced to the area where it now lives. |
| **Organic waste** | Organic waste is any waste containing material that comes from living organisms (plants or animals) and is biodegradable. |
| **Overfished** | A stock is considered overfished when exploited beyond an explicit limit beyond which its abundance is considered "too low" to ensure safe reproduction. In many fisheries fora the term is used when biomass has been estimated to be below a limit biological reference point that is used as the signpost defining an "overfished condition". |

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| **Overfishing** | A term used to refer to the state of a stock subject to a level of fishing effort or fishing mortality such that a reduction of effort would, in the medium term, lead to an increase in the total catch. Often referred to as overexploitation and equated to biological overfishing. |
| **Profit** | Revenues minus costs |
| **Rate of integration** | The rate of integration (expressed as a percentage) indicates how much the VC is part of the national economy. It is calculated as 100 * (total VA/(total VA+ imported consumables)). |
| **Renewable energy** | Renewable energy is any energy from a source that is not depleted when used, such as the wind or sun. |
| **Return on investment** | 100 * (operating profit over total cost), expressed as a percentage (%) |
| **Return on sales** | 100 * (net profit over total revenues), expressed as a percentage (%) |
| **Sanitary and phytosanitary (SPS) measures** | Measures to protect humans, animals, and plants from diseases, pests, or contaminants. All countries maintain measures to ensure that food is safe for consumers, and to prevent the spread of pests or diseases among animals and plants. These sanitary and phytosanitary measures can take many forms, such as requiring products to come from a disease-free area, inspection of products, specific treatment or processing of products, setting of allowable maximum levels of pesticide residues or permitted use of only certain additives in food. Sanitary (human and animal health) and phytosanitary (plant health) measures apply to domestically produced food or local animal and plant diseases, as well as to products coming from other countries. |
| **Shucking** | The process of removing oyster meat from the oyster shell. |
| **Spawning biomass** | The total weight of all sexually mature fish in the population |
| **Stock status** | The stock status refers to the biomass (B) of fish in the water and provides information on whether a stock is overfished, maximally sustainably fished or underfished. The amount of biomass (B) that produces the maximum sustainable yield (MSY) is referred to as BMSY. If the biomass of fish in the water is below BMSY, the stock is overfished. If the amount of fish in the water is more than what would produce MSY, the stock is underfished. |
| **Target reference point** | Corresponds to a state of a fishery and / or a resource which is considered desirable. Management action, whether during a fishery development or a stock rebuilding process should aim at bringing and maintaining the fishery system at this level. In most cases a TRP will be expressed in a desired level of output for the fishery (e.g., in terms of |

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|---|---|
| | catch) or of fishing effort or capacity and will be reflected as an explicit management objective for the fishery |
| **Total value added** | The sum of direct value added and indirect value added |
| **Total value of outputs** | The total value of the output (in USD/year) of all VC actors. This equals the sum of the value of production (sales + self-consumption), minus losses. |
| **Vulnerable ecosystem** | An ecosystem is vulnerable when it is at a high risk of collapse. |
| **vulnerable species** | A vulnerable species is a species that is threatened with extinction unless the circumstances that are threatening its survival and reproduction improve. |
| **Wastewater** | Wastewater is used water from any combination of mainly oyster harvesting and processing activities. |
| **West African mangrove oyster (*Crassostrea gasar*)** | A bivalve mollusc found in inter tidal coastal zones of the Atlantic Ocean also known as *Crassostrea tulipa*: from Mauritania to Angola and from Venezuela to Brazil. It grows on the bark of the stilt sections of mangrove trees, which are exposed during low tides and covered during high tides. It can also be found on some other suitable intertidal substrates in its range. This oyster has evolved to survive exposed to the air during low tides. |
| **Wet weight** | The weight of a species in whole form prior to processing. In the case of oysters, the wet weight is the weight of the oyster in its shell prior to shucking. |
| **Yield** | An amount produced of an agricultural or industrial product. In this case the amount of fresh oyster meat from the whole oyster and/or the amount of processed oyster meat from the whole live oyster. |

# 1. Introduction

## 1.1. Background and objectives

This report was developed under the FISH4ACP programme, an initiative of the Organization of African, Caribbean and Pacific States (OACPS) to support sustainable fisheries and aquaculture development. FISH4ACP is a value chain (VC) development programme implemented by the Food and Agriculture Organization of the United Nations (FAO) with funding from the European Union (EU) and the Germany's Federal Ministry for Economic Cooperation and Development (BMZ). [1] Adopting a holistic approach to sustainability, FISH4ACP seeks to promote investments into fisheries and aquaculture value chains with the goal of stimulating inclusive growth, poverty reduction and improving food and nutrition security, while at the same time ensuring the sustainability of marine and aquatic resources.

FISH4ACP aims to achieve the sustainable development of aquatic product value chains through five outcomes:

1. Improved stakeholder understanding of the value chain and participative development of a value chain upgrading strategy.
2. Increased micro, small and medium-sized enterprises (MSMEs) economic performance.
3. Improved inclusiveness and social sustainability throughout the value chain.
4. Enhanced management of natural resources and consideration for climate change.
5. Facilitated MSMEs access to finance and investment.

FISH4ACP is a five-year programme (2020–2025) implemented in 12 countries Africa, the Caribbean and the Pacific (ACP). Twelve value chains (one per country) were competitively selected from over 70 proposals for programme implementation. [2] The year 2020 was devoted primarily to the development of the methodological tools and approaches to be used by the FISH4ACP project as a whole and to mobilisation in the 12 countries. The year 2021 and part of 2022 have been used to conduct value chain analyses and the development of value chain upgrading strategies in the 12 countries. These upgrading strategies will be implemented in years 2022–2025 of the programme. This report was developed in this context and presents work conducted in The Republic of The Gambia (hereafter, the Gambia) in 2022.

[1] A shorter summary version of this report is published separately so no executive summary is provided.

[2] These 12 value chains are: the mahi-mahi VC in the Dominican Republic; the Atlantic seabob VC in Guyana; the oyster VC in Senegal; the farmed tilapia VC in Cote d'Ivoire; the farmed catfish VC in Nigeria; the Lake Tanganyika sardine, sprat and lates VC in Tanzania; the farmed tilapia VC in Zimbabwe; the shrimp VC in Cameroon; the pelagics VC in Sao Tome and Principe; oyster in The Gambia, small lake pelagics in Zambia, and the purse seine tuna VC in the Republic of the Marshall Islands.

## 1.2. FISH4ACP in the Gambia

In the country proposal for the development of the Gambia mangrove oyster (*Crassostrea gasar*)[3] value chain submitted by the Department of Fisheries of the Ministry of Fisheries, Water Resources and National Assembly Matters (MoFWRAM), a focus was given to: i) commercial expansion of oyster aquaculture; ii) review, implementation and replication of existing co-management arrangements for the wild oyster VC; iii) improved product handling and processing; iv) enhanced food safety standards and official controls, potentially facilitating more formalised exports of oysters; and v) improved support services to the oyster VC. Building on the competitive advantages of the VC in terms of existing levels of community organisation, high levels of female participation in the VC, the inherent characteristics of oysters in terms of their micronutrients and protein, and strong market demand, the upgrading strategy is expected to result in environmental benefits in the form of improved management arrangements, social benefits in terms of employment (especially for women) and food security, economic benefits through improved profitability for those involved with the VC, and enhanced resilience of the sector. This value chain analysis and design report was developed in response to, and to explore, such needs.

## 1.3. Methodology

In the context of the FISH4ACP Programme, FAO has joined forces with the European Commission (EC), the OACPS and Agrinatura, to develop a VC analysis (VCA) and development approach based on FAO's Sustainable Food Value Chain (SFVC) and Agrinatura's Value Chain Analysis for Development (VCA4D) methodologies (FAO, 2014; Agrinatura, 2017). The FISH4ACP methodology, applicable across all countries included in the project, has four main components: functional analysis; sustainability assessment; upgrading strategy development; and implementation planning (activities and investments). The approach is highly participatory, involving value chain stakeholders from the public and private sector from the outset in order to ensure national ownership of all four components, thereby increasing the likelihood of success of the project interventions.

The **functional analysis** looks at the current structure of the VC, the dynamics that explain how and why this structure is changing, and the capacities and incentives that drive behaviours of VC actors. It starts with the identification of end-market opportunities, as the economic performance of the VC is ultimately determined by its ability to capture value in an end-market. Based on the in-depth analysis of a wide range of primary and secondary data, the functional analysis presents a detailed VC map and systematically analyses the nature of the various VC elements across four layers, namely: (1) actors in the core VC, (2) input and service providers, (3) the societal environment, and (4) the natural environment. This analysis

[3] According to the World Register of Marine Species classification, *C. gasar* and *C. tulipa* are the same species.

includes the constraints and opportunities associated with the various VC elements and their linkages. The analysis is explicitly based on understanding the behaviour of the VC actors and the governance mechanisms that create incentives or disincentives for the observed behaviour. Through this in-depth and systemic approach, the functional analysis helps to identify the binding constraints in the VC and their root causes, as well as the leverage points for maximum impact that will inform the development of an upgrading strategy to bring about the desired economic, social and environmental impacts.

The **sustainability assessment** then uses a range of quantitative and qualitative indicators to measure the performance of the value chain in terms of its economic, social and environmental dimensions. This assessment includes: six economic sustainability domains (i.e., profitability, employment, value added, effects on the national economy, international competitiveness, and value for end-consumers); six social sustainability domains (i.e., inclusiveness, gender equality, food and nutrition security, decent employment social and cultural capital, and institutional strength); and seven environmental sustainability domains (i.e., climate impact, water footprint, fish stock sustainability, biodiversity and ecosystems, animal health and welfare, toxicity and pollution, and food loss and waste). The sustainability assessment identifies sustainability 'hotspots', which help to determine which opportunities should be pursued for upgrading, alongside government priorities and private sector ambitions. The assessment also includes the value chain's resilience to shocks, such as those caused by COVID-19.

The **upgrading strategy development**, the next step in the approach, starts with the development of a common vision based on the findings from the functional analysis and sustainability assessment. With facilitation by the project, VC stakeholders themselves develop this common vision, along with an associated set of targets to measure improvements in VC performance over a given time-period. The vision and targets are then used to devise an upgrading strategy. The upgrading strategy aims to address the binding constraints, sustainability hotspots and their root causes, and builds on the strengths and opportunities in the VC as identified in the functional analysis and sustainability assessment. Various upgrading options are considered in three categories: upgraded business models (elements), upgraded governance (linkages), and upgraded enabling environment (organizations, infrastructure, institutions, socio-cultural elements). These upgrading options are either derived from global best practices adapted to the situation at hand, or represent unique solutions prepared by experts in the particular upgrading area. The validity of these solutions typically needs to be assessed during the early stages of the activity plan implementation. A holistic approach to sustainability is included throughout this vision and strategy development process in order not to overlook any potential adverse impacts of the proposed upgrading interventions and to assure maximum resilience to shocks (such as those caused by COVID-19).

The **implementation planning**, as the final step in this process, translates the upgrading strategy into an activity and investment plan for each VC to be implemented during 2023–2025. The plans detail a sequence of activities that need to be conducted, and investments that need to be made, to implement the identified upgrading strategy. To ensure the sustainability of FISH4ACP's interventions, both the development of the plans (part of this report) and their implementation require an approach which facilitates local stakeholders' active participation and encourages stakeholders to take on their roles and to develop a sense of ownership of the development of the VC.

**In the Gambia, the standard FISH4ACP methodology was applied in a slightly adapted manner**. This involved some consideration of the potential vision from the very beginning of the project. Given the size and economic value of the oyster VC, a proportional approach to data collection was also adopted such that some indicators within the sustainability assessment were assessed qualitatively. A wide range of data collection tools were however utilized, and included observational visits, focus groups, surveys (of actors and consumers), expert consultations, key actor interviews, and key informant interviews. The surveys were used to obtain quantitative data to inform the economic sustainability assessment. With the analysis and design work in the Gambia starting early in 2022 when COVID-19 travel restrictions began to be lifted, the international FISH4ACP consultants were able to travel to the Gambia for the inception workshop, for the validation workshop, and for the planning workshop, allowing all three workshops to be held in-person. The inception workshop visit allowed the FISH4ACP consultants to familiarize themselves with the oyster VC and was used to train the national partner (the Institute of Social Research and Development [ISRAD]) in the data collection tools which ISRAD then implemented. A national professional officer, based in the Gambia and working from the FAO Gambia office, also supported the work throughout the analysis and design phase.

Table 1 shows the key events and activities associated with the preparation of this report, while a list of stakeholder consultations is provided in Annex 1.

**TABLE 1: KEY EVENTS AND ACTIVITIES IN THE PREPARATION OF THIS REPORT**

| Date | Event / Activity |
|---|---|
| January to March 2022 | Review of secondary literature, stakeholder mapping, and preparation of all primary data collection tools by FAO-contracted VCA team |
| March 2022 | Project inception workshop in the Gambia, revision of data collection tools, and training of national partner in data collection methods and tools |
| April to May 2022 | Primary data collection by national partner |
| May to June 2022 | Completion of sustainability assessment tools and drafting of sections 1-3 of report by FAO VCA team |
| June 2022 | Stakeholder validation workshop in the Gambia to discuss and validate sustainability assessment and contents of sections 1-3 of report and begin considerations of the upgrading strategy. |
| July to August 2022 | Drafting of upgrading strategy and implementation plan (sections 4 and 5 of report) by VCA team |
| September 2022 | Stakeholder workshop in the Gambia to discuss and validate the upgrading strategy and implementation plan. |
| September to October 2022 | Shellfish frame survey |
| November to December 2022 | Draft report finalisation |
| December 2022 to January 2023 | Review of report by internal FAO peer reviewers and Department of Fisheries, and report quality assurance (FAO) and finalization (FAO VCA team) |

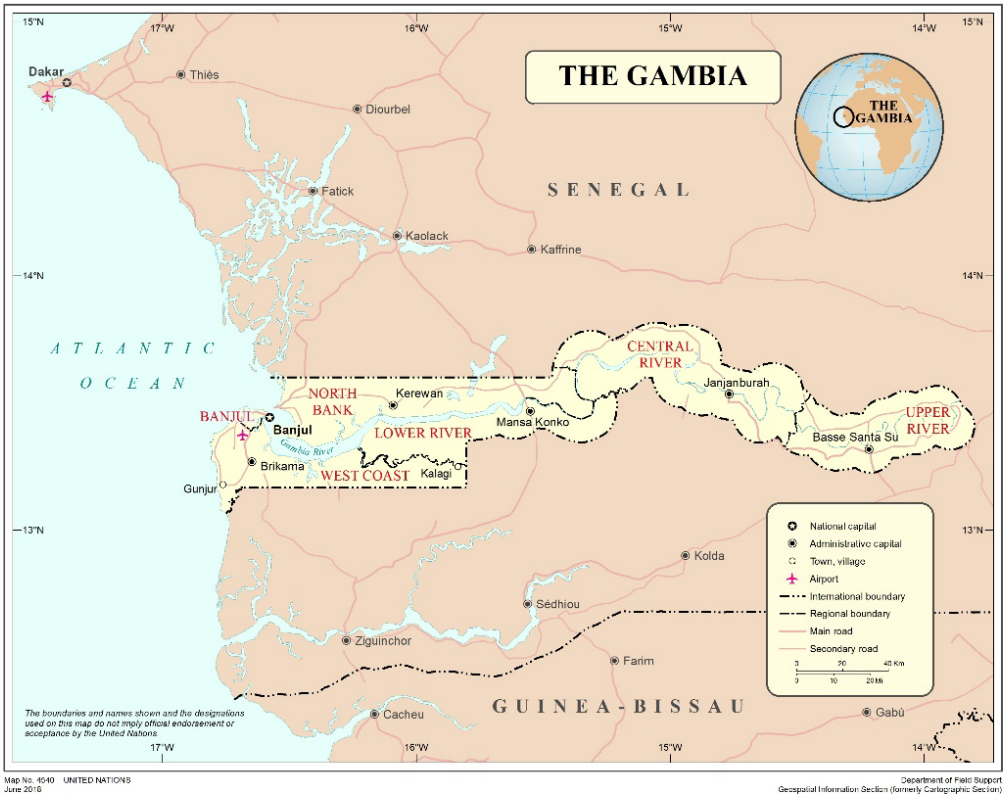
Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP actor survey

## 1.4. Brief history and overview of the value chain

The River Gambia flows from east to west along the length of the Gambia before emptying into the Atlantic Ocean. As it approaches the Atlantic Ocean, fresh water in the river and its tributaries mixes with sea water to create brackish water. The brackish water zone extends from the mouth of the river in coastal areas to about 100 kilometres inland, shifting above and below this limit depending on tidal and seasonal variations in water inflows.[4]

[4] Njie and Drammeh, 2011

**FIGURE 1: MAP OF THE GAMBIA**




Source: UN Geospatial https://www.un.org/geospatial/content/gambia (copyright United Nations)

The brackish water provides an environment for seven species of mangroves to grow, with oysters growing on the roots of three sub-species of *Rhizophora Sp*[5] in the inter-tidal zone, but not on other species.[6]

[5] *Rhizophora mangle, Rhizophora harisona, Rhizophora racemose* found in Tanbi, West Coast Region, Lower River Region and North Bank Region

[6] *Laguncularia racemosa, Avecinia Africana, Croka aposidotus, and Cono capus*

**FIGURE 2: MANGROVE OYSTER**

Source: ©Graeme Macfadyen

A single species of oysters is present in the Gambia,[7] *Crassostrea gasar* (see Figure above), which is the same species as *C. tulipa*.[8] Oysters grow predominantly as a conglomeration of shells on mangrove roots in the inter-tidal zone but can also be found permanently submerged on more rocky substrates in which case they can grow larger (see Figure 3).

**FIGURE 3: MANGROVE OYSTER (*LARGE*)**

Source: © Graeme Macfadyen

[7] As confirmed in January 2023 by FISH4ACP following genetic testing of forty samples from four sites (Memmeh in North Bank Region, Lamin in Greater Banjul Area, Kemoto in Low River Region and Bullock in West Coast Region) completed by Arnaud Tanguy from Roscoff Marine Station, Sorbonne University.

[8] according to the World Register of Marine Species classification

While very little published information is available on the historical development of the mangrove oyster VC in the Gambia, mangrove oysters have been harvested for subsistence purposes for many decades, if not centuries. Commercialisation of the sector started from around the 1970's,[9] and from the 1980's the oyster fishery has been a stated priority for the Government.[10]

The main practices involved with the collection processing and sale of oysters are:

- the harvesting of wild oysters at low tide from the roots of mangroves (or free-diving for the larger oysters, (using un-motorised wooden dugout canoes to access harvesting sites);
- boiling/smoking of oysters in cut-off 44-gallon oil drums over a wood fire;
- shucking and sorting of oysters by size;
- discarding of empty oyster shells;[11] and then
- transporting the boiled oysters in wicker baskets to markets for sale (while some quantities are sold in communities, most are sold by the roadside or in retail markets in urban areas).

At roadside market sites located close to landing sites, some oysters may be grilled/smoked in shells before shucking and sale. Boiled (or grilled/smoked) oysters not sold on the day they are taken to market are typically sun-dried for sale on subsequent days. Almost all oysters are sold domestically, although there are some informal 'exports' of oysters by individuals buying boiled oysters, freezing them, and then taking them as part of personal edible food allowances when flying to the UK, Europe and other countries in which Gambian nationals reside. In such cases oysters may be sold or given as gifts.

Oyster aquaculture is also practiced in the Gambia in a limited way. It was initiated in the mid-1980s with Canadian government support.[12] Currently there are only farms at five sites, most of which were constructed within the past 5–6 years.[13]

**Of strategic relevance to the upgrading strategy for the oyster VC are**:

- suspected over-exploitation of mangroves in some areas with potential for expansion in others.
- the potential for increased levels of oyster farming.
- the current rudimentary levels of processing and handling, and limited range of oyster products on sale.

[9] FISH4ACP data collection revealed that some individuals have been collecting oysters for up to 60 years
[10] Njie and Drammeh, 2011
[11] Shells may be sold for use in construction, or burnt to form white lime or ground for use as fertiliser, but are often just discarded at the landing/processing sites
[12] Pers. Comm., Department of Fisheries
[13] Faji Kunda, Lamin and Old Jeshwang in Tanbi Region, Bullock in West Coast Region and Kartong in West Coast Region

The remaining sections of this value chain analysis and design report explore and analyse the challenges and opportunities for improvements in the oyster VC in the Gambia.

# 2. Functional analysis

This section describes the structure of the mangrove oyster value chain in the Gambia. Four analytical steps were completed, each of which is presented in a specific sub-section:

- VC mapping to provide a general picture of the value chain from production to consumption, indicating the functions, the actors, the linkages between them, and the main channels (sub-section 2.1).
- End-market analysis to consider current and potential end market opportunities (sub-section 2.2).
- Analyzing the elements of the VC, in terms of the the actors in the core VC, the input suppliers and service providers in the extended VC, the societal enabling environment, and the natural environment (sub-section 2.3).
- Analyzing the governance and linkages in the system to consider how well the VC functions as a whole (sub-section 2.4).

## 2.1. VC mapping

This value chain analysis studies the mangrove oyster VC in the Gambia. Other shellfish species such as cockles, or crabs, collected by actors in the oyster VC are not a byproduct of oyster collection, but are generally collected by some actors when oyster collection is not taking place and are therefore not included within the analysis.

No historic time-series are available of the volume of oysters collected each year, as the species is not included in the Department of Fisheries' statistical fish landings data collection programme, and no production data are available from the five oyster farms established in the Gambia. No data are recorded either on the volume of oysters sold in the Gambia, either as sales weights or as the 'in-shell' equivalent of oysters that are harvested to generate processed sales volumes. Even the number of people involved in the VC was not well understood until the FISH4ACP programme funded a dedicated shellfish survey as part of the analysis and design phase.

Different functions taking place in the value chain (considered and described in more detail in Section 2.3) prior to consumption are:

- The collection of oysters.
- The farming of oysters.
- The processing of oysters.
- The retailing of oysters (with very limited sales of oysters in the food service sector by informal street food vendors).

Prior to the work completed as part of the FISH4ACP analysis and design, reliable data on the VC was lacking. Data collection to inform this report included a survey of actors and one

of consumers, sampling/weighing during field visits, and a dedicated shellfish frame survey conducted by the Department of Fisheries in September/October 2022[12] (supported financially by the FISH4ACP project). These activities, along with other research methods such as focus group discussions and interviews, enabled **the FISH4ACP project to resolve many data inconsistencies and uncertainties** in recent and historical literature on the value chain. Findings from the FISH4ACP data collection are:

- A total of 1 200 people are involved in the value chain as actors (88 percent of them women).[14]
- The final total value of oyster sales in 2022 is GMD 83 million (USD 1.4 million).
- 832 people are involved with collecting, processing and retailing of oysters (ca. 90 percent women): we term this actor group collector/processor/retailers (CPRs).
- 269 people are involved with collecting and processing oysters for sale to retailers i.e. they do not sell to consumers themselves (c.a. 80 percent women): we term this actor group collector/processors (CPs).
- 99 people are involved with retailing oysters to consumers in markets i.e. they are not involved in collecting and processing (99 percent women): we term this actor group (dedicated) retailers (Rs)
- All those involved in the five oyster farms (see later discussion) are also involved in wild oyster collection and processing.
- 70 percent of all sales volumes are made by CPRs, with the remaining 30 percent being sold through a channel involving the CPs and Rs.
- 95 percent of all sales volumes by retailers are to individual consumers, with 5 percent of sales at the retail level bought by informal street vendors (number unknown). Of the 95 percent sold to individual consumers small quantities (unquantified but perhaps c.a. 5 percent) of the total volumes purchased are taken overseas (in boiled form) for consumption and sale by/to the Gambian diaspora.
- 93 percent of all oysters sold are in boiled/steamed form, with just 6 percent as grilled/smoked, and less than 1 percent in dried form.[15]
- A conversion rate of 3.7 percent i.e. 10 kg of oysters-in-shell collected from the mangroves results in 370 grammes of boiled oyster meat.[16]
- Considering the typical sales volumes of 'cups' of oysters by actor type (and weight of sales in one 'cup': 6.5 cups = 1kg), and average self-consumption or payment in

[14] The shellfish frame survey recorded 1 419 individuals but 232 were working for less than 5 days a week, and 102 are recorded as 'processing only' so likely to be paid labour rather than actors owning product: all are therefore excluded for the purpose of estimates/analysis. Additionally, as the shellfish frame survey was conducted in communities it did not include dedicated retailers in urban markets, so numbers of dedicated retailers are estimated. Additional data from the frame survey are provided in Annex 1.

[15] 93.4% of consumers only buy boiled, 3.3% buy boiled and grilled/smoked, 2.5% grilled/smoked and 0.8% dried

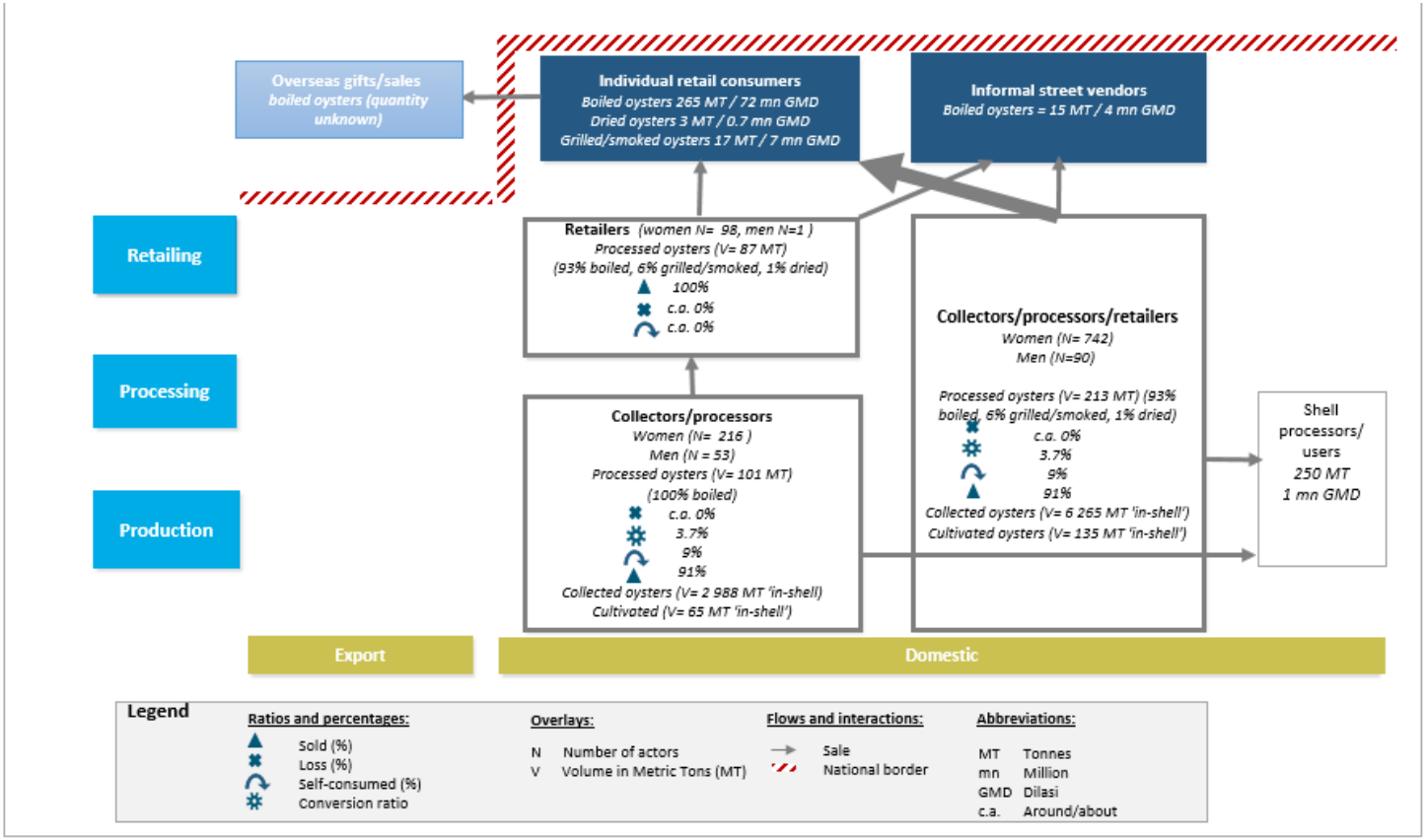
[16] samples were taken, involving the weighing of oysters-in-shell required in one drum for boiling/steaming, with the weight of boiled and shucked oysters also weighed to obtain the conversion ratio.

oysters to those helping with processing (9 percent of harvested/processed oysters), we estimate that total 'in-shell' production is 9 453 tonnes per year (200 tonnes of which is farmed), and sales of c.a. 300 tonnes a year of processed oysters.
- Farmed oysters account for only small sales volumes (estimated at around 7 tonnes in boiled/steamed form)
- Oyster processors in some cases sell empty shells (the waste product from processing): to producers of white lime; for use in construction; for use as fertiliser, or to feed producers as an input to chicken feed.

The main elements of the description above are presented graphically overleaf in the form of a mangrove oyster VC map. **Points of strategic relevance for the upgrading strategy from the contents of the VC map** are:

- Earlier estimates of harvested production (of 'in-shell' oysters) appear to be significant underestimates.
- The VC actors are overwhelmingly women.
- Apart from small volumes of product unofficially taken out of the Gambia by individuals, and some small and informal cross border product flows where communities live right on the border (but which are hard to quantify), the VC is a domestic one and involves no formal imports or exports.
- The VC is strongly vertically integrated.
- The VC involves few oyster products, with boiled oysters being by far the dominant form of product sold. Other sales include very small amounts of grilled/smoked oysters, some dried oysters, but there are no sales of fresh oysters or other value-added products (e.g. oysters in jars, preserves, etc.).
- There remain some data gaps and uncertainties about the VC, notably on: volumes of product taken out of the Gambia; the number of street vendors selling dishes which include oysters; the number and activities of oyster traders (but these are thought to be very few in number).

**FIGURE 4: MANGROVE OYSTER VALUE CHAIN MAP, 2022 (THE GAMBIA)**




Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Note: 1/ dedicated retailers in limited cases may dry oysters (so they don't need to throw product away), or grill/smoke oysters (on demand for processors) but these activities are not considered sufficient to include them in the collector/processor group of actors who collect and process all oysters through the boiling/steaming and shucking process. This explains why in the VC map collector/processors sell 100 percent of oysters boiled, but retailers do not. 2/ retailers' sales volumes do not exactly equal collector/processors' sales volumes despite the fact that retailers are not assumed to self-consume, due to assumptions about the number of retailers

## 2.2 End-market analysis

### 2.2.1. Domestic market for oysters

The Gambia is defined by the World Bank as a 'Low Income Country' (LIC)', [17] and under the UN classification as a 'Least Developed Country' (LDC). [18] Nevertheless, despite high domestic sales prices for oysters, its population [19] is the main end market for mangrove oysters.

#### 2.2.1.1. Retail sales

Retail sales of oysters take place in **various locations**. Most commonly representing the greatest share of total volumes sold (c.a. 90 percent) [20], are oysters sold in major urban markets or by the roadside in the Tanbi area. The major urban markets are: Serrekunda (Kanifing municipal Council (KC)), Brikama (West Coast Region (WCR)), Latri Kunda (KC), Lamin (WCR), Kemoto (Lower River Region (LRR)) and, in North Bank Region (NBR), Essau market.

Additionally and involving only small volumes (around 10 percent of production), oysters are sold by processors in the communities/villages where processing takes place.

Oysters are only sold in three main **product forms** when purchased by consumers in retail markets:

- boiled
- grilled/smoked; and
- dried.

No raw/fresh oysters are sold or consumed in the Gambia, [21] and while some attempts have been made over the past 5–10 years by the TRY oyster women's association to sell vacuum-packed and bottled oysters (having visited Senegal where such products are sold) the activity was not successful. Reasons for the failure of such product developments are reported to be less about potential market demand, and more because processors couldn't agree selling prices with/to TRY, and many processors have established relationships with retailers they preferred to continue to sell to. [22]

Boiled oysters are differentiated based on size, with two categories of 'big' and 'small' fetching different prices. Grilled/smoked oysters are mainly sold as 'big'. Dried oysters are not differentiated by size given that once dried they are all very small.

[17] https://data.worldbank.org/income-level/low-income (accessed 29 March 2022)
[18] https://www.un.org/development/desa/dpad/least-developed-country-category/ldcs-at-a-glance.html (accessed 29 March 2022)
[19] 2.4 million (Gambia, The - The World Factbook (cia.gov))
[20] Shellfish framesurvey, September/October 2022
[21] FISH4ACP data collection, consumer survey April and May 2022.
[22] Pers. Comm., TRY oyster women's association.

The setting and enforcement of **food quality standards** related to oysters in domestic retail markets are lacking. There is no control of standards at oyster processing sites, and no testing of product safety at retail markets, which represent the main marketing channel.

**Prices** obtained during the FISH4ACP data collection in April and May 2022 from actor and consumer surveys, and supported by focus group discussions (FGDs), (for more information see Annex 1) are provided below.

**TABLE 2: DOMESTIC RETAIL MARKET PRICES FOR OYSTERS IN THE GAMBIA, 2022 (IN GMD/'CUP')**

| Market location / Price per 'cup' | 'Big' boiled oysters | 'Small' boiled oysters | 'Big' grilled / smoked oysters | 'Small' grilled / smoked oysters | Dried oysters |
|---|---|---|---|---|---|
| Brikama (WCR) | 50 | 40 | - | - | - |
| Lamin (WCR) | 60 | 50 | - | - | - |
| Serrekunda (KC) | 60 | 35-50 | 70 | 50-60* | 50* |
| Latri Kunda (KC) | 50 | 40 | 65-70* | - | - |
| Kemoto (LRR) | 50 | 30-40 | - | - | - |
| Essau (NBR) | 50 | 30-35* | - | - | - |
| **Average**[23] | **52** | **40** | **69** | **55*** | **50*** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Data from FISH4ACP actor and consumer surveys completed April and May 2022. Notes: /1 A 'cup' of oysters = c.a. 125-150 grammes of oysters. 2/ 1 cup of 'big' boiled oysters contains around 35-45 boiled oysters and 1 cup of 'small' oysters around 125 oysters. 3/ USD 1 = GMD 53. 4/ When processors don't retail oysters themselves but sell to retailers, sales prices obtained by the processors are generally GMD 5-10/cup lower than final retail market prices. 5/ *less than four answers obtained from a total of 122 respondents.

As can be seen from the table above, the boiled oyster (big or small) price is quite homogeneous across regions, and around 50 GMD for a cup of big oysters and 40 GMD for a cup of small ones, with the exception of Lamin and Serrakunda markets, where big oysters are normally sold at 60 GMD and Kemoto and Essau markets, with some small oysters sold at 30 GMD. This may be due to levels of different consumer demand, with the former markets being in regions far from Banjul and the latter located in greater Banjul, with higher population concentration.

Prices for big boiled oysters of GMD 50-60 per cup (c.a. USD 1 per cup and equivalent to GMD 350-360/kg or USD 6.5/kg) are comparable to current prices of red meat (at around GMD 300-350/kg / USD 5.5-6.5/kg), and much higher than the cost of chicken (GMD 100-150/kg)

[23] Average retail market prices considers oyster prices from other markets as well, such as Gunjur (WC), Kartong (WC), Tallinding (KC) and Soma (LRR)

and many other forms of fish protein (GMD50-100/kg),[24] but demand for oysters is strong despite oyster prices having risen in recent years.[25] Indeed, mangrove oyster collectors/processors/retailers can be viewed as 'price setters' rather than 'price takers'[26] with members of the TRY oyster women's association for example setting prices each year by agreement amongst its members.[27] While no time-series data on changes in prices are available, prices are reported to have been rising over the years, and data collected by the FISH4ACP project suggest that prices set by the TRY oyster women's association serve as the benchmark for prices nationally, although with some variation between market location.

The FISH4ACP consumer survey[28] (and other supporting data collection e.g. FGDs) was also used to obtain a range of quantitative data on consumers and their purchases of oysters, and their buying preferences. Key findings from the FISH4ACP data collection completed during April and May 2022 are shown below.

**Retail consumers and their buying habits**

- Buyers of oysters in retail markets are most commonly women (85 percent of surveyed consumers) with an age of between 25 and 50 years (around 70 percent of respondents).
- During the season when oysters are available for sale, consumers most commonly buy boiled oysters (97 percent of surveyed consumers), with grilled/smoked oysters (6 percent) and dried (less than 1 percent) being far less purchased.
- The average number of cups purchased by a consumer in a month is around 13, with half of the consumers buying between 2 and 5 cups per month. With regards to purchase frequency, almost 40 percent of consumers buy oysters more than once a week, and 28 percent once every one or two weeks.
- Household expenditure on oysters (averaging GMD 700) compares with household expenditure of around GMD 1 815 for other fish products, and GMD 1 670 for other chicken and red meat protein.

**Volumes of consumer purchases and consumption**

- National consumption of oysters is estimated at c.a. 300 tonnes per year of processed oyster meat.
- Of this total, 95 percent is purchased by retail consumers for consumption at home in a variety of home preparations (stews, omelettes, fried).
- For oysters purchased, very few respondents (17 percent) declared wasting oysters bought and not consuming them, in very small amounts (average of 2.5 percent of

[24] Based on market observations
[25] FISH4ACP FGDs, 2022
[26] Pers. Comm., FISH4ACP project inception workshop
[27] Pers. Comm., TRY oyster women's association.
[28] Comprising 122 respondents.

the volume of purchases across all respondents). Reasons given for the small amounts of waste included: a lack of storage facilities at home, and the distance to markets.

**Information about imports of oysters for retail sales**

i. There are no formal 'imports' of oysters entering the domestic market e.g. from Senegal. However, in some communities which straddle the Senegal/Gambian border (on the northern and southern Gambian border), it is reported [29] that processors based in Senegal may trade their product into the Gambia. Quantitative data on volumes are not available.
ii. Very few buyers (6 percent) in the consumer survey reported purchasing oysters from Senegal, although 22 percent reported that they don't know the origin of the oysters they buy.
iii. However, there appears to be a strong preference of buyers for Gambian oysters: of the seven respondents stating they buy Senegalese oysters, six said they prefer to buy Gambian oysters.

**Retail consumer preferences and perceptions**

- Almost 90 percent of consumers surveyed stated that boiled oysters are their preferred product, with 7 percent reporting grilled/smoked oysters as being preferred and only 3 percent reporting dried oysters as their product of choice. However, at the validation and vision development workshop it was suggested that this stated preference by surveyed consumers may be because grilled/smoked oysters are not widely available and respondents may have mis-understood the survey question. Historically more grilled/smoked oysters were sold (and workshop participants generally stated their preference for them), but this is not now the case because of the smoke and danger to the eyes of processors when smoking which means they are generally not keen to grill/smoke oysters.

i. Currently only 34 percent of consumers buying oysters in retail markets also buy/consume oysters sold by food vendors, but 40 percent of those who don't, said they would be interested in doing so.

The most important reasons for deciding to buy oysters, and consumer perceptions about oysters are shown in the table below. Data from the survey show that freshness is the most important factor for consumers when deciding whether to buy oysters or not, indicated by 66 percent of the respondents. Eleven percent of buyers stated size as the most important, and 10 percent the price. The quality of oysters is perceived as very good by 61 percent of the respondents, while the quantity of oysters available for sale and oysters' value for money

[29] FISH4ACP FGDs and consumer survey, 2022

is, on average, also considered good. Most consumers stated as normal (neither good, nor bad) when asked about the reliability of finding oysters for sale on any given day.

**TABLE 3: GAMBIAN CONSUMER MOTIVATIONS FOR BUYING OYSTERS, AND THEIR PERCEPTIONS ABOUT OYSTERS IN THE MARKET**

| When you buy oysters which of the following factors is most important to you in deciding whether to purchase them or not (number / % of respondents) | | Using a scale of 1-5, with 1 being very good and 5 being very bad, what score would you give to (average score / modal score) | |
|---|---|---|---|
| Price | 10% | The quality of oysters available for sale | 1.5 / 1 |
| Freshness | 66% | The quantity of oysters available for sale | 2.2 / 2 |
| Size | 11% | The reliability of finding oysters for sale on any given day | 3.0 / 3 |
| Seller known to you | 4% | The price of oysters compared to other sources of fish and meat protein i.e. value for money | 2.3 / 2 |
| Combination of freshness and size or price | 7% | | |
| Something else | 1% | | |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Notes: the modal score shows the most commonly observed value in the data.

**Retail sales of farmed oysters** from the five sites currently operational in the Gambia, are not differentiated in the domestic market from wild oysters, and prices also do not differ. Harvesting, processing and sale takes place during the same months that wild oysters are collected and processed for sale.

#### 2.1.1.1. Food service sector sales

It is estimated[30] that only c.a. 5 percent of national production of processed oyster meat in the Gambia (15 tonnes), is sold through the 'food service sector' channel.[31] Primarily this means oysters bought from oyster processors by **informal street food vendors** for use and sale by them in food dishes containing oysters (see later discussion). A notable dish is the Gambia is the popular "*Benachin*" (everything cooked in one pot) in which it is common to find oysters cooked with the rice. Food vendors sell this dish with oysters added to stew[32] or fried and served with bread[33]. Other information on the food service sector is scant from the literature available, however the FISH4ACP data collection suggest that tourist restaurants and hotels do not appear to be a channel for any sales of oysters,[34] rather it is food vendors/stalls selling to Gambians in the domestic market which are the end market in the food service sector marketing channel. However, it is possible that some oysters may also be bought and used by hotels and restaurant operators, and party providers.[35]

As with retail sales, the setting and enforcement of **food quality standards** for oysters in the domestic food service sector i.e. sales by food vendors are few. Some limited food safety inspections by the Food Safety and Quality Authority (FSQA) occasionally cover food vendors, but not specifically oysters ones.[36]

### 2.2.2. Export markets for oysters

Seafood and other Gambian products can be exported at preferential duty rates and quota free to some markets (assuming that sanitary standards are complied with):

- ECOWAS markets under the ECOWAS Trade Liberalization Scheme (ETLS).
- European Union market under the Everything But Arms (EBA) Initiative offered by the European Union.
- India, Brazil and South Korea under preferential duty rates for products from Least-Developed Countries (LDCs).[37]

There are currently no formal 'exports' of oyster from the Gambia. Nevertheless:

- As with 'imports', some 'exports' of oysters may take place with sales in Senegal, where Gambian processors live in communities which straddle the Senegal/Gambian border (on the northern and southern Gambian border) and sell product in Senegal.

[30] Based on FISH4ACP data collection, 2022
[31] Based on the actor survey which revealed that only 3 of 104 respondents reported any sales to food vendors
[32] Momodou Njie, 2011
[33] FISH4ACP data collection, actor survey April and May 2022
[34] FISH4ACP data collection, actor survey April and May 2022
[35] Momodou Njie, 2011., Department of Fisheries (Pers. Comm., June 2022)
[36] FISH4ACP data collection (FSQA Pers. Comm., June 2022 and Food Vendor interviews June 2022)
[37] Gambia Investment and Export Promotion Agency, 2015

Quantitative data on such volumes are not available but volumes are thought to be very small.[38]

- Quantities of oysters are 'exported' by individuals who carry them for sale (i.e. conducting a trading function) or as gifts (serving as friends) to relatives in overseas markets. The main destinations of these exports are Gambians living in the USA and the UK,[39] and European Union countries.[40] Oysters can be taken as personal food items on planes (up to a volume of 10kg), with oysters typically frozen when purchased in the Gambia and taken in luggage when travelling.
- Given the informal nature of these 'exports', data on volumes and values are not available. However, the FISH4ACP consumer survey[41] revealed that around 11 percent of respondents (14 out of 122) declared taking an average of 34 cups of oysters cups for sale or to give to friends each time they travel outside the country, which happens 1-2 times a year.

### 2.2.3. Domestic markets for by-products of oyster processing

As noted above, when *collecting* oysters there are no by-products from the collection process i.e. cockles and crabs are generally not collected at the same time as the harvesting of oysters but rather when oysters are not being collected. The shellfish frame survey revealed that only 5 of 37 communities involved with oyster collection/processing also collect cockles, and generally do so outside of the oyster harvesting season.[42]

However, empty oyster shells from the processing of oysters are a by-product which may be sold by oyster processors to others for further processing and sale or used by processors themselves. Earlier literature[43] and FISH4ACP data collection suggests that the main by-products from processing oysters (the shells) are used for four main purposes:

- To produce white lime following burning, to be used as whitewash. The process involves considerable amounts of firewood and burning the shells for 2 -3 days, typically to produce 40-.
- In construction.
- As fertiliser
- In animal/chicken feed (once ground).

The FISH4ACP data collection indicated that little white lime is produced from the empty shells at present due to a) the large quantities of wood required for the burning process, b) the arduous and long work involved, and c) the low sales price for white lime (averaging

[38] FISH4ACP FGDs, 2022
[39] Momodou Njie, 2011
[40] FISH4ACP consumer survey
[41] FISH4ACP consumer survey, 2022
[42] Kamalo, Kartong, Lamin Lodge, Mbankam, and Ginak Niji
[43] Momodou Njie, 2011 / Carney, 2017

around GMD 200-250 per 50 kg bag). The FISH4ACP actor survey found that only 15 percent of processors sell shells to dedicated white lime producers, and that only 11 of 104 (10.5 percent) make white lime themselves. However, where such practices take place:

- Oyster shells cost changes depending on the region. In the NBR they can be given for free or sold at GMD 500 per pile, while in the WCR they can be sold for GMD 1 500 - 2 000 per oyster shell pile.
- When shells are sold to the one poultry feed plant in the Gambia that buys shells domestically (another imports ground shells from Senegal for GMD 3 per kg), the meal plant buys the shells for GMD 125 per 25 kg bag.
- The few oyster processors that do produce white lime generate around GMD 2 000/year through the sale of oyster shells.
- Processing of shells by white lime producers take place at/very near sites where oysters are shucked to reduce the need for transport costs. Lime producers prefer older shells that are already well washed and are brittle-dry, hence it can take several seasons before shells get used and the quality of the final lime product is determined by the cleanliness/whiteness of the shells. Lime production usually intensifies towards the end of the dry season as the rains approach and are normally sold to individual clients. [44]
- Lime is packed into 25kg or 50Kg bags [45] with recent sales prices varying between GMD 100 per 50kg (reported in the NBR) and GMD 350 per 50kg (reported in the WCR), and for around GMD 200-250/kg bag in the Banjul area. [46]

The numerous large piles of empty shells at the oyster processing sites observed during the FISH4ACP data collection may reflect low economic viability of processing the shells (white lime producers point the increase in the firewood cost), and/or a poor understanding of how to generate revenues from the shells and access markets for shell by-products.

[44] Momodou Njie, 2011
[45] Momodou Njie, 2011 / FISh4ACP data collection
[46] FISH4ACP data collection

**FIGURE 5: DISCARDED EMPTY OYSTER SHELLS (SUTU SINJANG, WEST COAST REGION)**

Source: ©Graeme Macfadyen

**FIGURE 6: EMPTY OYSTER SHELLS WAITING FOR BURNING INTO WHITE LIME (LAMIN, KANIFING MUNICIPAL COUNCIL)**

Source: ©Graeme Macfadyen

**FIGURE 7: WHITE LIME AFTER BURNING (MEMMEH, NORTH BANK REGION)**

Source: ©Graeme Macfadyen

**FIGURE 8: EMPTY OYSTER SHELLS WAITING FOR BURNING INTO WHITE LIME (MEMMEH, NORTH BANK REGION)**

Source: ©Graeme Macfadyen

While one participant at the national inception workshop reported having purchased a grinding machine to produce ground shells to be used as fertiliser and in animal feed, the FISH4ACP data collection indicates that this practice is not widespread. Likewise, sales by oyster processors of shells for use in construction is not widespread.

### 2.2.4. Market opportunities of strategic relevance to the upgrading strategy

**Domestic market opportunities**

Population growth, increasing urbanisation, and the high cost of other animal protein sources are suggested as drivers for increased domestic demand for seafood. [47]

Text in the sections above is of strategic relevance to the upgrading strategy and highlights that at present the domestic marketing arrangements for oysters already work well:

- The product range is simple but logistically easy to manage for actors, with low input costs in packaging.
- There is virtually no waste during processing or transportation.
- VC actors are price makers, rather than price takers, with strong demand for product in the local market and the ability to sell all product without difficulties.
- High levels of vertical integration within the VC mean that collector/processor/retailer actors (who are the majority) don't have to rely on middlemen and thus capture value added from the oysters themselves.

The findings from the FISH4ACP data collection, as discussed at validation and planning workshops, along with earlier literature, do however suggest some domestic market opportunities and requirements for consideration as part of the potential upgrading strategy:

- Testing of product hygiene safety to avoid any risk of market price shocks due to consumer scares of product safety.
- Expansion of sales into the food service sector, especially more formal restaurants as well as informal street vendors.
- Marketing of new products, e.g. fresh oysters.
- Differentiation in the market of oysters by production method.

Later text in this report considering the upgrading strategy and its implementation (sections 4 and 5) proposes the steps and requirements necessary to realise these domestic marketing opportunities.

**Export market opportunities**

The market in Senegal for oysters is strong and could offer a potential export marketing channel. [48] However, while some have suggested that developing export markets for

[47] Gambia Investment and Export Promotion Agency, 2015

[48] Sales in the domestic market in Senegal are mainly in the form of boiled and dried oysters due to long shelf life and potentially the large distance to market from the collection sites (not so much the case in The Gambia which allows for boiled/steamed oysters to be sold without drying), but also boiled only, roasted or fermented, and some fresh.

Gambian oysters may offer potential,[49] and the validation and vision development workshop discussed development of the export market, growing the export market is not assessed as being a sensible part of the upgrading strategy, at least in the short- to medium-term for the following reasons:[50]

- the more advanced state of production and marketing of Senegalese oysters in Senegal which would make breaking into the Senegalese market by Gambian processors/exporters difficult.
- the small volumes of Gambian oysters being produced, with the domestic market showing strong demand and being able to absorb all the production, and at 'good' prices.
- untapped market potential in the Gambia, for example of new product forms and new marketing channels (e.g. more sales to the vendors and restaurants), which would be logistically easier to respond to than focussing on export markets.
- the current status of food safety standards which would prevent formal exports. Rectifying this would require considerable levels of time, investment and capacity building.

However, the upgrading strategy could include some longer-term activities to help prepare for the development of export markets e.g. food safety testing/controls.

**By-product market opportunities**

In terms of better utilization of shells as the by-product of oyster processing, there are large volumes of oyster shells at almost all processing sites, for which some innovative use needs to be identified, so that shells can be sold by processors to generate additional revenue, and/or used by them to create products they can sell themselves. Possible opportunities include:

- Sale of shells by processors for industrial scale processing (into animal feed/fertiliser, white lime), following collection of shells from processing sites and aggregation to generate economies of scale in their processing at other locations (and not using wood as a fuel source). This has started to happen but could be expanded.
- Rough grinding of shells by oyster processors themselves at processing sites into grit for laying hens (given the high levels of calcium carbonate in the shells).
- Use of empty shells in create niche products such as jewellery[51] or other products[52] aimed primarily at the tourism market, or potentially also for export. Production of

[49] UNCTAD, 2014 / Momodou Njie, 2011
[50] This supposition has been discussed and validated with a wide range of national stakeholders e.g. during national FISH4ACP validation and planning workshops.
[51] Oyster Shell Jewelry | Etsy UK
[52] https://www.pinterest.com/pin/536350636868724047/

such items could take place during the rainy season when shell collectors/processors are not involved in oyster processing.

## 2.3. Analysing the elements of the value chain

As shown earlier in the VC map (Figure 4) there are **three types of core actors** in the oyster VC in the Gambia,[53] with a high degree of vertical integration in the VC:

- Collectors/processors/retailers (farmers). These actors undertake all three core functions of collecting, processing and retailing oysters (and in some cases are also involved in oyster farming, although as noted earlier oyster farming in the Gambia is not widespread). This is the largest actor group.
- Collectors/processors (farmers) i.e. those not selling to consumers themselves (but who also may in some cases are also involved in oyster farming).
- Dedicated retailers i.e. those not involved in collecting and processing oysters, but whose involvement with oysters is limited to selling to consumers.

Additionally, there are informal street vendors who buy oysters for use in some of their dishes, but which sell other food items as well. These vendors typically come to retail markets to make purchases so are not considered separately in the VC map

**Support services in the extended value chain** are few, given the few and low-cost items required to work in the VC. While the skills required to collect and process oysters (as well as farm them) are reported to represent a barrier to entry,[54] input costs generally are not, with only minimal investments in small items required by those wishing to become part of the oyster VC. Low-cost input items are readily available in the local market e.g. pans, buckets, baskets, machetes. For oyster farming, inputs are bamboo poles and nylon used in the oyster farms, again readily available in local markets. The one larger investment item required is the non-motorised dug-out canoe for oyster collection and accessing mangrove areas. These canoes may be purchased by oyster collectors or rented from other canoe owners. Finally, by way of introduction to service support, the role of government (the Department of Fisheries in particular), in technical support to oyster farming should be noted, along with the role of transport providers used by actors to transport oysters to market.

[53] There are no traders in the VC. Some processed oysters from processors in the North Bank Region are aggregated and taken by one person across the ferry for sale in the greater Banjul area, but those involved are themselves collector/processors just working on behalf of other actors and do not buy/purchase processed oysters for other processors, rather they just transport and sell them on behalf of other processors in the community.

[54] FISH4ACP FGD, April 2022.

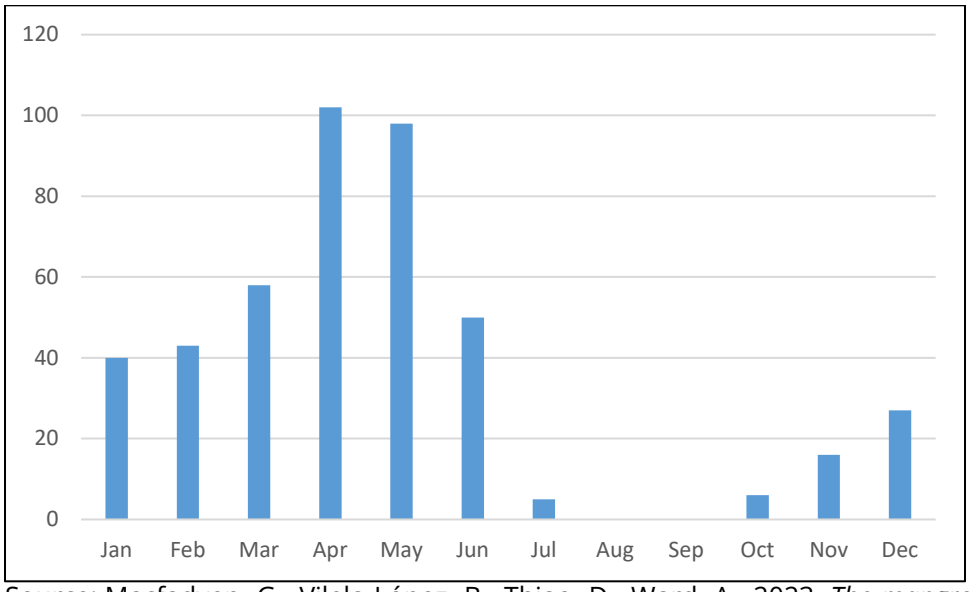
### 2.3.1 Actors in the core value chain [55, 56]

#### 2.3.1.1. Collectors/processors/retailers (farmers)

This is the dominant actor type in the VC. These actors typically work around 5-6 days per week during the oyster season and around 30 hours per week. It is typical for 1 or 2 cycles of collection processing and retailing each week, with each cycle comprising collection until enough oysters have been collected for processing, processing, and then sale.

Collection of oysters starts each year in December or January (if possible, starting with Ramadan celebration to guarantee greater sales, when the timing of Ramadan allows) and continues through to June (with July being the start of the raining season). However, due to increases in the number of collectors in some areas (e.g. Tanbi) it has been necessary to control harvesting through agreed management arrangements with harvesting not starting until March each year and only lasting for four months. Individual actors spend between 1 and 9 months a year involved with the VC, with 4-5 months being the average, but 2 months of activity per year is the mode/most common.

**FIGURE 9: MONTHLY DISTRIBUTION OF ACTIVE OYSTER COLLECTORS AND PROCESSORS**




Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Data from FISH4ACP actor survey (n=104). Note: the frame survey indicated 18 of 37 communities engaged in the oyster VC being active in December

The practices and technologies used by these actors during each function, are described below.

[55] All text in this section based on data obtained from the various FISH4ACP data collection tools deployed during April and May, 2022.

[56] When not collecting processing and selling oysters, those involved may harvest cockles and crabs, but such collection does not take place when oysters are being collected.

## Collection

During the months that actors are involved with collection, on average they spend 3.5 days a week working to collect oysters.[57] Collection typically involves 6 hours of work on a particular day (and only in daylight hours), but some collection may be completed in an hour or take more than 6 hours.[58] As the harvest season progresses, collectors may have to venture farther a-field and deeper into the mangroves in search of larger marketable oysters.[59] Actors (almost all women) typically depart 1 person (or occasionally 2 persons) per canoe as the tide turns, timing their departure to arrive at the collection areas as low tide, and paddling canoes to collection sites.[60] In some instances however, c.a. 8 individuals may group together and pay a motorised boat owner to take them to and from the collection site.[61] The shellfish frame survey revealed the use of 309 canoes in the 37 communities surveyed, 233 (75 percent) of which were 3-5m in length, 254 (82 percent) of which were planked or dugout (the remainder being fibreglass), and with just 12 being motorised.

Collection of mangrove oysters

Collection areas may range from <1km to as much as 8km from the point of departure for the canoes, and collectors may travel to collection sites together i.e. canoes leaving at the same time.[62] While the tide is out, larger oyster shells or groupings of shells made visible by the low tide, are prised from the roots of mangroves (without damaging the roots) using machetes/pangas, referred to locally as 'axes' or 'cutlasses'. Collectors wear long-sleeved clothing and gloves to cover their skin to protect from scratches and cuts while accessing oysters within the mangrove roots, and bags/cloth on their feet to prevent cuts. Sturdy plastic 'pans' (buckets), baskets or sacks are used to collect oysters while moving around in the mangroves before the oysters are tipped into the canoe for transport back to the processing site. Collection trips are also often used to collect wood (not mangrove wood) to be used later as fuel for the fires needed to boil/steam the oyster.

[57] FISH4ACP data collection, actor survey April and May 2022
[58] FISH4ACP data collection, actor survey April and May 2022
[59] Fund et al., 2011
[60] UNCTAD, 2014 report that some collectors do not use canoes because they cannot afford them, and they walk on foot to get at the exposed oysters. FISH4ACP data collection confirmed this, noting this practice in Mayamba
[61] FISH4ACP data collection April-May 2022
[62] FISH4ACP data collection, April-May 2022. And Carney, 2017

**FIGURE 10: PADDLE CANOES USED TO COLLECT OYSTERS**

Source: ©Graeme Macfadyen

Oysters collected on days when processing does not take place are kept in bags or pans, covered with moist clothes up to 24-48 hours, or more normally submerged in bags or as piles in shallow water until processing.[63]

In some communities (e.g. Memmeh in the North Bank Region), collectors also use a different harvesting method to collect larger oysters which are not inter-tidal but remain submerged and grow individually on rocky substrate rather than on mangrove roots. Collection from the wild thus occurs with individual actors diving to collect the oysters. No diving equipment of any sort is used when doing so.

[63] FISH4ACP data collection April-May 2022. And Momodou Njie, 2011

**Processing**

Actors spend an average of 2 days a month on processing activities during the months they are active in the VC, and an average of 5.5 hours per day processing oysters on the days they are engaged in processing.[64] The processing of oysters takes place at landing sites and involves boiling/steaming the oysters for 30-60 mins in cut off metal oil drums (see Figure 11) about 75cm x 80cm. Between 1.5 and 4 'pans' of oyster shells are added to the drums for boiling/steaming.[65] The amount of water added to the drums varies (e.g. 1.5 - 5 litres), but the use of covers (which may be in the form of material/blankets) is typical with covers placed over the drums to aid with boiling/steaming. This process causes the oyster shells to open, with care taken to ensure that the oysters do not overcook.

The wood used for heating/boiling the water over a 'three-stone stove' is collected when harvesting oysters,[66] collected from dead tree branches and shrubs in the vicinity of the processing site,[67] and sometimes purchased. Once boiled, the oysters are then tipped into a pile for shucking (removing the oysters from the shells) underneath rudimentary wooden structures to provide shade.

Shucking of oysters takes place by groups of people (typically 5-8) including the collector, family members (some of whom may be men and children if out of school hours), other female collectors who don't have oysters to shuck that day (who may get given a cup or two of the small oysters in return for the favour), and in some cases paid (female) shuckers (who get paid around GMD 100-150 for the ½ day or so taken to shuck a pile of boiled oysters). Shucking is done using normal table knives and it is easy to remove oysters from shells after the boiling process. As oysters fuse together when growing, one 'aggregation' picked up to be shucked may contain 2-8 oysters depending on how many oyster shells are fused together. During/once shucked, oysters are allocated into separate wicker baskets for large and small oysters (see Figure 12). Big oysters typically represent around 70-80 percent of the total volume of oysters shucked from a pile of boiled oysters.[68] There is no wastage of oysters during processing due to spoiling. Estimates of self-consumption (including the 'payment in oysters' by those shucking) being c.a. 9 percent of the volume of oysters (and only the small oysters).[69]

[64] FISH4ACP data collection, actor survey March and April 2022
[65] Each pan can contain 25-30 kg of oyster shells.
[66] FISH4ACP data collection April-May 2022
[67] Momodou Njie, 2011
[68] FISH4ACP data collection, observational visits, and actor survey, March to May 2022
[69] FISH4ACP data collection April-May 2022. Actors sell an average of around 96 cups per week, and only consume or give away an average of 6 cups

**FIGURE 11: DRUM AND BLANKET USED FOR BOILING/STEAMING OYSTERS OVER WOOD FIRE (BULLOCK, WEST COAST REGION)**

Source: ©ISRAD

**FIGURE 12: OYSTER SHUCKING AFTER BOILING (SUTU SINJANG, WEST COAST REGION)**

Source: ©Graeme Macfadyen

Once the boiled oysters have been shucked (which takes 4-5 hours on average), they are washed/cleaned in water[70] by the 'owner/collector' of the oysters to remove any small pieces of shell and stored in pans or baskets before taken for sale. Discarded shells are placed into the thick plastic 'pans' (buckets) before discarding onto one of the nearby piles of oyster shells.

**FIGURE 13: WASHING OYSTERS AFTER SHUCKING (SUTU SINJANG, WEST COAST REGION)**

Source: ©Graeme Macfadyen

**FIGURE 14: EMPTY SHELLS FOR DISCARDING (SUTU SINJANG, WEST COAST REGION)**

Source: ©Graeme Macfadyen

### Retailing

Actors then take the boiled oysters to market for sale. This take place immediately after processing is completed as there are no chill storage facilities at processing sites. On average

[70] Very few sites have potable water

actors need to travel around 20km from their processing sites to market destinations, but some may travel more than 100km from the processing sites to markets.[71] Where they take product to market, transport costs to market are typically around GMD 50-100 each way depending on distance to market, plus a small payment (e.g. GMD 10) levied on the basket in which the oysters are transported. Actors typically use a variety of transport means (buses, shared taxis, etc) which are shared with other members of the public, rather than contracting transport specifically for themselves and for the purpose of taking product to market. The baskets used to take oysters for sale and used when retailing are normally the same ones used when separating oysters by size during shucking.

Urban markets are the most common retail venue. They are managed by Council Authorities, and comprise a mixture of stalls, mini-stores, and in some cases dedicated fish market areas. Retailers typically pay GMD 10/day for the right to sell product in these council markets. In Brikama market for example, the largest market in the West Coast Region, and in Serrakunda market, oyster retailers can be found selling product in the dedicated fish market areas. The equipment and inputs needed by retailers consists just of a basket in which to display/hold the oysters, plastic bags or old newspapers to be used as wrapping for customers, a measuring tin, and a wooden table.

[71] FISH4ACP data collection, actor survey March and April 2022

**FIGURE 15: RETAIL SALES (SERRAKUNDA MARKET, BANJUL)**

Source: ©Bernal Vilela

**FIGURE 16: RETAIL SALES (SERRAKUNDA MARKET, BANJUL)**


Source: ©Graeme Macfadyen

Oysters are most commonly sold by the 'cup' (old condensed milk tins' (170 g / 150 ml) to consumers, with around 35-45 big oysters, or 125 small oysters, in one cup. The cups are used to measure out the oysters being sold (with a heaped cup representing a 'cup', with the oysters then tipped into plastic bags or wrapped in paper for the customer. Oysters are kept in wicker baskets prior to sale and covered by cloth if boiled, or open to the air if dried.

Retailers need spend only around 2 hours at the market sites in order to fully sell their product in busy periods when demand is high e.g. during Ramadan, but during other periods when they able to buy oysters they may need to be at the market site for most of the day (up to 6 hours)[72] to sell their oysters.

[72] FISH4ACP data collection, actor survey March and April 2022

**FIGURE 17: 'CUPS' TO MEASURE RETAIL SALES OF OYSTERS, AND TYPICAL BASKETS IN USE WHEN RETAILING**


Source: ©Graeme Macfadyen

Source: ©Graeme Macfadyen

Some retailing, notably in the Tanbi area, takes place by the roadside (e.g. in Karmalloh on the Banjul-Serrekunda highway). One to two women typically share a basic 'market stall', constructed of rudimentary materials (wood, poly sacks). Some oysters may be grilled/smoked using grilling racks in small grilling/smoking sheds constructed by an earlier UNDP project in various roadside/community locations,[73] or grilled/smoked when placed directly in a fire or on a metal grill over the fire. However, actors report that they don't like to engage in this form of processing (due to the heat and time involved) and only do so when customers request it. When such practices take place (which is seldom), shells are removed one by one as they open because of the heat and split open with a knife. The whole process can take up to two hours.

[73] Smoking is not a collective activity but rather the 5-7 women who use the smoking facilities organize themselves to use the individual grilling/smoking racks in turns. UNDP financed the construction of 15 such grilling/smoking sheds but only 3 are reported to be in use (Department of Fisheries)

**FIGURE 18: ROADSIDE RETAILING OF OYSTERS (KARMALLOH)**

Source: ©Graeme Macfadyen. Notes: typical roadside shelter used for the selling of oysters (left). UNDP-financed grilling/smoking shed (right)

At times of the year when the collection and processing of oysters from within the Tanbi area has not started (given the closed/open season agreed by the TRY oyster women's association), women who are part of the association may only engage with the retail function, buying in oysters from other areas where collection/processing has already begun. Typically, this involves

- women travelling to/from other processing sites in the West Coast Region to buy oysters from collectors/processors for retailing, or
- buying processed oysters from traders bringing oysters from North Bank Region (for example having been collected/processed in Tambana and Bakang), for retailing.

Retailers may occasionally dry oysters upon request but normally this is done to avoid spoilage when boiled oysters available for sale on any one day are not completely sold. The remaining unsold boiled oyster meat is sun dried on piece of cloth or inside perforated baskets to allow for water drainage. The final product is shrunk in size and discolored brown, due to dehydration.

In some cases, collectors/processors and their family members may also engage in community sales, selling processed oysters in the communities in/near to which processing has taken place, often at a selling price slightly lower (c.a. GMD 5-20/cup less).

**Farming**

Farms have been constructed with financial and technical support from the Department of Fisheries and donor projects, starting in year 2010. There are now five farms, mainly located

in Tanbi Region. Technical training and extension advisory services are being provided by the Department of Fisheries.

Farming of oysters is not practiced by all those collecting oysters from the wild, but rather oyster farmers represent a sub-set of those engaged in collection of oysters. There are no dedicated oyster farmers who are not also engaged in collection. As noted earlier in the VC map, at the national level farmed oyster production is estimated to be around 200 tonnes of farmed 'wet weight' and 7 tonnes of farmed processed oyster meat, produced from a total of 3 000 horizontal poles (see Figure 19 below) distributed amongst the five farms in operation.

The farms are typically group owned (with around 300+ people involved across the five farm sites), but with individuals allocated responsibility for maintaining a specific number of poles. Oysters on the poles are owned by the group, and there can be specific days in the month when all members of the group are expected to be at the farm to work with those not participating being fined GMD 50.

Oyster farms may cover an area around 100 m x 15 m as at Lamin, or occasionally (but not commonly) be more integrated with/in mangroves (see Figure 19). A small hole is made in large oyster shells before they are tied to a length of nylon of around 100 cm, with the nylon lines and shells then taken to the farm site, where the nylon lines are tied to the horizontal bamboo poles and left to hang vertically.[74] Oyster spat naturally attach themselves to the empty oyster shells. As the oysters grow the nylon lines may be left hanging vertically or wrapped around the horizontal poles, and some ongoing maintenance and de-fouling of other organisms (such as star fish) from the shells can take place by some actors. Oysters are harvested just before the rainy season in June/July after around 8 months when they have grown to a suitable size (around 1.5 cm long), and around 8 cups of boiled/shucked oysters can typically be harvested from one horizontal bamboo pole.

While farmed oysters are normally boiled/shucked separately to collected oysters since the former are collectively owned and the latter individually owned, they are not discernable by consumers from collected oysters, and fetch the same prices.

A costs and earnings model per productive horizontal pole is provided in Annex 2 and show oyster farming to be profitable (but less so than wild collection/processing in terms of the time inputs required).

[74] Around 1 000 bamboo poles may be required for a farm of 100m x 15m. An assessment of profitability of oyster farming (per horizontal productive pole) is provided in Annex 2

**FIGURE 19: OYSTER FARM (LAMIN AND BULLOCK)**

Source: ©Graeme Macfadyen

Source: ©Graeme Macfadyen

Source: ©Bernal Vilela

#### 2.3.1.2. Collectors/processors (farmers)

These actors don't retail oysters themselves but take oysters to a nearby urban market and sell to dedicated retailers (see below) immediately once processing is completed or sell to retailers who come to them to buy product. The technologies and practices used in the collection and processing of oysters are the same as those described above for collector/processor/retailers.

#### 2.3.1.3. Dedicated retailers

Dedicated retailers are those that never collect/process oysters, but who buy oysters from processors and sell them to consumers, normally in urban market settings as discussed above.[75]

Dedicated retailers are almost exclusively women[76] and may include those retired from oyster collection due to health or mobility issues. Typically, a mark-up of GMD 10 per cup is made on the price per cup of oysters bought from processors. Many have links (family or social) to collectors/processors. While processors often take product to sell to retailers, dedicated retailers may also travel to processing sites to purchase product, and where they do so they purchase from processors known to them and with whom they have developed sales relationships over the years. Where retailers travel to processing sites (in many cases 1-2 hours away) and therefore have to pay for transport costs, a mark-up of around GMD 20/cup of oysters is typically made between the processing site buying price and the urban market retail price i.e. a 25-50 percent mark-up on the cost of purchases.

#### 2.3.1.4. Food vendors

Food vendors purchase oysters from collector/processor/retailers or dedicated retailers, either going to retail locations themselves to purchase, or making arrangements for retailers to deliver oysters to them. They generally buy from 1 or 2 two trusted retailers with whom they maintain communication about their requirements and with whom they have long-established relationships. They typically buy 3-20 cups per day, 5-6 days a week during the oyster season. Vendors use the oysters mainly in stews, but some fry the oysters for sale. Their customers include the general public coming to eat at their informal street vending stalls as well as in some cases sales in schools. Actor interviews completed during the FISH4ACP data collection revealed that oyster retailers from whom they buy always or almost always meet the buying requirements of the vendors in terms of quality/freshness, prices, and availability (quantities and reliability).

### 2.3.2. Goods and service providers in the extended value chain

#### 2.3.2.1. Canoe owners

While some actors/collectors own their own canoes, the actor survey revealed that this was only the case for only one-fifth of the collectors. While data collection revealed one owner of a fibreglass canoe (13 metres long) with an engine who transports around eight women to collection sites as a group, more common is for collectors who don't own their own canoe to rent one by the day from an owner of a small paddle canoe (3-4 metres) in their community. The owners of these canoes rent them to collectors when they are not using themselves for

[75] UNCTAD (2014) reported that some retailers carry the oyster products on their head and sell from house to house in neighborhoods, and dried oysters may be sold on the weekly market days ("loumo") in rural communities, which move from village to village on a daily basis.

[76] FISH4ACP data collection, actor survey March and April 2022, and frame survey September/October 2022

fishing. This serves as a mutually beneficial arrangement for both the canoe owners (to earn additional income) and the collectors (who would otherwise potentially not have use for canoes in the off-season). Collectors typically rent the canoes for around GMD 50 per person per day, having to advise collectors to not overload their canoes with oyster shells. The costs of these canoes may typically range from GMD 12 000 to GMD 23 000, and timber for canoes may be imported from Senegal.

#### 2.3.2.2. Finance providers [77]

There are five main types of finance providers in the Gambia.

- There are 12 commercial banks in the Gambia, with a combined total of 80 branches and 140 automated teller machines (ATMs). Eighty percent of these branches and ATMs are located in the Greater Banjul Area (GBA). It is unclear the extent to which VC actors have credit or savings accounts.
- Five microfinance institutions (MFIs) play an important role in the provision of financial services to the unbanked population, low-income groups and the informal sectors of the economy, which are usually perceived as high-risk sectors by the commercial banks.
- Twelve insurance companies in the country provide three main types of products: General Policy, Motor and Fire Policies, and Takaful (Islamic) Insurance Policies.
- There are two mobile money operators, Africell (Afrimoney) and Qcell (Qmoney) which can be used as means of payments and fund transfers. While increasing, current market penetration rates are low, and concentrated in urban areas.
- Local savings and credit associations/groups provide savings and loans to their members (based on accumulated savings from contributions and grants) and are known locally as 'osusu'.

Of strategic relevance to the oyster VC and potential upgrading strategy are that:

- The first four of these generally have poor rural coverage/penetration and are not thought to be used by many VC actors with few credit requests having been lodged. The FISH4ACP actor survey found that only 25 percent of actors have a bank account, and only 2 percent use mobile banking. The low levels of borrowing by the VC actors from formal providers may be due to multiple factors:
  - the concentration of finance providers in urban areas (and few point-of-sale services in rural areas).
  - high interest rates (15-18 percent from commercial banks and 20 percent - 25 percent from MFIs).
  - collateral requirements.

[77] Based on Gillen, M., 2022 unless otherwise noted

- low levels of literacy for VC actors.
- There are no tailor-made insurance products for the oyster VC actors which could potentially serve to mitigate against risks/shocks to the VC actors and their operations.
- Oyster value chain actors are more amenable to using osusu, which gives them access to revolving loans based on amounts in the savings portfolio.

#### 2.3.2.3. Government extension and food safety control services

The Department of Fisheries attempts to conduct yearly extension activities in the oyster VC communities, focussing on oyster culture and improved processing of oysters. However, coverage of these extension services is thought to be patchy geographically and not routine due to government allocation of funds to the department of fisheries and other competing demands for funds.

The Food Safety and Quality Authority of the Gambia (FSQA) has the responsibility to test food and collect sample across the whole nation and at any time as far as public health is concerned. However, their laboratory at Kerr Serigne is not operative. FSQA does not conduct yet testing of oysters' food safety in any kind of markets, neither has currently plans to conduct them, hence no records of food safety violations with regards oysters exist.

### 2.3.3. The societal enabling environment

#### 2.3.3.1. Institutional arrangements

Several national- and sub-national policies and legislative instruments impact on the oyster VC as shown in the table below. As the table also highlights, management arrangements have also been agreed specifically for cockle and oyster collection in the Tanbi Wetlands National Park (TWNP).

**TABLE 4: KEY POLICIES, LEGISLATION AND MANAGEMENT ARRANGEMENTS OF RELEVANCE TO THE PROJECT**

| Policy, legislation, or management arrangement | Key importance to the oyster VC |
|---|---|
| Draft Fisheries and Aquaculture Policy 2022-2031 | The policy specifies a vision, goal, general objective, and then specific objectives as follows:<br>• Ensure effective management and sustainability of fisheries and aquaculture resources;<br>• Strengthen and promote research for innovation and development in fisheries & aquaculture;<br>• Provide quality extension services to promote standards that meets the needs of fisherfolk;<br>• Promote rigorous inspection services for assuring quality control in fisheries and aquaculture; |

| | |
|---|---|
| | • Strengthen the monitoring, control and surveillance system to avert the illegal, unregulated and unreported exploitation of fisheries and aquaculture resources;<br>• Promote responsible aquaculture that efficiently complements capture fisheries;<br>• Promote investments in fisheries and aquaculture infrastructure and facilities'<br>• Develop institutional and human resource capacity and promote fishers and aqua farmer;<br>• Enhance the active involvement of women and youth in fisheries and aquaculture development;<br>• Build the capacity of fishers and aqua-farmers to access and better manage finance and credit facilities;<br>• Promote availability of quality fisheries and aquaculture inputs;<br>• Strengthen capacity for effective participation in regional and international cooperation; and<br>• Mainstream cross-sectoral issues in fisheries and aquaculture development |
| The Draft Fisheries and Aquaculture Sector Strategy, 2022 | Provides the basis for implementing fisheries policy. The strategy itemises four (4) broad-based Strategic Priority Areas (SPAs) covering a wide range of issues involved in the conservation, protection, management, utilisation, processing, marketing and trade of fisheries and aquaculture products. The Strategic Priority Areas are:<br>i. Management and sustainability of fisheries resources;<br>ii. Aquaculture development;<br>iii. Strengthening capacity for fisheries management and development; and<br>Improving value addition, post-harvest fisheries marketing and trade |
| The Fisheries Act, 2007, Fisheries Regulations, 2008, and Fisheries (Amendment) Regulations, 2017 | Provide the legislative basis for managing the fisheries and aquaculture sector in the Gambia. The Act provides in its different Parts for: Administration of the Act and Appointments; establishment and functions of a Fisheries Advisory Committee (not currently functional); Fisheries conservation, management and development measures; A Fisheries Fund; General licence requirements; Local licensing provisions; Foreign licensing provisions; High Seas fishing; Aquaculture licensing, research, protection and prohibitions; Fish processing, import and export; Prohibitions; Powers of authorised officers; Fisheries observers; Sale, release and forfeiture of retained property; Jurisdiction and evidence; and Miscellaneous. The Fisheries Regulations have Parts dealing with: Preliminary; Register of fishing vessels; Register of commercial fishing canoes; Foreign fishing vessel licences; Local fishing vessel licences; Sports fishing vessel licences; Research and test fishing licences; High Seas fishing licences; Communication; Aquaculture; Conservation measures; Miscellaneous.<br>Section 14 of the Act empowers the Minister of Fisheries to establish "special management areas" for the conservation and management of community fisheries. |

| | |
|---|---|
| | The Act and Regulations are currently (December 2022) under review. A national workshop took place 1-2 November, facilitated by a national consultant, with funds provided from the sectoral support component of the SFPA to proposed revisions to the Act and Regulations. |
| Fisheries Products Regulation 2011 | The regulation objective is to pursue a high level of protection of human life and health and the protection of consumers' interests, including fair practices in food trade, taking account of the protection of animal health and welfare and the environment. It declares the Fisheries Department the Competent Authority to enforce the Regulation and establishes conditions to place fishery product on the market or for import and export. Other parts of the regulation refer to health control, national environmental monitoring program, control plan for production conditions, etc |
| The Food Safety and Quality Act 2011 | Establishes the food safety and quality environment by instituting structures and control mechanisms to ensure the safety and quality of food and feed at the national level and for connected matters. The Act also established the Food Quality Authority Safety and Quality Authority responsible for implementing legislation, standards and inspection as well as delegating authority for the same. |
| Wildlife Conservation Management Act 1977 | This Act provides for the conservation and rational management of wildlife in the Gambia and for matters connected therewith and incidental thereto. |
| Cockle and Oyster Co-Management Plan for the Tanbi Special Management Area (2012) | Grants exclusive rights to manage shellfish resources in the TWNP to the TRY oyster women's association and provides exclusive user rights to members of the association. Key aspects of the management rules agreed between members are a seasonal closure, with oyster collection currently permitted for a four-month period each year (March – June) |
| The Forest Act (1998) and Regulations | Provides for mandate for forestry (including mangrove) management by the Department of Forestry, and involvement of the communities in forest management and protection by legally requiring them to participate in fire prevention and participative in forest management activities. |
| Food Safety and Quality Act, 2011 (and amendment bill of 2014) | Provides the basis for the creation of the Food Safety and Quality Agency (FSQA) and its mandate, and the agency has relevance in terms of food standards applicable to oysters (and other fish and food products) |
| The National Environmental Management Act, 1994 | This Act provides the principles of environment protection and the instruments to carry out an environment protection policy in the Gambia. |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

None of the national policies or legislation, or the area-based management arrangements, impose any fees or levies on the oyster VC actors for the collection, farming, or processing

of oysters. Sale of oysters at urban markets does however involve payments by sellers to urban councils.

#### 2.3.3.2. Infrastructure

At the oyster collection stage of the VC, there is generally no infrastructure at the landing sites for use by the paddle canoes,[78] and canoes are launched and kept on 'beach' landing sites within the mangrove areas (see Figure 10). Access to/from these landing sites is typically only possible using unpaved/graded tracks, which in many cases are not easily passable by car/truck (especially during the rainy season).

The boiling of oysters at landing sites takes place in the open air, with shucking then carried out under informal constructed semi-permanent structures typically made of collected wood, and branches to provide shade. There are no concrete or wooden floors and boiled oysters are deposited on the sandy ground or on pieces of plastic material before shucking.

Roadside stalls used in some locations to retail oysters are semi-permanent and informal in terms of construction being made of collected wood, plastic sacking and other collected materials (see Figure 18).

As noted earlier, UNDP financed 15 small grilling/smoking sheds (see Figure 18) at a variety of locations. These sheds are permanent structures each with 3 grilling/smoking racks. Following some deficiencies in the original design (with grilling racks being too high above the spaces for the wood fires), the grilling racks were lowered in 2020. It is estimated that of the 15 structures built, 3 are being used during the oyster season.

Infrastructure are urban markets is limited to fish market halls (where they exist), or the stalls used by retailers at such markets. Informal tables are used to display the oysters. Urban council-run markets are reported to be congested, often with poor access (and by foot only), with poor waste disposal arrangements and hygiene conditions, and there are no chill or cold storage facilities available for use/rental by sellers in cases where product on a particular day is not sold.[79]

#### 2.3.3.3. Organisations and cooperation

**Government ministries and agencies**

The principal Ministries, departments and agencies of strategic relevance to the oyster VC are provided in Table 5, along with their main roles and relevance to the oyster VC.

[78] Once exception is a jetty at Lamin, serving a yacht mooring site and small tourist complex, which can be used by oyster collectors.

[79] FISH4ACP data collection April-May 2022

**TABLE 5: KEY GOVERNMENTS ORGANISATIONS AND THEIR ROLES OF RELEVANCE TO THE OYSTER VC**

| Government organisation | Potential relevance to the VC |
|---|---|
| Ministry of Fisheries, Water Resources and National Assembly Matters (MoFWRNA) | The Ministry is responsible for oversight of fisheries policy development and resources management conservation and protection, promotion of development and management of fisheries including value chains, approval and authorisation. |
| Department of Fisheries | The lead technical institution for fisheries matters including implementation of policy, legislation, management measures and development plans and strategies including project planning and implementation. It is also the partner for the FISH4ACP project. It provides advice, technical backstopping, guidance and related support services including extension research, inspection and certification. Five main units are: Fisheries development and research unit, Fisheries extension unit, Fisheries MCS unit, Fisheries inspection unit, and Aquaculture development unit. |
| Office of the Vice President / Food Safety and Quality Authority of the Gambia (FSQA) | Responsible for food and feed quality assurance. The OVP is responsible for Food safety and quality policy and legislation oversight. The FSQA is responsible for health protection, implementation of policy and legislation, risk assessment and management. It is responsible for official control of food safety and quality including inspections along the value and supply chain, product and process approvals and certification systems and related controls and provide guidance and direction in quality and safety matters. |
| Ministry of Environment, Climate Change & Natural Resources (MECCNAR) | Its line agencies and departments include the Department of Forestry, the Department of Parks and Wildlife (DPWM) and the National Environment Agency (NEA). Overall responsibility of overseeing and coordinating the development and implementation of policies and programs relevant to the environment, climate change, and natural resources management in the Gambia. |
| Department of Parks and Wildlife Management (DPWM) | Its main purpose is to preserve the protected areas, and this includes the TWNP on which may oyster VC actors depend. |
| Department of Forestry | In charge of forestry administration – ensuring sustainable management, utilization and protection of forest resources in the Gambia, including the mangroves on which oysters grow. The forestry legislative frameworks give the department the mandate to govern the affairs of forest resources in the Gambia, while soliciting active participation of the rural population and other stakeholders. |
| National Environment Agency (NEA) | The is a semi-autonomous agency with an independent structure to serve as the "principal body responsible for overall management of the environment" in the Gambia. It is the advisory body to the National Management Council (NEMC) on the formulation, review, revision and repealing of environmental policies, plans, standards, guidelines, criteria and regulations. The NEMC is the main policy-making body for the environmental management in the Gambia. |

| | |
|---|---|
| Ministry of Women, Children and Social Welfare. | Its mission is to contribute to the development of the Gambia through the principle of equity, inclusiveness and equality, protecting the rights of women and children and the integration and protection of vulnerable and excluded groups including people living with disability through appropriate policies, strategies and adequate resources |
| Ministry of Trade, Industry, Regional Integration and Employment (MOTIE) | MOTIE is responsible for establishing the appropriate setting for private sector development, improved economic growth, trade promotion, and a reduction in poverty. This responsibility is implemented by the creation and application of trade policy and programmes for the growth of trade and execution of policies that will promote commercial production to expand export trade, and the preparation of employment policies, programmes and strategies for the private sector in Gambia. |
| Ministry of Finance and Economic Affaires | This Ministry is responsible for setting the Government's overall economic policy objectives and the legal and institutional framework through which such objectives are meant to be achieved. |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

### Donor projects

Table 6 below provides an overview of several ongoing projects of relevance to the oyster value chain and FISH4ACP's work on developing the value chain. The analysis and design phase of FISH4ACP has communicated with lead implementing partners for the projects, and the main FISH4ACP project phase will need to maintain close collaboration and communication with the projects to ensure synergies and avoid duplication.

**TABLE 6: ONGOING DONOR PROJECTS IN THE GAMBIA OF RELEVANCE TO THE OYSTER VC AND THE FISH4ACP PROJECT**

| Project title | Donor / Lead implementer | Status | Short description | Relevance to FISH4ACP |
|---|---|---|---|---|
| Mangrove ecosystem restoration in the Gambia | AFD / MECCNAR | Ongoing (2022–2027) | Has four specific objectives (and a budget of EUR 6.9 million):<br>• Strengthen the national legal and policy framework for enhanced climate adaptation and coastal resilience.<br>• Test restoration technics on 800 ha of mangrove in different contexts and develop a national strategy and action plans for large-scale restoration of mangrove ecosystems in the Gambia.<br>• Improve governance and management effectiveness of marine protected areas in key mangrove areas<br>• Support the development of sustainable value chains and alternative income for grassroots women's and youth organizations in the project's pilot sites. | All four objectives have strong relevance to the FISH4ACP project and its support for the mangrove VC. The project's five year implementation period mean it will be ongoing throughout the FISH4ACP project. |
| Climate Resilient Fishery Initiative for Livelihood Improvement in the Gambia (PROREFISH Gambia) | Green Climate Fund / FAO | Planned (2022–2027) | The project (USD 17.2 million grant + USD 7.8 million co-financing) aims to assist Gambian fisherfolk to build their resilience against climate change and improve their livelihoods. The project has a particular focus on climate-proofing fisheries infrastructure and on value chain segments dominated by women (fish handling and processing) and has 3 components:<br>• Restoration of key fisheries habitats, designed to reverse the degradation of mangrove ecosystems<br>• Climate resilient fisheries infrastructure and aquaculture development<br>• Improved climate change adaptive capacities, providing the support necessary for the successful implementation, scaling up and sustainability of the mangrove restoration, infrastructure climate proofing and aquaculture results | Focus on women will provide basis for involvement in oyster VC. Component 1 will support protection of mangroves of which oyster VC depends. Component 2 includes provision for oyster farming. The project's six-year implementation period means it will be ongoing throughout the FISH4ACP project. |
| Women Shellfishers and Food Security | USAID / University of Rhode Island (URI) (USA) and | Recently finished (2020–2022) | Project aims to:<br>• Conduct a participatory regional assessment of the situation, unmet needs, and promising approaches to shellfish co-management led by women across eleven countries in West Africa | Strong focus on learning from previous experience in the Gambia. Other findings from other countries may have |

| | | | | |
|---|---|---|---|---|
| Project: Phase 1 | University of Cape Coast in Ghana | | • Elaborate and test elements of models based on existing approaches through site-based research in theGambia and Ghana to strengthen the evidence base for successful elements of the model<br>• Foster a community of practice around the development and dissemination of a toolkit on a rights-based, ecosystem-based, participatory co-management of shellfish by women in mangrove ecosystems in West Africa with and for community, national, and regional level stakeholders | relevance for the Gambia oyster VC and the FISH4ACP project. Has produced a regional report and reports on Senegal and the Gambia with useful information. |
| Women Shellfishers and Food Security Project: Phase 2 | USAID / University of Rhode Island (USA) and University of Cape Coast in Ghana | Recently finished (2022–2025) | The project will be be implementing: 1) activities in the ground in Gambia (with TRY as the main partner) and Ghana as well as 2) continuing to build a regional network of West Africa shell fishers–knowledge hub. | There will be room for collaboration, over activities to:<br>1. Improve co-management in Tanbi but also in Bullock<br>2. Aquaculture development<br>3. Oyster shells value added<br>4. Keep supporting TRY |
| LEAD project | MAVA (Swiss philanthropic organisation), and Clarmondial (Swiss company promoting sustainable resource use), MSC | Ongoing (2022 – 2026) | This project seeks to support West African fisheries in their transition to sustainable management. With a focus on eight fisheries located in Cape Verde, Mauritania, Senegal, and the Gambia, the Lead Project partners will develop Fishery Action Plans and appropriate financing instruments to support these fisheries in their journey toward sustainability and MSC certification. Mangrove oysters in the Gambia are one of the selected fisheries and, and a pre-assessment report has already been prepared | Provides useful benchmarking of existing environmental performance and will support management improvements. |
| "Fund for Regional Stabilization | GIZ | 2019–2023 | The Pilot project is active in three different value chains. 1) Vegetables/Agriculture, 2) Poultry and 3) Fisheries/Aquaculture. A financial component Window (Implemented by Gamworks) | While not focusing specifically on the oyster VC, the project may |

| | | | | |
|---|---|---|---|---|
| through Development in fragile regions within ECOWAS Member States" which includes a pilot project in Gambia. | | | provides infrastructure support to 42 communities, including for construction of aquaculture ponds, fish smoking houses and potentially a oyster/fish processing facility. A technical cooperation window (Implemented by GIZ) provides technical know-how through training and capacity building measures and is targeting 850 beneficiaries in the fisheries value chain namely: production (aquaculture), processing, storage, transportation and marketing (there is a budget of EUR169,000 through a Financing Agreement with the Department of Fisheries as the main Implementing Partner). Additionally a Micro Enterprise Start up Support Initiative (MESSI), will provide mini grants for beneficiaries for start-up support for small and medium businesses in their communities. For fisheries this will target individuals and communities in need of solar drying for fish, tri-cycles for transportation, solar fridges for storage, solar pumps. | involve actors and/or provide funds for them. |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

**Actor organisation**

Organisation of some oyster VC actors began in 2007 with the creation of the TRY oyster women's association, bringing together around 500 [80] female oyster harvesters from 15 villages in the Greater Banjul area. However not all oyster collectors in the Gambia (estimated at 1 200) are part of the TRY association. This is of obvious strategic importance to the upgrading strategy given the potential for replication or expansion of current actor organisation, and the fact that at present the voices of those actors not organised are not well represented.

The association has been successful in developing an Oyster and Cockle Co-Management Plan (agreed in 2012, but not updated since then) for the Tanbi Special Management Area (6 300 ha) in the Tanbi Wetlands National Park (designated a Ramsar site in 2007). Through this legal arrangement, TRY members have exclusive access to and ownership of certain harvesting areas.

In addition to the co-management plan, other successes in terms of organisation of actors by the TRY association include agreement over the season which oysters can be collected (currently March to June), the setting of market prices (as discussed earlier in Section 2.2.1), and some 'branding' of association members through the use of uniform red clothing to signify sales by members of the association. However less/not successful have been attempts by the association, supported through a variety of donor projects in recent years, to organise actors for the purpose of: i) paying membership fees to the association (undermining its financial sustainability); [81] ii) establishing group savings and revolving credit funds; and iii) developing and marketing new products. [82] All such activities have ceased to exist.

Through the organisation of actors and their representation by the TRY association, the association liaises with a variety of other associations and government departments, such as the Association of Small Scale Enterprises in Tourism (ASSET) and the government organisations listed in Table 5 (for example communicating with DPWM on enforcement activities in the Tanbi Wetlands National Park). However, despite the association having a memorandum of understanding (MoU) with DPWM, Department of Fisheries, and the Department of Water Resources which specifies an annual review meeting, this meeting does not take place and encroachment by other users into mangrove areas reserved for the association reportedly takes place. [83]

Efforts have been made in the past by the TRY association, and by the Department of Fisheries, to encourage group actor organisation for the purposes of oyster farming. Establishment of the farms (installation of bamboo poles) is typically completed as an

[80] The frame survey reported 484 individuals being part of TRY.
[81] The association is strongly dependent on donor support for its activities.
[82] As discussed earlier. TRY oyster women's association, Pers. Comm., 2022.
[83] TRY oyster women's association, Pers. Comm., 2022.

organised group activity, with actors also having group obligations to maintain/manage the farms.

#### 2.3.3.4. Socio-cultural elements

Actors in the oyster VC are from a wide variety of ethnic groups, including Jola, Mandinkas, Manjagos, Karoninkas, Serrer and Fula [84], with many being first- or second-generation descendants of immigrants of from Senegal and Guinea Bissau. [85] However, there is very little seasonal in-migration of workers to communities to engage in the oyster VC. The shellfish frame survey found such migration in only 8 of 37 communities and involving less than 40 people.

Women oyster harvesters/processors/retailers in the Gambia (representing around 90 percent of all actors have traditionally been among the most vulnerable and marginalized working population, many are divorced or widowed with little formal education, and others have fled political instability in Casamance and Guinea-Bissau. [86]

Actors range in age from young adults to the relatively old, but only 5 percent of actors are less than 25 years old, with around 50 percent being between 25 and 50, and 45 percent over 50. [87] The age of actors, and an average period of involvement of 18.5 years (and many actors having more than 25 years working in the VC), indicates that the VC has been of interest to individuals for decades, and is still able to attract them to work in it.

The actor survey data revealed that of the 104 respondents, only 1 relies on VC earnings from more than 95 percent of their income, and 13 for between 75 percent and 90 percent of their income. 87 percent of actors therefore do not rely solely on the VC for their income but have diversified livelihood strategies. This is perhaps expected given the seasonal nature of the VC activities as described earlier.

While levels of investments needed to enter the VC are low, knowledge of collection and processing techniques provides a natural barrier to entry to new entrants wishing to become engaged in the VC. The provision of community use rights in some areas (Tanbi) also serves to restrict access. However, user rights are not *individually* allocated so individuals in communities wishing to become involved may acquire the necessary knowledge and be able to enter the fishery, and focus groups indeed revealed that the number of collectors/processors in some areas has been increasing in recent years, which may be negatively impacting on individual earnings in some cases.

[84] The shellfish frame survey conducted in September/October 2022 found that out of 37 communities surveyed, 33 had Jolas, 8 Mandinkas, 7 Manjangos, and 4 Karoninkas, Serrer and Fula.
[85] FISH4ACP observational visits, April-May 2022, Jabai et al, 2014, UNCTAD 2014, Saine et al 2021.
[86] Carney, 2017; UNDP, 2013
[87] FISH4ACP data collection, actor survey, April and May 2022

While at the individual community level there is considerable evidence of actors collaborating during the functions of collecting and processing, at a broader VC level socio-cultural aspects (not fully researched or well understood by our work) appear to have prevented actors in the VC from successfully collaborating in several initiatives as described above when considering actor organisation.

## 2.3.4. The natural environment

### 2.3.4.1. The climate and its impact on oysters

The Gambia has a warm climate that is characterized by a long dry season from mid-October to early June (favourable for oyster collection), followed by a short rainy season from mid-June to early October. July and September are the hottest months of the year with average daytime maximum temperatures of around 30°C. During this period there are frequent rainstorms. From December to mid-February the average daytime temperature falls to around 24°C. Average rainfall per year is around 1,020 mm, but in the western part of the country this can be much higher (up to 1 700 mm). The low gradient of the Gambia and River influences the mangrove coverage and diversity in relation with the precipitation cycles, marine currents, diurnal tides, and saline water concentration. [88] Over the past 40 years there has been a slight warming in the average temperatures and a decrease in rainfall, possibly due to global climate change. In addition, global warming models that predict rising sea levels place Gambia's low-elevation coast at particular risk in the coming decades.

### 2.3.4.2. General characteristics of the mangrove forest impacting on oyster production

With a length of 680 km from the Futa Jallon highlands in the Republic of Guinea to the Atlantic Ocean, the River Gambia occupies about one fifth of the surface area of the country. It offers 160 km of brackish inland water system comparing rivers, estuaries, and tributaries marked by the presence of extensive mangrove. Covering about 4 percent of the Gambia's surface, the mangrove forest provides favourable conditions for shelter and nurseries of oysters (and many fish species). Oysters are found attached to the mangrove roots which serve as substrate for spats of young oysters to grow to maturity.

The Gambia mangrove systems covers about 67 000 hectares comprising 15 000 hectares of tall mangroves *Rhizophora* and 52 000 hectares of short mangroves *Avicennia* and *laguncularia*. *Avicennia spp* are the most salt tolerant species, and thus found along the Atlantic coastline. Although *Rhizophora spp.* is tolerant of highly saline water and sometimes fresh water, it nonetheless prefers brackish water. and grow alongside the waterways to a height of 6–7 meters.

Past studies indicate that the mangroves have been declining with a reduction of more than 30 percent over the last 25 years. This situation is due to several causes including the cutting

[88] Carney, Gillespie and Rosomoff, 2014

of the mangrove for home firewood and building material, as well as for fish smoking and cooking.[89] In addition, the mangrove ecosystems face threats due to population growth, deforestation, pollution and waste dumping.[90] However, recent studies have also showed recovery and "natural" re-growth of the mangrove forests in some areas including at the Senegal-Gambia border of Saloum-Niumi, and that re-seeding of Senegambian mudflats with *Rhizophora* propagules has helped restore mangrove coverage.[91] [92] [93]

#### 2.3.4.3. The oyster stocks

The oyster most commonly found in the Gambia is assumed to *Crassostrea gasar* (the same species as *C. tulipa)* which lives in colonies that anchor on the root system of the mangrove and is commonly known as the mangrove or cupped oyster.

The rising tide delivers the phytoplankton upon which the oysters feed. Oyster reproduction is attuned to the seasonal concentration of salt in mangrove waterways, which is at its highest during the late dry season. Data show that spat settlement of oysters occurs every month but that there is maximum spat fall in September and October. The effect of this post-rainy season in maximizing oyster recruitment is found elsewhere in many other populations of tropical mangrove oysters.

In addition, larger oysters are present which are not inter-tidal but live submerged and grow individually rather than in conglomerations.

#### 2.3.4.4. Other key-factors

In early 2010s, the USAID Ba Nafaa project, in partnership with the Water Resources Board, put in place a water quality monitoring system on a monthly basis at nine landing sites in the Tanbi Wetlands Complex. Results showed that both total coliform and faecal coliform counts were very low in all sample sites, even during the rainy season. However, slightly elevated coliform counts were found at two locations in the estuary system at Old Jeswang (where pigs are raised within the tidal zone), and at Lamin Lodge, the site of a hotel, boat marina and fishing boat landing.[94]

## 2.4. Governance analysis (linkages)

Value chain governance refers to the coordination of value chain stages and the relationships and decision-making between value chain actors, making it possible to bring a commodity from primary production to end use. Two kinds of linkages between value chain actors are considered in this section: vertical and horizontal.

[89] Cormier-Salem, 2017
[90] UNDP, 2013
[91] Cormier-Salem, 2017
[92] Carney, Gillespie and Rosomoff, 2014
[93] Cormier-Salem and Panfili, 2016
[94] Njie, 2011

Vertical linkages in the oyster value chain are strong and well defined, even if not codified in terms of formal contractual relationships and sales contracts. As noted earlier in the VC map, while there are some sales of product through the food service sector channel (to food vendors), the main marketing channel is from collection through to retail sales at urban (and highway) stalls. Given that the collector/processor/retailer actor type (see Section 2.3.1.3) engages in collection, processing and retailing themselves, this group has achieved complete vertical integration of all these VC functions. Dedicated collectors/processors who don't retail oysters themselves typically take product to market and sell to retailers with whom they have informal but good working relations and good levels of trust. These levels of trust are supported by the use of standardised 'cups' as the measurement unit (as discussed earlier). Forward and formal sales contracts are not used (and would likely be inappropriate given the informal nature of the VC). [95]

Strong vertical integration and generally good relationships between individual actors, coupled with the strong grouping of most individuals within the TRY oyster women's association (i.e. horizontal integration), ensures that actors generally set market prices, with the association functioning as a channel 'captain', with price setting also benefitting actors who are not part of the association. Actors have also been successful in differentiating prices for large and small oysters in the market.

The strong horizontal integration in the form of many (but not all) actors in the TRY oyster women's association has also enabled support to be channelled by government and donors to actors through the association, and for the association to raise the profile of the oyster VC (both nationally and even internationally) [96] which serves to increase donor-interest in the VC. Horizontal integration in the form of the TRY association with assigned user rights over specific locations (in the Tanbi area), and the fact that collection takes place close to where individual actors live, reduces risks of competition for access to resources between individual actors.

Horizontal integration in the farming of oysters is also notable, with farms being installed and maintained on a group basis, with sales also being community/group based.

There are no noted vertical power imbalances between actors, or between actors and input providers (e.g. canoe owners) leading to any forms of exploitation, and good levels of social capital evidenced in individual actor communities. This social capital is evidenced in farming activities (as noted above), in processing activities with individual actors in particular often benefiting from support by family and community members, and also in the collection of oysters with individual actors often travelling to collection sites together.

[95] FISH4ACP data collection, April-May 2022

[96] https://www.theguardian.com/global-development/2022/may/03/stewards-of-the-forest-the-pioneering-womens-collective-harvesting-the-gambias-oysters

However, despite the generally positive nature of governance arrangements, of **potential strategic importance for the upgrading strategy** is that existing levels of vertical and horizontal integration have not so far resulted in:

- the setting or application of any sort of marketing standards.
- Quality premiums (apart for product differentiated by size).
- sustainable marketing of value-added products: some initiatives have been tried by the TRY oyster women's association but were not successful due to a lack of trust by individual actors in the efforts and the challenges of working collectively.
- economies of scale being achieved by individual actors given the individual nature of their operations i.e. individuals purchase the small input items individually, transport product individually from community processing sites to markets, and do not engage in any group marketing/sales activities.

# 3. Sustainability assessment

In this section the performance of the VC is assessed in terms of its economic, social and environmental impacts. This section reflects the five main parts of the FISH4ACP's sustainability analysis and is structured accordingly into five main sub-sections. The first three sub-sections (3.1, 3.2, and 3.3) consider the economic, social and environmental impacts specifically. Sub-section 3.4 considers resilience of the VC as a meta-dimension of sustainability: how vulnerable is the VC to various potential external shocks such as an economic crisis or a natural disaster? The final sub-section (3.5) presents a 'heat map' which provides an overview of the overall sustainability performance of the VC, and which feeds into the upgrading strategy development in Section 4. Annex 3 contains more information about the inclusion and exclusion of certain indicators from the standard FISH4ACP assessment methodology.

## 3.1. Economic analysis (Economic Snapshot)[97]

### 3.1.1. Profitability

As discussed in section 2, the oyster value chain involves various actors in the Gambia. Within the scope of this VC analysis, the profitability assessment covers collectors/processors/retailers, collector/retailers, and retailers. A profitability assessment of street food vendors is not included in the analysis as these actors sell many different products/dishes, and even dishes/products including oysters also contain other ingredients, making an assessment of oyster-related activities impractical.

The operating accounts of three main actor groups were developed based primarily on the actor survey completed over April and May 2022, with data relating to 2021. An overview of the profitability of the three actor groups is provided in the table below, with the more detailed operating accounts per actor for the three actor types provided in Annex 2. Annex 2 also contains an assessment of the profitability of current oyster farming activities, showing profitability per horizontal pole used to produce oysters. The analysis of oyster farming/processing shows that it is profitable (with low input costs), but less profitable per time spent than wild collection/processing.

[97] As noted in section 2, some actors are engaged in aquaculture activities. However, oyster farming is not widespread, and where sales of farmed product do occur they take place alongside and indistinguishable from oysters collected from the wild. Aquaculture-specific revenues, costs and profits were not collected in the actor survey but may to some extent be included in the economic sustainability assessments presented in this section. Annex 2 however provides a specific set of operating accounts for a typical aquaculture farm based on data obtained from those farming oysters.

**TABLE 7: PROFITABILITY ASSESSMENT OF THE GAMBIA OYSTER VALUE CHAIN (2021)**

| For whole VC (2021) | Collector / processor/ retailers (CPR) | Collector / processors (CP) | Retailers (R) | Total |
|---|---|---|---|---|
| Number of actors | 832 | 269 | 99 | 1 200 |
| Annual revenues (GMD) | 58 838 526 | 25 571 340 | 12 789 563 | 97 199 428 |
| Annual net operating profit (GMD) | 48 581 648 | 21 655 660 | 7 997 963 | 78 235 271 |
| Annual revenues per actor (GMD) | 70 719 | 95 061 | 129 188 | 81 000 |
| Annual operating profits per actor (GMD) | 58 391 | 80 504 | 80 788 | 65 196 |
| Return on sales | 83% | 85% | 63% | 80% |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP actor survey (2022), with number of actors from shellfish frame survey.

As can be seen from data in table, the profitability performance in terms of revenues and operational profits per actor, and in terms of return on sales per actor type, is quite consistent.

Based on the scoring guidance in the FISH4ACP methodology[98], the profitability indicators of the VC are assessed as below (**overall domain score 2.8**):

- *Net profits*: All of 104 respondents in actor survey reported making net profits (average of c.a. GMD 65 000/year when considering all actor types), and as shown in the table above all actor types generate net profits. Net profits are thus scored 3/green (sustainable).
- *Trend in net profits*: Six of 104 actors surveyed reported no change in net income, with 45 reporting net income had increased 53 that it has declined down over the past 5 years. The picture is thus inconclusive, and the difference may also reflect regional variations and/or individual variations. Taking these factors into account a flat trend in profits is assumed for the VC, with the indicator scored 2/yellow (concerning).
- *Return on sales*: All actor groups, and individual actors surveyed display positive (and large) return on sales. The return on sales (80 percent on average) is well above the cost of capital (c.a. 20 percent). The indicator is scored 3/green (sustainable).
- *Return on investment*: Investment costs are virtually non-existent for most actors (just small items such as baskets, pans, knives/machetes, which can be considered more as operational costs) and only 22 of 104 actors surveyed had invested in a canoe (at an average cost GMD 12500 with a likely life span of c.a. 10 years). The return on

[98] A score 1 – 3 (corresponding to red (1), yellow (2) and green (3)) is provided to each economic indicator, with 1 (red) means unsustainable, 2 (yellow) means concerning, and 3 (green) means sustainable. See more in see Annex 3.

investment is also well above cost of capital and the indicator is scored 3/green (sustainable).

### 3.1.2. Employment

There is limited (and unquantifiable) employment generation in support services and inputs providers in the *extended* value chain given the small amounts of goods and services required as inputs. Input items are typically only small items not specifically produced for the VC but available more widely in the economy e.g. baskets, clothing, pans, knives. Employment generated by the VC is primarily therefore the employment in the *core* VC. Actors are individual owner-operators but do in some cases also employ other individuals to assist with processing/shucking of oysters after boiling/steaming. Data on paid labour are not available but hired labour may be in the order of 100 individuals additional to the actor numbers shown above (1 200) given that the frame survey recorded 102 people only processing (for more than 5 days a week). Given that while the oyster season lasts those employed work in it on a fairly full-time basis (30+ hours/week on average),[99] but that actors are only involved with the VC for an average of 4.3 months per year, total FTE employment is estimated at 36 percent (4.3 / 12 months) of total employment i.e., 36 percent of 1 300 = 468 FTE.

Based on the scoring guidance of FISH4ACP methodology, the employment indicators of the VC are assessed as follows (**overall domain score 2.2**):

- *Number of jobs expressed in FTE term (in the core VC)*: This indicator is rated as 2/yellow (concerning) because the number of FTE jobs is between 25 percent to 100 percent of the number of actors.
- *Number of FTE jobs*. This indicator should be scored as 1/red (unsustainable) as none of the jobs in the VC are full-time. However, we have scored it 2/yellow (concerning) as part-time employment need not necessarily be undesirable if it allows flexibility and additions to individual and household incomes and livelihood strategies.
- *Number of wage or salaried jobs (in the core and extended VC) and Number of self-employed/family jobs*: Almost all those working in the sector are self-employed/family members with virtually no hired employment created (either paid in cash or in kind/oysters). However, it is unrealistic for the VC to do so given its nature, so rather than scoring as 3/red, we have scored both indicators as 2/yellow (concerning).
- *Average wage proxy of family labour:* the minimum wage in Gambia is GMD 50/day[100] while the actor survey shows average daily earnings of GMD 672/day). The indicator is thus scored 3/green (sustainable)

[99] The shellfish frame survey conducted in September/October found that 86% of actors work 5 or more days a week during the oyster season.

[100] https://www.minimum-wage.org/international/the-gambia (accessed June 2022)

### 3.1.3. Value added

The (financial) value added is assessed at two levels: (i) the *direct value added*, which includes net profits for the actors, net wages for their workers, and government revenue in the form of taxes and fees, and (ii) the *indirect value added*, which is embedded in the domestic goods and services that the VC actors purchase from outside of the core VC.[101] The generation of direct value added, the distribution of this value added, and the total value of outputs (i.e., oyster products) are therefore calculated from the operating accounts of the core VC actors and are summarized in Table 8 and Figure 20 below.

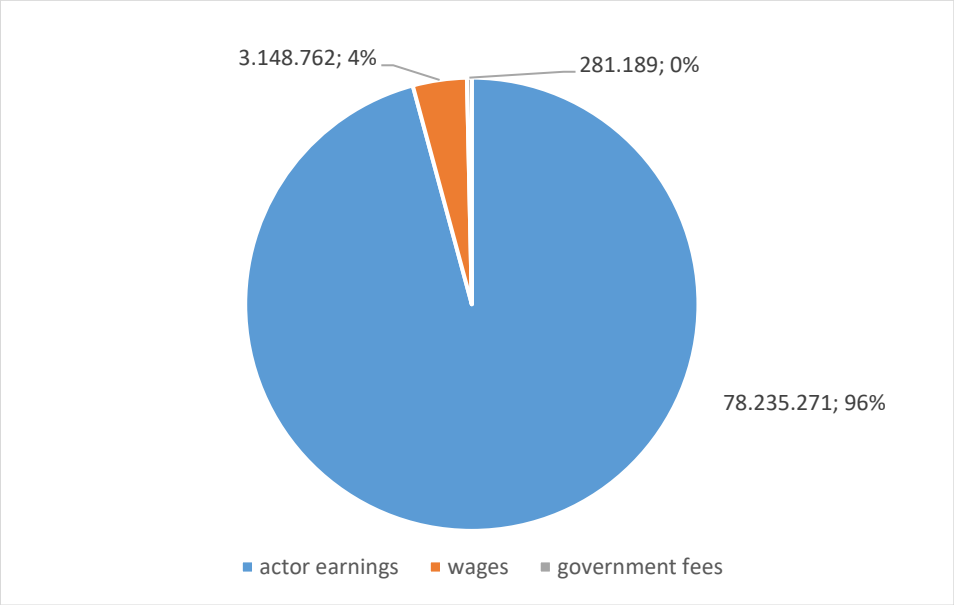
[101] FISH4ACP full methodological guide.

**TABLE 8. GENERATION OF DIRECT VALUE ADDED (IN GMD) IN THE OYSTER VALUE CHAIN (2021)**

| For whole VC: distribution of direct value added | 2021 (GMD) |
|---|---|
| Collector/processor/retailers | |
| net profits | 48 581 648 |
| net wages | 1 244 026 |
| Collector/processors | |
| net profits | 21 655 660 |
| net wages | 1 904 735 |
| Retailers | |
| net profits | 7 997 963 |
| Government | 281 189 |
| Direct VA (in core VC) | 81 665 222 |
| Total value of outputs (revenues) | 97 199 428 |
| Direct VA as proportion of outputs | 84% |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

**FIGURE 20. DISTRIBUTION OF DIRECT VALUE ADDED CAPTURED BY CORE VC ACTORS, THEIR WORKERS, AND THE GOVERNMENT (2021)**




Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

The direct value added generated by the VC is almost exclusively captured by the actor/owners themselves. This is reflective of the low levels of employment in the VC as most actors are self-employed, and the fact that the government extracts very less resource rent

from the VC. Government charges are limited to market duties paid to local government councils and market authorities.

The indirect value added is calculated by considering the costs of domestic goods (inputs) and services paid for by the core VC actors, making an assumption that there is 20 percent value-added on all these inputs.[102] The total value added (see Table 9) is the sum of the direct value added (see Table 8) and the indirect value added (also shown in Table 9). To provide a clearer picture of the contribution of each VC actor types and function to total value added, the direct and indirect value added are broken down by actor type in Table 9 below.

**TABLE 9. TOTAL VALUE ADDED (IN GMD) IN THE OYSTER VALUE CHAIN (2021)**

| For whole VC (2021) | Collector / processor/ retailers (CPR) | Collector / processors (CP) | Retailers (R) | Total | Share in total outputs (revenue) of VC |
|---|---|---|---|---|---|
| Number of actors | 832 | 269 | 99 | 1 200 | |
| Direct value added (GMD) | 49 885 678 | 23 618 231 | 8 161 313 | 81 665 222 | 84% |
| Indirect value added (GMD) | 1 790 570 | 390 622 | 925 650 | 3 106 841 | 3% |
| Total value added (GMD) | 51 676 248 | 24 008 852 | 9 086 963 | 84 772 063 | 87% |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

Key findings from the table above are:

- Levels of value added are 87 percent as a share of output revenues.
- Indirect value added is low as a share of outputs, reflecting the low value of input items required by actors to complete the collection, processing and retailing functions.

Based on the scoring guidance of FISH4ACP methodology, the value-added indicators of the VC are assessed as follows (**overall domain score 2.7**):

- *Direct value added*: Direct value added is high and makes up 84 percent of the total value of output at VC level, so the indicator is scored as 3/green (sustainable).
- *Indirect value added*: Input costs are very low in the VC, and with margins on those costs assumed at 20 percent, indirect value added is certainly below 10 percent of the value of sales. This indicator should thus be scored 1/red (unsustainable). However, while the VC creates little multiplier effects from inputs, higher indirect VA would likely

[102] Data on margins/VA for specific items are not available but the figure of 20 percent used is considered realistic based on our expert judgement and experience of other VCs.

imply higher costs for the VC actors depressing profits/income which would be undesirable, so this indicator is scored 2/yellow (concerning).

- *Total value added*: Total value added is high and makes up 87 percent of the total value of output at VC level, so this indicator is scored as 3/green (sustainable).

### 3.1.4. Effects in the national economy

While not part of the hotspot map as contributions to national and sectoral Gross Domestic Product (GDP) cannot be assessed as good or bad as doing so would imply value judgements about contributions by the oyster VC being more important than those of other VCs, annual oyster VC value added of USD 1.4 *million* a year is tiny (0.03 percent) when be compared with national GDP in 2020 of USD 1.87 *billion*.[103]

Based on the scoring guidance of FISH4ACP methodology, indicators related to the effects of the VC in the national economy which can be scored are assessed as follows (**overall domain score 2.3**):

- *Net impact on the balance of trade*: Impacts on the balance of trade are estimated to be neutral/zero. There are no formal exports of oysters. Virtually no imports are used in the VC, with only very small amounts/costs of some imported items such as plastic pans, clothing. The indicator is thus scored as 2/yellow (concerning).
- *Rate of integration*: This indicator is scored as 3/green (sustainable) as all VC operations are domestically focused.
- *Net impact on public funds*: There are very little/few payments to government from actors (restricted to some small amounts paid as market duty, and no license or access fees are charged to harvest oysters). While the government does/has provided some financial support and extension to oyster VC actors (quantitative data are not available on the sums involved), amounts are thought to be small, so the net impact on public funds is assessed as only slightly negative. The indicator is thus scored as 2/yellow (concerning).
- *Access and costs of capital*:[104] There are several banks and a variety of micro-finance institutions available in the Gambia. However, they tend to be concentrated in the Banjul area, and there are limited Point of Sale services (POS) and mobile banking options in rural areas. There are few tailor-made lending products for the fisheries/oyster sector, and formal financial service providers often have limited knowledge of the VC/fisheries reducing a willingness to lend. However, small-scale borrowing activities are available also through "Osusu" activities / associations. And

[103] Gambia, The | Data (worldbank.org) accessed June 2022

[104] This is an indicator not included in the standard FISH4ACP methodology, but included here as considered more useful/neutral than the standard indicators Ec24-28 on borrowing. Access to capital should be available to those that need/want it and at 'fair' rates, but while investment borrowing may be required to upscale a VC borrowing can also result in indebtedness and increased costs for actors in the VC.

short-term loans are available to cover operational expenses and current or savings products / services. The actor survey revealed that 74 percent of respondents do not have a bank account, and only 2 (<2 percent) use mobile banking. Interest rates are high from commercial banks (15 percent - 18 percent) and microfinance institutions (20 percent - 25 percent).[105]

### 3.1.5. International competitiveness

The FISH4ACP consumer survey[106] found that average prices for large-boiled oysters are GMD 52/cup (c.a. USD 1), and GMD 40/cup (c.a. USD 0.75) for small boiled oysters. This equates to USD 6.5 per kg for large oysters and USD 5/kg for small oysters (assuming 6-7 cups per kg). This compares with oyster prices in Senegal of similar products which are higher. The FISH4ACP consumption survey in Senegal in 2021 found that the average price for boiled oyster was XOF 4,430 per kilo corresponding to about USD 8 per kilo.[107] The National Protection Coefficient indicator is thus scored as 3/green (sustainable) as the coefficient is below 1 with the market not protected and more competitive (consumers pay a lower price for the domestic oysters).

Based on the same data comparing oyster prices in the Gambia and Senegal, the indicator *Domestic Resource Cost Ratio* is also scored as 3/green (sustainable). The ratio is below 1 indicating that domestic production is efficient and internationally competitive, and less than the opportunity cost of substituting domestic oysters with imports from Senegal. (**overall domain score 3.0**)

### 3.1.6. Value for end-consumers (domestic)

The ultimate beneficiaries of the value chain are the end-consumers who consume the oysters in the domestic market. The value of the product to the end-consumers can be measured through several proxy indicators, which are assessed and scored as follows (**overall domain score 2.0**):

*Consumer price benefit surplus (USD): output value at reference prices – output at market price*: Domestic sales prices are more than 20 percent below parity price (the prices in Senegal for similar products i.e. boiled oysters) so the indicator is scored as 3/green (sustainable).

*Consumer evaluations of the different aquatic products (scores) – 1-5 evaluations on selected criteria*: The FISH4ACP consumer survey assessed views about quality, quantity available, reliability of supply, and price. Using a score range of 1-5 (with 1 being very good and 5 being very bad), average scores were respectively 1.5, 2.2, 3.0 and 2.3 indicating a generally positive view by consumers. The indicator is thus scored as 3/green (sustainable).

[105] Gillen, M., 2022.
[106] April – May 2022.
[107] exchange rate: USD1 = XOF550

*Price relative to four most direct substitute food products (market price differences)*: There are no direct substitutes for oysters in the domestic market, but oysters are far more expensive than other fish products, and more in line with prices of red meat. Prices for boiled oysters are in around GMD 350/kg. This compares with GMD 25-30 for three small bonga (300-400 grammes in total for the 3 fish) and GMD 100-150/kg for chicken. Oyster prices are thus more in line with the cost of red meat the domestic market (GMD 300-350/kg).

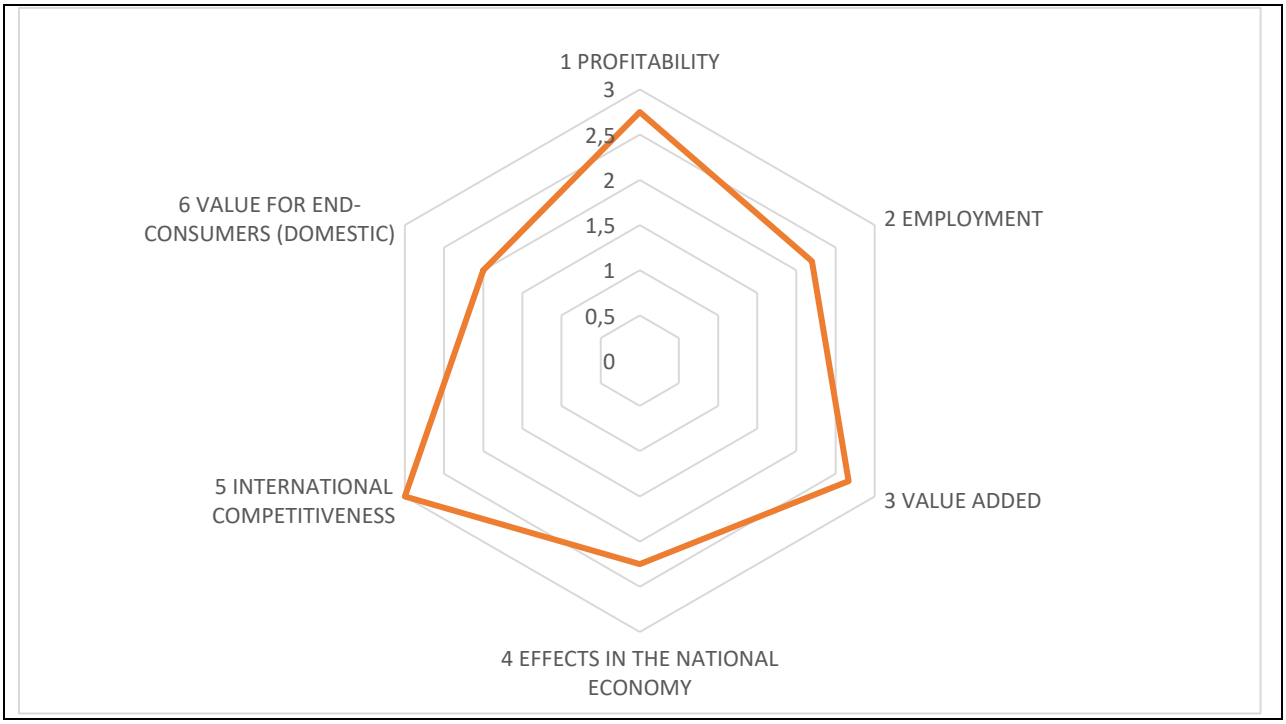
### 3.1.7. Economic analysis overview

Based on the analytical assessment of economic performance as discussed above, and using the FISH4ACP economic assessment tool, an overview of economic performance for the oyster VC is provided in Table 10 and Figure 15 below. A score in the range 1 – 3 (with 1 means unsustainable (red), 2 means concerning (yellow), and 3 means sustainable (green)) is given to each sub-domain of the economic sustainability domains, as seen below. The scoring was conducted by the VCA team, following the FISH4ACP methodology guide (see Annex 3), and then was revised to incorporate feedbacks from VC stakeholders at the validation workshop.

**TABLE 10. ECONOMIC SUSTAINABILITY PERFORMANCE SCORES FOR THE OYSTER VALUE CHAIN**

| | | |
|---|---|---|
| **1 PROFITABILITY** | | |
| Net profits | **3** | **Sustainable** |
| Trend in net profits | **2** | **Concerning** |
| Return on sales | **3** | **Sustainable** |
| Return on investment | **3** | **Sustainable** |
| Average | **2.8** | **Sustainable** |
| **2 EMPLOYMENT** | | |
| No. of jobs in FTE | **2** | **Concerning** |
| No. of full-time jobs | **2** | **Concerning** |
| No. of wage labour/salaried jobs | **2** | **Concerning** |
| No. of family/self-employed jobs | **2** | **Concerning** |
| Average wage proxy family labour | **3** | **Sustainable** |
| Average | **2.2** | **Concerning** |
| **3 VALUE ADDED** | | |
| Direct value added at core VC level | **3** | **Sustainable** |
| Indirect value added at VC level | **2** | **Concerning** |
| Total value added at VC level | **3** | **Sustainable** |
| Average | **2.7** | **Sustainable** |
| **4 EFFECTS IN THE NATIONAL ECONOMY** | | |
| Net impact on the balance of trade | **2** | **Concerning** |
| Rate of integration | **3** | **Sustainable** |
| Net impact on public funds | **2** | **Concerning** |
| Access and costs of capital | **2** | **Concerning** |
| Average | **2.3** | **Concerning** |
| **5 INTERNATIONAL COMPETITIVENESS** | | |
| National protection coefficient | **3** | **Sustainable** |
| Domestic resource cost ratio | **3** | **Sustainable** |
| Average | **3.0** | **Sustainable** |
| **6 VALUE FOR DOMESTIC END CONSUMERS** | | |
| Consumer price benefit surplus | **3** | **Sustainable** |
| Consumer evaluation | **3** | **Sustainable** |
| Price relative to substitutes | **1** | **Unsustainable** |
| Average | **2.0** | **Concerning** |

**FIGURE 21. ECONOMIC SUSTAINABILITY PERFORMANCE SCORES FOR THE VALUE CHAIN**




Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

Key issues, recommendations, risks, and mitigating measures flowing from the assessment of performance are provided in Table 11.

**TABLE 11. KEY ISSUES, RECOMMENDATIONS, RISKS, AND MITIGATION MEASURES – ECONOMIC SUSTAINABILITY**

| Key issues | Main recommendations |
|---|---|
| • Declining profits/net income for some actors<br>• Seasonal nature employment<br>• No formal employment, high levels of owner-operator actors with little hired labour<br>• Low levels of indirect value added<br>• Neutral rather than positive contribution to balance of trade and government sector finances<br>• Access to capital patchy for actors and costs can be high | • Increase access to capital in case needed by actors<br>• Explore potential for generating value added from waste material (shells) |
| **Main risks** | **Mitigating measures** |
| • Lack of diversity in marketing channels could mean market channels close quickly if consumer preferences or willingness to buy oysters change/decline<br>• Environmental changes or shocks could threaten natural resource productivity with negative impacts on economic performance of VC | • Market promotion initiatives (product development, new channels, segmentation, etc?)<br>• Enhance management arrangements around resource sustainability |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

## 3.2. Social analysis (Social Profile)[108]

### 3.2.1. Inclusiveness

The inclusiveness of the oyster VC faces some problems and is rated as concerning. The distribution of wages between workers is unequitable with considerable differences between those with higher and lower earnings. The value added is retained mostly by VC actors, with little payment to the government. Furthermore, the VC is small in size with an estimated 1 200 actors that only work seasonally collecting oysters. On the other hand, the oyster VC represents an employment opportunity to vulnerable groups, most of the actors are women of certain age, belonging to minority tribes. Their active role in the VC has a positive influence on sociocultural norms.

Based on the scoring guidance of FISH4ACP methodology, the inclusiveness indicators of the VC are assessed as follows:

**Wages and employment distribution (score: 2.33)**

- Most of the 'wages' earned in the VC are by self-employed/individuals and there is very little paid labour. The actor survey found that average earnings per hour for actors is GMD 120 per hour worked. The standard deviation of the average earnings per hour per actor is 96, with large differences in the those with higher and lower earnings, even allowing for potential outliers. Data thus suggest that wages are unequitable (score: 2).
- The oyster VC has around 1 200 core actors who are self-employed owner/operators, and also involves 100 people in labour paid (in cash or in oysters). The VC is however seasonal with actors operating on average for 18.5 weeks per year (source: actor survey). FTE jobs in the VC are thus in the order of <500. The Gambia labour force (in 2019) was 780 000.[109] The VC thus make a very low contribution to the national employment (score: 1).
- According to the Gambia National Gender Policy 2010-2020[110], "there are strong traditional and cultural forces that impinge on the participation of women in development endeavors. Disparities still exist between men and women in power sharing, participation and control over decision-making processes at all levels of

[108] The assessment presented below is based on review of relevant literature and the FISH4ACP data collection, including two expert groups (one comprised of government officials and sector/topic experts, and one of actors) which were used to score (by consensus) a number of indicators where quantitative data are not available. The scores proposed by the two expert groups informed a final decision on scoring made by the FAO FISH4ACP team

[109] https://www.indexmundi.com/facts/the-gambia/labor-force#:~:text=The%20value%20for%20Labor%20force%2C%20total%20in%20The,and%20a%20minimum%20value%20of%20308%2C661%20in%201990

[110] Ministry of Women's Affaires, 2010. The Gambia National Gender Policy 2010-20

society". Furthermore, 73 percent of women aged 15–49 years in the country have been subjected to Female Genital Mutilation.[111] Most of the VC actors are women from specific ethnic groups (i.e mostly dominated by minority tribe) and are not young. They are also considered to be low class and illiterate and many are divorced or widowed.[112] Hence, the VC provides jobs to vulnerable and marginalized groups (score: 4).

**Value added distribution (score: 2.00)**

- Value added distribution is very unequitable. Almost all actors are sole workers and, as demonstrated by data collected during the actor survey, very little payments are made to government in the form of duties/fees/taxes and many actors make no payments to government at all. Value added is thus very inequitably distributed between VC actors and stakeholders e.g. government, employed labour (score: 1).
- The distribution of the VC actors net profits between VC actors is somewhat equitable. The actor survey provides data on net profits per hour worked for three actor types (collector/processor/retailers, collector/processors, and retailers). While the sample size of collector/processors and retailers was small, data show that value added/income for collector/processor/retailers and collector/processors is very similar (GMD 122 and GMD 105 per hour respectively). Dedicated retailers however generate less value added per hour worked (GMD 53) (score:3).

**Poverty and vulnerability (score: 4.67)**

- The Ministry of Finance and Economic Affairs stated that 48.4 percent of the population lives below the poverty line of US$ 1.25 per day.[113, 114] In the Gambia, poverty is mainly found in rural areas, indeed, although the rural population represents less than half of the total country's population, the rural poor make up more than 60 percent of the total poor.[115]
- The actor survey showed that average earnings/wages per day for those in the VC (GMD 673 = USD 12.3) are well above the national and international poverty line. Only 6 of 104 actors surveyed reported earnings/day less than GMD 100. Even considering the seasonality of oyster harvesting, the income generated for four months provides a yearly average above the poverty line.[116] Hence, the prevalence of poverty in the VC can be considered as no to very low poverty (score: 5; 5). In addition, and considering

[111] One UN The Gambia, 2021. Annual Results Report 2021
[112] FISH4ACP data collection, EGDs, April and May 2022, Jabai et al, 2014, UNCTAD 2014
[113] Ministry of Finance, Economic Affairs, 2014. MDG Status Report
[114] National poverty line is below the international poverty line (USD 1.9/day)
[115] Republic of The Gambia, 2018. Zero Hunger Strategic Review
[116] Actors work an average of 5.1 days per week for 4.3 months, make an average of GMD 673/day, and around GMD 60 000 per season/year. This amount divided by 365 days equals to 165 GMD/per day (USD 3.1 ) only coming from oysters and not considering other sources of income.

these results, rural communities dedicated to oyster collection seem to be less affected by poverty than an average rural community.

- Furthermore, the actor survey data show that of the 104 respondents only 1 relies on VC earnings from more than 95 percent of their income, and 13 for between 75 percent and 90 percent of their income. 87 percent of actors therefore do not rely solely on the VC for their income. According to EGDs, VC actors also engage in other forms of livelihood such as other shellfish (cockle and crab) collection, gardening, livestock rearing, rice production or rock crushing. Their income diversification changes by region, for instance most actors from LRR and NBR take oyster business as their secondary activity, while in Tanbi complex, some actors can entirely depend on oyster collection as their sole income activity (score: 4).

**Discrimination (score: 4.0)**

- As described in section 2.3.3.4., ators in the oyster VC are from a wide variety of ethnic groups, including Jola, Mandinkas, Manjagos, Karoninkas, Serrer and Fula (minority tribes), are women and are not young, these three characteristics are common along the VC actors. Hence the VC integrates a profile of actor that normally faces difficulties to access sources of income because of pre-conceived sociocultural norms and thus, provides a possibility to proof these norms wrong (score: 4).

### 3.2.2. Gender equality

Gender equality is considered sustainable in the oyster VC. Oyster collection has historically been a women's activity at all the functional levels (collection, processing and retailing); hence their economic involvement is very high and they do not feel discriminated when working in the VC, having no issues accessing mangroves where oysters grow. However, women are still the main contributors to domestic workload and even if they manage the income earned with oysters activities, most of it is spent to support family needs. It is important to note that some of the indicators of this domain are not applicable to the oyster VC since it is not possible to compare women and men roles, given the lack of men in the VC.

Based on the scoring guidance of FISH4ACP methodology, the gender equality indicators of the VC are assessed as follows:

**Women's economic involvement (score: 5.00)**

- Shellfish collection, also oysters, has long been considered a female activity in the Gambia. The three main functions of the oyster VC (collecting, transforming and retailing) are essentially conducted by women. For instance, only 1 of the 104 actors surveyed was male, proving how economically involved women are in the VC, and the shellfish frame survey revealed that around 90 percent of all actors are women (score: 5).

- The Gambia has ratified the ILO (International Labour Organization) equal remuneration convention in 2000. [117] The Convention focuses on gender discrimination in employment and outlines principles for the equal remuneration for work of equal value independent of whether it is performed by men or women. In the case of the oyster VC, even if some men are currently getting involved in oyster collection, women still comprise almost all those actively engaging in the VC and, hence, there it can be determined here is no women gender discrimination. (score: 5).

**Gendered division of labour (score: 3.00)**

- Women are the main contributors to domestic workload, such as child or family care, collecting wood or drinking water or cooking for the entire family. All of these are non-paid activities. These limits the time they can dedicate to other activities such as the oyster VC, conditioning their capacity to earn more income. According to the EGD only few men help in domestic workload, so the distribution of workload is unequal (score: 1). However, women are also the ones spending more time in the VC what justifies adjusting the overall score for this subdomain to 3.

**Gendered access to productive resources (score: 5.00)**

- The 1997 Constitution clearly prohibits all forms of discrimination based on sex, with some exemptions: in respect of adoption, marriage, divorce, burial, devolution of property on death or other matters of personal law. [118] None of the exemptions apparently influencing oyster VC direct activities.
- Oyster collection is almost exclusively dominated by women however, this does not mean that if men wanted to participate in this activity, they could not do it (for instance, men dominate non-shellfish fishing activities). Indeed, mangroves by the tributaries and oyster collection sites are common/public goods; where people have equal access, there is no discrimination to fishing tenure (score: 5).

**Women's decision-making and leadership (score: 4.00)**

- Most of the oyster VC actors' households are female headed and the income earned from oyster business is managed and control by them. However, most of them spend this income to support the family needs (score: 2).
- Women are involved in associations (TRY Women Oyster association is the main one but the actor survey revealed women making part of other associations as well) led by women. Since the associations are mostly composed by women, no comparison

[117] https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103226

[118] UN Women and Commonwealth Secretariat, 2020. Towards reversing discrimination in law, mapping and analysis of the laws of The Gambia from a gender perspective; Ministry of women's affaires, n.d. The Gambia national gender policy 2010-2020;

with men can be established in terms of who is involved and leads, but it is evident women have a relevant role (score 5; 5).

### 3.2.3. Food and nutrition security

Food and nutrition security with regards to the oyster VC is unsustainable. Oyster production in the Gambia is seasonal and it does not meet the national demand. Its availability along the year and across the country is also inconsistent. The prices of oyster products have increased during the last years and are only affordable for wealthier households, having a low contribution to the country's food security.

Based on the scoring guidance of FISH4ACP methodology, the food and nutrition security indicators of the VC are assessed as follows:

**Availability of Food (score: 2.00)**

- Oyster harvesting is seasonal, taking place around 4 to 8 months per year depending on the region (with a national average of 4,3 months and normally lasting four months in the TWNP one of the main oyster sources supplying Greater Banjul market), leaving the rest of the year with little to no oysters to sell. Given the seasonality and the short shelf-life due to lack of cold-chain, it is concluded the oyster do not meet national demand (score: 2).
- Most of the oyster national production are consumed domestically with apparently few imports/exports. FISH4ACP consumer survey determined some consumers (11 percent) take an average of 34 cups of oysters cups for sale or to give to friends each time they travel outside the country, which happens 1 or 2 times a year. On the other hand around 6 percent of the consumers surveyed reported buying oysters coming from Senegal informally, even if they preferred the local ones, while 22 percent of the respondents did not know where the oysters were from. (score: n/a).
- Oyster production areas are limited to estuarine areas, with mangrove cover, mainly in WCR, KC, LRR and NBR, other regions such as Central River and Upper River have access to oysters if they source them from producing regions. The consumer survey, with most respondents located in WCR and KC markets, showed that 33 percent of them consider it was difficult to find oysters in the market in any given day, with other 33 percent saying it was normal and the remaining 33 percent that it was easy. Considering that oysters are a seasonal product also affects its time availability, mainly restricted to harvesting months (score: 2).

**Accessibility of food (score: 3.00)**

- Prices for large boiled oysters (GMD 350-360/kg) are higher but comparable to current prices of red meat, but much higher than the cost of chicken and other forms of fish protein. On the other hand, the minimum expenditure basket (MEB) based on

commodities rice, millet/maize, fish, vegetable oil and salt was around 486-508 GMD/month in 2017.[119] Consequently, being among the most expensive sources of protein and considering the cost of the MEB, the current cost of oysters does not appear to be affordable for most types of consumers (score: 2).

- EGDs stated that oyster prices have regional variations, and their price has increased nationally during the last years, due to a higher demand (for instance, in the last 2 years the price of oyster meat per cup was D40 and currently the price ranges from D60-70 in GBA). On the other hand, it was stated the purchasing power of most households has decreased, this fact with current high oyster prices makes these products not more accessible to many households in the Gambia than in previous years (source: EGDs) (score: 2).
- According to EGDs there is no discrimination with regards to access oysters among household members. The entry of the oysters in the household depends on the oysters' affordability and the household purchasing power (score: 5).

**Utilization of food (nutrition, safety) (score: 2.33)**

- Oysters are bought mainly boiled (97 percent of surveyed consumers), few are bought grilled/smoked oysters (6 percent) and fewer are bought dried (<1 percent). None of them are sold fresh, which could represent, higher health risk due to their filtering nature. When consumed, boiled oysters have gone through a double heat processing stage: the initial processing/boiling and then the actual cooking by food vendors or consumers. In theory this is positive when it comes to food safety. However, oysters can pick up pathogens (e.g. algal toxins) from the water while they are alive that can be difficult to eradicate by cooking. The country does not have a water quality monitoring system neither a depuration after harvesting to prevent such risks. Another risk is also contamination of cooked oysters before consumption. Therefore, oysters can be somewhat unhealthy and safe (score: 3).
- Oysters are not affordable for most of the consumers (see previous section: Accessibility of food), and hence consumed by few. Even if for some individuals who do purchase oysters they may represent a significant proportion of their fish purchases, its contribution to national food and nutritional security is very small (score: 1).
- A household food security and market prices analysis published by WFP on August 2020[120], stated that overall, 52 percent of the households in the Gambia had a moderate dietary diversity, eating 3-4 food groups, while 8 percent had severe dietary

[119] WFP Gambia, 2017. Monthly Market Monitor: issue 1

[120] WFP, 2020. Household food security and market prices. mVAM Food Security and Market Bulletin #I, August 2020

diversity taking only 0-2 food groups, with the remaining having 5 (21 percent) or more (19 percent) food groups (score: 3).

**Stability of food (trends) (score: 2.33)**

- Consumers surveyed revealed oyster availability was good (see section 2.2.1.1) during the oyster season. However, due to oyster production seasonality, most part of the year harvesting is stop and oysters are scarce in the market (score: 2).
- Oyster prices in TWNP is set by TRY oyster women's association by agreement amongst its members (see section 2.2.1.1). In fact, if any member of the group is found to deviate lower than this price, she will be charged with a fine. This process has ever since facilitated price stability of oyster where TRY operates. Furthermore, data collected by the FISH4ACP project suggest these set prices serve as the benchmark for prices nationally, although with some variation between market locations (score: 3).
- In the Gambia there is no trade of fresh oysters, a vey perishable product if not kept in the right conditions. Most of the oysters bought by consumers are boiled (see previous section: Utilization of food (nutrition, safety)). Due to lack of cold storages, if boiled oysters are not completely sold within days after transformation, they will be dried to avoid higher losses. Even if limited, these transforming techniques provide greater shelf-life to oyster products but cannot be compared to the shelf-life it would attain if oysters were to be refrigerated, frozen or canned. Furthermore, oyster harvesting months limit the quantity of marketable oysters to a short period over the year (score: 2).

### 3.2.4. Decent employment

Decent employment with regards to the oyster VC is concerning. Most of the workers (collectors, processors, retailers) if not all, are informal and seasonal. Children can help, mainly during processing, but normally out of school hours. VC actors, mainly collectors but also processors, often experience injuries due to their activity and the precarious condition of the protective equipment they use. The average income oyster VC actors earn is well above the minimum wage, making the sector attractive, despite having a low adoption of technologies or innovative practices.

Based on the scoring guidance of FISH4ACP methodology, the decent employment indicators of the VC are assessed as follows:

**Respect of labour rights (score: 3.00)**

- Most of the workers in the oyster VC are informal and seasonal. They work from 8 to 4 months (average is 4,3 months) while oysters can be collected. Most of them work an average of 3,5 to 1,8 hours a day in any of the three main functions (collection, processing, retailing). They tend to work all the weekdays except if there is a festivity (i.e.: church on Sundays) or ceremonies that affect most of the collectors. In addition,

the average earnings are ways above national minimum wage (see section below: Attractiveness). However, they do experience frequent injuries due to the hazardous nature of their work (score: 3).

**Child and forced labour (score: 4.00)**

- The Gambia has ratified the ILO (International Labour Organization) minimum age convention (setting it in 14 years) in 2000 and the Worst Forms of Child Labour Convention in 2001[121]. There are no formal companies working in the oyster sector to analyse if they comply with national laws based on the two conventions. On the other hand, given the informality of the oyster VC and according to FISH4ACP analysis, children normally help their families as labour force but during holidays, weekends or after school hours, not interfering with their education. In one of the FGDs it was stated "children are never allowed to come around during school days/hours". Children are not involved in collection but support oyster processing, on few occasions for extended hours (4-5 hours) (score: 4; 4)
- No other form of forced labour was identified in the oyster VC (score: 5).

**Job safety and security (score: 3.00)**

- All the VC actors work informally, hence there is no formal application of safety standards for the actors. Nevertheless, it is a common practice for collectors to apply certain safety standards such as wearing gloves or protective clothes around the feet to avoid injuries while harvesting. In any case, the protection measures can be precarious (i.e. wearing socks instead of protective boots) and not that effective to avoid injuries. Collectors, claim to have very often wounds caused by working tools or by shells[122] (score: 3).
- The most common injuries reported during FISH4ACP field work were cuts in feet by oysters shelfs or in hands by knives/cutlax or small craps entering the ears or eyes while collecting. During processing injuries are caused by knives when shucking, particularly if oysters are big, also steam coming from boiling drums can cause burns or smoke from the fire can cause respiratory difficulties. Even if the injuries are not severe, they seem to be frequent affecting most of the VC actors (i.e. in one of the EGDs it was cited that 50 percent of harvesters normally sustained injuries at sea on any particular day) (score:2).
- According to the actors interviews the average time spent in any of the VC functions is 18.5 years and many actors having more than 25 years working in the VC. Considering that almost 55 percent of the actors are below 50 years old it can be considered that the VC has a low turnover (score: 4).

[121] https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103226

[122] FISH4ACP data collection, FGDs, April-May, 2022; Avadí, A. et al, 2020

**Attractiveness (score: 3.67)**

- The minimum wage in Gambia is GMD 50/day.[123] Actor survey shows average daily earnings is GMD 672/day, more than 13 times the minimum wage. Despite being an informal sector and not having benefits regular employees may have (health insurance, leave, family benefits, etc.) oyster VC actors earnings are still very competitive compared with national standards (score: 5).
- As stated in section 2.3.3.4, actors range in age from young adults to the relatively old but the greatest part (around 50 percent) are between 25 and 50, with 45 percent being over 50 and only 5 percent are less than 25. The average period of involvement (around 18.5 years) indicates the VC has been of interest to individuals for decades. In addition, FGDs state that in the last five years more people have started working in the oyster VC in some areas and gains from oyster business is very rapid, within a day or two days one can get quick income to support family needs. Finally, even if oyster collection is a seasonal activity, the average daily income generated is considerable and can still be complemented with other income generated activities, as 87 per cent of the value chain actors do[124] (score: 4).
- A rudimentary system of oyster aquaculture has been recently introduced in the country by the Department of Fisheries. Oyster farming can mitigate the intensive labour wild oyster harvesting demand, since they grow on nylon cord attached to bamboo poles and are easier to collect. However, the profitability of the oyster farms is lower than for wild collection activities (see section 3.1.1), and only serves as complement to wild collection. Additionally, all the other activities of the VC from wild collection to any kind of processing are by hand using rudimentary tools and methods, with no machines or automatization of any of the processes (score: 2).

### 3.2.5. Social and cultural capital

The oyster VC social and cultural capital domain is concerning. Most of the actors of the VC belong to an association which is beneficial to them with regards easiness to receive training or price setting, with TRY Oyster Women Association standing out from the others in terms of number of members (500, around 40 percent of the estimated oyster VC actors). Levels of trust both vertically and horizontally along the VC are strong, however only few actors participate at the decision-making level and the majority of the actors do not adequately network.

Most of the VC actors claim to have access to secure markets, in the sense oysters sell well. The VC activities have raised awareness of the importance of mangrove preservation and there is a general belief eating oyster brings health benefits.

[123] https://www.minimum-wage.org/international/the-gambia
[124] FISH4ACP data collection, actor survey, April and May 2022

Based on the scoring guidance of FISH4ACP methodology, the social and cultural capital indicators of the VC are assessed as follows:

**Collective Action (horizontal linkages) (score: 4.00)**

- Actor survey revealed that 80 percent of the actors belong to an association, with almost 60 percent of them belonging to TRY Oyster Women Association. TRY, founded in 2007, has of over 500 women oyster and cockle harvesters in the Gambia, mainly in TWNP, GBA. Some actors in other regions, WCR and LRR, are also part of community associations (FGDs, actor survey) (score: 4).
- Being part of an association entails benefits such as access to training on good governance (i.e.: collective decisions respected by members), effective information sharing, benefits from canoes rental, receiving assistance in cash or in-kind when need arises or working together during processing (score: 4).
- Besides common action taken by TRY oyster women's association explained previously (decision on open season, price setting, etc.), most of the VC actors join forces for processing, even if they normally collect individually. It should also be noted that some communities work together in oyster culture and harvest collectively, having set a penalty system for those who do not respect their commitment (i.e. in the absence of a member to accomplish her duties, a fine of GMD25 is charged which is saved at the association account) (score: 4).

**Coordination of transactions (vertical linkages) (score: 4.00)**

- Main actor in the oyster VC conducting the three functions: collect, process and retail, hence even if vertical linkages in the VC are very well established, no contracts apply. The material used to collect, process and sell is very basic and accessible in different shops in the country, hence there are no contract neither for input providers (score: n/a).
- VC actors have access to informal markets where oysters sell well. These are normally urban market and highways but they also sell in landing sites or deliver to the retailers in the local markets with whom they have informal but reliable relationship (score: 4).
- The VC actors have good levels of trust, both horizontally and vertically (see section 2.4). Horizontally integration is favoured by the existence of oyster actors' associations, particularly TRY Association, but also by sociocultural norms that allow them to provide, for instance, financial support to fellow actors at community level in case needed. Vertical integration from collectors/processors and retailers is also strong, having established good levels of trust along the years (score: 4).

**Social Cohesion (score: 2.33)**

- As mentioned before, VC actors belonging to TRY association are involved in a major decision-making process with regards oyster VC. However, according to EGDs, only

few actors are involved in the decision making which sometimes are not representative of the whole collective. Furthermore, outside TWNP the involvement of actors in the decision making is limited (score: 2).

- Even if within TWNP actors are informed about oyster seasons period and price, most of the actors do not adequately network and information sharing is limited (score: 3).
- Collaboration between VC actors and the public sector can be considered weak. Department of Fisheries has supported the establishment of oysters' farms, but these are very few. Other than that, most of the support they receive is in form of training but they are not too frequent (annually or bi-annually) and some actors declared not having received any support at all (score: 2).

**Cultural Traditions (score: 3.67)**

- Oyster collectors claim VC activities have promoted awareness of the importance of preserving the mangrove, the negative consequences of cutting branches and the importance of reforesting the mangrove.[125] Actors stated as well that there is a general belief eating oysters have health benefits, except when eating oyster harvested during the rainy season, since they may be bitter and could be poisonous. The latter can be a sign of getting food poisoning from eating oysters with toxins, coming from dirty waters that reach the mangroves in an easier way with rains (score: 4).
- Considering practically most of the VC actors are women, it can be stated VC activities have a positive impact on sociocultural norms, particularly gender ones. Because of their participation in the whole value chain, making decisions with regards oysters management and managing their own incomes, VC actors become socially empowered (score: 4).
- According to EGDs, there is a positive public perception on oyster consumption among those who know oyster, mainly in urban markets which have high demand, but there is limited awareness of the commodity in the rural regions. There is also a need to improve hygiene and environmental sanitation aspects. Some people have the belief that oysters produced locally fall short of quality standards. However, the consumers surveyed revealed that those buying oyster from Senegal, prefer the local ones (score: 3).

### 3.2.6. Institutional strength

The oyster VC institutional strength domain is unsustainable. The oyster has one management plan for the TWNP but it has not been updated since its publication in 2012. Furthermore, most of, if not all, the VC actors are informal not been registered within any

[125] FISH4ACP data collection, FGDs, April-May, 2022; Avadí, A. et al, 2020.

public competent authority and public support to the sector is weak. Actors do not normally have banks accounts and their access to formal finance services is limited.

Based on the scoring guidance of FISH4ACP methodology, the institutional strength indicators of the VC are assessed as follows:

**Policy, regulations and standards (score: 1.67)**

- The TWNP has a management plan in place, agreed in 2012 but not updated since then with user rights granted to TRY association. However, the enforcement is very weak, and the management plan only covers TWNP, leaving the remaining producing areas of the county out of its scope (score: 2).
- Actors survey showed that less than 15 percent (14 of 104) of the actors are formally registered but just within an association (mainly TRY oyster association), not mentioning having been register legally within any of the competent authorities (score: 1).
- According to EGDs, there is a need to improve public support to the oyster VC. For instance, water quality monitoring, food quality assessment, environmental impact assessments are not forth coming from respective authorities (score: 2).

**Access to finance (score: 1.67)**

- VC actors are mostly illiterate with limited knowledge and understanding of the formal financial system. Interest rates are prohibitively high and a deterrent for application of credit facilities and they also lack the requisite collaterals / security, which are a condition precedent for credit facilities. [126] Furthermore, there are no rural and community banks in the Gambia, where many actors of the oyster VC live, excluding the ones settled in GBA. The banks' role is to a large extent provided by the Microfinance Institutions and to a lesser extent by local villages savings and credit schemes locally rereferred to as “Osusu”. [127] These challenges have inhibited their utilization and dependence on the formal banking system. In fact, according to the actors’ survey, slightly over 25 percent of the 104 actors surveyed have bank accounts, while only 2 use mobile banking (score: 2).
- According to Gillen [128] VC actors prefer "Osusu" model (see previous paragraph), which avails small loans to their members to fund micro and small enterprises including farmers and oyster value chain actors. The source of loans is accumulated savings contributed by members and grants. These are very small actors that mostly contribute to the production and processing segments of value chains. Furthermore, TRY Oyster Women Association has operated a microfinance program has provided

[126] Gillen, M., 2022
[127] Gillen, M., 2022
[128] Gillen, M., 2022

TRY members with knowledge on how to manage their small businesses and how to save money, however it is no longer operative (score: 2).

- Gillen (2022)[129] states Commercial Banks and microfinance institutions offer various and similar products and services including tailor-made ones to meet their growing and diverse clientele, but none appear to be specific to the oyster VC actors. With regards to the Insurance Sector, it does not have tailor-made products for the oyster sector. They offer general products including coverages for accidental injury or deaths, which are applicable to oyster value chain actors, if required. But, apparently, no specific measures to reduce the risk in lending to the sector exist (score: 1).

**Access to natural resources (score: 1.67)**

- The current Fisheries and Aquaculture Policy from 2018, states previous regime political environment was never conducive at the national level for unfettered policy development. The policy explains this context did not allow to align the policy to FAO VGGT. Furthermore, the existing 2012 Cockle and Oyster Fishery Co-Management Plan for the Tanbi Special Management Area was developed through community consultations, and it grants community exclusive use zones where communities can restrict access by individuals from outside the community and establishes additional rules for management. However, the plan has not been updated since 2012 and, generally, VC actors do not find policies implementation adequate in terms of their participation (score: 2).
- Some of the actors in the TWNP are aware of the existence of the management plan which grants exclusive rights to manage shellfish resources to TRY Oyster Association members. However, VC actors claim the adherence to tenure policy is weakly enforced (score: 1).
- According to consultations with VC actors, there are several persisting conflicts with intruding neighbouring communities in other communities' collection/harvest sites (score: 2).

**Access to information (score: 1.67)**

- Obtaining current and reliable statistical data remains one of the challenges the fisheries and aquaculture sector in the Gambia face. Generally, institutions are constrained with the required resources (finance, human resources (in terms of number and technical capacity) and infrastructure) to provide timely and accurate data. Oysters produced are hardly monitored and very little data is available (score: 1).

[129] Gillen, M., 2022

- Around 40 percent of the actors surveyed declared having received training, many on oyster farming. However, the two EGDs conducted coincided the extension services rendered are not sufficient, especially outside TWNP (score: 2).
- With the exemption of TRY Oyster Association members, who set up the price of the oyster for each season and conduct an annual meeting to share information, market information is mainly obtained through local networks (fellow workers, neighbors or customers) (score: 2).

### 3.2.7. Social analysis overview

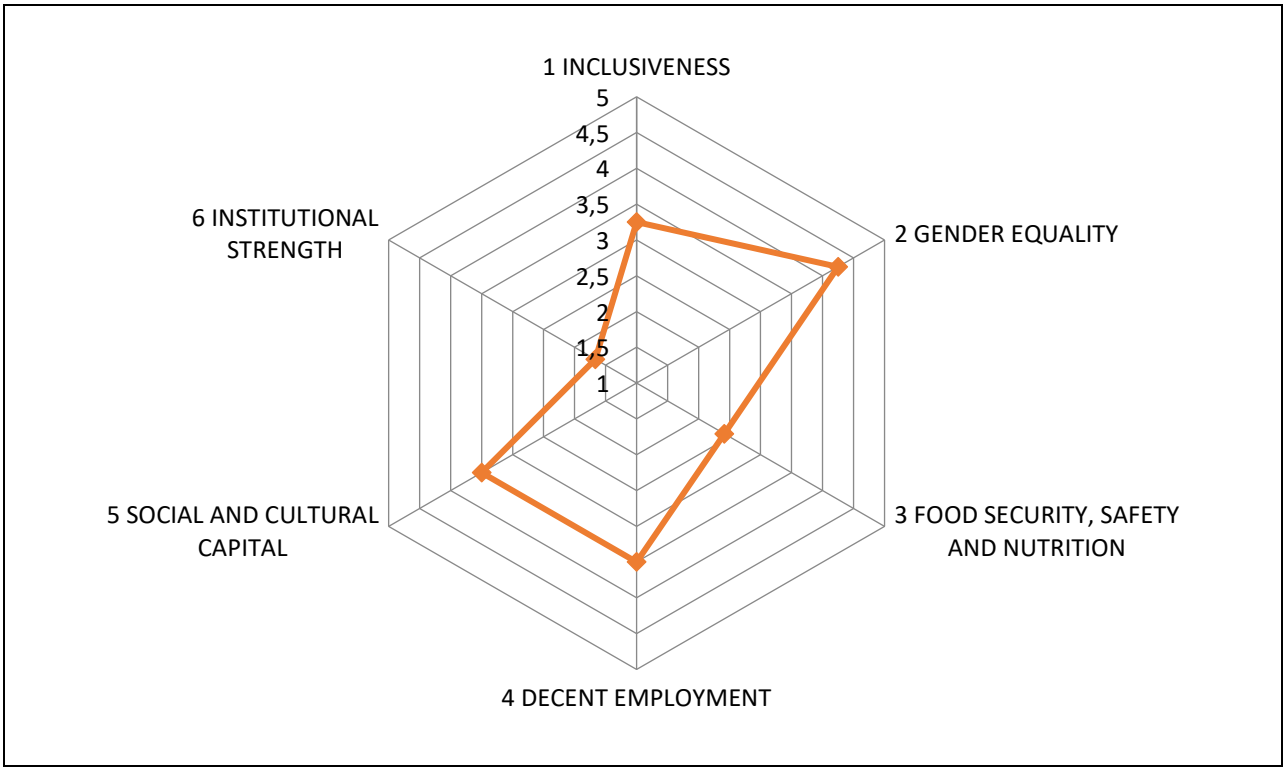
Based on the analytical assessment of social performance as discussed above, and using the FISH4ACP social profiling tool, an overview of social performance for the VC is provided in Table 12 and Figure 22 below. A score in the range 1 – 5 (with 1 means "highly concerning" (red) and 5 means "not concerning" (green)) is given to each sub-domain of the six social sustainability domains (i.e., inclusiveness; gender equality; food security, safety and nutrition; decent employment; social and cultural capital; and institutional strength). The scoring was conducted by the VCA team, following the FISH4ACP methodology guide (see Annex 3), and then was revised to incorporate feedback from VC stakeholders at the validation workshop.

TABLE 12. SOCIAL SUSTAINABILITY PERFORMANCE SCORES FOR THE VALUE CHAIN

| | | |
|---|---|---|
| **1 INCLUSIVENESS** | | |
| 1.1 Wages and employment distribution | **2.33** | **Concerning** |
| 1.2 Value added distribution | **2.00** | **Concerning** |
| 1.3 Poverty and vulnerability | **4.67** | **No concerns** |
| 1.4 Discrimination | **4.00** | **Minor concerns** |
| Average | **3.25** | **Moderate concerns** |
| **2 GENDER EQUALITY** | | |
| 2.1 Women's economic involvement | **5.00** | **No concerns** |
| 2.2 Gendered division of labour | **3.00** | **Moderate concerns** |
| 2.3 Gendered access to productive resources | **5.00** | **No concerns** |
| 2.4 Women's decision-making and leadership | **4.00** | **Minor concerns** |
| Average | **4.25** | **Minor concerns** |
| **3 FOOD SECURITY, SAFETY AND NUTRITION** | | |
| 3.1 Availability of Food | **2.00** | **Concerning** |
| 3.2 Accessibility of food | **3.00** | **Moderate concerns** |
| 3.3 Utilisation of food (nutrition, safety) | **2.33** | **Concerning** |
| 3.4 Stability of food (trends) | **2.33** | **Concerning** |
| Average | **2.42** | **Concerning** |
| **4 DECENT EMPLOYMENT** | | |
| 4.1 Respect of labour rights | **3.00** | **Moderate concerns** |
| 4.2 Child and forced labour | **4.00** | **Minor concerns** |
| 4.3 Job safety and security | **3.00** | **Moderate concerns** |
| 4.4 Attractiveness | **3.67** | **Minor concerns** |
| Average | **3.42** | **Moderate concerns** |
| **5 SOCIAL AND CULTURAL CAPITAL** | | |
| 5.1 Collective Action (horizontal linkages) | **4.00** | **Minor concerns** |
| 5.2 Coordination of transactions (vertical linkages) | **4.00** | **Minor concerns** |
| 5.3 Social Cohesion | **2.33** | **Concerning** |
| 5.4 Cultural Traditions | **3.67** | **Minor concerns** |
| Average | **3.50** | **Minor concerns** |
| **6 INSTITUTIONAL STRENGTH** | | |
| 6.1 Policy, regulations and standards | **1.67** | **Concerning** |
| 6.2 Access to finance | **1.67** | **Concerning** |
| 6.3 Access to natural resources | **1.67** | **Concerning** |
| 6.4 Access to information | **1.67** | **Concerning** |
| Average | **1.67** | **Concerning** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

**FIGURE 22. SOCIAL SUSTAINABILITY PERFORMANCE SCORES FOR THE VALUE CHAIN**




Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

Key issues, recommendations, risks, and mitigating measures flowing from the assessment of performance are provided in Table 13.

**TABLE 13. KEY ISSUES, RECOMMENDATIONS, RISKS, AND MITIGATION MEASURES – SOCIAL SUSTAINABILITY**

| Key issues | Main recommendations |
|---|---|
| i. Informal, relatively small and seasonal sector;<br>ii. No actors registered within public competent authority;<br>iii. Very little contribution (duties, fees or taxes) made to government;<br>iv. Limited offer of transformed oysters: almost all are sold boiled;<br>v. Low availability of oysters along the year due to seasonality and lack of cold-chain to preserve oysters longer time;<br>vi. High selling price, only affordable for the wealthier households;<br>vii. No water quality monitoring or depuration systems to guarantee oysters food safety;<br>viii. Frequent injuries due to the hazardous nature of the work;<br>ix. Women manage the income they generate but mostly to cover family needs;<br>x. Few actors participate in decision-making;<br>xi. Difficulty in accessing source of finance;<br>xii. Weak public sector capacity to support VC actors;<br>xiii. VC actors have few opportunities of training and capacity building | i. Formalize the sector with a register for oyster collectors, processors, and retailers;<br>ii. Diversify production (e.g. oyster farming) and preservation (e.g. cold-chain) means to increase oyster availability time and quantity wise;<br>iii. Diversify oysters products by investing and developing new value added products;<br>iv. Set up a water quality monitoring system in the main oyster productive areas to guarantee its food safety;<br>v. Improve provision of adequate protective material and collection techniques to minimize work injuries;<br>vi. Update, improve and extend to other producing areas the existing co-management plan for TWNP.<br>a. Map the production areas and make them territorial units of reference for oyster and mangrove management.<br>b. Improve community engagement and actors decision-making capacity;<br>vii. Set up special lines of credit for VC actors adapted to their characteristics;<br>viii. Strengthen Department of Fisheries extension services to train oysters VC actors |
| **Main risks** | **Mitigating measures** |
| • Lack of enforcement of an appropriate oyster management may result on resource overexploitation due to higher collecting pressure | • Approve a nation-wide oyster management system, properly enforced by competent authorities. |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

## 3.3. Environmental analysis (Ecological Footprint)[130]

### 3.3.1. Climate Impact

In terms of impact on the climate, the oyster value chain in the Gambia is assessed as sustainable (**domain score, 2.7**). Electricity is not used in the oyster value chain at all. As canoes used in harvesting are generally paddled, the level of fuel consumption in the value chain is very low and not significant enough to raise sustainability concerns. While difficult to quantify its carbon footprint, there is some wood burning in oyster processing (boiling and grilling/smoking) that generates $CO_2$ emissions and is of some concern and has potentially negative impacts on forest cover and vegetation. In addition, the cutting of trees used to construct dugout canoes used by most harvesters reduces the potential for carbon sequestration. But the impacts of the VC on forest cover is likely to be very small in absolute terms and compared to other uses of wood. Given the fact that little/no energy is used in the VC, no assessment is made of the extent to which energy requirements are met by renewable sources.

### 3.3.2. Water footprint

The water footprint of the oyster value chain is concerning (**domain score, 2.5**). Whereas water and ice consumption are not a major problem, pollution and wastewater is an unsustainability issue. There is no ice consumption/use and salt/brackish water used in processing activities (boiling and washing) is extracted from the natural environment (estuaries). There are some risks associated with water-based pollution as there is no wastewater treatment and waste water generated along the value chain is directly dumped into the natural environment. However, given that waste water is only that used when boiling/steaming oysters, and quantities are small, these risks are not assessed as being that significant.

### 3.3.3. Oyster stock sustainability

Considering recent trends, an assessment is made that oyster harvesting is not sustainable (**domain score, 1.0**). Quantitative assessment of stocks is not available. According to discussions held with local experts, oyster stocks are thought to be generally overexploited in the Gambia. The situation is worse in some areas like the Greater Banjul Area and Tanbi where oysters harvested are now characterized by smaller sizes. Moreover, as oyster abundance has considerably dropped, several local communities report that they need to travel further away to find oysters. The fishing pressure is also thought to have increased

[130] The assessment presented below is based on review of relevant literature and the FISH4ACP data collection, including two expert groups (one comprised of government officials and sector/topic experts, and one of actors) which were used to score (by concensus) a number of indicators where quantitative data are not available. The scores proposed by the two expert groups informed a final decision on scoring made by the FAO FISH4ACP team

due to an increasing number of harvesters. The management plan is not fully enforced in most oyster collection sites. While there is the use of a closed season for the Tanbi area, this does not apply in other areas of the country. And the number of collectors and the size of oysters to be collected is not regulated anywhere in the country (although regulating size of oyster at harvest would be difficult given the way oyster shells aggregate together, and collectors already try to collect only the largest oysters as processing small ones is less efficient and sales prices for small oysters are lower than for larger ones). In the past, bad practices such as collecting of immature oysters and cutting of mangrove roots aggravated the situation. However, following sensitization campaigns and awareness-raising, such practices have generally been eradicated.

### 3.3.4. Biodiversity and ecosystems

Regarding its impacts on the biodiversity and ecosystems, the oyster value chain is sustainable (**domain score, 3.0**). Oysters harvesting is a very selective activity. Harvesters directly target oysters and collect them from the mangrove roots. As any other non-target species does not exist at this level, there is no problem of bycatch. Because of its selectivity this activity does not have any detrimental effect on endangered, threatened and protected (ETP) species. The limited farming that takes place uses local oyster species instead of genetically modified and/or foreign ones. Therefore, the use of aquatic genetic resources is responsible. Regarding the mangrove forest which is the major vulnerable ecosystem related to the oyster value chain, it no longer faces any irrepressible damage due to the harvesting and post harvesting practices. Oysters are harvested from roots, in almost all cases, without damaging the mangrove tree root. In addition, unlike in the past, local communities are now more aware about the necessity of mangrove conservation. They are more and more actively involved in protecting and planting mangrove, contributing to restoration.

### 3.3.5. Animal health and welfare

The oyster value chain does not raise any particular sustainability concerns in terms of animal health and welfare (**domain score, 3.0**). Farming activities rely on spat naturally attaching to empty shells. Therefore, there are no particular husbandry and handling measures required. For the same reason, there is no need for specific biosecurity measures. Regarding oysters, no appropriate slaughter technique is defined by the World Organization for Animal Health. Hence, this issue does not apply to the oyster value chain in the Gambia.

### 3.3.6. Toxicity/pollution

Although it is difficult to quantify, the issue of toxicity and pollution related to the oyster value chain is of some concern (**domain score, 2.0**). Whereas feed, drug and chemicals are not used, air pollution is concerning due to the smoke generated from oyster processing activities. The burning of fuelwood as an input for boiling and grilling/smoking oysters, and for making white lime from shells, without any appropriate mitigation measures pollutes the open environment. This practice releases various harmful substances such as $CO_2$ and

carbon monoxide. Furthermore, the magnitude of the organic solid waste is just concerning. There has been an accumulation of large amounts of empty oyster shells over many decades in the environment around the processing sites. Although shells are sometimes reused for white lime or in construction, this activity is not widespread enough to significantly mitigate the issue. However, besides the visual impact the piles of shells do not appear to physically pollute the environment. Regarding the inorganic solid waste pollution, no sustainability concern related to the value chain is currently noted. In the past such pollution was mainly driven by the use of plastic bags to pack the oysters for sale by retailers. But as the Gambia has banned non-biodegradable plastic bags since 1st July 2015, such a practice is no longer a problem.

### 3.3.7. Food loss and waste

The magnitude of food loss and waste in the oyster value chain is sustainable as it is negligible in the Gambia (**domain score, 3.0**). In fact, the oyster is so valuable, prized, and scarce that all actors along the value chain take all appropriate precautions to preserve the product. If not immediately consumed once harvested, oysters are generally boiled or grilled/smoked and then well dried to guarantee their long-lasting storage before sale. In addition, because of the strong demand at national level, most oysters produced are not generally stored a long time before being consumed. Levels of post-harvest losses and waste of oysters are therefore virtually zero with almost full consumption of harvested product (although very small levels of waste may occur by consumers failing to consume oysters and discarding them due to poor refrigeration in many households).

### 3.3.8. Environmental analysis overview

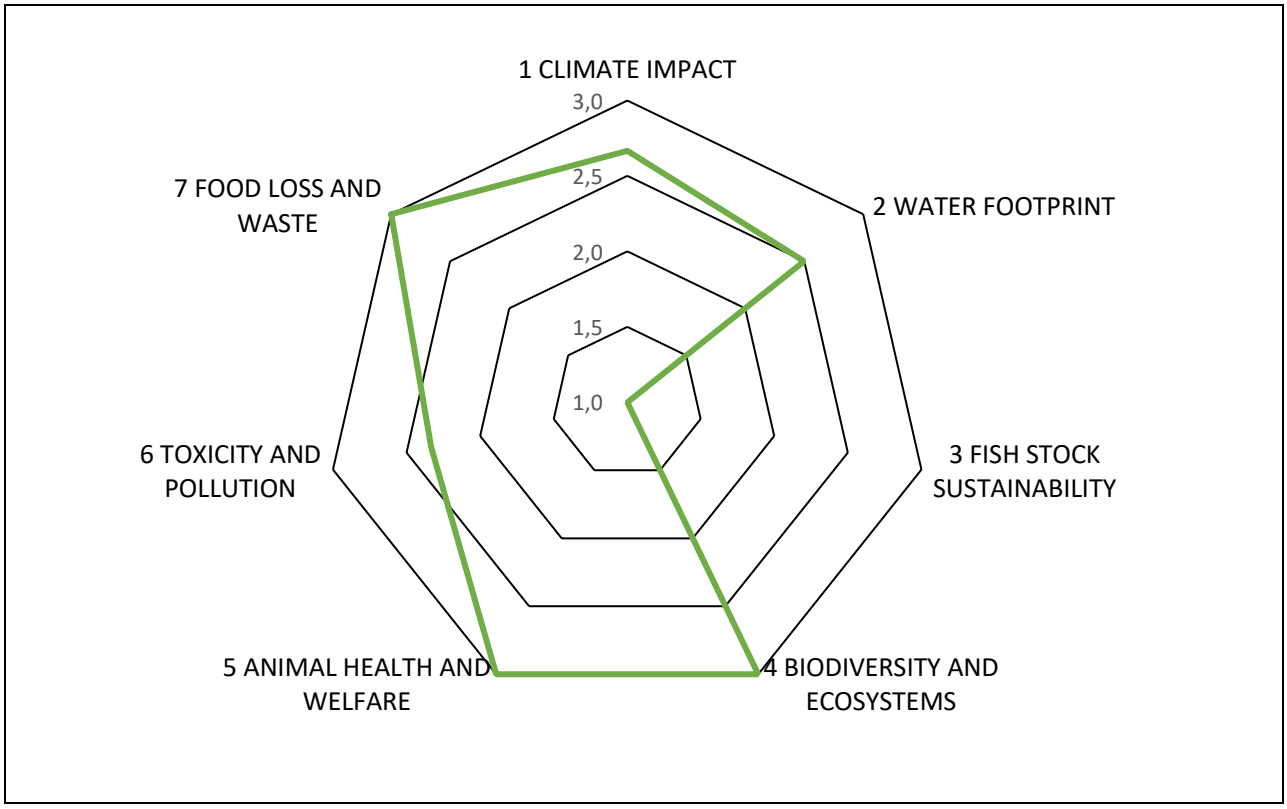
Based on the analytical assessment of environmental performance as discussed above, and using the FISH4ACP environmental assessment tool (which uses a score range of (1-3), with 1 being “Unsustainable” and 3 being “Sustainable”), a summary of performance for the Gambia oyster VC is provided in Table 14 and Figure 23 below.

**TABLE 14. ENVIRONMENTAL SUSTAINABILITY PERFORMANCE SCORES FOR THE VALUE CHAIN**

| | | |
|---|---|---|
| **1.CLIMATE IMPACT** | | |
| 1.1 Electricity use | **3** | **Sustainable** |
| 1.2 Fuel consumption | **3** | **Sustainable** |
| 1.3 Carbon footprint | **2** | **Concerning** |
| **2.WATER FOOTPRINT** | | |
| 2.1 Water and ice consumption | **3** | **Sustainable** |
| 2.2 Water pollution and waste water treatment | **2** | **Concerning** |
| **3.FISH STOCK SUSTAINABILITY** | | |
| 3.1 Stock status and stock dynamics | **1** | **Unsustainable** |
| 3.2 Fishing pressure | **1** | **Unsustainable** |
| **4.BIODIVERSITY AND ECOSYSTEMS** | | |
| 4.1 Impact on associated species | **3** | **Sustainable** |
| 4.2 Status of vulnerable ecosystems | **3** | **Sustainable** |
| 4.3 Status of ETP species | **3** | **Sustainable** |
| 4.4 Responsible use of aquatic genetic resources | **3** | **Sustainable** |
| **5.ANIMAL HEALTH AND WELFARE** | | |
| 5.1 Application of biosecurity measures | **3** | **Sustainable** |
| 5.2 Appropriate animal husbandry and handling | **3** | **Sustainable** |
| **6.TOXICITY AND POLLUTION** | | |
| 6.3 Air pollution | **2** | **Concerning** |
| 6.4 Inorganic solid waste pollution | **3** | **Sustainable** |
| 6.5 Organic solid waste pollution | **2** | **Concerning** |
| **7.FOOD LOSS AND WASTE** | | |
| 7.1 Food loss | **3** | **Sustainable** |
| 7.2 Food waste | **3** | **Sustainable** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

**FIGURE 23. ENVIRONMENTAL SUSTAINABILITY PERFORMANCE SCORES FOR THE VALUE CHAIN**




Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

Key issues, recommendations, risks, and mitigating measures flowing from the assessment of performance are provided in the table below.

**TABLE 15. KEY ISSUES, RECOMMENDATIONS, RISKS, AND MITIGATION MEASURES – ENVIRONMENTAL SUSTAINABILITY**

| Key issues | Main recommendations |
|---|---|
| • Unsustainable stock status and dynamics as oysters are overexploited and their abundance and size have considerably decreased in recent years.<br>• Unsustainable fishing pressure due to the increasing number of harvesters combined with the lack of enforcement of the management plan in most of the oyster collection sites.<br>• Additional concerns (less serious) over: carbon footprint because of the dependency on wood for canoes construction and oyster processing; air pollution fuelwood burning when processing; and organic solid waste pollution from the dumping of oyster shells. | • Improve mangrove and oyster resource management and restoration, through actions aimed both at VC actors and other stakeholders impacting negatively on the mangrove ecosystem<br>• Investigate alternative fuel sources and methods of boiling/steaming oysters<br>• Identify market opportunities for oyster shells and/or ways of removal/disposal from processing sites. |
| **Main risks** | **Mitigating measures** |
| • Lack of political will and public/collective commitment for reducing impacts of the VC on the environment.<br>• Lack of data and knowledge to better understand and monitor the environmental performance of the oyster value chain.<br>• Reluctance of the local communities to adhere and cooperate with measures and strategies to increase environmental sustainability. | • Capacity development of actors and other stakeholders about importance of environmental sustainability.<br>• Introduce new/improved data collection mechanisms to provide data needed to better manage the VC. |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

## 3.4. Resilience

Resilience is a meta-dimension of sustainability that entails how economic, social and environmental sustainability aspects, which relate to performance under normal circumstances, are affected by shocks. As recognised in the FISH4ACP methodology, assessing resilience implies taking a dynamic, longitudinal perspective, i.e., how the normal development trends of the system were affected by past shocks to it, and from this historical perspective, how the current structure would respond to a variety of potential future shocks. This requires considering relevant shocks, assessing how resilient the VC is to them, and

assessing sustainability impact pathways of shocks. This potential resilience, or lack therefore, determines the economic impacts on VC actors, and resulting impacts on employment (potentially in terms of numbers and levels of earnings), and potentially also on government revenues.

### 3.4.1. Potentially relevant shocks

Considering the likelihood of occurrence (re-occurrence) and the (potential) severity of impact, the following potential shocks are considered the most relevant to the oyster VC based on stakeholder consultations and secondary information. Text in brackets indicates the type/nature of the potential shock.

- Fall in demand for oysters in the domestic market (economic shock, potentially resulting from health scares and consumer concerns over food safety).
- Fall in availability of oysters available for collection (environmental shock, resulting from pollution, disease, or over-exploitation).
- Increase in transport and other input costs (economic shock, resulting from macro-economic factors).
- Increase in actor numbers (social shock, resulting from new entrants, the lack of individual user rights, and the open access nature of the fishery in some areas)

### 3.4.2. Resilience of the VC to potential shocks

A rapid qualitative assessment based on six domains results in the resilience sustainability heat map shown in Table 16.

**TABLE 16: RESILIENCE DOMAINS**

| **Resilience domains** | | |
|---|---|---|
| **Structural resilience domains** | | |
| Redundancy | Diversity | Connectivity |
| **Behavioural resilience domains** | | |
| Collaboration and governance | Learning and adaptation | Participation and inclusion |

| **Hotspot classification** | | |
|---|---|---|
| Not concerning | Concerning | Highly concerning |

Note: Structural domains evaluate the presence and nature of certain structural elements that may contribute to resilient value chains. Behavioural domains refer to how actors and other stakeholders' behavioural patterns interact in ways that may contribute to resilient value chains.

**Redundancy:** resilience of a VC can be enhanced if the VC has excess capacity which enable the maintenance of the VC's core functionalities in the event of shocks. In the case of the oyster VC, the lack of any storage facilities means there are no stocks of supply held in

reserve, and while not quantitatively assessed levels of savings by VC actors are suspected to be low.

**Diversity:** The more diverse a value chain is, the less likely it is that a shock will wreak havoc on the VC. The oyster VC is very homogenous in terms of the technologies, functions, products, and actors. Almost all actors carry out very similar activities and methods in the collection, processing and marketing of oysters. There is little diversity in terms of market products (almost all boiled) or different forms of value addition (no branding of packaged products), or in marketing channels (with almost all oysters sold in urban retail markets). The actors themselves are also not diverse with a large proportion being collector/processor/retailers.

**Connectivity.** Good connections of various kinds between actors, other VC stakeholders and resources, and the extent to which they may hold up in case of a shock, impacts on the ability to quickly identify problems and needs, attenuate the effects of shocks. The VC displays strong social linkages at the community level with processing activities in particular often being a group activity allowing time for the exchange of information and the development of strong social relationships. Many of the actors are organised into the TRY oyster women's association, with the organisation providing a good basis for imparting knowledge to VC actors and for the association to be aware of issues/shocks facing actors. Relationships between actors and government are also generally strong, with staff in the Department of Fisheries having good relationships with actors, helping to ensure that they remain connected to activities at the village/community level. The relatively small distances generally involved in travelling between processing sites and markets also means that in physical terms there is good connectivity between actors and their markets.

**Collaboration**. Collaboration between actors and other VC stakeholders enhances resilience capacities since risks are shared among stakeholders and since the VC stakeholders as a group have a better picture of the risks and how to manage them. At a horizontal level, both collection and processing functions in particular are often undertaken by groups of actors enabling good collaboration. Given the vertical integration of functions by individual VC actors collaboration between vertical functions in the VC is by definition very strong. As noted above, the presence of the TRY oyster women's association provides a good forum for the exchange of experiences between actors, as does the group nature of processing activities at the village/community level. The TRY association also supports collaboration between actors and the government. Levels of trust between actors, and between actors and government, are also generally not assessed as being problematic, and the presence of co-management arrangements (for the Tanbi area, if not all areas in which oysters are collected) is evidence of generally good collaboration.

**Learning and adaptation.** Learning and adaptation refers to the levels of flexibility and innovation in the VC, which may serve to increase resilience. Efforts have been made in the

past to innovate in terms of new market products and packaging but were not successful and demonstrate a lack of flexibility by producers to alter existing practices which are largely individual in nature to a more collective approach to marketing. Indeed, the technologies and practices used in collection, processing and retailing have changed very little, if at all, over the years, and would struggle to do so as a response to shocks. The ability for core actors in the VC to adapt and engage in activities less subject to shocks is low i.e. actors could not easily switch to other income generating activities in their communities. Earlier programmes to monitor water quality are not ongoing, and there is no routine monitoring of the state of oyster stocks, reducing early detection of environmental shocks impacting on resource abundance, which would enable actors to prepare for such shocks.

**Participation and inclusion.** Participation refers to the empowerment and engagement of the full range of diverse VC stakeholders in forums and processes which can reduce the impact of shocks. Only around 40 percent of actors in the VC are represented by the TRY oyster women's association, and so some actors are less connected to response and recovery mechanisms.

### 3.4.3. Sustainability impact pathways of potential shocks

The impact pathways from the shocks highlighted in section 3.4.1 are as follows:

i. Fall in demand for oysters in the domestic market:
   - Reduced prices leading to lower sales revenues per cup, and therefore lower earnings/income for actors.
   - Reduced volume of sales, leading to lower total sales revenues and therefore lower earnings/income for actors (given some costs are fixed).
   - Reduced sales of oysters and presence of actors in markets leading to reduced market duties generated by local councils/urban markets.

ii. Fall in the availability of oysters for collection (and subsequent processing and marketing) due to environmental shocks and/or over-exploitation:
   - Reduced product available for processing and sale, leading to lower total sales revenues and therefore lower earnings/income for actors.

iii. Increase in transport and other input costs
   - Increased operational costs, leading to reduced earnings/income for actors.

The above three shocks and their impacts could potentially lead to reductions in the number of actors i.e. 'employment' in the VC

iv. Increase in actor numbers
   - Reduced volumes of oysters for collection by individual actors, leading to lower volumes available per actor for processing and sale, in turn reducing earnings/income per actor.

## 3.5. Sustainability and resilience heat map

A sustainability and resilience heat map overleaf provides a synthesis of the economic, social and environmental sustainability assessment and the resilience analysis (see sections 3.1 to 3.4).

| | |
|---|---|
| **Economic sustainability score [131]:** | **73.8%** |
| **Social sustainability score:** | **54.1%** |
| **Environmental sustainability score:** | **80.5%** |
| **Resilience score:** | **41.7%** |
| **Overall sustainability score:** | **65.9% (34 of 69 green, 23 of 69 yellow)** |
| **Number of highly concerning hotspots (red):** | **12 (of 69)** |

[131] According to the FISH4ACP methodological guide, "the (sustainability scores) indexes are calculated by adding up across sub-domains (1 for green, 0.5 for yellow, 0 for red) and dividing this by the number of subdomains, expressed as a percentage".

**FIGURE 24. THE GAMBIA MANGROVE OYSTER VALUE CHAIN SUSTAINABILITY AND RESILIENCE HEAT MAP**

| Economic Sustainability | Social Sustainability | Environmental Sustainability |
|---|---|---|
| Net profits | Wage and employment distribution | Electricity use |
| Trend in net profits | Value added distribution | Fuel Consumption |
| Return on sales | Poverty and vulnerability | Carbon footprint |
| Return on investment | Discrimination | Water and Ice Consumption |
| No. of jobs in FTE | Women's economic involvement | Water pollution & wastewater treatment |
| No. of full-time jobs | Gendered division of labour | Stock status and stock dynamics |
| No. of wage labour jobs/salaried jobs | Gendered access to productive resources | Fishing pressure |
| No. of family/self-employed jobs | Women's decision-making and leadership | Impact on associated species |
| Average wage proxy family labour | Availability of food | Status of vulnerable ecosystems |
| Direct value added at core VC level | Accessibility of food | Status of ETP species |
| Indirect value added at VC level | Utilization of food (nutrition, safety) | Responsible use of aquatic genetic resources |
| Total value added at VC level | Stability of food (trends) | Application of biosecurity measures |
| Net impact on the balance of trade | Respect of labour rights | Appropriate animal husbandry and handling |
| Rate of integration | Child and forced labour | Air pollution |
| Net impact on public funds | Job safety and security | Inorganic solid waste pollution |
| Access and cost of capital | Job attractiveness | Organic solid waste pollution |
| National protection coefficient | Collective action (horizontal linkages) | Food loss |
| Domestic resources cost ratio | Coordination of transactions (vertical linkages) | Food waste |
| Consumer price benefit surplus | Social cohesion | |
| Consumer evaluation | Cultural traditions | |
| Price relative to substitutes | Policy, regulations, and standards | |
| | Access to finance | |
| | Access to natural resources | |
| | Access to information | |

| Resilience | | |
|---|---|---|
| Redundancy | Diversity | Connectivity |
| Collaboration | Learning and adaptation | Participation and inclusion |

| Key | | |
|---|---|---|
| Not concerning | Concerning | Highly concerning |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.131F131F[132]

The main conclusions to be drawn from the heat map when viewed in totality are that VC performance in terms of sustainability is mixed, with several areas (12 of 69 indicators), being highly concerning.

With respect to the different dimensions of sustainability, social sustainability is assessed as the weakest, accounting for 6 of the 12 highly concerning red hotspots. These hotpots relate to a variety of 'access' issues (to information, to finance, to resources), as well the uneven levels of value-added between individual actors. The seasonal nature of the oyster fishery also reduces its ability to contribute to food security, both directly in terms of the oysters available for consumption, and indirectly through the ability of VC actors to use income to purchase food as most only operate for around 4 months a year.

The environmental sustainability performance of the VC is better than its social performance. The environmental sustainability assessment indicates that for most domains and specific indicators, there are not concerns. However, a critical finding from the assessment is that both stock status and fishing pressure are highly concerning. Given that all social and economic benefits from the VC rely on a sustainably managed oyster stock, this suggests that the upgrading strategy will need to focus strongly on correcting these aspects of poor VC performance.

The VC performs relatively well with regards to economic sustainability. While there are several yellow/concerning indicators (9 of 21), there is only one indicator that is highly concerning (prices relative to substitutes), however even the high and rising prices do not so far seem to have reduced domestic market demand for oysters.

When considering resilience, the assessment highlights several areas of considerable concern which could serve to reduce the ability of the VC actors to respond to shocks, notably the lack of an ability to hold stocks (due to a lack of storage facilities) and the homogenous nature of VC activities.

[132] As seen in table 9 scores for the social profile are classified into five categories: 1) no concerns ( > 4.5); 2) minor concerns (3.5 ≤ < 4.5); 3) moderate concerns (2.5 ≤ < 3.5); 4) concerning (1.5 ≤ < 2.5) and 5) very concerning (<1.5). In Figure 24, the analysis team has matched the social scores to the ones used in the economic and environmental domain, using the following formula to convert scale 1-5 to 1-3 (highly concerning: 1, concerning:2, not concerning:3) y =(((x-1)/(5-1))*(3-1))+1) with x = score from 1 to 5 and y = score from 1 to 3.

# 4. Upgrading strategy

This section of the report draws on the analysis presented in Sections 2 and 3 to develop an upgrading strategy for the mangrove oyster value chain in the Gambia. It starts with a SWOT analysis to begin the process of moving from analytical complexity to strategic simplicity (sub-section 4.1). Informed by the SWOT analysis, the sustainability heat-map (see earlier, Figure 24), the VC map (see earlier, Figure 4), and varied stakeholder interests as reflected during consultations, an overall objective for the upgrading strategy is developed in the form of a vision statement (co-developed with VC stakeholders based on the SWOT). The vision statement has concrete targets attached to it, and will be realised through four main elements, or outcomes of an upgrading strategy, brought about by a range of activities and outputs which are presented graphically in a theory of change (section 4.2). Sub-section 4.3 presents assumptions about factors that will change under the upgrading strategy, and then business models, the enabling environment and governance arrangements under the baseline situation and following upgrading. Sub-section 4.4 builds on preceding sub-sections to develop an assessment of the sustainability impact the upgrading strategy it is expected to have.

## 4.1. SWOT analysis

**A SWOT analysis** of the mangrove oyster VC in the Gambia is provided in Figure 25.

**FIGURE 25: SWOT OF THE MANGROVE OYSTER VALUE CHAIN IN THE GAMBIA**

| **Strengths (internal)** | **Weaknesses (internal)** |
|---|---|
| • Low input costs, strong market demand, technical skills necessary preventing new entrants, lack of middlemen due to vertical integration, and rising prices, all contributing to good incomes for VC actors.<br>• Wastage of harvested product from point of collection to consumption is virtually non-existent due to short-time between processing and sale, and strong market demand.<br>• Good levels of organization, coordination and representation of many VC actors, which may be used as a model in areas where representation is less organised.<br>• Employment creation for women and minority ethnic groups. | • Oyster fishery is seasonal meaning seasonal earnings, contributions to food security and employment.<br>• Lack of use of individual user rights (community rights in Tanbi and open access in others) has resulted in increased fishing pressure.<br>• Insufficient funding and capacities results in poor data collection and means the state of stocks is not well known, but stock is suspected to be fully- or over-exploited.<br>• Cutting of wood required for fires for boiling and for paddle canoes has some negative environmental impacts.<br>• Cultured production of oysters is limited in scale and technology meaning low profits and value added from aquaculture.<br>• Homogenous activities and lack of product storage/holding facilities means actors have low resilience to potential market and environmental shocks.<br>• Access by actors to finance is limited.<br>• Work related accidents and injuries. |
| **Opportunities (external)** | **Threats (external)** |
| • Aquaculture technologies offer potential to increase overall profitability to complement wild collection.<br>• New marketing channels for fresh oyster products and sale of oyster shells are available for development.<br>• Collaborative arrangements by actors could be expanded to cover all actors rather than just those in the Tanbi area.<br>• Donor interest in the sector (given the benefits of the VC to women and marginalized/poor groups) which could be leveraged to provide support and funding.<br>• Use of regional experience of water quality monitoring practices as the basis for water quality testing.<br>• The existence of some limited areas where oysters are available but not being collected.<br>• Internationally recognised best practices in management provide the basis for increasing/re-building oyster stocks. | • Poor water quality/pollution and reduced levels of mangrove coverage negatively impact on volumes of oyster production.<br>• Consumers stop or reduce buying oysters due to water quality or post collection practices which compromise product safety/hygiene causing consumers to reduce/avoid purchases due to health concerns. This threat is only theoretical at present.<br>• Climate change impacts negatively on mangroves and oyster productivity. These impacts may be long-term and relate primarily to inundation of mangroves<br>• Competing use of river and mangroves causes user conflicts. |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

The strengths of the VC are that it is well-established having been operating for many decades using tried and tested methods which serve to generate good levels of income for the actors involved (almost exclusively women, and many from minority ethnic groups). Market demand is strong and there is virtually no post-harvest loss/waste due to the rapid processing and sale of oysters. Collaboration of actors, and with government, in many geographical areas of production is generally good.

Weaknesses of the VC include suspected overfishing and declining status of oyster stocks largely due to a failure to limit those engaged in collection activities, and an embryonic aquaculture sector which has not developed sufficiently in volume terms to generate meaningful levels of income diversification. Other weaknesses are the seasonal nature of the fishery which means that actors must find other income-generating activities for significant periods during the year, poor access to finance, and insufficient data about the VC being collected on an ongoing basis.

Considering potential Opportunities for the VC, these revolve most strongly around developing and improving aquaculture technologies and practices which are available, enhancing and ensuring resource management through building on existing collaboration and partnerships, exploiting demand for fresh oysters and oyster shells, and leveraging donor interest in supporting to develop the capacities of actors, improve equipment and infrastructure available to actors.

Looking to the future, it is important to consider the Threats to the VC. Most notably these include the risk of a fall in demand for oysters becoming a threat (mostly likely as a result of a health scare due to poor food safety controls and practices), or declining oyster production due to climate change, disease, or the impacts of other factors on water quality and mangrove cover.

Key **strategic options** emerge from the SWOT and revolve around the opportunities and threats as follows:

1. Improving oyster resource and mangrove ecosystem monitoring and management.
2. Developing new and improved aquaculture methods.
3. Market development for oysters and oyster by-products.
4. Improving working and enabling conditions for value chain actors.

These strategic options are likely to require **support for cross-cutting enabling factors** in the form of:

a. capacity development of VC actors.
b. improved equipment and infrastructure available to actors.
c. improved access by actors to finance.

## 4.2. Vision, targets and core strategy

A **shared and agreed vision** for the mangrove oyster value chain that is achievable and realistic, following successful implementation of the upgrading strategy, has been developed together with stakeholders during the validation and activity planning workshops. This vision is:

*"By 2032, there will be a vibrant and sustainable oyster sector in the Gambia, with oyster value chain actors being resilient to potential shocks and generating profits through an increase in production and enhanced value addition."*

The specific timeframe specified in the vision is based on the need to move quickly while allowing sufficient time for the strategies to support the vision to be put into place.

Specific and measurable **targets** associated with the vision (by 2032) are: [133]

1. Annually updated and implemented oyster and cockle management plan (for the Tanbi area).
2. Increase in wild oyster production from 9 253 in 2021 to 10 178 tonnes in 2032 (10 percent increase), due to stock rebuilding and better harvest controls in over-exploited areas, and of possible through expansion of collection activities into areas not currently well utilised
3. Increase in aquaculture production from 200 tonnes in 2021 to 1 000 tonnes per year in 2032. This would raise aquaculture production from 2.6 percent of current production to c.a. 10 percent of production by 2032.
4. Increase in the proportion of actors represented by respective community associations from 50 percent in 2021 to 80 percent in 2032.
5. Increase in the sale of oyster shells by VC actors from 250 tonnes in 2021 to 2 500 tonnes per year in 2032 (1 500 tonnes sold bulk and 1 000 sold as shells processed/ground in communities)
6. 15 communities involved in selling oyster shell jewellery and other high value oyster shell items.
7. Sale of fresh oysters to restaurants/hotels has begun by 2023 and continues, rising in volume to 25 tonnes a year by 2032.
8. Increase in direct value added by 35 percent.

The vision statement recognises a desire and belief by stakeholders that both economic and social benefits can be achieved. It also recognises the importance of environmental objectives, and the vision statement (and its targets) includes a specific focus on resource

[133] GMD values at current prices.

management, given that economic and social benefits (e.g. incomes, employment) are dependent on the natural environment from which oysters are produced.

The vision is coherent with, and relevant to, national needs and policies[134] which aim to ensure ecologically and economically sustainable fisheries that ensures food and nutrition security for the population. The vision will also support and be consistent with:

v. SDG 6 Clean water and sanitation, and its goal of 'ensure availability and sustainable management of water and sanitation for all'.
vi. SDG 8 Decent work and economic growth, and its goal to 'promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all'.
vii. SDG 12 Responsible consumption and production, and its goal to 'ensure sustainable consumption and production patterns'.
viii. SDG 14 Life below water, and its goal to 'conserve and sustainably use the oceans, seas and marine resources for sustainable development.

The proposed upgrading strategy has **four major elements to bring about the vision**:

1 Improved resource and ecosystem management and status.
2 Aquaculture development.
3 Development of markets for oysters and oyster by-products.
4 Improved working conditions and enabling conditions for value chain actors.

A range of **activities and inputs** (e.g. studies, trainings, funds) supported by government, the private sector (core VC actors and service providers), the FISH4ACP project, and other donors (discussed in detail in Section 5), will produce the **outputs needed** to bring about improvements in the enabling environment (**intermediate outcomes**) and in turn a series of environmental, economic and social **outcomes**, in support of the vision.

The **Theory of Change** (ToC) for the VC upgrading is presented overleaf, and shows the logic and linkages between the inputs, outputs, outcomes, and vision in figurative way. The ToC covers the whole upgrading strategy (whose implementation will go beyond the scope of FISH4ACP project) rather than being specific to the FISH4ACP project. Assumptions are not contained in the ToC; the more detailed logframe for the upgrading strategy presented Section 5 contains assumptions that are specific to different levels of the logframe, while the risk analysis in Section 5 addresses broader general risks and assumptions to the strategy.

The underlying **narrative for the upgrading strategy** for the mangrove oyster value chain in the Gambia represents an integrated approach to realise the vision, and helps to explain the ToC. Through grants and other supporting measures such as trainings and workshops to

[134] e.g. Fisheries and Aquaculture Policy 2018, Fisheries and Aquaculture Sector Strategy, 2017-2020, Fisheries Act and Regulations

build capacities, and feasibility studies to further understand and justify interventions included in the strategy, exploitation of wild oyster stocks will be placed on a sustainable footing through improved resource management arrangements resulting from updated and improved management arrangements and increased participation of value chain actors and government stakeholders in decision-making. At the same time, support will be provided to expand and upgrade the emerging oyster aquaculture sector through financially viable new production methods and an expansion in the number of oyster farms and area under cultivation, as well as updating the associated regulatory framework. Increased aquaculture production will serve to increase natural spat availability and increase incomes of actors. This dual focus on wild and farmed oysters will serve to better support the value chain actors in meeting the strong demand for oysters in the local market. Pilot schemes to trial the sale of new oyster products (e.g. fresh oysters) and explore new marketing channels not currently utilised in the domestic market (e.g. to high-end hotels and restaurants) will provide learning that will underpin the articulation and implementation of a market strategy for the mid- to longer term. The market strategy will potentially be based on segmenting the market and differentiating sales by farmed and wild collection methods, with a strong emphasis on ensuring robust product hygiene standards for consumer safety. The market strategy is envisaged to rely on domestic sales.[135] The overall upgrading strategy will also explore and develop the potential to generate additional value added from the oyster shells which are the by-products of oyster processing. Opportunities may lie in bulks sales of shells for 'industrial' use in poultry feed mills or as fertiliser, or their use in innovative tourism (and export) products such as jewellery and handicraft items which could be made by value chain actors in the off-season, and market development will be coupled with and supported by improvements in equipment and infrastructure, where relevant financed by actors themselves based on improved access to finance and in other cases by donors. This will allow for the expected developments in value chain performance, increased resilience of value chain actors to potential economic and environmental shocks, and improved working conditions for actors in the value chain.

The **four elements to bring about the vision are**:

1. *Improving oyster resource and mangrove ecosystem monitoring and management*. This will involve updating and improving the Tanbi oyster and cockle management plan (to include management, access and harvesting arrangements, protection of bio-security issues, etc), increasing the number of value chain actors who are part of and represented by the TRY oyster womens' association or other

[135] Given the requirement for exports to be underpinned by a shellfish sanitary program meeting export standards for the European Union or US and the time that would be required to establish one, strong domestic market, and the complex logistical arrangements for export, an export focus is unlikely to be feasible/desirable withing the life-span of the strategy.

community-based associations, routine stock assessments, water quality testing, and support for mangrove protection, re-planting and re-growth.

2. *Developing new and improved aquaculture methods*. This will involve research to explore potential aquaculture methods suitable to local species and conditions, and then a series of activities for piloting and experimentation to identify optimal spat collection areas[136] and the trialling and rolling-out of new and improved aquaculture production methods. Expansion of the area under farming will take place following careful site selection (recognising the potential complexity of land tenure issues and the granting of concessions) and agreement over ownership and management arrangements for new aquaculture farms. Expansion will also need to be supported by increased access to services, technology and finance to value chain actors, to ensure bio-security, and to provide an appropriate legislative environment governing oyster cultivation. This element will also need to ensure that the economics of oyster farming are fully understood and that investments are justified in financial terms, rather than just being possible in biological and technical terms given the fixed and operational costs involved and the resulting revenues based on market prices for product.
3. *Market development for oysters and oyster by-products*. This element will have two main parts, one focussing on oysters, and the other on shells as the by-products of oyster processing. Important for the part focussing on oysters will be activities designed to ensure food safety and hygiene for oysters being sold. Market research and pilots will test the potential for new products (primarily fresh oysters, but potentially others such as oysters in jars)[137] to be sold in the domestic market. New marketing channels, especially to hotels and restaurants, will be explored. Research and pilots will be used as the basis for activities to articulate and agree a marketing strategy, which would then become part of the overall upgrading strategy. Some investments in marketing-related equipment and infrastructure will be required. The second part of the element will focus on market research and then the building of market relationships and sales arrangements between oyster processors and buyers of shells, as both a low-cost bulk input to poultry feed or fertiliser, and as small volume high value tourism products. For the latter, skills development for the production of sales items will be supported, once product options have been explored for their potential demand (in both domestic and export markets) and likely prices.
4. *Improving working conditions and enabling conditions*. This element will involve the provision of equipment and infrastructure to improve working conditions and reduce current safety concerns about working practices at different stages of the value chain i.e. collection, processing, sale. It will involve the provision of personal protective equipment (PPE) and safety equipment used during the collection of wild oysters and their steaming/boiling or smoking, following consultations to verify the

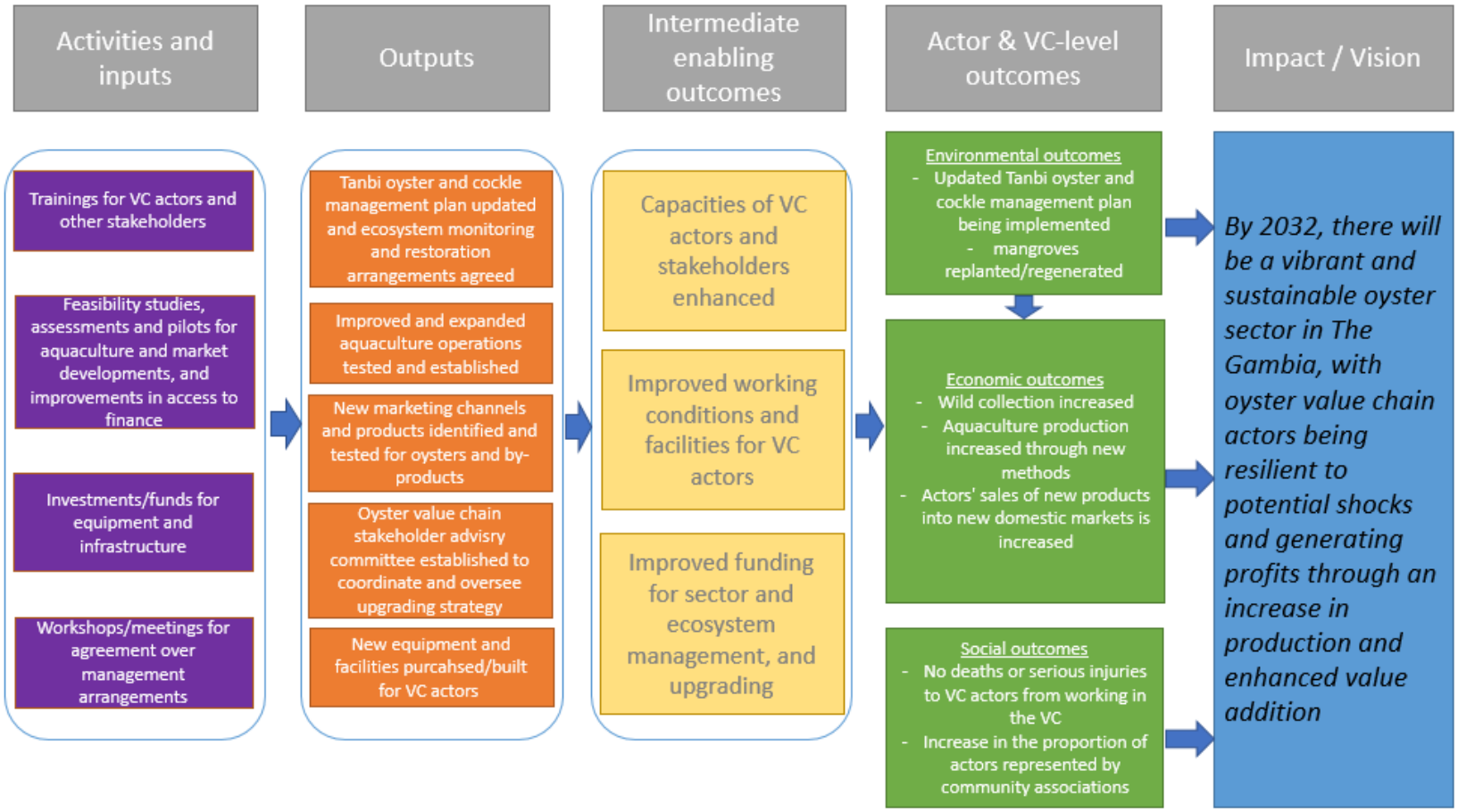
[136] Building on information from earlier studies e.g. Ba NaFAA, UCC.

[137] Earlier attempts to sell in jars were not successful so the reasons why would be explored

real demand and potential for their use. It will also involve research, trials and funds for improved steaming/boiling methods, chill/cold storage of processed oysters, processing-related shelters, and sales-related equipment. In all cases, careful attention will be paid to the economic viability, certainty over use, sustainability, and any management related arrangements for any equipment or infrastructure provided. A small and targeted programme to teach value chain actors how to swim will be established for those that need it. Support for increased access to finance will enable VC actors to make necessary investments.

Through the implementation of the upgrading strategy and its four elements, linkages will be developed with the strategy being deployed by the FISH4ACP project in Senegal, which is also focusing on mangrove oysters. This will ensure cross-VC learning and potentially economies in the funding of certain activities.

**FIGURE 26: THEORY OF CHANGE FOR THE OVERALL UPGRADING STRATEGY OF THE OYSTER VALUE CHAIN IN THE GAMBIA**




Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in The Gambia: Analysis and design report*. Rome, FAO.

## 4.3. Upgrading activities

### 4.3.1. Assumptions about changes from upgrading

The **key assumptions** underpinning and impacting on the assessment of current and future VC performance relate to economic factors, but also to the key societal and governance conditions and arrangements as discussed in Section 2. The key assumptions for factors that are expected to change with implementation of the upgrading strategy, are provided in Table 17, and relate to business models, the enabling environment, and governance arrangements, which are the subject of the following sub-sections. Justification is provided for each item for the assumptions about changes resulting from the upgrading.

**TABLE 17: KEY ASSUMPTIONS – CURRENT AND UNDER UPGRADING**

| Item | Current situation (2022) | With upgrading | Justification |
|---|---|---|---|
| | Unit or cost | Unit or cost (change from current in bracket) | |
| **Production** | | | |
| Annual volume (tonnes) of farmed production | 200 tonnes | 1 000 tonnes | New methods/practices will be assessed, justified, piloted and replicated allowing for increase |
| Annual volume (tonnes) of wild production | 9 253 tonnes | 10 178 tonnes | Improved management will ensure rebuilding of oysters stocks in some areas where there is overexploitation, and actors in other areas not currently exploited will be encouraged to enter the VC |
| | | | |
| **Sales** | | | |
| Annual volume (tonnes) of fresh oyster sales (in shell) | 0 tonnes | 25 tonnes | Market relationships will be brokered between communities and restaurants/hotels and trials and training completed. Initial research has validated the potential demand. |
| Sales price (USD/tonne) of fresh oysters | n/a | USD 7.5/kg (in shell) | Fresh oyster prices will be much higher than the c.a. USD 6/kg for boiled/steamed oysters after shucking, and prices in Senegal are USD 7,5 per dozen oysters in-shell (roughly 1/kg) |
| Annual volume (tonnes) of bulk and ground shell sales | 250 tonnes | 2 500 tonnes | Demand by poultry feed mills in the country has been established through initial research, and 750 tonnes of |

| | | | |
|---|---|---|---|
| | | | processed shells already being imported from Senegal annually. Volume of shells from wild collection easily supports/enables this target (representing around 1/3 of the volume of shells processed each year) |
| Number of communities involved in selling high value items, such as jewellery, made from oyster shells | 0 | 15 | Strategy will support training and trials of community-based jewellery and handicraft items from oyster shells |
| Sales price (USD/kg) of shell jewellery and handicraft products | n/a | USD 100/kg | Jewellery products will be high value items catering to the foreign tourists visiting the Gambia (and/or potentially also for export) |
| **Societal environment** | | | |
| Proportion (%) of actors being part of community associations | 50% | 80% | Upgrading strategy will provide for increased membership/expansion of TRY oyster women's association and creation/development of other new associations. The increase will support improved management arrangements |
| **Governance** | | | |
| Area (hectares) of mangroves | tbd | tbd | Project supported by AFD and other donors will support mangrove replanting and natural regeneration, and be underpinned by legislative protection of mangroves |
| Number of oyster and cockle management plan updated and improved annually | 0 | 1 | The strategy will provide support for annual updates and improvements of the plan for the Tanbi area managed by TRY |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

### 4.3.2. Upgraded business model

The table below shows the operational accounts for oyster collectors/processors/retailers under the current situation and after upgrading (see Annex 2 for comparative accounts).

Assumptions driving changes in performance in the operational accounts for individual collector/processor/retailers (CPRs) with upgrading are as follows:

- All changes from the strategy accrue to CPRs (the main channel in the VC representing c.a. 70 percent of oyster sales).

- Aquaculture operations are conducted by CPRs (as is currently the case) rather than by a separate group of actors so no separate business model for oyster farmers is provided.
- The 10 percent increase in wild oyster production with upgrading is applied to all the different products sold under the baseline model, at constant prices, resulting in increased revenues with upgrading.
- Upgrading provides for new revenue items in the form of: i) fresh oysters; ii) bulk shell sales; iii) jewellery and handicraft sales made from oyster shells; iv) increased aquaculture production. Volumes of sales for these items which are assumed at an aggregated VC level are divided by the number of CPRs in the value chain in the individual actor model.
- Increased operational costs relate to the purchase of ice and additional transport costs for the sale of fresh oysters, and to inputs required for jewellery and handicraft making. No increases in operational costs are assumed for increases in wild oyster production as increased volumes would not require additional canoe rental costs or increases in costs for transporting small increases in product to market as additional trips to market would not be required.
- Increased fixed costs relate to investments required in new aquaculture production methods.

**TABLE 18. ANNUAL OPERATIONAL ACCOUNTS FOR OYSTER CPRS, CURRENT AND UPGRADED SITUATIONS (IN GMD)**

| Item | Current situation (GMD) | With upgrading (GMD) |
|---|---|---|
| **Revenues** | **70 719** | **117 421** |
| Processed oysters | 70 719 | 77 791 |
| Fresh oysters | 0 | 13 436 |
| Bulk shell sales | 0 | 9 014 |
| Jewellery and other high value item sales | 0 | 7 166 |
| Additional aquaculture sales | 0 | 10 013 |
| **Costs** | **12 328** | **22 012** |
| Operational | 9 860 | 16 040 |
| Fixed | 2 468 | 7 475 |
| **Operating profits** | **58 391** | **93 906** |
| **Return on sales** | **83%** | **80%** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

### 4.3.3. Upgraded enabling environment

Consideration of the results of the strategy to support an upgraded enabling environment involves assessing the changes to the organizations, infrastructure, and institutions (policy and legislation) which govern and/or support value chain operations. The upgrading strategy will result in an upgraded enabling environment, with improvements in four main areas:

1. **Institutional arrangements for the management of wild oyster stocks and protection/restoration of the mangroves on which they depend**. This will take the form of an updated and improved Tanbi oyster and cockle management plan (given the age and some weaknesses in the existing plan), and an expansion in the number of value actors that are represented by the TRY oyster womens' association and other representative communication organisations/associations (given that only c.a. 50 percent of value chain actors are currently represented). Institutional arrangements for the protection, replanting and natural regeneration of mangroves will be enhanced resulting in increased mangrove coverage, through new and innovative funding mechanisms relying on corporate and donor support for carbon sequestration and climate change mitigation and adaptation.
2. **Arrangements for the aquaculture sector**. New and improved policy and regulations for the aquaculture sector will be developed to provide an enabling environment for the private sector to flourish while simultaneously addressing bio-security concerns. Agreements will be brokered over optimal ownership and management arrangements for aquaculture farms to address existing weaknesses,[138] and support for technical services and inputs from both government and private sector providers will be enhanced through an articulated and funded programme of support provision.
3. **Food safety controls**. The monitoring of the conditions in which oysters grow in the wild and in farms will be started through an agreed and funded programme of water quality testing (which is not currently in operation). A risk-based strategy towards product hygiene controls/tests will be introduced, with a programme of testing from the point of collection through processing to sale, to ensure consumer safety over products in the market, again addressing the lack of current food hygiene controls.
4. **Equipment and infrastructure**. One of the four main elements of the strategy will focus on the introduction of new and improved equipment and infrastructure, to enhance the environment in which actors operate. While not yet fully articulated in terms of detail (as it will be the focus of studies completed early during the strategy's implementation), the 'environment' for the processing of oysters is likely to be a focus

[138] This may involve some form of leasing system for areas managed by Department of Fisheries, a zoning plan of allowable areas, prohibited areas, and limits on the size of individual farms.

of improvements, along with equipment and facilities for oyster preservation and transport to market.

### 4.3.4. Upgraded governance

Thanks to the upgrading strategy, several improvements will be made in VC linkages, notably with regards to marketing and sales arrangements. The strategy will result in new marketing channels and linkages for value actors for the sale of oysters to restaurants and potentially other market outlets not currently being exploited given the predominance of sales in consumer retail markets. The strategy will also result in new market linkages to enhance the sales of shells (for example to poultry feed mills, and tourist handicraft outlets) to increase value added from the by-product of oyster processing, as current practices meaning that little value is generated from them.

Governance arrangements for the VC will also be improved through the strengthening of the TRY oyster women's association and other community-based management associations and arrangements.

## 4.4. Anticipated sustainability impact

To complete the upgrading strategy development, the upgrading strategy is linked in this sub-section back to the sustainability impact it is expected to have, with sustainability encompassing economic, social and environmental aspects. Three questions are explored in this section:

1. Will the strategy lead to the realization of the vision and deliver impact at scale?
2. Will the strategy generate important positive or negative economic, social or environmental externalities?
3. Will the strategy increase the resilience of the VC?

### 4.4.1. Results of realising the vision

The **key economic, social and environmental performance indicators** under current and upgraded conditions are shown in the table below. These indicators show the positive impacts of the upgrading strategy across the three elements of sustainability.

**TABLE 19: KEY ECONOMIC, SOCIAL, AND ENVIRONMENTAL PERFORMANCE INDICATORS UNDER CURRENT AND UPGRADED PRACTICES (AGGREGATED AT VC LEVEL)**

| **Economic indicators** | **Current situation** | **With upgrading** |
|---|---|---|
| Total VC sales values | USD 1.63 million per year | USD 2.28 million per year |
| Total VC direct value added | USD 1.37 million per year | USD 1.87 million per year |
| **Social indicators** | **Current situation** | **With upgrading** |
| Proportion (%) of actors part of community associations | 50% | 80% |
| Full-Time Equivalent employment | 468 (375 women) | 515 (413 women) |
| **Environmental indicators** | **Current situation** | **With upgrading** |
| Stock status | Subject to overfishing and overfished in some areas | Stocks not subject to overfishing and not overfished |
| Number of oyster and cockle management plans updated and improved annually | 0 per year | 1 per year |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

Current **revenues, costs and profits at an aggregated level for core VC actors**, and those in the future following implementation of the upgrading strategy are as shown below.

**TABLE 20: PROFITABILITY ASSESSMENT OF CORE VC ACTORS (AGGREGATED AT VC LEVEL), CURRENT AND UNDER UPGRADING (PER YEAR)**

| **Item** | **Current situation** | **With upgrading** |
|---|---|---|
| Revenues | USD 1.63 million | USD 2.28 million |
| Costs | USD 318 084 | USD 474 200 |
| **Operating profits** | **USD 1.31 million** | **USD 1.81 million** |
| **Return on sales** | **80%** | **79%** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

### 4.4.2. Potential externalities

Potential externalities of the proposed upgrading strategy may be both positive and negative.

**Potentially negative externalities** include:

- Increase in electricity/power/fuel use associated with the production of ice necessary for sales of fresh oysters, and their transport to market. However, ice requirements will be very small given the target of just 25 tonnes of fresh oyster sales a year by 2032, and it may be possible to align travel/transport with trips to market to sell boiled/steamed oysters.
- Increased fuel/power associated with the collection of shells from communities, transport to poultry feed mills, and then processing/grinding before use as an input to poultry feed.
- Use of plastics in the VC in the form of bags which may be used in new aquaculture methods. The use of biodegradable materials could be considered.
- Use of fuel associated with the implementation of project activities and associated contributions to greenhouse gases. Local consultants will be used where skills are available to reduce the need for international flights, and efforts made during implementation to ensure shared travel when using private vehicles, and/or to use public transport where feasible.
- Impacts on sales of fish/food items in markets from the increased production of oysters. This externality is likely to be small if it occurs at all, given the small volumes of oysters sold compared to all fish/food items, and the lack of any products competing directly with oysters in the market (oysters occupy their own market niche with no real substitutes).

**Potentially positive externalities** include:

- Successful activities related to the building of community associations, and the establishment/support of co-management arrangements and management plans could provide lessons for replication in other fisheries value chains.
- Mangrove protection and restoration will provide broader societal benefits in terms of reduced impacts of severe weather events and could be monetised in the form of carbon offsets.
- Development of local input supply businesses to support new aquaculture methods, such as the manufacture of bags to grow oysters.
- Mechanisms created to favour oyster VC actors' access to the micro-finance and the formal banking finance sector may benefit other members of the communities involved with other productive sectors.

- Establishing links between communities and poultry feed manufactures to use local oyster shells could favour the increase of feed production and benefit poultry sector development.
- New market linkages established to supply fresh oysters may be an opportunity to trade other goods produced at the community level (vegetables, poultry, etc.) to a top-end market, resulting in other gains for rural communities.
- Fresh oysters served at hotels and restaurants could contribute to enhancing the touristic attractiveness of the Gambia thus benefitting tourism activities.

### 4.4.3. Resilience

Increased profits generated through the upgrading strategy, will contribute towards increasing the resilience of the VC actors. Resilience will also be enhanced through the improvement in the ecosystem status of the mangroves, on which the oysters depend, and which serve a key function in climate change mitigation.

When reflecting on the key domains of resilience discussed earlier in Section 3.4, resilience of the VC to potential market shocks will be enhanced through equipment (fridges/freezers) for the storage of processed oysters which will allow for increases in 'redundancy' i.e., the ability of VC actors to store product.

The 'diversity' of the value chain will also be enhanced, thereby increasing resilience to market shocks, through the new marketing channels (e.g. restaurants) and products (e.g. fresh product) developed for the sale of oysters. Diversity will also be increased through the expansion of oyster culture, thereby increasing resilience through reducing the reliance on wild oyster collection.

Actions in the upgrading strategy related to increasing the levels VC actor participation in representative organisations, will increase levels of 'participation and inclusion', thereby increasing resilience, and will also serve to increase 'connectivity' allowing value chain actors to respond to shocks and challenges in a coordinated manner. Greater levels of participation and inclusion in such representative organisations, along with expanded and improved government service provision (especially in aquaculture developments and product handling/hygiene control), will also serve to increase the potential for 'learning and adaptation' and thereby the resilience of the VC actors.

# 5. Implementation plan

In this final section of the report, the upgrading strategy presented in Section 4 is translated into a VC upgrading implementation plan. This section includes four main sections: (1) a logframe for the whole upgrading strategy, which will be used to monitor and evaluate the implementation and results of the strategy; (2) specification of the activity and investment plans for sustainably developing the value chain. This also covers the whole set of activities all VC stakeholders will have to engage in, as well as those specifically by the FISH4ACP project; (3) a detailed FISH4ACP project design (i.e., the role of the project in the overall plan); and (4) a risk analysis which reflects on the risks that could prevent the achievement of the envisioned impact, and which develops associated mitigation strategies affecting both the overall and project-specific plans.

## 5.1. Logframe for VC upgrading

A logframe for the VC upgrading is provided below. As with all logframes, it should be seen as a living framework to monitor and evaluate progress towards achieving the stated vision and upgrading strategy.

The logframe will be further discussed, validated, and refined during an inception phase for the project early in 2023 (as discussed in Section 5.3).

Aspects of the logframe design to note include:

- The impact reflects the vision statement.
- Four outcomes reflect the four upgrading elements.
- All outputs are attached to one outcome only.
- Assumptions in the logframe at one level are those that must hold true to support result at the next level up i.e., an assumption at output level should be that which if holds true means a related outcome will be achieved.
- Interim targets are specified for 2025, which would be the end of the FISH4ACP project.

**TABLE 21: OVERALL LOGFRAME FOR VC UPGRADING**

| Impact | Impact indicator 1 | 2022 baseline | | 2025 target | 2032 target | Assumptions |
|---|---|---|---|---|---|---|
| Increased oyster production and profits for value chain actors | National production (tonnes) per year of wild (W) and farmed (F) oysters[127] | 9 253 (W) 200 (F) | Planned | 9 253 MT (W) / 300 MT (F) | 10 178 MT (W) / 1 000 MT (F) | n/a |
| | | | Achieved | | | |
| | | | MoV | Department of Fisheries annual statistical report<br>Independent assessment report in 2025 and 2032 | | |
| | **Impact indicator 2** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | National final sales value (USD) per year of wild and farmed oyster sales. | USD 1.63 million | Planned | USD 1.75 million | USD 2.28 million | |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Impact indicator 3** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | Total value chain direct value added per year | USD 1.37 million | Planned | USD 1.50 million | USD 1.89 million | |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Impact indicator 4** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | Number of jobs (in FTE) in oyster VC (gender disaggregated) | 468 (375 women) | Planned | 468 (375 W) | 515 (413 W)[139] | |
| | | | Achieved | | | |
| | | | MoV | National census or frame survey in 2032 | | |
| | **Impact indicator 5** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | Number of social hotspots improved | 16 (6 red) | Planned | 5 (4 red, 1 yellow) * | 5 (4 red, 1 yellow) * | |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Impact indicator 6** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | Number of environmental hotspots improved | 5 (2 red) | Planned | 2 red** | 2 red** | |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |

*1) availability of food; 2) policy, regulation and standards; 3) access to finance; 4) access to information and 5) job safety and security

** 1) stock status and stock dynamics and 2) fishing pressure

| **Outcome 1** | **Outcome indicator 1.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (necessary for impact)** |
|---|---|---|---|---|---|---|
| Improved management of wild oyster stocks and mangrove ecosystems | Tanbi oyster and cockle management plan updated and *being implemented* each year | 1 (which was never updated) | Planned | 1 /yr | 1 /yr | Contents/arrangements in updated plans are sufficient to contribute to an increase in production. |
| | | | Achieved | | | |
| | | | MoV | Management plan document / TRY meeting records of % of actions in plan completed | | |

[139] small increases are expected due to expansion of oyster collection in new areas (perhaps 2 communities), but will not represent an increase in effort in areas already exploited and where there are concerns over the state of the resource.

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Assessment report of the level of implementation in 2025 and 2032 | | |
| | **Outcome indicator 1.2** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (necessary for impact)** |
| | Hectares of mangroves increased (*Rhizophora spp.)* [140] | tbd | Planned | tbd | tbd | Increasing mangrove coverage will increase total wild oyster production available for collection. Climatic and environmental factors don't unduly impact negatively on oyster growth on mangroves. |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Outcome indicator 1.3** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (necessary for impact)** |
| | Proportion of oyster samples tested which pass agreed safety levels | 0 | Planned | 100% | 100% | Consumer confidence in the quality of oysters ensures strong demand, market prices, and thereby profits for VC actors, with a reduced risk of market (price and demand) shocks from consumer concerns over food safety. |
| | | | Achieved | | | |
| | | | MoV | Department of Fisheries annual statistical report | | |
| | **Outcome indicator 1.4** | **2022 baseline** | | **2025 target** [141] | **2032 target** | **Assumptions (necessary for impact)** |
| | Stock status assessed as not overfished or subject to overfishing | Assumed subject to overfishing and overfished in some locations | Planned | Stocks not subject to overfishing and not overfished | Stocks not subject to overfishing and not overfished | Increased density/stock status will contribute to greater production and profits. |
| | | | Achieved | | | |
| | | | MoV | Stock assessment report | | |

[140] baseline and targets to be inserted following additional discussions with AFD

[141] targets for 2025 and 2032 will be determined once a baseline has been established following a 'weight of evidence' assessment of stocks ion 2023

| **Output 1.1** | **Output indicator 1.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 1 to be achieved)** |
|---|---|---|---|---|---|---|
| Stock assessment and other studies completed to inform contents of revised Tanbi oyster and cockle management plan, general oyster stock status, and locations for mangrove replanting and regeneration | Number of studies completed on relevant topics (6 studies, 3 assessments of stocks) | 0<br>on topics selected | Planned | 6 | 9 | Basis for improved management arrangements needs to be evidence-based. Exact nature of studies to inform update of Tanbi oyster and cockle management plan not well defined at design stage and will be agreed early during implementation phase. Assessment of stocks integral to improved management and to be conducted every 3-4 years. |
| | | | Achieved | | | |
| | | | MoV | Stock assessments and Study reports | | |

| **Output 1.2** | **Output indicator 1.2.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 1 to be achieved)** |
|---|---|---|---|---|---|---|
| Meetings and workshops held to update and improve existing Tanbi oyster and cockle management plan. | 4 TRY meetings/workshops supported by project to discuss, agree, and validate changes/updates to existing plan | 0 | Planned | 4 | 4 | Meetings/workshops can agree changes/improvements and serve to mobilise actors towards implementation. Funding mechanisms necessary for implementation of the improved plan are itemised within the plan itself and are provided as expected. |
| | | | Achieved | | | |
| | | | MoV | Meetings/workshops reports | | |
| | **Output indicator 1.2.2** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | Number of management plan updated, and draft submitted for approval | 1<br>which was never updated | Planned | 1 /yr | 1 /yr | |
| | | | Achieved | | | |
| | | | MoV | Management draft plan document submitted for approval | | |

| **Output 1.3** | **Output indicator 1.3** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 1 to be achieved)** |
|---|---|---|---|---|---|---|
| Mangrove replanting programme implemented in critical/defined areas | Hectares of mangroves (*Rhizophora spp.) re-planted* | 0 | Planned | tbd | tbd | Other factors e.g. climate, deforestation, don't negatively impact on sustainable increases in mangrove cover. Will contribute to oyster stock status |
| | | | Achieved | | | |
| | | | MoV | Programme monitoring and evaluation report | | |
| **Output 1.4** | **Output indicator 1.4** | **2022 baseline** | | **2025 target** [142] | **2032 target** | **Assumptions (for outcome 1 to be achieved)** |
| Mangrove areas designated, reserved and protected for natural regeneration | Hectares of mangroves (*Rhizophora spp.) protected for regeneration* | tbd | Planned | tbd | tbd | As above |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| **Output 1.5** | **Output indicator 1.5** | **2022 baseline** | | **2025 target** [143] | **2032 target** | **Assumptions (for outcome 1 to be achieved)** |
| Water quality testing programme is developed and implemented in key selected regions/areas | Number of water samples tested per year | 0<br>There is no water sampling done at the moment | Planned | tbd | tbd | Any problems with water quality identified are acted on so that collection/harvest is halted until water quality improves. |
| | | | Achieved | | | |
| | | | MoV | Water quality monitoring reports | | |

[142] based on additional discussions with AFD

[143] targets for 2025 and 2032 will be determined once the detailed arrangements for a water testing programme have been specified and agreed

| **Output 1.6** | **Output indicator 1.6** | **2022 baseline** | | **2025 target** [144] | **2032 target** | **Assumptions (for outcome 1 to be achieved)** |
|---|---|---|---|---|---|---|
| Training of water quality monitors completed | Number of water quality monitors trained | 0 | Planned | tbd | tbd | Monitors (who will be VC actors) understand the importance of testing and agree to monitoring without funding being provided. Equipment for water testing provided is maintained in good working order. |
| | | | Achieved | | | |
| | | | MoV | Training workshops report | | |
| **Output 1.7** | **Output indicator 1.7** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 1 to be achieved)** |
| TRY strengthened and other organisations created | Number of organizations supported | 0 | Planned | 3 | 3 | Actors perceive benefits from participating in such organisations. Participation in a community management organisation will contribute to and support effective implementation of the upgrading strategy and other outcomes, thereby in turn supporting the intended impacts |
| | | | Achieved | | | |
| | | | MoV | Organisations' membership registries<br>Independent assessment report in 2025 and 2032 | | |

| **Outcome 2** | **Outcome indicator 2.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (necessary for impact to be achieved)** |
|---|---|---|---|---|---|---|
| VC actors adopt new oyster farming practices | Number oyster farms in operation | 5 | Planned | 10 | 15 | Suitable aquaculture sites and methods including techniques for spat collection, can be identified, and are of interest to actors. |
| | | | Achieved | | | |
| | | | MoV | Department of Fisheries annual statistical report | | |
| | **Outcome indicator 2.2** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (necessary for impact to be achieved)** |
| | | 0 | Planned | 5 | 10 | |

[144] targets for 2025 and 2032 will be determined once the detailed arrangements for a water testing programme have been specified and agreed

| | | | | | | |
|---|---|---|---|---|---|---|
| and expand oyster operations [145] | Number of farms with new equipment | | Achieved | | | Required equipment that can be found locally and of interest to actors |
| | | | MoV | Department of Fisheries annual statistical report | | |
| | **Outcome indicator 2.3** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (necessary for impact to be achieved)** |
| | Number of actors adopting new or improved methods (women in brackets | 0 | Planned | 300 (270) | 500 (450) | New methods are technically and economically viable and result in increased production |
| | | | Achieve | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| **Output 2.1** | **Output indicators for 2.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 2 to be achieved)** |
| Land tenure and site location study completed | Number of studies completed | 0 | Planned | 1 | 1 | Increases in aquaculture production can only be sustainable if site selection and tenure issues are fully understood and considered. |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| **Output 2.2** | **Output indicators for 2.2** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 2 to be achieved)** |
| Technical feasibility study of spat collection and alternative farming methods/oyster species completed | Number of studies completed | 0 | Planned | 1 | 1 | Growth in oyster farming only possible if grounded in good understanding of technical viability and methods/species, and sufficient wild spat is available and/or can be collected. |
| | | | Achieved | | | |
| | | | MoV | Study report | | |
| **Output 2.3** | **Output indicators for 2.3** | **2022 baseline** | | **2025 target** | **2032 target** | |
| Study of the financial viability | Number of studies completed | 0 | Planned | 1 | 1 | Technical viability is not sufficient on its own to ensure |
| | | | Achieved | | | |

[145] this outcome will also be supported through: i) the sharing of lessons from Senegal where oyster farming is more developed and where the strategy is also intending to conducted trials and introduce new oyster farming methods, ii) support within the Gambia strategy for strengthening community associations (given that actors involved in wild collection are also those involved with aquaculture

| | | | | | | |
|---|---|---|---|---|---|---|
| and management arrangements of alternative methods of oyster farming completed | | | MoV | Study reports | | long-term growth in farmed oysters. Financial viability must also be ensured, and management arrangements for farms agreed. |
| **Output 2.4** | **Output indicators for 2.4.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 2 to be achieved)** |
| Pilot/demonstration of new methods for expansion completed and results disseminated | Number of demonstration sites established to test different methods | 0 | Planned | 5 | 5 | Successful farming at pilot sites will provide the basis for capacity building and replication, with less successful methods dropped. |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Output indicators for 2.4.2** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 2 to be achieved)** |
| | Number of awareness raising events, communication and information activities for replication | 0 | Planned | 0 | 15 | Actors from communities with no tradition on oyster farming understand its potential and are interested in replicating the pilots |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| **Output 2.5** | **Output indicators for 2.5** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 2 to be achieved)** |
| Aquaculture regulations re-drafted | Number of new/updated aquaculture regulations | 1 | Planned | 1 | 1 | An expanded aquaculture sector will need rules to allocate concessions, and codify rules, standards and safeguards. Assumes drafted regulations would then be enacted by legislature. |
| | | | Achieve | | | |
| | | | MoV | Legal Department/Service of the Ministry of Fisheries and Water Resources | | |

| Output 2.6 | Output indicators for 2.6 | 2022 baseline | | 2025 target | 2032 target | Assumptions (for outcome 2 to be achieved) |
|---|---|---|---|---|---|---|
| Replication of successful new/improved aquaculture methods | Number of sites replicating pilot activities | 0 | Planned | 3 | 10 | Uptake of new methods at new sites |
| | | | Achieve | | | |

| Outcome 3 | Outcome indicator 3.1 | 2022 baseline | | 2025 target | 2032 target | Assumptions (necessary for impact to be achieved) |
|---|---|---|---|---|---|---|
| New sales outlets/channels being utilised and new safe fresh oyster, and oyster shell by-products, are available on the market | Annual volume (tonnes) and value (USD) of sales of new oyster products or through new channels | 0 | Planned | 10 (T) / 82 678 (USD)[146] | 25 (T) / 187 856 (USD) | New marketing channels and products will be important to increase profits. Assumes other macro-economic factors won't negatively affect profits. |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Outcome indicator 3.2** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | Annual volume (tonnes) and value (USD) of bulk or ground sales of oyster shells | 250 MT / 16 773 USD | Planned | 1 000 (T) / 50 319 (USD) | 2 500 (T) / 125 797 (USD) | |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Outcome indicator 3.3** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | | 0 | Planned | 300 kg / 30 191USD | 1 000 kg / 98 960 USD | |

[146] Sales prices paid by restaurants to actors for fresh oysters in Senegal are c.a. USD 7,5 dozen (roughly 1 kg of oysters in shell), and similar prices can be assumed in The Gambia (given that boiled/steamed prices as similar in the two countries).

| | | | | | | |
|---|---|---|---|---|---|---|
| | Annual volume (kgs) and value (GMD) of shell jewelry sales | | Achieved | | | |
| | | | MoV | Actor/market survey in 2025 and 2032 | | |
| | **Outcome indicator 3.4** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | Number of markets developed | 0 | Planned | 3 | 3 | |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 (of fresh oysters, sales to poultry, jewelry) | | |
| | **Outcome indicator 3.4** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | Number of actors adopting new sales practices related to sale of oysters / shell sales (women in brackets) | 0 / 50 (45) | Planned | 100 (90) / 200 (180) | 250 (225) / 400 (360) | |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| **Output 3.1** | **Output indicator for 3.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 3 to be achieved)** |
| Market research study completed on new marketing channels for fresh oysters and shell | Number of studies completed | 0 | Planned | 1 | 1 | Study can identify potential new channels and products to be tested during trials. |
| | | | Achieved | | | |
| | | | MoV | Study report | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| by-products, and new products | | | | | | |
| **Output 3.2** | **Output indicators for 3.2** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 3 to be achieved)** |
| Market development strategy developed and agreed in consultation with stakeholders | Number of marketing strategies finalised | 0 | Planned | 1 | 1 | An agreed strategy will serve to ensure successful trials are replicated and additional market evolution is planned for |
| | | | Achieved | | | |
| | | | MoV | Market strategy document | | |
| **Output 3.3** | **Output indicators for 3.3** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 3 to be achieved)** |
| Training of actors and pilot market trial completed for new oyster channels and products | Number of actors involved in oyster trial (women in brackets) | 0 | Planned | 45 (41) | 45 (41) | New market channels and products are viable and relationships can be established between VC actors and buyers. |
| | | | Achieved | | | |
| | | | MoV | Market trial report | | |
| **Output 3.4** | **Output indicators for 3.4** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 3 to be achieved)** |
| Training of actors and pilot market trial completed for oyster shell sales | Number of communities trained | 0 | Planned | 3 | 3 | Viable markets can be found for oyster shells and relationships can be established between VC actors and buyers. |
| | | | Achieved | | | |
| | | | MoV | Market trial report | | |
| **Output 3.5** | **Output indicator 3.5** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 3 to be achieved)** |
| Training of food safety inspectors and actors completed | Number of food safety inspectors and actors (women in brackets) trained | 0 | Planned | 50 (45) | 100 (90) | Those inspectors trained are retained by the FSQA, and FSQA budgets are sufficient to allow for dedicated oyster testing once FISH4ACP funding |
| | | | Achieved | | | |
| | | | MoV | Training workshops report | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | stops. Actors also need training in hygiene standards to ensure new markets for fresh oysters can be accessed |
| **Output 3.6** | **Output indicator 3.6** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 3 to be achieved)** |
| Food safety controls of oyster products are conducted | Number of oyster product samples tested per year | 0 | Planned | 100 | 250 | Any problems with product quality identified are acted on so that product is not harvested or removed from the market and unavailable to consumers. Depuration facilities are available. |
| | | | Achieved | | | |
| | | | MoV | Sanitary control report | | |
| **Output 3.7** | **Output indicator 3.7.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 3 to be achieved)** |
| Communities supported to start wild oyster collection | Number of villages work conducted in to explore potential to start oyster activities and provide relevant technical services | 0 | Planned | 4 | 4 | Dependent on identifying areas where oysters could be exploited but currently aren't, and interest of communities in being part of the VC |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Output indicator 3.7.2** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | Number of people trained (women in brackets) | 0 | Planned | 80 (72) | 80 (72) | |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |

| Output 3.8 | Output indicator 3.6 | 2022 baseline | | 2025 target | 2032 target | Assumptions (for outcome 3 to be achieved) |
|---|---|---|---|---|---|---|
| Replication of pilot fresh oyster and shell sales | Number of MoUs signed between communities and buyers for sales offresh oysters / sale of shells | 0 / 0 | Planned | 0/ 0 | 20 / 25 | Market potential/demand can absorb replication. Assumes successful pilot approaches will be picked up by others for replication. |
| | | | Achieved | | | |
| | | | MoV | MoU documentation (Note: single communities may sign MoUs with more than 1 buyer of oysters or shells) | | |

| Outcome 4 | Outcome indicator 4.1 | 2022 baseline | | 2025 target | 2032 target | Assumptions (necessary for other outcomes and overall impact) |
|---|---|---|---|---|---|---|
| An enabling and secure environment is created for VC actors, strong sector management, and implementation and monitoring of the VC upgrading strategy | Number of VC actors accessing loans from 'osusu' or micro-finance institutions (women in brackets) | 72 (65) i.e. 6% of 1200 | Planned | 300 (270) | 420 (378) | Improved access to finance and savings will enable actors to expand aquaculture, and to invest in equipment and infrastructure, improve working conditions, develop aquaculture, grow businesses and increase profits. |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Outcome indicator 4.2** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (necessary for other outcomes and overall impact)** |
| | Number of actors benefitting from equipment and infrastructure provided by the strategy | 0 | Planned | 250 (225) | 500 (450) | Equipment and infrastructure may be required in support of other aquaculture and market development and improved working conditions/safety. Investments may be by actors, government, and donors. |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Outcome indicator 4.3** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (necessary for other outcomes and overall impact)** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Proportion of data needs specified in a data collection / M&E programme that are being met/provided | 0 | Planned | 80% | 90% | Current weaknesses in data collection need to be addressed to better inform interventions included within the strategy and assess their impacts over time |
| | | | Achieved | | | |
| | | | MoV | Independent assessment report in 2025 and 2032 | | |
| | **Outcome indicator 4.4** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (necessary for other outcomes and overall impact)** |
| | Strategy to increase access to finance and enhance savings validated | 0 | Planned | 1 | 1 | |
| | | | Achieved | | | |
| | | | MoV | Strategy document validated | | |
| **Output 4.1** | **Output indicator for 4.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 4 to be achieved)** |
| Study into equipment and infrastructure needs completed | Number of equipment and infrastructure studies completed | 0 | Planned | 1 | 1 | Study needed to better understand needs and to ensure any equipment/infrastructure provided will be used and maintained. Could include new fires/stoves, fridges, PPE, safety equipment, processing shelters, depuration |
| | | | Achieved | | | |
| | | | MoV | Study report | | |
| **Output 4.2** | **Output indicator for 4.2.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 4 to be achieved)** |
| Appropriate equipment and infrastructure specified, procured and delivered | Number of initiatives providing new equipment | tbd based on output above | Planned | tbd | tbd | Appropriate specifications can be agreed, and material/goods sourced from suppliers. Investments in equipment/infra may be by actors, government, or donors |
| | | | Achieved | | | |
| | | | MoV | Inspection visits, procurement records | | |
| | **Output indicator for 4.2.2** | **2022 baseline** | | **2025 target** | **2032 target** | |
| | | | Planned | tbd | tbd | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Number of infrastructure built or renovated | tbd based on output above | Achieved | | | |
| | | | MoV | Inspection visits, procurement records | | |
| **Output 4.3** | **Output indicators for 4.3** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 4 to be achieved)** |
| Study completed to identify data gaps and needs, and define a data collection programme for the sector that will inform M&E of the whole VC strategy | Number of studies completed and associated data operations manuals prepared | 0 | Planned | 1 | 1 | Once data collection programme is defined, training and funds are available to support implementation. Expected that data collection gaps will include 'registration' of all actors, and a range of economic, social and environmental data need for management and to assess implementation of strategy |
| | | | Achieved | | | |
| | | | MoV | Study report | | |
| **Output 4.4** | **Output indicator for 4.4** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 4 to be achieved)** |
| Training completed in data collection and M&E of strategy | Number trainees in data collection and M&E strategy (women in brackets) from government and actors. Targets specified by/in output above | 0 | Planned | tbd | tbd | Training necessary to ensure data collection is completed to standard and expectation. May include government employees and actors. |
| | | | Achieved | | | |
| | | | MoV | Study report | | |
| **Output 4.5** | **Output indicator for 4.5** | **2022 baseline** | | **2025 target** | **2032 target** | |
| Ongoing data collection and | Number of annual M&E reports | 0 | Planned | 3 | 10 | Data is needed to guide and assess strategy |
| | | | Achieved | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| M&E of strategy completed | | | MoV | Data/M&E reports (one per year) | | |
| **Output 4.6** | **Output indicator for 4.6** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 4 to be achieved)** |
| Strategy developed to increase access to finance and enhance savings | Number of strategies prepared | 0 | Planned | 1 | 1 | Earlier AFRACA studies indicated that 'osusu' is the preferred method of financing in communities. Detailed activities and implementation arrangements for how increasing access and savings can be achieved to be included in the strategy. |
| | | | Achieved | | | |
| | | | MoV | Study report | | |
| **Output 4.7** | **Output indicator for 4.7.1** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 4 to be achieved)** |
| Finance and savings strategy implemented | Number of awareness raising campaigns to inform about the strategy | 0 | Planned | 1 | 1 | Above study outputs and recommendations are robust, and VC actors are interested in borrowing and investing. |
| | | | Achieved | | | |
| | | | MoV | Awareness campaign material | | |
| **Output 4.8** | **Output indicators for 4.8** | **2022 baseline** | | **2025 target** | **2032 target** | **Assumptions (for outcome 4 to be achieved)** |
| Water safety/swimming programme implemented for VC actors in need | Number of VC actors (women in brackets) trained in swimming | 0* | Planned | 100 (90) | 200 (180) | Programme will reduce occupational risks for VC actors given the nature of collection activities. |
| | | | Achieved | | | |
| | | | MoV | M&E report | | |

| Output 4.9 | Output indicators for 4.9 | 2022 baseline | | 2025 target | 2032 target | Assumptions (for outcome 4 to be achieved) |
|---|---|---|---|---|---|---|
| Technical support and services provided to collectors, farmers, processors and retailers | Number of people trained (women in brackets) | 0 | Planned | 500 (450) | 1 000 (900) | Implementing of the strategy will require the technical and capacity support for VC actors across a range of topics e.g. new farming methods and practices on an ongoing basis, market development, use of new equipment and maintenance of infrastructure. |
| | | | Achieved | | | |
| | | | MoV | Department of Fisheries monitoring report | | |

Source : Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

* Informal research findings indicate that people do not feel safe on boats because they cannot swim.

Notes: MoV = means of verification. Tbd = to be determined. There may be potential to use harmonized surveys (and other data collection methods) for various indicators in this logframe and those used for different country VCs.

## 5.2. Activity and investment plans

For all outputs specified in the logframe above, one or more activities will need to be implemented for the outputs to be realised. In most (but not all cases), these activities will require associated costs/investments. Table 22 below provides a summary list of activities in support of the different outputs. For each activity, an indication is provided if the activity and associated investment relates to:

- Facilitation/studies
- Training
- Plant and equipment
- Infrastructure

Following the summary table below, information is provided for each activity on the key stakeholders involved, the costs/investments, the timing, a link to the relevant output in the logframe, along with a short description to aid with implementation.

The activity and investment plans in this section, in line with the logframe above, are for the whole upgrading strategy, rather than being FISH4ACP-specific. Costs are indicative only and based on the best assessment possible during the design and analysis phase and may be adjusted during the implementation period if necessary.

### TABLE 22: SUMMARY OF UPGRADING ACTIVITIES AND INVESTMENTS (IN USD)

In the table below:

- Activities to be funded by FISH4ACP are shaded in green [147]
- Activities to be funded by other donors are shaded in yellow
- Activities to be funded by the private sector are shaded in red
- Activities to be funded from blended sources (e.g. FISH4ACP and government, other donors and private sector) are shaded in orange

| **Outcome 1: Improved management of wild oyster stocks and mangrove ecosystems** | | **Funding source** | **Total Costs (USD)** | **Type of cost** | **Timing (by)** |
|---|---|---|---|---|---|
| **Outputs** | **Activities** | | | | |
| 1.1 Stock assessment and other studies completed to inform contents of revised Tanbi oyster and cockle management plan and locations for mangrove replanting and regeneration | 1.1.1 Conduct studies on topics needed to inform update and improvements to Tanbi oyster and cockle management plan and issues related to mangrove restoration/protection | FISH4ACP | 45 000 | Facilitation / studies | 2023 |
| | 1.1.2 Conduct assessment of status of oyster stocks | FISH4ACP / (then Government) | 40 000 (20 000) | Facilitation / studies | 2023, 2027, 2030 |
| 1.2 Meetings and workshops held to update and improve existing Tanbi oyster and cockle management plan | 1.2.1 Hold TRY meetings/workshops with TRY, Department of Fisheries, and other actors to discuss, agree, and validate annual changes/updates to plan | FISH4ACP | 30 000 | Facilitation/ studies | 2024 |
| 1.3 Mangrove replanting programme implemented in critical/defined areas | 1.3.1 Develop and implement a mangrove replanting programme in clearly defined priority areas | AFD (other donors) | tbd [148] | Plant and equipment | 2024 onwards |

[147] Based on current proposals. Contact between FISH4ACP and other donors may enable other donors picking up funding for some activities currently allocated for FISH4ACP funding

[148] not yet known as dependent on AFD and Ministry agreeing detailed programme

| | | | | | |
|---|---|---|---|---|---|
| 1.4 Mangrove areas designated, reserved and protected for natural regeneration | 1.4.1 Develop legislative arrangements and mechanisms to protect mangroves in specific areas and allow for natural regeneration | AFD (other donors) | tbd | Facilitation / studies | 2024 onwards |
| 1.5 Water quality testing programme is implemented in key selected regions/areas | 1.5.1 Define and implement a water quality testing programme in specific areas | FISH4ACP / (then private sector) | 50 000 (75 000) | Facilitation / studies | 2023 onwards |
| 1.6 Training of water quality monitors completed | 1.6.1 Conduct training of water quality monitors (likely to be from the communities) | FISH4ACP | 13 000 | Training | 2024 |
| 1.7 TRY strengthened and other organisations created | 1.7.1 Conduct outreach in villages to further strengthen the TRY association and build new organisations in areas outside of Tanbi to aid management and support VC interests | FISH4ACP | 50 000 | Training | 2023-2025 |
| **Outcome 2: VC actors adopt new oyster farming practices and expand oyster farming operations** | | **Funding source** | **Total costs (USD)** | **Type of cost** | **Timing (by)** |
| **Outputs** | **Activities** | | | | |
| 2.1 Land tenure and site location study completed | 2.1.1 Conduct study to assess land tenure issues and site location for aquaculture expansion | FISH4ACP | 20 000 | Facilitation / studies | 2023 |
| 2.2 Technical feasibility study of alternative farming methods/species completed | 2.2.1 Conduct technical feasibility study for alternative farming methods/oyster species | FISH4ACP | 30 000 | Facilitation / studies | 2023 |
| 2.3 Study of the financial viability and management arrangements of alternative methods of oyster farming completed | 2.3.1 Conduct financial feasibility study and assessment of farm management arrangements for alternative/new oyster farming methods | FISH4ACP | 15 000 | Facilitation / studies | 2023 |

| | | | | | |
|---|---|---|---|---|---|
| 2.4 Pilot/demonstration of new methods for expansion of oyster farming completed [149] | 2.4.1 Conduct pilot field-based trials of new methods and in new areas | FISH4ACP | 90 000 | Plant / equipment | 2024 |
| | 2.4.2. Communication/dissemination events around pilot trial results | FISH4ACP | 30 000 | Training | 2032 |
| 2.5 Aquaculture regulations re-drafted | 2.5.1 Review and update aquaculture regulations | FISH4ACP | 25 000 | Facilitation / studies | 2024 |
| 2.6 Replication of successful new/improved aquaculture methods | 2.6.1 Replication of methods and investments in other sites | Private sector | 150 000 | Investment | 2025 onwards |
| **Outcome 3: New sales outlets/channels being utilized and new fresh oyster and oyster shell by-products are available on the market** | | **Funding source** | **Total costs (USD)** | **Type of cost** | **Timing (by)** |
| **Outputs** | **Activities** | | | | |
| 3.1 Market research study completed on new marketing channels for oysters and by-products, and new products | 3.1.1 Conduct market study to assess potential for new product and marketing channels for oysters and oyster by-products (shells) | FISH4ACP | 10 000 | Facilitation / studies | 2023 |
| 3.2 Market development strategy developed and agreed in consultation with stakeholders | 3.2.1 Develop a market strategy with time-bound responsibilities for market development | FISH4ACP | 10 000 | Facilitation / studies | 2023 |
| 3.3 Training of actors and pilot market trial completed for new oyster channels and products | 3.3.1 Train actors in requirements of new product/channels for oysters and support pilot/test of market arrangements | FISH4ACP | 12 500 | Training | 2023 |
| 3.4 Training of actors and pilot market trial completed for oyster shell sales | 3.4.1 Train actors in requirements of new product/channels for oyster shells and support pilot/test of market arrangements | FISH4ACP | 25 000 | Training | 2023 |

[149] note need for coordination with similar activities in Senegal

| | | | | | |
|---|---|---|---|---|---|
| 3.5 Training of food safety inspectors and actors completed | 3.5.1 Conduct training for food safety inspectors and VC actors on oyster product hygiene/safety standards | FISH4ACP | 35 000 | Training | 2024 |
| 3.6 Food safety controls of oyster products are conducted | 3.6.1 Conduct programme of food safety controls for oyster products | FISH4ACP / (then government) | 5000 (17 500) | Facilitation / studies | 2024 onwards |
| 3.7 Communities supported to start wild oyster collection | 3.7.1 Conduct consultations and skills training in villages which don't engage in oyster collection but which are near to oyster stocks, to assess and support involvement of new actors in the VC | FISH4ACP | 25 000 | Training | 2024 |
| 3.8 Replication of fresh oyster and shell sales | 3.8.1 Replication of fresh oyster and shell sales by other communities | Private sector | 50 000 | Investment | 2025 onwards |
| **Outcome 4: An enabling and secure environment is created for VC actors, strong sector management, and implementation and monitoring of the VC upgrading strategy** | | **Funding source** | **Total costs (USD)** | **Type of cost** | **Timing (by)** |
| **Outputs** | **Activities** | | | | |
| 4.1 Study into equipment and infrastructure needs completed | 4.1.1 Complete a study to further assess the needs and justification for equipment and infrastructure | FISH4ACP | 25 000 | Facilitation / studies | 2023 |
| 4.2 Appropriate equipment and infrastructure specified, procured and delivered | 4.2.1 Specify, procure and deliver appropriate equipment | FISH4ACP | 50 000 | Plant and equipment | 2024 and 2025 |
| | 4.2.2 Specify, procure and deliver appropriate infrastructure | Donors | 60 000 | Infrastructure | 2024 onwards |
| 4.3 Study completed to identify data gaps and needs, and define a data collection programme for the sector and M&E of the VC strategy | 4.3.1 Complete a study to review existing data collection, data gaps, and data collection needs for the VC and upgrading strategy and develop a data collection framework (content and implementation arrangements) | FISH4ACP | 17 500 | Facilitation / studies | 2023 |
| 4.4 Training completed in data collection and M&E of strategy | 4.4.1 Conduct training programme for those involved with data collection and M&E strategy | FISH4ACP | 5 000 | Training | 2023 |

| | | | | | |
|---|---|---|---|---|---|
| 4.5 Ongoing data collection and M&E of strategy completed | 4.5.1 Collect and publicize relevant data | FISH4ACP and Government | 55 000 | Facilitation / studies | 2024 onwards |
| 4.6 Strategy developed to increase access to finance and enhance savings | 4.6.1 Prepare and validate a strategy to increase access to finance and enhance savings of VC actors | FISH4ACP | 10 000 | Facilitation / studies | 2023 |
| 4.7 Finance and savings strategy implemented | 4.7.1 Facilitate access to finance and support savings by actors | FISH4ACP | 20 000 | Facilitation / studies | 2024 onwards |
| 4.8 Water safety/swimming programme implemented for VC actors in need | 4.8.1 Complete a programme to teach VC actors who can't swim how to do so | FISH4ACP | 25 000 | Training | 2023-2025 |
| 4.9 Technical support and services provided to farmers | 4.9.1 Provide technical support, training and services to VC actors to support uptake of new methods and practices across all elements of the strategy | FISH4ACP, Government, Donors | 275 000 | Training | 2023 - onwards |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

In the descriptions below, indicative costs to be funded by FISH4ACP are indicated with an * under the line 'Costs and investments'. Costs for other activities will be financed by the stakeholders identified in the row above (Stakeholders and catalysts involved).

### Activities under Outcome 1: Improved management of wild oyster stocks and mangrove ecosystems

**Activity number and name**: Activity 1.1.1 Conduct studies on topics needed to inform update and improvements to Tanbi oyster and cockle management plan, management arrangements in other areas, and issues related to mangrove restoration/protection
**Stakeholders or catalysts involved**: TRY oyster women's association, Department of Fisheries, Department of Parks and Wildlife Management, consultants
**Costs and investments**: USD 45 000 *
**Category of investment**: Facilitation / studies
**Timing**: by end of 2023
**Associated output**: Stock assessment and other studies completed to inform contents of revised Tanbi oyster and cockle management plan, general oyster stock status, and locations for mangrove replanting and regeneration
**Description**: As inputs to an improved Tanbi area oyster and cockle management plan, or developing new management arrangements in other areas, background studies on specific topics will be necessary to ensure that the revised plan is based on best practices, recognizes local needs and conditions, and is informed by baseline data. These studies will be agreed during the first 1-2 months of implementation early in 2023, in consultation with the stakeholders noted above. Studies may cover topics related to environmental (for example the location of areas of high spat production which could/should be left protected), economic, social issues, or other enabling conditions (such as legislative underpinnings), and may also include an assessment of the performance of the previous management arrangements to identify appropriate processes to update/develop the plan, and issues related to the content of the plan itself. One of the studies may also aim to develop an appropriate methodological and operational framework for monitoring the effectiveness of the implementation of management plans. Studies will be build on, but not repeat the work completed as part of the design and analysis phase (i.e this report), and be informed by lessons from other earlier projects. Inspiration and needs will also be informed by the MSC pre-assessment report completed by the LEAD project, which articulates a range of needs and additional information requirements. Studies may be both field-based in the Gambia to generate important baseline data needed for inclusion in the improved Tanbi oyster and cockle management plan, as well as desk-based if it is found appropriate to research best practices of relevance to the improved plan. Studies may therefore require a mix of local and international expertise/consultants for their completion.

**Activity number and name**: Activity 1.1.2 Conduct assessment of the status of oyster stocks
**Stakeholders or catalysts involved**: TRY oyster women's association, Department of Fisheries, consultants
**Costs and investments**: USD 40 000 * (Government USD 20 000)
**Category of investment**: Facilitation / studies
**Timing**: 2023, 2027, 2030
**Associated output**: Stock assessment and other studies completed to inform contents of revised Tanbi oyster and cockle management plan, general oyster stock status in other areas, and locations for mangrove replanting and regeneration
**Description**: The current status of the oysters stocks is not well known, but the stock is suspected to be subject to overfishing and overfished. This activity will fill an important information gap to provide baseline data for the strategy. The methodology used to assess stock status will be carefully documented as part of the initial assessment made in 2023 so that it can be repeated in later years to allow for comparability. The 2023 assessment will have a focus not just on the Tanbi Wetland Complex to better inform the development of its oyster and cockle management plan, but also on other areas where wild oysters are collected. Coordination with the USAID/URI project will be required. In order to keep costs realistic, and due to the nature of the species, it is expected that the assessment will be a 'weight of evidence' assessment of stocks, rather than a full stock assessment. The weight of evidence assessment may include key indicators related to density of spat in specific locations at specific times of the year, catch per unit of effort (CPUE) e.g. kgs or pans of oysters in shell collected per day of collection, and oysters sizes collected. While density and length-related data will be collected based on transects in different sites, CPUE will be calculated through stratified sampling of harvesters. Both types of data collection approaches will involve local stakeholders (fisheries officers, consultants and harvesters). The PMU will provide technical oversight and guidance, and additional international consulting expertise may be recruited if felt necessary to guide the first assessment in 2023 and the methodological basis for the assessment. The first assessment will be paid for by the FISH4ACP project and will be more expensive given the work involved in establishing the methodology (USD 40 000), with later assessments (at lower costs of USD 20 000) to be funded by the Government (or other donors if funds can be attracted). Other data collected as part of the data collection activities included under Outcome 4 may also be used to feed into the assessment of the status of stocks.

**Activity number and name**: Activity 1.2.1 Hold TRY meetings/workshops with TRY, Department of Fisheries, and other actors to discuss, agree, and validate annual changes/updates to plan
**Stakeholders or catalysts involved**: TRY oyster women's association, Department of Fisheries, Department of Parks and Wildlife Management (support from NPO/PMU as required)

**Costs and investments**: USD 30 000 *
**Category of investment**: Facilitation / studies
**Timing**: annual to 2032
**Associated output**: Meetings and workshops held to update and improve existing Tanbi oyster and cockle management plan
**Description**: Drawing on the background studies and information from the two activities above, consultative meetings will be organised by TRY's secretariat/management to discuss and agree proposals for updates/revisions to the Tanbi oyster and cockle management plan on an annual basis. These proposals would include the steps to be taken when/if water or product quality problems are identified, be informed by stock assessments periodically made available, and would also consider pollution issues. The processes and methodologies to be deployed will be guided and influenced by the recommendations contained in the document 'Empowering Women for Shellfish Management, Food Security and Biodiversity Conservation in Estuarine Ecosystems of West Africa' produced by the recent USAID-funded and University of Rhode Island implemented regional Women Shellfishers and Food Security Project. Funds are provided to cover travel and food, for meetings to be held in TRY's offices (I.e. bringing representatives of actors to Banjul), and/or individuals from TRY's secretariat/management to visit actors in their communities. The meetings/workshops will be an opportunity for TRY's youth branch to be integrally involved to build capacity for the future. TRY's secretariat/management, in close collaboration with Department of Fisheries and other stakeholders, will be responsible for generating the text of the revised management plan, but the NPO and PMU will be available to support the generation of the output/document if required.

**Activity number and name**: Activity 1.3.1 Develop and implement a mangrove replanting programme in clearly defined priority areas
**Stakeholders or catalysts involved**: AFD, Department of Forestry, VC actors
**Costs and investments**: unknown
**Category of investment**: Plant and equipment
**Timing**: 2023 onwards
**Associated output**: Mangrove replanting programme implemented in critical/defined areas
**Description**: It is expected that funding for this activity will come from the ongoing AFD project. This activity will first involve careful assessment of the current status of mangroves (status and condition by area), characterization of the natural environment (i.e. type of substrate/soil, tides/ currents, salinity …), and a document review of lessons and key determinants of success from other mangrove replanting initiatives in the Gambia and in other countries. These lessons may relate to the timing of planting, the need for species diversity to ensure ecosystem development, technical issues related to planting methods to increase chances of survival of seedlings (e.g. age of seedlings, density, post planting nurturing protection and management, etc), and the best way to involve local actors. Drawing

on these lessons, a mangrove replanting programme will be designed and implemented. The detailed approach will be discussed and agreed with stakeholders/actors prior to finalisation to ensure stakeholder buy-in/agreement. It is likely that replanting will be done by VC actors, at carefully selected locations. Funds allocated to this activity may be used for survey work, and to purchase/grow seedlings. Whether community actors should be paid to plant seedlings or be expected to do so for free if seedlings are provided and will benefit their oyster activities, will need to be determined. The activity will also involve the monitoring of the results of regeneration of publication of relevant data. Detailed implementation arrangements will be specified by AFD.

**Activity number and name**: Activity 1.4.1 Develop legislative arrangements and mechanisms to protect mangroves in specific areas and allow for natural regeneration
**Stakeholders or catalysts involved**: AFD, Department of Forestry, VC actors
**Costs and investments**: unknown
**Category of investment**: Facilitation / studies
**Timing**: 2023 onwards
**Associated output**: Mangrove areas designated, reserved and protected for natural regeneration
**Description**: This activity is distinct from the one above in that it recognizes that in some cases natural re-generation may be more cost effective that replanting programmes. It will also be used to generate counterfactual data and learning to assess mangrove regeneration from re-planting and natural regeneration to compare with data generated from the activity above. The activity will involve the selection of sites (through surveying and mapping, and consultation with stakeholders, for which costs are expected) where special protection of mangroves for natural regeneration can be supported, and the specification of protection measures (legislative, community-based) to ensure that mangroves are left undisturbed to regenerate naturally. The activity will also involve the monitoring of the results of regeneration of publication of relevant data. Detailed implementation arrangements will be specified by AFD who will funds this activity.

**Activity number and name**: Activity 1.5.1 Define and implement a water quality testing programme in specific areas
**Stakeholders or catalysts involved**: VC actors, Ministry of Environment, Department of Fisheries, Department of Water Resources (Water Quality Division)
**Costs and investments**: USD 50 000 * (private sector USD 75 000)
**Category of investment**: Facilitation / studies
**Timing**: 2023 onwards
**Associated output**: Water quality testing programme is developed and implemented in key selected regions/areas

**Description**: Monitoring the quality of water in which oysters are grown, or from which they are collected, is critical in ensuring food safety and consumer confidence. It will be important to be able to demonstrate to potential new markets (e.g. restaurants) that oysters are safe to buy/consume. This will especially be the case for fresh oysters – a product not currently being marketed but which the strategy intends to promote in the domestic market. This activity will identify key locations and initiate a water sampling programme at these locations. The locations involved may include both those from which fresh oysters are sourced, as well as those which represent suspected high-risk areas in which oysters are collected/farmed and destined for sale as boiled/steamed oysters. The activity will review and recommend whether VC actors or relevant government officials (Department of Fisheries, Department of Water Resources, Ministry of Environment?) should be responsible for taking water samples, with costs provided under this activity and/or under activity 4.2.1 to cover water testing equipment and consumables associated with their operation. The activity will also involve specifying actions to be taken when testing shows concerns/risks of water quality, and dissemination of these actions to VC actors/communities. Guidance can be provided by FAO normative documentation (FAO and WHO. 2021).[150] This activity is linked to the activity 1.2.1 above on the oyster and cockle management plan, as the plan would need to provide provision of opening/closing harvesting (and farming areas) based on water sampling/testing results. It is also linked to activity 2.1.1 to inform suitable aquaculture sites for development.

**Activity number and name**: Activity 1.6.1 Conduct training of water quality monitors
**Stakeholders or catalysts involved**: VC actors, Ministry of Environment, Department of Fisheries, equipment suppliers?
**Costs and investments**: USD 13 000 *
**Category of investment**: Training
**Timing**: 2024
**Associated output**: Training of water quality monitors completed
**Description**: Linked to the activity above, this activity will involve the completion of training for those identified as being responsible for water sampling. This may involve both the taking of samples, the recording of data, and the transfer/submission of data on the tests completed to the relevant government authorities. It is envisaged that the activity will be completed by local consultants/extension officers, and/or by providers of equipment, with costs providing for travel to appropriate communities for demonstration of equipment in the field for maximum effectiveness. Budget is provided for once off training only, but over time if refresher training is required additional budget should be found and added to the costs associated with implementation of the upgrading strategy.

[150] FAO and WHO. 2021. *Technical guidance for the development of the growing area aspects of Bivalve Mollusc Sanitation Programmes*. *Second edition.* Food Safety and Quality Series No. 5A. Rome. Avaialble at Technical guidance for the development of the growing area aspects of Bivalve Mollusc Sanitation Programmes (fao.org)

**Activity number and name**: Activity 1.7.1 Conduct outreach in villages to further strengthen the TRY association and build new organisations in areas outside of Tanbi to aid resource management and support VC interests
**Stakeholders or catalysts involved**: TRY, Department of Fisheries, consultants
**Costs and investments**: USD 50 000 *
**Category of investment**: Training
**Timing**: Starting 2023, to 2025
**Associated output**: TRY strengthened and other organisations created
**Description**: Only around half of all VC actors in the Gambia are part of the TRY oyster women's association. Having strong organisations in the communities in which VC actors operate, to represent them, and through which capacity development and other support can be channeled, is important. Such organisations provide mechanisms through which management improvements can be introduced. The TRY oyster women's association would benefit from a renewed effort to ensure VC actors in the Tanbi area are part of the association and engaging effectively with it. Meetings under activity 1.2.1 will also contribute to this goal. And lessons learned from the experiences of those involved with TRY, and the benefits of the association, can also be used to build community associations in other areas/communities outside of the Tanbi area. This activity would thus involve members of TRY, and potentially also local consultants and/or government extension officers, engaging with and training relevant communities to strengthen existing participation, and support the formation of new community-based associations, for example in Memmeh and Bullock. It may be appropriate to stagger outreach work and training activities in those communities currently without associations, so that lessons can be learned about the most effective methods and approaches. Therefore, part of this activity will be devoted to a rapid assessment of the experience and lessons learnt from TRY, as well as a development of a legal and institutional framework for new organisations in other communities. Building new institutions will also involve sensitisation and training on issues such as processes for selection (e.g. elections) of officials, articles of operation, financial management, etc. As with other activities involving TRY, its youth section would be integrally involved both because of their existing experience and so as to help build capacity for the longer term.

### Activities under Outcome 2: VC actors adopt new oyster farming practices and expand oyster farming operations

**Activity number and name**: Activity 2.1.1 Conduct study to assess land tenure issues and site location for aquaculture expansion
**Stakeholders or catalysts involved**: Department of Fisheries, VC actors and communities
**Costs and investments**: USD 20 000 *
**Category of investment**: Facilitation / studies
**Timing**: by 2023
**Associated output**: Land tenure and site location study completed
**Description**: Before new and improved/alternative oyster farming methods can be introduced, it will be important to have clarity over the best/appropriate sites for aquaculture expansion. Locating these sites will be dependent largely on three factors: i) land tenure issues associated with different sites; and ii) the technical and social suitability of different sites and iii) the level of any contamination and the identified sources of pollution at different sites. Regarding the first factor, it will be important to ensure that any potential sites are not subject to land/ownership disputes and that tenure arrangements are known and accepted by the communities involved. The second factor considers the technical feasibility and social suitability of different sites may depend on bio-chemical and physical properties of water in those locations, access to them by communities, and agreement by communities to use them for aquaculture. Finally, clearly identifying the water's level of contamination and sources of pollution will also contribute to determining the suitability of the sites for oyster farming. This study will thus involve study and consultation at potential sites and the mapping/identification of agreed areas for development. Field work will be carried out by local researchers/consultants in collaboration with staff from Department of Fisheries and an international aquaculture expert, and will involve site visits and consultations in communities, not just with existing VC actors but also potentially with other stakeholders in the communities that may have an interest in the areas considered for oyster farming.

**Activity number and name**: Activity 2.2.1 Conduct technical feasibility study for alternative farming methods/oyster species
**Stakeholders or catalysts involved**: International aquaculture consultant (and communities)
**Costs and investments**: USD 30 000 *
**Category of investment**: Facilitation / studies
**Timing**: by 2023
**Associated output**: Technical feasibility study of spat collection and alternative farming methods/oyster species completed
**Description**: This activity will involve a review of best aquaculture practices elsewhere and potential alternative/new/improved oyster spat collection and farming methods which may

be suitable in the Gambia. Potential new methods may be determined/limited by the different species available in the country and their suitability to alternative farming methods. The work will involve desk-based review of potential improved methods and practices, as well as field visits to communities to view sites and discuss with stakeholders. Spat collection sites will be identified and spat collection techniques will be piloted. Special emphasis will be placed on linking with work to be conducted in Senegal under FISH4ACP and in learning lessons from Senegal. This may therefore involve exchange visits.

**Activity number and name**: Activity 2.3.1 Conduct financial feasibility study and assessment of farm management arrangements for alternative/new oyster farming methods
**Stakeholders or catalysts involved**: International aquaculture economist (and communities)
**Costs and investments**: USD 15 000 *
**Category of investment**: Facilitation / studies
**Timing**: by 2023
**Associated output**: Study of the financial viability and management arrangements of alternative methods of oyster farming completed
**Description**: Initiatives to develop aquaculture are premised on technical feasibility without full consideration of the financial viability of proposed developments, when considering all necessary investment and operational costs, and prices which can be achieved in the market. Once the activity above has been completed and potential options for new/improved methods have been proposed this activity will involve financial modelling of the proposed aquaculture methods to be the basis for expansion of the aquaculture sector. Cost/earnings models will be generated for all potential new aquaculture methods/options proposed, with an assessment of likely revenues, operational and fixed costs (including transport costs to market), gross and net profits, internal rates of return and net present values. The output from this activity will provide the models generated along with a detailed list of all assumptions and a sensitivity analysis to test the impact of key assumptions on operational performance. The activity will involve a short field mission to the Gambia by a relevant expert to collect relevant input costs data and to consult with communities and review market considerations. It may need to take place after the activity below (2.4.1) has been completed if field-based data are considered necessary for the financial models to be developed.

**Activity number and name**: Activity 2.4.1 Conduct pilot field-based trials of new methods and in new areas
**Stakeholders or catalysts involved**: Actors, Department of Fisheries
**Costs and investments**: USD 90 000 *
**Category of investment**: Plant and equipment
**Timing**: by 2024

**Associated output**: Pilot/demonstration of new methods for expansion completed and results disseminated
**Description**: Following on from, and based on, the two activities above, once appropriate new methods have been assessed as being technically and financially viable in theory, it will be necessary to pilot test the proposals in the field. This is likely to involve testing different methods/options for development, as well as the suitability of different sites/areas. As the methods will be new to the Gambia it will be appropriate for grant funding to be provided to communities/individuals to demonstrate viability in practice, so that the new methods can be replicated and other communities/individuals incentivized to invest in similar methods. Grant funding will be conditional on prior agreement in/by communities of management and maintenance arrangements for the pilot sites, as well as issues of ownership of sites and oyster produced. It will also be conditional on careful recording of data on the economic and biological performance of the methods being tested. While the costs for this activity as classified as being 'plant and equipment', activity 4.9.1 will provide for the technical support services and capacity building required to ensure that the pilot tests are run effectively. For those methods found to be successful, community actors from other areas will be invited to successful oyster farms to view and observe the new methods as a way supporting replication (with additional support under activity 4.9.1 available to support replication).

**Activity number and name**: Activity 2.4.2 Communication/dissemination events around pilots
**Stakeholders or catalysts involved**: FISH4ACP, Department of Fisheries, private sector
**Costs and investments**: USD 30 000 *
**Category of investment**: Plant and equipment
**Timing**: by 2025
**Associated output**: Pilot/demonstration of new methods for expansion completed and results disseminated
**Description**: This activity will involve dissemination of findings from pilot trials in support of replication. As series of events are envisaged in communities to demonstrate, share information, discussions lessons from trials, etc. Decisions will be made during implementation as to whether to bring actors from communities to one location for events, or whether to hold them in the communities offering potential for replication.

**Activity number and name**: Activity 2.5.1 Review and update aquaculture regulations
**Stakeholders or catalysts involved**: Aquaculture lawyer/consultant, Department of Fisheries
**Costs and investments**: USD 25 000 *
**Category of investment**: Facilitation / studies
**Timing**: by 2024
**Associated output**: Aquaculture regulations re-drafted

**Description**: Efforts as part of the upgrading strategy to expand aquaculture and introduce new aquaculture methods must be accompanied by a suitable regulatory legislative environment for development and management of the aquaculture sector, which is both supportive of sectoral development while ensuring necessary safeguards and protections. This activity will involve a review of existing regulations and legal instruments covering aquaculture development, and almost certainly proposals for amendments/improvements in the form of a new aquaculture regulation given the content of existing regulatory instruments. The regulation would be likely to include sections and provisions related to: objectives and general principles; definitions; administrative provisions for the sector; licensing and concessions arrangements; best practices related to environmental management, bio-security management, food safety and water monitoring, escapees, etc.; compliance monitoring and reporting; enforcement and fines/penalties. The activity will also include the dissemination of information to stakeholders in a form/manner which they can understand.

**Activity number and name**: Activity 2.6.1 Replication of new aquaculture methods in new areas
**Stakeholders or catalysts involved**: Actors
**Costs and investments**: USD 150 000
**Category of investment**: Plant and equipment
**Timing**: from 2025
**Associated output**: Replication of successful new/improved aquaculture methods
**Description**: Following on from the pilot activities, and communication of their benefits, this activity would involve investments by the private sector for replication of successful pilot activities. Additional investment requirements by the private sector for replication may be revised following pilot trials.

### Activities under Outcome 3: New sales outlets/channels being utilized and new fresh oyster and oyster shell by-products are available on the market

**Activity number and name**: Activity 3.1.1 Conduct market study to assess potential for new product and marketing channels for oysters and oyster by-products (shells)
**Stakeholders or catalysts involved**: Local consultants (with consultation/collaboration with actors and end markets)
**Costs and investments**: USD 10 000 *
**Category of investment**: Facilitation / studies
**Timing**: by 2023
**Associated output**: Market research study completed on new marketing channels for fresh oysters and shell by-products, and new products
**Description**: This activity will cover two main issues/potentials: fresh oyster sales; sales of oyster shells. With regards to fresh oyster sales, the design and analysis phase of the FISH4ACP project included some limited and initial discussion by the NPO with potential end markets (in the form of hotels/restaurants) for the sale of fresh oysters in the domestic market. At present there are no such sales in the Gambia and all oysters are sold in boiled/steamed, smoked, or dried product form. Sales of fresh oysters would be likely to fetch high prices. This study would deepen an understanding of the potential to develop such sales, and the requirements and methods of doing so. Of particular importance would be the need to consider buyer needs and requirements in terms of continuity of supply, preferential days of purchases (if any), product quality, packaging/handling of oysters, minimum quantities, etc. The activity would involve a series of interviews with an appropriate number of business owners and/or chefs in restaurants and hotels which might be potential buyers of fresh oysters. Additionally, discussions with stakeholders in Senegal may be beneficial given that sales of fresh oyster in Senegal is already established. Finally, if market interest is noted, the activity will establish a series of contacts with communities that meet requirements to supply fresh oysters and assess their interest in marketing this new product, their production and transportation capacity to Banjul. This will provide detailed information to be included in the market strategy to be developed under the following activity. The second part of the study would focus on potential sales of oyster shells that are the by-product of processing oysters. Again, some limited consultations during the design and analysis phase revealed a potential for sales to industrial poultry feed manufacturers, as well as sales to communities/actors for use as white lime, fertilizer or chicken feed, but greater understanding is required of the potential for increased sales of shells, to whom, in what form and quantities, logistical arrangements for transporting bulk amounts of shells, etc. The potential market for added value shell products such as jewelry, ornaments will also be undertaken. This second part of the study would thus involve consultations with potential end markets to explore such issues in more detail. Findings from the research on both parts (oysters, and oyster shells) would inform the training needs and articulation of approaches

to the pilots/testing which will be part of activities 3.3.1 and 3.4.1. The research will be contracted to local researchers/consultants and guided by expertise contained with the PMU/FAO.

**Activity number and name**: Activity 3.2.1 Develop a market strategy with time-bound responsibilities for market development
**Stakeholders or catalysts involved**: Local consultants (supported by an international consultant, with consultation/collaboration with actors and end markets)
**Costs and investments**: USD 10 000 *
**Category of investment**: Facilitation / studies
**Timing**: by 2023
**Associated output**: Market development strategy developed and agreed in consultation with stakeholders
**Description**: A clear strategy for developing the market for oysters is required as part of the overall upgrading strategy. This activity will be closely linked to, and informed by the following activity, and will formalise agreements over the best way to ensure market development. The market strategy will include a short background description of existing market conditions and arrangements drawing on information contained in this report, and a vision for the future (over an agreed timeframe and likely in harmony with the overall timeframe for the upgrading strategy). It is expected that the market strategy will specify issues such as: the approach to developing sales of new products; developing new marketing channels; branding and promotional activities; packaging; issues related to transportation from processing sites to market; ensuring consumer safety; and dedicated personnel to oversee the strategy. It is likely that it will segment the domestic market, with specific needs of different segments considered and addressed. Over the longer-term the strategy may consider the merits of including an export strategy, although at design stage it is felt that given strong demand in the domestic market, potential for domestic market growth, and challenges that would be involved with export markets, the strategy would be best focused on the domestic market only. The strategy would include clear timebound responsibilities for different activities contained within it, where appropriate specifying budgets/costs which if related to activities not already included in the overall upgrading strategy would need to be added to it. It is envisaged that the marketing strategy would be developed by local consultants in collaboration with and based on consultation with local actors and end markets in the Gambia, supported through desk-based inputs by the PMU and if necessary an international consultant with marketing expertise.

**Activity number and name**: Activity 3.3.1 Train actors in requirements of new product/channels for oysters and support pilot/test of market arrangements
**Stakeholders or catalysts involved**: Local consultants and Department of Fisheries, with local actors

**Costs and investments**: USD 12 500 *
**Category of investment**: Training
**Timing**: by 2023
**Associated output**: Training of actors and pilot market trial completed for new oyster channels and products
**Description**: Following from the first part of the market study presented above on fresh oysters, this activity would sensitize actors in key selected communities about their involvement in a trial marketing exercise to test the sale of fresh oysters. Training would be conducted (by local consultants and Department of Fisheries staff) to communicate safety requirements and any depuration requirements, and buyer requirements (as identified from the market study) and the importance of adhering to forward supply arrangements/agreements agreed with buyers so as to build trust with the buyers. Training would also cover appropriate arrangements for transport from collection sites to buyers. Product would need to be iced from point of harvest and involve a traceability system. It may be appropriate to conduct trials of fresh oyster sales from a small number of communities selected based on their willingness and keenness to be part of the trial, and on their ability to provide the large oysters that would be required for fresh oyster sales. Training would also cover record keeping so that the trial can be appropriately assessed, and lessons drawn, which may be important in correcting approaches before replication can be supported. This activity would need careful identification of those to be trained throughout all VC functions (collection, processing, selling). Any need for depuration facilities would be considered by activity 4.1.1.

**Activity number and name**: Activity 3.4.1 Train actors in requirements of new product/channels for oyster shells and support pilot/test of market arrangements
**Stakeholders or catalysts involved**: Local consultants and Department of Fisheries, local actors
**Costs and investments**: USD 25 000 *
**Category of investment**: Training
**Timing**: by 2023
**Associated output**: Training of actors and pilot market trial completed for oyster shell sales
**Description**: This activity would be a replica of the one above, but rather than focusing on fresh oyster sales, it would support the training and piloting of the bulk sale of oyster shells to prospective buyers identified during the market study, and training in the production of jewelry products. Again, a small number of communities would be selected for participation in the pilot, and trained accordingly, with findings from the trail documented. The activity will require careful identification of feed mills and processors of shells to be involved. Coordination with the USAID/URI project will be required.

**Activity number and name**: Activity 3.5.1 Conduct training for food safety inspectors and VC actors on oyster product hygiene/safety standards
**Stakeholders or catalysts involved**: Food Safety and Quality Authority, VC actors, food safety consultants
**Costs and investments**: USD 35 000 *
**Category of investment**: Training
**Timing**: by 2024
**Associated output**: Training of food safety inspectors and actors completed
**Description**: The FSQA is the statutory authority responsible for food safety in the Gambia. At present only limited testing of informal street vendors using oyster in dishes they sell is conducted, and there is no testing of oysters for product safety in retail urban market settings. VC actors are also not well attuned to practices needed to ensure product safety. While product safety risks are relatively low for boiled/steamed, smoked and dried oysters, they still remain. For the fresh oyster sales which the upgrading strategy aims to promote, risks to consumer health are significant unless practices to ensure food safety, quality, and testing, are put into place. This activity will involve training of VC actors in methods aimed at maintaining product safety between the point of harvesting to sale, and will also train FSQA staff in specific issues related to oyster product safety about which they should be aware, and appropriate methods for testing the quality of oysters on the market, and being sold through different marketing channels. This activity would involve a consultant (probably international, but local if suitable domestic consultants are available) conducting a short training course with actors, and with staff from FSQA and the Department of Fisheries, both to build capacity of FSQA inspectors, and to train trainers/staff from the Department of Fisheries who would then in turn engage with VC actors to disseminate best practices on product handling to ensure product safety.

**Activity number and name**: Activity 3.6.1 Conduct programme of food safety controls for oyster products
**Stakeholders or catalysts involved**: Food Safety and Quality Authority
**Costs and investments**: USD 22 500 *
**Category of investment**: Facilitation / studies
**Timing**: 2024 onwards
**Associated output**: Food safety controls of oyster products are conducted
**Description**: This activity and the associated budget provides for the FSQA to conduct food safety controls targeted at the oyster VC. It would involve testing an agreed number of oyster products/samples being sold through different marketing channels. A small annual budget (USD 2500) is provided to conduct an agreed number of tests per year based on individual/unit testing costs. Costs would be covered by the FISH4ACP project in 2024 and 2025, and thereafter the government would be expected to find funds to continue this dedicated testing programme.

**Activity number and name**: Activity 3.7.1 Conduct consultations and skills training in villages which don't engage in oyster collection but which are near to oyster stocks, to assess and support involvement of new actors in the VC
**Stakeholders or catalysts involved**: Department of Fisheries, local consultants
**Costs and investments**: USD 25 000 *
**Category of investment**: Training
**Timing**: 2024-2025
**Associated output**: Communities supported to start wild oyster collection
**Description**: It is suspected that there are communities located nearby to unexploited oyster stocks who do not currently engage in the VC through the collection, processing or sale of oysters. This represents a potential opportunity to sustainably increase production and supplies to the domestic market, if such communities can be sensitised to the potential economic and social benefits of engaging in the VC, and if training ensures that new entrants to the fishery exploit resources in a sustainable manner. Department of Fisheries staff and local consultants will engage in a field programme to survey/visit potential sites, and to engage with and then train communities/individuals who express an interest in being involved in oyster collection, processing and marketing. It may be appropriate for this training programme to recruit existing VC actors from other communities to aid with skills transfer. The allocated budget will primarily be used to cover field costs (transport, dsa), any consultant inputs, and compensation for VC actors from existing communities who are recruited to aid with skills transfer. Some small part of the budget may also be used for the purchase of small items of equipment (knives/aces, etc) if not available in the communities and the hiring of paddle canoes for use during demonstration activities.

**Activity number and name**: Activity 3.8.1 Replication of fresh oyster and shell sales pilots by other communities
**Stakeholders or catalysts involved**: Actors
**Costs and investments**: tbd
**Category of investment**: Plant and equipment
**Timing**: from 2025
**Associated output**: Replication of fresh oyster and shell sales
**Description**: Following on from the pilot activities, and communication of their benefits, this activity would involve investments and activities by the private sector for replication. Additional investment requirements by the private sector for replication may be revised following pilot trials.

### Activities under Outcome 4: An enabling and secure environment is created for VC actors, strong sector management, and implementation and monitoring of the VC upgrading strategy

**Activity number and name**: Activity 4.1.1 Complete a study to further assess needs and justification for equipment and infrastructure
**Stakeholders or catalysts involved**: Local consultants in collaboration with the Department of Fisheries (involving consultation with TRY and other VC actors)
**Costs and investments**: USD 25 000 *
**Category of investment**: Facilitation / studies
**Timing**: by 2023
**Associated output**: Study into equipment and infrastructure needs completed
**Description**: During the design and analysis phase, consultations revealed that a wide range of possible investments in plant/equipment and/or infrastructure may be required in support of value chain upgrading of wild collection. These investments could include the following: depuration facilities, safety equipment for actors (life vests, protective glasses, gloves, boots, etc), equipment and infrastructure associated with the processing of oysters (processing shelters, equipment for boiling/steaming oysters, etc) or the marketing of products (e.g. packaging machines, storage facilities such as fridges/freezers). However, there was not time during the design to sufficiently assess needs and associated costs, and importantly to make a detailed assessment of whether possible equipment and infrastructure would be used and maintained and would be commercially viable. The study may also allow to assess the needs for capacity building to help the VC actors to be able to effectively use the equipment/infrastructure that may require technical knowledge (e.g. equipment for boiling/steaming oysters, packaging machines, etc.) This activity will therefore further explore potential needs, paying special attention to the justification provided for future investments. It will result in fully justified proposals for equipment and infrastructure, which could then be supported through activity 4.2.1. The investment requirements for expanded aquaculture operations would not be part of this study, as would be covered under element 2. However, this study should also consider and include: i) the potential need for investments in laboratory equipment for the testing of water and oyster samples (see activity 3.6.1), and ii) the potential need for infrastructure investments in depuration facilities (once fresh oyster sales have started) - see activity 3.6.1.

**Activity number and name**: Activity 4.2.1 Specify, procure and deliver appropriate equipment
**Stakeholders or catalysts involved**: PMU (in consultation with Department of Fisheries and VC actors)
**Costs and investments**: USD 50 000 * (budget may need revision based on activity above)
**Category of investment**: Plant and equipment

**Timing**: by 2025
**Associated output**: Appropriate equipment and infrastructure specified, procured and delivered
**Description**: Following the activity above which will clarify plant and equipment needs, and the recommendations under outcome 2 for the funding required to support aquaculture pilot/demonstration activities, this activity relates to specific budget from the FISH4ACP project, and the procurement of appropriate plant and equipment. It does not cover larger investment items in infrastructure (see activity below), which would be supported by other donors once identified. This budget is intended for smaller items of equipment required to support upgrading. Examples may include (subject to the findings from activity 4.1.1 and from outcome 2) protective clothing and onboard safety equipment, or small equipment needed to produce, store and transport processed oyster products. Relevant equipment would be procured by the FISH4ACP PMU based on standard FAO procurement rules. Budget may be used over the course of 2024 and 2025, after activity 4.1.1. has been completed in 2023.

**Activity number and name**: Activity 4.2.2 Specify, procure and deliver appropriate infrastructure
**Stakeholders or catalysts involved**: Donors
**Costs and investments**: USD 60 000
**Category of investment**: Infrastructure
**Timing**: by 2032
**Associated output**: Appropriate equipment and infrastructure specified, procured and delivered
**Description**: This activity would be similar to activity 4.2.1 above, but instead of supporting the provision of equipment it would support larger infrastructure needs. It would be funded by other donors, with the outputs from activity 4.1.1 being used to gain commitments from donors about funding such items. Examples of potential infrastructure could relate to processing or marketing facilities/buildings or aquaculture investments (if pilots prove successful). Investments would be made in line with the procedures of the donors supporting investments.

**Activity number and name**: Activity 4.3.1 Complete a study to review existing data collection, data gaps, and data collection needs for the VC and upgrading strategy and specify a data collection programme (content and implementation arrangements)
**Stakeholders or catalysts involved**: international consultant in data, monitoring and evaluation, in consultation with the Department of Fisheries and the OSAC
**Costs and investments**: USD 17 500 *
**Category of investment**: Facilitation / studies
**Timing**: by 2023

**Associated output**: Study completed to identify data gaps and needs, and define a data collection programme for the sector that will inform M&E of the whole VC strategy
**Description**: Prior to the design and analysis phase of the FISH4ACP programme, data on the oyster VC was either completely lacking or generally very outdated. This report has provided a wide range of up-to-date data to describe and benchmark VC performance in environmental, social and economic terms. However there are other data which may be useful for the future which the FISH4ACP programme has not collected. Looking forward it will be necessary to identify key data requirements to track performance of the VC, and implementation of the upgrading strategy. This activity will establish any remaining data gaps, identify a streamlined set of data requirements for the future, and identify appropriate arrangements and approaches for the collection, analysis, storage, and dissemination of data. It will consider and be aligned, if possible, with data gathering conducted under activity 1.1.2 (stock assessment) The output from the activity will be an operations manual for a data collection programme for the VC to guide future activities related to data. It will contain detailed information about the data involved/needed, the periodicity of collection and dissemination, methods involved, and responsibility for all data-related activities covered by the manual (responsibilities may be allocated not just to Department of Fisheries but also to VC actors and other donors). When considering data requirements, the indicators contained in the logframe for the upgrading strategy will obviously be of most importance, but other requirements may be drawn from the LEAD project MSC pre-assessment report which identifies a wide range of data requirements for sector management. The study may also result in a set of proposals for building the capacity of local officers and actors that will be involved in the data collection operations. The activity will be contracted to an international consultant, who will work in close collaboration with the Department of Fisheries and the upgrading strategy Task Force.

**Activity number and name**: Activity 4.4.1 Conduct training programme for those involved with data collection and M&E of the strategy
**Stakeholders or catalysts involved**: Department of Fisheries, actors, NPO/PMU
**Costs and investments**: USD 5 000 *
**Category of investment**: Training
**Timing**: by 2023
**Associated output**: Training completed in data collection and M&E of strategy
**Description**: Once the data collection manual has been prepared, it will be necessary to ensure that all those allocated with responsibilities are aware of them and confident in their own roles in the data collection programme and the M&E of the upgrading strategy. This will require a short training activity to disseminate the contents of the manual, data collection programme, and the M&E of the upgrading strategy. Costs will be provided for food and room hired for training of relevant stakeholders to be completed by the NPO. Costs may also need to be covered for bringing actors involved with data collection to Banjul for training if

considered necessary and if training in the field cannot/is not covered under activity 4.9.1 below. The PMU will support remotely.

**Activity number and name**: Activity 4.5.1 Collect and publicize relevant data
**Stakeholders or catalysts involved**: Department of Fisheries, VC actors
**Costs and investments**: USD 20 000 * / Government USD 35 000
**Category of investment**: Facilitation / studies
**Timing**: 2024 onwards
**Associated output**: Ongoing data collection and M&E of strategy completed
**Description**: This activity covers the routine and ongoing data collection and publication in line with the contents of the data collection programme and M&E of the strategy articulated during activity 4.3.1. Costs are expected for field activities to collect data and are budgeted for 2024 and 2025 at USD 10 000 per year to be paid for by the FISH4ACP project and thereafter at USD 5 000 per year to be paid for by the Government (for 2026-2032). Costs will also cover the preparation and publication of an annual report on the economic, social and environmental performance of the VC and implementation of the upgrading strategy.

**Activity number and name**: Activity 4.6.1 Validate and refine strategy to increase access to finance and enhance savings of VC actors
**Stakeholders or catalysts involved**: AFRACA (micro-finance institutions: Supersonicz Microfinance / Reliance Financial Services / Bayba Microfinance)
**Costs and investments**: USD 10 000 *
**Category of investment**: Facilitation / studies
**Timing**: by 2023
**Associated output**: Strategy developed to increase access to finance and enhance savings
**Description**: Background studies by AFRACA during the design and analysis phase considered the current status of lending to the VC, and savings by VC actors, and proposed a draft strategy for increasing access to finance. The studies resulted in 4 separate reports, the last one being a strategy paper with options for investment, micro-finance, credit and insurance provision to the oyster VC actors. The findings and recommendations were not discussed widely with stakeholders for validation or prioritization during the design and analysis phase. This activity will thus build on the earlier work to further discuss with finance providers, actors and the Task Force, recommendations of ways to increase access to finance and enhance savings. The strategy may need to include a dual focus on “osusu” and micro-finance institutions. The result will be a single ‘finance and savings strategy’ document with validated, prioritized, timebound and costed interventions to increase access to finance and enhance savings. The strategy should consider in particular the potential linkages with an African Development Bank project called GAMIRSAL (Gambia Incentive-Based Risk Sharing System for Agricultural Lending) which is at an appraisal stage and should be operational by

the end of 2024 or 2025. Its mandate is to de-risk and leverage on banks' excess liquidity to lend principally to the agriculture sector (including fisheries).

**Activity number and name**: Activity 4.7.1 Facilitate access to finance and provide support for savings
**Stakeholders or catalysts involved**: FISH4ACP (actors, micro-finance organisations)
**Costs and investments**: USD 20 000 *
**Category of investment**: Facilitation / studies
**Timing**: 2024 onwards
**Associated output**: Finance and savings strategy implemented
**Description**: This activity will involve support for brokering relationships between actors and lending institutions and involve the preparation and provision of documentation for micro-finance organizations to demonstrate the viability of sector investments following piloting of initiatives such as new aquaculture methods and sales of fresh oysters. This may involve the documentation of financial models for investments required by the private as part of the upgrading strategy, showing financial viability. At the same time, work will be completed to train actors interested in borrowing in the preparation of applications for financing, and outreach completed in the benefits and simple steps involved in the opening/establishment of savings accounts. It is envisaged that increased access to finance will enable the private sector to borrow for investments they deem necessary to expand their businesses. As the amounts to be lent by finance organizations are not known at this stage, and the specific investments are also unclear, the costings for the upgrading strategy do not include the sums lent by finance organisations/borrowed by actors. The activity will include an awareness raising campaign to inform other actors about the financial strategy and the possibility to take advantage of it.

**Activity number and name**: Activity 4.8.1 Complete a programme to teach VC actors who can't swim how to do so and increase water safety awareness
**Stakeholders or catalysts involved**: Gambian Navy in association with the Fire Department
**Costs and investments**: USD 25 000 *
**Category of investment**: Training
**Timing**: 2023-2025
**Associated output**: Water safety/swimming programme implemented for VC actors in need
**Description**: While the number of deaths from drowning of VC actors is low due to the depth of water in areas women collect oysters, one death is too much, and risks nevertheless occur when travelling to collection sites. Concerns of canoes capsizing in bad weather (and especially in wind against tide conditions) also result in considerable levels of mental anxiety for some collectors who are not able to swim. This activity will provide the opportunity for selected collectors and oyster farmers to participate in swimming classes. Additionally, it may be appropriate to support sensitization over water safety issues in other communities. The

result would both reduce actual risks, and be empowering for those VC actors involved. It is believed that the Gambian Navy (in association with the Fire Department) can provide such courses on a contracted basis. But if necessary other providers would be contracted to provide the swimming lessons. Discussions with the provider of swimming lessons would determine whether the classes would take place in the communities or at a central training facility. Costs would cover those of the swimming trainers, and potentially of transport for VC actors to travel to training locations.

**Activity number and name**: Activity 4.9.1 Provide technical support, training and services to VC actors to support uptake of new methods and practices
**Stakeholders or catalysts involved**: Consultants, Department of Fisheries, Other as appropriate
**Costs and investments**: USD 75 000 * (other donors [USAID] USD 200 000)
**Category of investment**: Training
**Timing**: 2023 - 2025
**Associated output**: Technical support and services provided to collectors, farmers, processors and retailers
**Description**: The upgrading strategy for the oyster VC includes many training activities articulated in earlier activities. However, a full list of training requirements cannot be known at this stage, and other specific trainings are likely to emerge as the strategy is being implemented. These may relate to various aspects of the outcomes 1-3 of the strategy focused on resource management of wild oysters, aquaculture development, and market practices and developments. This activity and the associated budget therefore provide a contingency allocation for training and technical support to aid other elements and activities already envisaged, or which may emerge. It is ear-marked for funding by FISH4ACP until 2025, but on conclusion of the FISH4ACP project, budget for technical support and training may be added to the upgrading strategy by other donors to assist with implementation over the remainder of the upgrading strategy period to 2032.

Over 2023 – 2025 USAID is providing USD 200-250K for activities in the Gambia as part of the regional Women Shellfishers and Food Security Project. The funds will be used to support 70 shellfish actors in Tanbi and 80 in Bullock. Support will be provided under the following themes: women shellfishers empowerment, gender sensitive shellfish co-management, mangrove co-management, and landscape food systems. Specific activities under these themes which may overlap with activities in the upgrading strategy presented above (but in Tanbi and Bullock only) include: strengthening of community associations, exchange visits to Senegal for some members of TRY, improved shellfish data collection, value chain development, and family-based aquaculture trials for 20 arms in Tanbi. There may therefore be potential for cost-sharing of some activities by the USAID project and FISH4ACP, thereby saving costs for both FISH4ACP and USAID, and/or the potential for some FISH4ACP activities

to exclude work in Tanbi and Bullock if similar activities are being supported in those areas by USAID. As a breakdown of the USAID budget by specific activity is not available at the time of writing (January 2023), the USAID funds are included in the cost tables as part of activity 4.9.1 (under training) rather than being distributed between different outcomes/activities of the upgrading strategy.

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Drawing on the information provided above, the investment table (Table 23) below provides an overview of the investments needed to realize the vision and how these investments are expected to be financed. Costs related to element 1 of the strategy account for 23 percent of total costs, element 2 accounts for 25 percent of total costs, element 3 for 13 percent of total costs, and element 4 for 38 percent of costs.

**TABLE 23: VC UPGRADING INVESTMENT TABLE (USD)**

| In USD | Financing sources | | | | Total |
|---|---|---|---|---|---|
| **Type of investment** | **FISH4ACP** | **Government** | **Other donors** | **Private sector** | **Totals by type** |
| Facilitation/studies | 372 500 | 72 500 | | 75 000 | 520 000 |
| Plant/equipment | 140 000 | | | 200 000 | 340 000 |
| Training | 295 500 | | 200 000 | | 495 500 |
| Infrastructure | | | 60 000 | | 60 000 |
| **Totals by source** | **808 000** | **72 500** | **260 000** | **275 000** | **1 415 500** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Note: 1/ some investments are dependent on studies providing sufficient justification and more detailed costings. 2/ FISH4ACP investments do not include costs of the national project officer or PMU costs in FAO/Rome supporting project implementation. 3/ investments do not include AFD investment in mangrove rehabilitation as not yet known and investments not specific to oyster VC but have wider societal benefits.

Table 24 shows the key stakeholders involved in the four elements/outcomes of the strategy.

**TABLE 24. KEY STAKEHOLDERS AND CATALYSTS INVOLVED IN THE UPGRADING STRATEGY AND ITS FOUR ELEMENTS**

| Upgrading strategy elements | Key stakeholders and catalysts involved |
|---|---|
| Improved management of wild oyster stocks and mangrove ecosystems | • Department of Fisheries<br>• VC actors<br>• VC associations (e.g. TRY)<br>• FISH4ACP<br>• AFD<br>• URI/USAID<br>• Department of Parks and Wildlife Management<br>• Department of Forestry<br>• Department of Water Resources |
| VC actors adopt new oyster farming practices and expand oyster operations | • Department of Fisheries<br>• VC actors<br>• FISH4ACP<br>• VC associations (e.g. TRY) |
| New sales outlets/channels being utilized and new safe fresh oyster, and oyster shell by-products, are available on the market | • Department of Fisheries<br>• VC actors<br>• FISH4ACP<br>• VC associations (e.g. TRY)<br>• Tourism operators<br>• Seafood buyers in local restaurants<br>• Poultry feed mill operators<br>• Food Safety and Quality Authority |
| An enabling and secure environment is created for VC actors, strong sector management, and implementation and monitoring of the VC upgrading strategy | • Department of Fisheries<br>• VC actors<br>• FISH4ACP<br>• VC associations (e.g. TRY)<br>• Navy/Fire Department<br>• URI/USAID<br>• Other donors<br>• Micro finance institutions |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

To aid with implementation and planning, a provisional scheduling and drawn-down of FISH4ACP funds is provided in the table below over the life of the project (2023–2025). The draft scheduling will be reconsidered on project initiation in the Gambia as part of the short 'inception period' discussed below (see Section 5.3). The scheduling of activities and budget will also need to reflect the ability of the PMU in FAO/Rome to provide management and support across the whole FISH4ACP programme i.e. 12 countries and value chains, without bottlenecks in implementation being experienced.

**TABLE 25: PROPOSED PHASING OF FISH4ACP INVESTMENTS, 2022 – 2025 (USD)**

| Activity | 2023 | 2024 | 2025 | USD total |
|---|---|---|---|---|
| **Element 1:** Improved management of wild oyster stocks and mangrove ecosystems | 106 110 | 73 410 | 43 340 | 222 860 |
| **Element 2:** VC actors adopt new oyster farming practices and expand oyster operations | 64 345 | 129 914 | 15 000 | 209 259 |
| **Element 3:** New sales outlets/channels being utilised and new safe fresh oyster, and oyster shell by-products, are available on the market | 59 112 | 35 634 | 27 500 | 122 246 |
| **Element 4:** An enabling and secure environment is created for VC actors, strong sector management, and implementation and monitoring of the VC upgrading strategy | 79 815 | 82 500 | 82 500 | 244 815 |
| **Total** | 309 382 | 321 458 | 168 340 | 799 180 |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Note: FISH4ACP investments in this table do not include costs of national project officer or PMU costs in FAO/Rome supporting project implementation but include operational costs to allow the NPO to participate in some activities. Figures in table 27 differ slightly to those in Table 25 as figures in Table 25 are rounded for different activities to be funded by FISH4ACP, while figures in Table 27 are based on a more detailed breakdown for the purposes of implementation.

## 5.3. FISH4ACP project activities and modalities

### 5.3.1. Project onboarding / start up

The intention is for the main project phase of FISH4ACP in the Gambia to continue seamlessly from the design phase and the completion of this report, without any interruption. Delays in start-up would jeopardise the momentum that has been gained towards the end of the design phase, especially through the planning workshop, and could negatively impact implementation. Most critically and urgently in achieving this will be a project launch event to be held in early February 2023, and ongoing recruitment/retention of a National Professional Officer (NPO). This individual will be based in the FAO office in Banjul (at least for the duration of the FISH4ACP project).

The main project phase is expected to start in **January 2023**, and to run until **February 2025**, which is the overall FISH4ACP programme will finish.

The project will start in January with an **inception phase**, which will run from January to March 2023. This phase is critical for additional planning and stakeholder engagement prior to the implementation of upgrading strategy activities. During the inception period the following tasks will be completed, through a collaborative approach between the NPO, the PMU in Rome, and the Department of Fisheries.

- Insert targets into the logframe where currently not provided.
- Obtain approval from key public and private stakeholders on this design report and the implementation plan.
- Complete launch activities. These will involve joint FAO/Department of Fisheries press releases and a launch workshop in which relevant stakeholders make endorsements of the strategy and their proposed involvement in it through the activities.
- Hold the first Oyster value chain Stakeholder Advisory Committee (OSAC) meeting.

### 5.3.2. Non-financial resources, partners and pre-conditions for FISH4ACP supported activities

For those activities detailed above in Section 5.2 which involve the FISH4ACP project, additional information is provided below on the non-financial resources required, the partners, and pre-conditions that will be required. Activity numbering uses the same numbering as in Section 5.2 above, meaning that activity numbers not involving the FISH4ACP project are excluded. Additional information/detail is recorded in

In all cases where activities require as a pre-condition that ToR are prepared and approved, ToR will be developed by the National Professional Officer (NPO) – see more below, before being approved by both the PMU and the potential partners involved in the activity. This will ensure that the work carried out meets the needs of the partners/beneficiaries.

**TABLE 26: FISH4ACP PROJECT DESIGN**

| Activity number and name description | Resource required (non-financial) | Likely key partners | Pre-conditions for support being provided |
|---|---|---|---|
| 1.1.1 Conduct studies on topics needed to inform update and improvements to Tanbi oyster and cockle management plan and issues related to mangrove restoration/protection | Local/regional organisation, international consultants | Department of Fisheries and other government organisations | Studies build on past research rather than duplicate it and are coordinated with other donor and government activities. Studies directly beneficial to other aspects of the strategy i.e. are applied research with practical implications/use. |
| 1.1.2 Conduct assessment of status of oyster stocks | International fisheries expert | Department of Fisheries, actors, URI | Expert recruited has experience of oysters/shellfish. Coordination with USAID/URI project. |
| 1.2.1 Hold TRY meetings/workshops with TRY, Department of Fisheries, and other actors to discuss, agree, and validate annual changes/updates to plan | Facilitation by NPO | TRY, Department of Fisheries and other relevant government organisations | Letter of Agreement signed by/with TRY to conduct meetings/workshops to discuss, agree and validate plans. |
| 1.5.1 Define and implement a water quality testing programme in specific areas | International consultant | Department of Fisheries, Department of Water Resources | Letter of Agreement with Department of Water Resources to identify key locations to test water quality and conduct testing. |

| | | | |
|---|---|---|---|
| 1.6.1 Conduct training of water quality monitors (likely to be from the communities) | International consultant | VC actors | Actors in agreed locations agree to undertake testing after training has been completed. Extent of this work specified and actors agree to conduct testing without payment. |
| 1.7.1 Conduct outreach in villages to further strengthen the TRY association and build new organisations in areas outside of Tanbi to aid management and support VC interests | National expert/consultant | TRY, other community associations, Department of Fisheries, actors | Letters of agreement with TRY and other local organisations to undertake and engage with outreach work.<br>Coordination with USAID/URI project. |
| 2.1.1 Conduct study to assess land tenure issues and site location for aquaculture expansion | International aquaculture consultant, national legal consultant | Department of Fisheries, actors, other relevant government ministries | Study recognises and reflects any existing land-use plans and existing legislation on tenure. |
| 2.2.1 Conduct technical feasibility study for alternative farming methods/oyster species | International aquaculture consultant | Department of Fisheries, actors, FISH4ACP in Senegal | Feasibility study builds on lessons and technologies proven to be successful elsewhere. Visit to Senegal coordinated with FISH4ACP in Senegal and planned for an appropriate time of year. |
| 2.3.1 Conduct financial feasibility study and assessment of farm management arrangements for alternative/new oyster farming methods | International aquaculture economist | Department of Fisheries, actors | Financial study builds on technical feasibility study, and incorprates best practices in financial modelling, detailing all assumptions and data limitations. |
| 2.4.1 Conduct pilot field-based trials of new methods and in new areas | International aquaculture consultant | Department of Fisheries, actors | Pilots are based on findings of technical and financial feasibility studies, with site locations agreed by Government and communities and in line with any existing legislation. Trials don't duplicate activities which may be supported by the USAID/URI project. Results of pilots to be communicated/disseminated (see activity below). |
| 2.4.2. Communication/dissemination events around pilot trial results | n/a | Department of Fisheries | Letter of Agreement with Department of Department to disseminate results. |
| 2.5.1 Review and update aquaculture regulations | National legal expert | Department of Fisheries | Existing Act and Regulations (already under review at end of 2022) form basis for revisions. Revisions made end of 2022 don't make this activity |

| | | | |
|---|---|---|---|
| | | | redundant. Proposals for revisions adequately discussed and communicated with all relevant stakeholder groups before being finalized. |
| 3.1.1 Conduct market study to assess potential for new product and marketing channels for oysters and oyster by-products (shells) | National fisheries expert | National partner organisation | LoA signed with partner organisation, to include provision by them of suitably qualified national consultant(s). |
| 3.2.1 Develop a market strategy with time-bound responsibilities for market development | National fisheries expert | National partner organisation | LoA signed with partner organisation, to include provision by them of suitably qualified national consultant(s). |
| 3.3.1 Train actors in requirements of new product/channels for oysters and support pilot/test of market arrangements | National fisheries expert | National partner organisation, actors in selected communities | LoA signed with partner organisation, to include provision by them of suitably qualified national consultant(s). Communities to be trained must be those that have agreed to engage with and be part of pilots. |
| 3.4.1 Train actors in requirements of new product/channels for oyster shells and support pilot/test of market arrangements | National fisheries expert | National partner organisation, actors in selected communities | LoA signed with partner organisation, to include provision by them of suitably qualified national consultant(s).<br>Communities to be trained must be those that have agreed to engage with and be part of pilots.<br>Coordination with USAID/URI project. |
| 3.5.1 Conduct training for food safety inspectors and VC actors on oyster product hygiene/safety standards | International fisheries and aquaculture food safety expert | Actors, FSQA | Letter of Agreement with FSQA to conduct agreed number of tests per year.<br>Actors involved in training those involved with fresh oyster sales and/or those in areas deemed at highest risk of poor product safety. |
| 3.6.1 Conduct programme of food safety controls for oyster products | n/a | FSQA | Letter of Agreement with FSQA to conduct agreed number of tests per year. |
| 3.7.1 Conduct consultations and skills training in villages which don't engage in oyster collection but which are near to oyster stocks, to assess and support involvement of new actors in the VC | National consultants/staff | Department of Fisheries, national partner organization, potential actors | Letter of Agreement with Department of Fisheries/national partner organisation to train communities in harvesting techniques. |

| | | | |
|---|---|---|---|
| 4.1.1 Complete a study into equipment and infrastructure needs of VC actors | International fisheries and aquaculture expert | Department of Fisheries, actors, other donors | Reflects on the lessons from earlier support provided about the usefulness, maintenance and continued use of equipment and infrastructure. Coordination with other donors thinking to provide support (e.g. GIZ). |
| 4.2.1 Specify, procure and deliver appropriate equipment | tbd | tbd | Tbd depending on the mechanism (e.g. LoA) to be used as the basis for the provision of any equipment justified. |
| 4.3.1 Complete a study to review existing data collection, data gaps, and data collection needs for the VC and upgrading strategy and develop a data collection framework (content and implementation arrangements) | International fisheries and aquaculture expert | Department of Fisheries, actors, other donors | Coordination with other donors such as USAID/URI. Department make commitment to fund routine data collection. |
| 4.4.1 Conduct training programme for those involved with data collection and M&E strategy | As above | Department of Fisheries, actors | Suitable venue(s) identified for training. |
| 4.5.1 Collect and publicize relevant data | n/a | Department of Fisheries | Letter of Agreement with Department of Fisheries to collect data and publication of annual report. |
| 4.6.1 Prepare and validate a strategy to increase access to finance and enhance savings of VC actors | National financial expert | Actors, micro-finance institutions | Build on work already completed by AFRACA consultant. |
| 4.7.1 Facilitate access to finance and support savings by actors | Micro-finance institution(s) | Actors, micro-finance institutions | Tbd depending on the mechanism (e.g. LoA, MoU) to be used |
| 4.8.1 Complete a programme to teach VC actors who can't swim how to do so | n/a | Gambia Navy/Fire Department | LoA with partner organisation |
| 4.9.1 Provide technical support, training and services to VC actors to support uptake of new methods and practices | Tbd based on nature of support | Department of Fisheries, actors, others tbd | Letter of Agreement with national partner(s) (Department of Fisheries / Try / others) |

Source*:* Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

## 5.4 Risk analysis

This final section considers key risks associated with the proposed activities, along with the mitigation measures to ameliorate them. Text description is provided before presenting a summary risk analysis table (Table 27). For each risk articulated, comment is provided on the likelihood of the risk occurring, as well as its potential impact on successful implementation of the upgrading strategy.

### *Failure of pilot activities and/or replication of pilot activities supported by FISH4ACP is not widespread*

Pilot activities related to aquaculture development, and the marketing of new products, are intended to demonstrate viability and the replicated more widely by VC actors. There is a risk, as with any new activities/pilots, that they will not prove to be technically, financially, socially, or environmentally viable. Unsuccessful piloting would have a serious impact on the ability of some aspects of the strategy be realized as there would be no strong justification for replication. Minimizing the risk of unsuccessful pilots has already been partly ensured through preliminary assessment of the market potential during the analysis and design phase. Additional mitigation will take the form of drawing on lessons from elsewhere (e.g. Senegal) to ensure that pilot activities are more likely to succeed based on technologies, practices, and known successes in other places. Additionally, high quality consulting/expertise recruited to design and provide inputs to pilots will ensure they are more likely to succeed. Even if/when pilot activities are shown to be viable, there is an additional risk that their uptake and replication more widely in the country will not take place, which again would have a significant impact on the strategy to achieve its objectives. To mitigate this risk, the upgrading strategy includes specific activities designed to ensure widespread communication and demonstration of successful piloting.

### *Capacity/willingness of actors and Department of Fisheries (and other donors) to engage with FISH4ACP given other activities/demands*

VC actors and government officials have many activities to complete as part of their normal activities, as well as demands placed on them by other donors. This means there is a risk that they will fail to engage actively or sufficiently with activities to be supported by FISH4ACP. The likelihood of this risk negatively affecting FISH4ACP activities and the successful implementation of the strategy is assessed as medium, but should engagement by insufficient, the impacts would be considerable. This risk is mitigated through the active participation in actors and government officials in the analysis and design phase, careful phasing of activities, and will be further supported through the activities of the OSAC and its support for the strategy. Additional mitigation will be ensured through collaboration with other donors to coordinate across activities.

### *Stakeholders' enthusiasm for the upgrading strategy will not continue post-FISH4ACP*

The FISH4ACP methodology attempts to build and verify stakeholder support for a long-term vision (to 2032) and upgrading strategy, which continues past the project's lifespan (2022–2025). There is a risk that once FISH4ACP funding and technical support finishes, enthusiasm for continued implementation of the strategy wanes, and funding for ongoing activities by government is not made available. Mitigating this risk has been attempted by making sure stakeholders understand that they have a role to play in the longer-term implementation of the strategy, rather than relying on a 'project-based' approach through FISH4ACP. The risk will be further mitigated by the oyster value chain stakeholder advisory committee OSAC (already established), made up of local government and private sector representatives, to drive the upgrading strategy from the beginning and post-FISH4ACP involvement. These strategies imply that the likelihood of this risk occurring is medium-low. The impact of this risk can also be considered relatively low as considerable gains are expected to be realised during the first three years of the upgrading strategy.

### *Difficulties in accessing all actors*

While the Gambia is not a large country, access to some communities involved with the VC can be difficult due to road quality and isolation/distance from Banjul (especially during the rainy season). The large number of actors involved also means that ensuring that all have access to and benefit from the strategy could be problematic. The TRY oyster women's association is a useful organisation to mitigate the challenges of accessing stakeholders, but it only represents around 40 percent of all actors and its geographical focus is not national but focused on the Tanbi area. This risk will be mitigated through use of the contacts obtained by Department of Fisheries and ISRAD during the data collection and shellfish frame survey completed during the analysis and design phase, and a constant effort to ensure that activities don't focus on activities closest to Banjul and the sites that are most easily accessible.

### *Climate change impacts threaten investments made*

The effects of climate change are likely to be longer-term in nature and relate to inundation of mangrove areas used for the collection of oysters, and their likelihood and impacts on the upgrading strategy (implemented over a ten-year period to 2032) are both assessed as low. Investments made in the VC by all parties will nevertheless need to be 'climate-proofed' against climate change impacts to the extent possible. This will require by way of mitigation careful siting of investments in physical assets, equipment and infrastructure.

**TABLE 27: SUMMARY RISK ANALYSIS TABLE**

| Risk description | Likelihood (1-5) | Impact (1-5) | Overall Risk (1-25) | Mitigation |
|---|---|---|---|---|
| Failure of pilot activities and/or replication of pilot activities supported by FISH4ACP is not widespread | 3 | 5 | **15** | High quality technical inputs to pilot activities and targeted facilitation and support. Lessons from elsewhere. Preliminary assessment of demand for new products. Specific activities targeted at communicating and disseminating results of pilot activities. |
| Capacity of actors and Department of Fisheries to engage with FISH4ACP given other activities/demands | 3 | 4 | **12** | Phasing of activities, coordination with other donors, support from the oyster stakeholder advisory committee (OSAC). |
| Lack of stakeholder enthusiasm for strategy post FISH4ACP | 3 | 3 | **9** | Participatory nature of FISH4ACP methodology, creation of VC advisory committee, the OSAC. |
| Difficulties in accessing all actors | 3 | 3 | **9** | Utilization of Department of Fisheries contacts and those from FISH4ACP field work in communities not represented by TRY. Constant efforts to reach communities more distant from Banjul. |
| Climate change impacts threaten investments | 2 | 2 | **4** | Appropriate siting and climate-proofing aquaculture investments. |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Note: overall risk calculated by multiplying risk likelihood and risk impact. Scores are necessarily subjective and the views of the consultants. Overall risk = likelihood x impact

# Annexes

## Annex 1 – Primary and secondary data collection, and additional data tables from the shellfish frame survey

Secondary data collection (desk research) covered many reports, publications, and databases (including confidential reports), and was completed primarily by a small team of international consultants (the authors of this report).

Primary data collection was completed mainly during April and June 2022 by a small team from ISRAD, under contract to FAO, with the development of data collection tools being the responsibility of the international team. The FAO team provided training to ISRAD in the tools, and ISRAD piloted them before revision and full roll out of the different methods used. The main challenges experienced during the data collection process related to obtaining access to stakeholders in remote locations, during Ramadan. Nevertheless, the data collection programme was completed as planned and on time. Various primary data collection methods and means were utilized, including observational visits, focus group discussions, actor interviews, key informant interviews, actor and consumer surveys, and expert groups. Almost all were carried out in person [151] using detailed checklists of the information to be obtained, questionnaires, or interview/focus group guides. In several cases, consultees were re-approached on an iterative basis during the study following the initial primary data collection, to help answer emerging questions, respond to data requests, and to validate emerging proposals with regards to the contents of the upgrading strategy.

A detailed list of data collection methods and geographical coverage is provided below. Data collection covered all actor types and key stakeholders external to the VC e.g. government organisation, input suppliers, etc.

**TABLE 28. METHOD OF PRIMARY DATA COLLECTION AND GEOGRAPHICAL COVERAGE**

| Method | West Coast Region | North Bank Region | Lower River Region | Kanifing/ Bajul | Total |
|---|---|---|---|---|---|
| Observational visits | 5 | 1 | 2 | 4 | 12 |
| Focus Groups with actors | 4 | 1 | 1 | 4 | 10 |
| Actor survey | 39 | 20 | 16 | 29 | 104 |
| Consumer survey | 58 | 5 | 15 | 43 | 121 |
| Actor interviews | 10 | | | 5 | 15 |
| Key informant interviews | 3 | 1 | 1 | 6 | 11 |
| Expert Group discussions * | - | - | - | - | 2 |

[151] A few supplementary interviews were completed by the international team using video-conferencing.

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.
Note: * = not specific to a region. Data collection completed by ISRAD.

Additional primary data collection through the analysis and design phase was conducted by the international team and the national project officer, and by ISRAD between June and September 2022. And bilateral meetings were conducted with related projects and partners (i.e., AFD, USAID) to explore synergies between FISH4ACP and these projects.

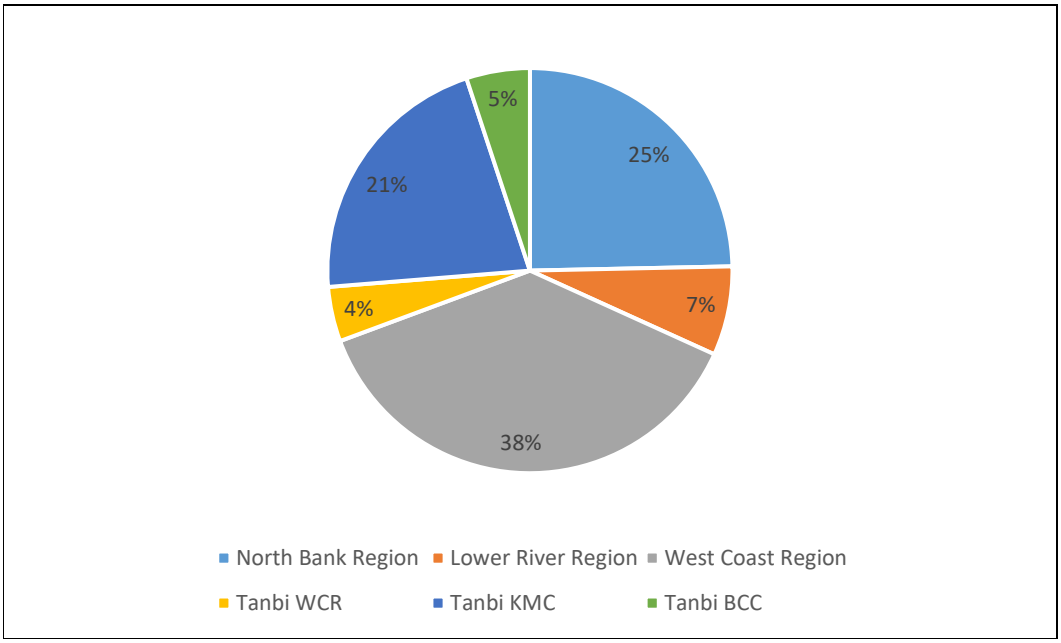
Additionally, a national level shellfish frame survey was funded by FISH4ACP and completed in September and October 2022 by Department of Fisheries/ISRAD staff. Data were collected using tablets and ODK software, so that results were immediately available through excel and SPSS output files. Data were collected from 37 communities identified during field work as being involved with shellfish in the Gambia. Additional tables and figures of interest from the frame survey are provided below.

**TABLE 29: NUMBER OF PEOPLE INVOLVED WITH THE OYSTER VALUE CHAIN BY REGION**

| number of actors | male | female | total | % of total |
|---|---|---|---|---|
| North Bank Region | 44 | 306 | 350 | 25% |
| Lower River Region | 26 | 75 | 101 | 7% |
| West Coast Region | 68 | 465 | 533 | 38% |
| Tanbi WCR | 0 | 62 | 62 | 4% |
| Tanbi Kanifing Municipal Council (KMC) | 8 | 293 | 301 | 21% |
| Tanbi Banjul City Council (BCC) | 4 | 68 | 72 | 5% |
| Total | 150 | 1269 | 1419 | 100% |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP frame survey

**FIGURE 27: PROPORTION OF PEOPLE INVOLVED WITH THE OYSTER VALUE CHAIN BY REGION**




Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP frame survey

### TABLE 30: NUMBER OF COMMUNITIES INDICATING DIFFERENT ETHNIC GROUPS AS BEING MOST INVOLVED WITH SHELLFISH

| Fula | Jola | Karoninka | Mandinka | Manjago | Serrer | Wollof | Other |
|---|---|---|---|---|---|---|---|
| 4 | 33 | 4 | 8 | 7 | 4 | 0 | 2 |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP frame survey

### TABLE 31: NUMBER OF PEOPLE INVOLVED IN THE OYSTER VALUE CHAIN BY FUNCTION, GENDER, AND LEVEL OF INVOLVEMENT

| | male | female | total | % of total |
|---|---|---|---|---|
| only collect < 5 days/week | 2 | 5 | 7 | 0,5% |
| only collect > 5 days/week | 1 | 18 | 19 | 1,3% |
| **total only collect** | **3** | **23** | **26** | **1,8%** |
| only process < 5 days/week | 1 | 30 | 31 | 2,2% |
| only process > 5 days/week | 1 | 102 | 103 | 7,3% |
| **total only process** | **2** | **132** | **134** | **9,4%** |
| collect and process < 5 days/week | 3 | 47 | 50 | 3,5% |
| collect and process > 5 days/week | 52 | 198 | 250 | 17,6% |
| **total collect and process** | **55** | **245** | **300** | **21,1%** |
| only retail < 5 days/week | 0 | 15 | 15 | 1,1% |
| only retail > 5 days/week | 1 | 11 | 12 | 0,8% |
| **total only retail** | **1** | **26** | **27** | **1,9%** |
| collect/process/retail < 5 days/week | 2 | 127 | 129 | 9,1% |
| collect/process/retail > 5 days/week | 90 | 742 | 832 | 58,6% |
| **total collect/process/retail** | **92** | **869** | **961** | **67,7%** |
| **Total** | | | | **102,0%** |
| **Total < 5 days/week during season** | 8 | 224 | 232 | 16,3% |
| **Total > 5 days/week during season** | 145 | 1071 | 1216 | 85,7% |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP frame survey. Note. Those only processing oysters are likely to be labour rather than actors 'owning' oysters. Frame survey numbers underestimate numbers of retailers, as was conducted in communities and not in urban markets where dedicated retailers are known to operate.

### TABLE 32: ESTIMATED NUMBER OF ACTORS IN THE OYSTER VALUE CHAIN

| | male | female | total | % of total |
|---|---|---|---|---|
| only collect > 5 days/week | 1 | 18 | 19 | 1,6% |
| collect and process > 5 days/week | 52 | 198 | 250 | 20,8% |
| only retail > 5 days/week | 1 | 98 | 99 | 8,3% |
| collect/process/retail > 5 days/week | 90 | 742 | 832 | 69,3% |
| **TOTAL** | 144 | 1056 | 1200 | 100,0% |
| | 12% | 88% | | |

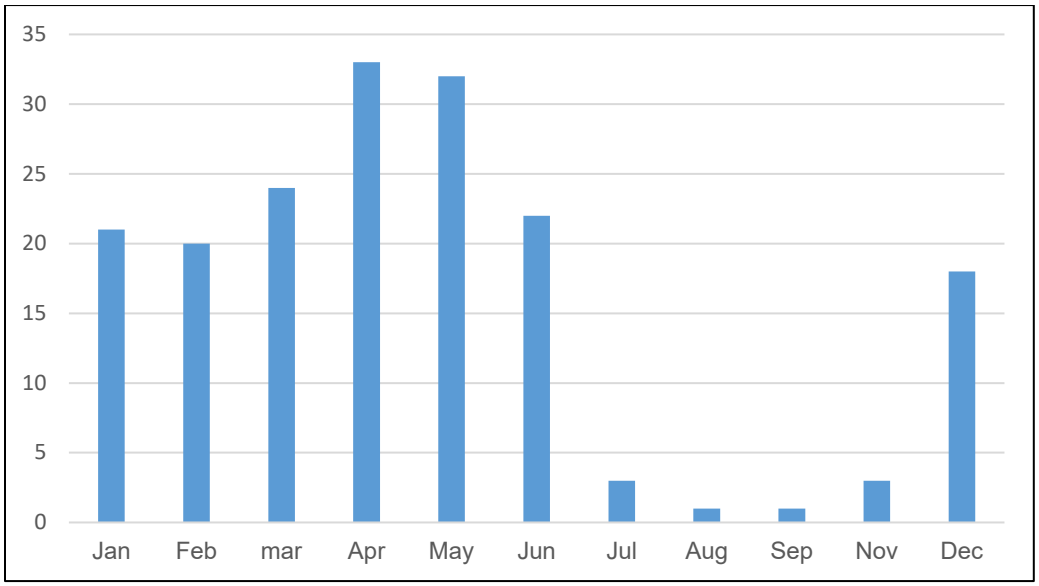
Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP frame survey. Note: figures exclude those involved for less than 5 days a week, and those who only process, from table above.

**TABLE 33: CANOES USED BY OYSTER COLLECTORS**

| **Canoes used by actors** | **total** | **309** | **with engine** | **12** |
|---|---|---|---|---|
| **Canoe ownership** | **single ownership** | **collective ownership** | **rented** | **total** |
| number | 159 | 69 | 81 | 309 |
| **type** | **planked** | **dugout** | **fibreglass** | **total** |
| number | 138 | 116 | 55 | 309 |
| **length** | **<3m** | **3-5m** | **>5m** | **total** |
| number | 23 | 233 | 53 | 309 |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP frame survey

**FIGURE 28: NUMBER OF COMMUNITIES REPORTING OYSTER COLLECTION IN DIFFERENT MONTHS**




Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP frame survey

### TABLE 34: AVERAGE OF PRODUCT TYPES SUGGESTED ACROSS ALL COMMUNITIES

| Products | boiled/ steamed | dried | smoked |
|---|---|---|---|
| average % of sales by product | 94% | 1% | 5% |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP frame survey. Note: these figures are almost identical to the findings from the actor survey

### TABLE 35: MARKETING CHANNELS

| Market destination | own consumption | retailed in community by processors | sold to retailers who buy in community for sale elsewhere | taken and sold to retailers in markets elsewhere | taken and sold by collectors / processors in retail markets |
|---|---|---|---|---|---|
| average % of sales channel suggested across all communities | 8% | 13% | 10% | 41% | 28% |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP frame survey

# Annex 2 – Detailed economic calculations

**TABLE 36: ANNUAL OPERATING ACCOUNTS INDIVIDUAL COLLECTOR/PROCESSOR/RETAILER (2021)**

| **Collector/processor/retailer** | Data based on actor survey (n=95) | | | **2021** |
|---|---|---|---|---|
| **Operational information** | | | | |
| weeks per year | 18.5 | | | |
| hours per year | 546 | | | |
| **Revenues (GMD)** | unit | no. units | unit cost (GMD) | total (GMD) |
| large boiled | cups | 1 354 | 43.3 | 58 630 |
| small boiled | cups | 215 | 31.3 | 6 724 |
| large smoked | cups | 69 | 62.2 | 4 280 |
| small smoked | cups | 12 | 45.0 | 526 |
| dried | cups | 16 | 35.0 | 559 |
| *Total revenue* | | 1 665 | | 70 719 |
| | | | | |
| **Operational costs (GMD)** | | | | |
| transport to sites | | | | 844 |
| canoe rental | | | | 3 489 |
| transport cost to market | | | | 1 383 |
| labour | | | | 1 495 |
| wood | | | | 1 725 |
| other small items | | | | 923 |
| *Total operational costs* | | | | 9 860 |
| | | | | |
| **Fixed costs (GMD)** | | | | |
| loans | | | | 2 134 |
| government charges | | | | 72 |
| canoe depreciation | | | | 262 |
| *Total fixed costs* | | | | 2 468 |
| | | | | |
| **Net operating profit GMD** | | | | **58 391** |
| **Net operating profit USD** | | | | **1 093** |
| | | | | |
| **Direct value added (earnings, labour, gov charges) (GMD)** | | | | **59 959** |
| **Indirect value added (20%) (GMD)** | | | | **2 152** |
| **Earnings per hour (GMD)** | | | | **107** |
| **Return on sales** | | | | **83%** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP actor survey

### TABLE 37: ANNUAL OPERATING ACCOUNTS INDIVIDUAL COLLECTOR/PROCESSOR/RETAILER (2032 WITH UPGRADING)

| **Collector/processor/retailer** | | | | **2032** |
|---|---|---|---|---|
| **Operational information** | | | | |
| weeks per year | 18,5 | | | |
| hours per year | 546 | | | |
| **Revenues (GMD)** | unit | no. units | unit cost (GMD) | total (GMD) |
| *fresh oysters* | *kgs in shell* | *30* | *447* | *13 436* |
| large boiled oysters | cups | *1 489* | 43,3 | *64 493* |
| small boiled oysters | cups | *236* | 31,3 | *7 396* |
| large smoked oysters | cups | *76* | 62,2 | *4 708* |
| small smoked oysters | cups | *13* | 45,0 | *579* |
| dried oysters | cups | *18* | 35,0 | *615* |
| *bulk oyster shell sales* | *tonnes* | *3,00* | *3000* | *9014* |
| *jewelry products* | *kgs in shell* | *1,20* | *5962* | *7166* |
| *increase in aquaculture production* | *cups* | *231* | *43,3* | *10013* |
| ***Total revenue*** | | | | ***117 421*** |
| **Operational costs (GMD)** | | | | |
| transport to sites | | | | 844 |
| canoe rental | | | | 3 489 |
| transport cost to market | | | | 1 383 |
| labour | | | | 1 495 |
| wood | | | | 1 725 |
| other small items | | | | 923 |
| *ice and transport for fresh oyster sales* | | | | *4 031* |
| *inputs to jewellry production (paint, clasps, etc)* | | | | *2 150* |
| ***Total operational costs*** | | | | ***16 040*** |
| **Fixed costs (GMD)** | | | | |
| loans | | | | 2 134 |
| government charges | | | | 72 |
| canoe depreciation | | | | 262 |
| *aquaculture yearly depreciation costs* | | | | *5 007* |
| ***Total fixed costs*** | | | | ***7 475*** |
| **Net operating profit GMD** | | | | ***93 906*** |
| **Net operating profit USD** | | | | ***1 575*** |
| **Direct value added (earnings, labour, gov charges) (GMD)** | | | | ***95 473*** |
| **Indirect value added (20%) (GMD)** | | | | ***4 390*** |
| **Return on sales** | | | | ***80%*** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP actor survey. Text in italic shows changes from the baseline model for 2021.

**TABLE 38: ANNUAL OPERATING ACCOUNTS INDIVIDUAL COLLECTOR/PROCESSOR (2021)**

| **Collector/processor** | Data based on actor survey (n=7) | | | 2021 |
|---|---|---|---|---|
| **Operational information** | | | | |
| weeks per year | 16.7 | | | |
| hours per year | 746 | | | |
| **Revenues (GMD)** | unit | no. units | unit cost (GMD) | total (GMD) |
| large boiled | cups | 2 188 | 39.2 | 85 758 |
| small boiled | cups | 269 | 34.6 | 9 303 |
| large smoked | cups | | | 0 |
| small smoked | cups | | | 0 |
| dried | cups | | | 0 |
| *Total revenue* | | 2 457 | | 95 061 |
| | | | | |
| **Operational costs (GMD)** | | | | |
| transport to sites | | | | 835 |
| canoe rental | | | | 1 431 |
| transport cost to market | | | | 2 004 |
| labour | | | | 7 081 |
| wood | | | | 1 555 |
| other small items | | | | 1 435 |
| *Total operational costs* | | | | 14 341 |
| | | | | |
| **Fixed costs (GMD)** | | | | |
| loans | | | | 0 |
| government charges | | | | 215 |
| canoe depreciation | | | | 0 |
| *Total fixed costs* | | | | 215 |
| | | | | |
| **Net operating profit GMD** | | | | **80 504** |
| **Net operating profit USD** | | | | **1 508** |
| | | | | |
| **Direct value added (earnings, labour, gov charges) (GMD)** | | | | **87 800** |
| **Indirect value added (20%) (GMD)** | | | | **1 452** |
| **Earnings per hour (GMD)** | | | | **108** |
| **Return on sales** | | | | **85%** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP actor survey

### TABLE 39: ANNUAL OPERATING ACCOUNTS INDIVIDUAL RETAILER (2021)

| **Retailer** | Data based on actor survey (n=2) | | | 2021 |
|---|---|---|---|---|
| **Operational information** | | | | |
| weeks per year | 26.0 | | | |
| hours per year | 572 | | | |
| **Revenues (GMD)** | unit | no. units | unit cost (GMD) | total (GMD) |
| large boiled | cups | 1 950 | 50.0 | 97 500 |
| small boiled | cups | 975 | 32.5 | 31 688 |
| large smoked | cups | | | 0 |
| small smoked | cups | | | 0 |
| dried | cups | | | 0 |
| *Total revenue* | | 2 925 | | 129 188 |
| | | | | |
| **Operational costs (GMD)** | | | | |
| transport to sites | | | | 0 |
| canoe rental | | | | 0 |
| transport cost to market | | | | 19 500 |
| labour | | | | 0 |
| wood | | | | 0 |
| other small items | | | | 1 250 |
| *Total operational costs* | | | | 20 750 |
| | | | | |
| **Fixed costs (GMD)** | | | | |
| loans | | | | 26 000 |
| government charges | | | | 1 650 |
| canoe depreciation | | | | 0 |
| *Total fixed costs* | | | | 27 650 |
| | | | | |
| **Net operating profit GMD** | | | | **80 788** |
| **Net operating profit USD** | | | | **1 513** |
| | | | | |
| **Direct value added (earnings, labour, gov charges) (GMD)** | | | | **82 438** |
| **Indirect value added (20%) (GMD)** | | | | **9 350** |
| **Earnings per hour (GMD)** | | | | **141** |
| **Return on sales** | | | | **63%** |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO. Based on FISH4ACP actor survey

**TABLE 40: ANNUAL PROFITABILITY OF OYSTER FARMING PER HORIZONAL PRODUCTIVE POLE (2021)**

| Item | *Costs* | | notes |
|---|---|---|---|
| 1 | Cost one bamboo pole (GMD) | 50 | cost per horizontal pole |
| 2 | Number of poles needed for each horizontal productive pole | 3 | Two vertical and one horizontal |
| 3 | Total cost per productive pole | 150 | item 1 x item 2 |
| 4 | lifespan of poles (years) | 6 | average of interview answers (3, 4, 5, 8, 10) |
| 5 | Total annual cost of poles | 25 | item 3 divided by item 4 |
| 6 | Nylon cost (GMD/metre) | 0.375 | 200m bundle costs GMD 75 |
| 7 | Nylon needed per horizontal pole (m) | 12.5 | assuming 10 vertical lines of 1m each, discarded each year so an annual cost. 15-20cm between vertical lines |
| 8 | Total nylon cost per horizontal pole (GMD) | 4.68 | item 6 x item 7 |
| 9 | **Total input costs per year per productive pole (GMD)** | 29.69 | item 3 + item 8 |
| | *Revenues* | | |
| 10 | Number of boiled cups of oysters per horizontal pole per year | 15 | one harvest per year. Average of interviews answers (4-6, 6-8, 8, 12 cups per pole). Department of Fisheries suggested 25 cups per line |
| 11 | Price per cup of boiled oysters (GMD) | 43.2 | average price of large boiled oyster from actor survey |
| 12 | **Total revenue per horizontal pole (GMD)** | 648.00 | item 10 x item 11 |
| 13 | **Net revenue (GMD)** | 618.31 | item 12 - item 9 |
| 14 | **Return on sales (%)** | 95% | item 13 / item 12 |
| 15 | **Days of input per pole** | 4 | assumes 1-2 hours day for punching and tying shells and 4 hours for construction, 2 days for maintenance (2 hours twice a month = 4 hours/month = 48 hours/year = 2 days), 1 day total for harvesting/boiling |
| 16 | **Revenue per day (GMD)** | 154.58 | compares with collector/processor revenue of GMD 673/day from actor survey |

Source: Macfadyen, G., Vilela López, B., Thiao, D., Ward, A., 2023. *The mangrove oyster value chain in the Gambia: Analysis and design report*. Rome, FAO.

# Annex 3: Extracts from FISH4ACP methodological guide on scoring

This Annex provides information about the scoring used for the economic, social and environmental sustainability assessments. Text is taken from the FISH4ACP methodological guide. For each of the three pillars of the assessment, a table is first provided to show:

- Indicators from the full suite of indicators in the FISH4ACP methodology that are included, with scoring based on quantitative data
- Indicators from the full suite of indicators in the FISH4ACP methodology that are included, but with scoring based on qualitative assessment (due to data gaps)
- Indicators from the full suite of indicators in the FISH4ACP methodology that are excluded, either because they are not relevant to the mangrove oyster value chain, or because there is no quantitative or qualitative basis on which to complete the scoring.

The scoring is done by the VCA team using multiple sources of information, and then reviewed based on feedbacks collected from the VC stakeholders at the validation workshop.

## Economic analysis – Scoring

**TABLE 41: INCLUSION/EXCLUSION OF FISH4ACP ECONOMIC INDICATORS IN ASSESSMENT OF THE GAMBIA OYSTER VALUE CHAIN**

| Components | indicator # | Indicators | Included/Excluded and basis for scoring | Source of data (or justification for exclusion) |
|---|---|---|---|---|
| **Profitability** | Ec1 | Net income at actor level | Included, quantitative | Actor survey |
| | Ec2 | Trend in net income at actor level (last 5 yrs) | Included, quantitative | Actor survey |
| | Ec3 | Net profit margin (or return on sales) (%) | Included, quantitative | Actor survey |
| | Ec4 | Return on investment (%) | Included, quantitative | Actor survey |
| **Employment** | Ec5 | Number of jobs in FTE | Included, quantitative | Actor survey |
| | Ec6 | Number of FTE jobs | Included, quantitative | Actor survey |
| | Ec7 | Number of wage/salaried (hired) jobs in FTE | Included, qualitative | Focus groups |

| Components | indicator # | Indicators | Included/Excluded and basis for scoring | Source of data (or justification for exclusion) |
|---|---|---|---|---|
| | Ec8 | Number of self-employed/family labour jobs in FTE | Included, qualitative | Focus groups |
| | Ec9 | average gross wage paid to hired workers | Excluded | there is virtually no hired labour in the VC |
| | Ec10 | average gross wage proxy for family labour | Included, quantitative | Actor survey |
| | Ec11 | total value of net wages | Excluded | Intended to assess the extent to which hired labour are paid fairly, but is not suitable for the Gambia VC where almost all actors are self-employed |
| **Value added** | Ec12 | Direct value added at VC level | Included, quantitative | Actor survey |
| | Ec13 | Indirect VA at VC level | Included, quantitative | Actor survey |
| | Ec14 | Total VA | Included, quantitative | Actor survey |
| | Ec15 | Total value of output | Excluded | Cannot be assessed as good or bad |
| **Effects on national economy** | Ec16 | Contribution to GDP (%) | Excluded | Cannot be assessed as good or bad |
| | Ec17 | Contribution to agriculture GDP (%) | Excluded | Cannot be assessed as good or bad |
| | Ec18 | Contribution to fisheries GDP (%) | Excluded | Cannot be assessed as good or bad |
| | Ec19 | Net impact on the balance of trade (USD) | Included, qualitative | Actor survey, focus groups |
| | Ec20 | Rate of integration (%) | Included, qualitative | Actor survey, focus groups |

| Components | indicator # | Indicators | Included/Excluded and basis for scoring | Source of data (or justification for exclusion) |
|---|---|---|---|---|
| | Ec21 | Net impact on public funds (US$) | Included, qualitative | Actor survey, KII, focus groups |
| | Ec22 | Contribution to national budget (%) | Excluded | Cannot be assessed as good or bad |
| | Ec23 | Contribution to the line ministry budget (%) | Excluded | Cannot be assessed as good or bad |
| | Ec24 | Private investment (US$) | Excluded | Not considered a robust indicator |
| | Ec25 | Investment borrowing (% of investment) | Excluded | Not considered a robust indicator. Investment and borrowing may be required to grow businesses, but depending on amounts and cost of capital can lead to indebtedness and poor economic performance |
| | Ec26 | Formal investment borrowing (% of borrowed) | Excluded | Not considered a robust indicator |
| | Ec27 | Total borrowing (US$) on annual basis | Excluded | Not considered a robust indicator |
| | Ec28 | Formal borrowing (% of borrowed amounts) | Excluded | Not considered a robust indicator |
| | new | Access and costs of capital | Included qualitative | Access to capital at competitive rates should be available for those that require it |
| **International competitiveness** | Ec29 | Nominal protection coefficient (NPC) | Included quantitative | Consumer survey and Senegal VC report/survey |
| | Ec30 | Domestic resource cost ratio (DRC) | Included quantitative | As above |

| Components | indicator # | Indicators | Included/Excluded and basis for scoring | Source of data (or justification for exclusion) |
|---|---|---|---|---|
| **Value for end consumers** | Ec31 | Consumer price benefit surplus: output value at reference prices – output at market price | Included, quantitative | Consumer survey and Senegal VC report/survey |
| | Ec32 | Number of annual food safety violations recorded in the VC | Excluded | Data not available as so little/no testing conducted |
| | Ec33 | Consumer evaluations of the different aquatic products (scores) - 1-5 evaluations on selected criteria | Included, qualitative | Indicator scoring not numeric, but data should be available from consumer survey on scale 1-5 for different criteria |
| | Ec34 | Consumer preference relative to the four most direct substitute food products (1-5 rank) | Excluded | No direct substitutes for oysters and consumers not asked about substitute preferences |
| | Ec35 | Price relative to four most direct substitute food products (market price differences) | Included quantitative | No direct substitutes but oyster prices compared to other fish prices (and chicken and meat) |

To assess the economic domains, a score 1 – 3 (corresponding to red (1), yellow (2) and green (3)) is provided to the economic indicators in the assessment, with 1 (red) means unsustainable, 2 (yellow) means concerning, and 3 (green) means sustainable.

## *1. Profitability indicators*

*Ec1 Net profits at actor level*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If positive | If zero | If negative |

*Ec2 Trend in net profits at actor level*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If growing significantly (e.g., 10% per year | If flat or growing slowly (less than 10% per year) | If decreasing |

*Ec3 Net profit margin (or return on sales)*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If significantly above the cost of capital (e.g. 20% above) | If around the cost of capital (e.g. less than 20% above or below) | If significantly below the cost of capital (e.g. less than 80% of the cost of capital) or even negative |

*Ec4 Return on investment*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If significantly above the cost of capital (e.g. 20% above) | If around the cost of capital (e.g. less than 20% above or below) | If significantly below the cost of capital (e.g. less than 80% of the cost of capital) or even negative |

## *2. Employment indicators*

Ec5 *Number of jobs in FTE terms*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If the number of jobs is twice the number of actors | If the number of jobs is 25% to 200% of the number of actors | If the number of jobs is less than 25% of the number of actors |

Ec6 *Number of full-time jobs*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Above 50% of all jobs | Between 10% and 50% of all jobs | Below 10% of all jobs |

**This indicator should be scored 1/red but is instead scored as 2/yellow as part-time employment need not necessarily be a negative thing if it allows flexibility in individual and household livelihood strategies**

Ec7 *Number of wage/salaried (hired) jobs*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Above 50% of all jobs | Between 10% and 50% of all jobs | Below 10% of all jobs |

Ec 8 *Number of self-employed/family labour jobs*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Below 50% of all jobs | Between 50% and 90% of all jobs | Above 90% of all jobs |

Ec9 *Average gross wage paid to hired workers*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Average wage at VC level is 10% or more above the living wage and/or minimum wage level, and average wage is not below these values at any node in the VC | Average wage at VC level is within 10% of the living wage and/or minimum wage level, and average is wage is not below these values at any node in the VC | Average wage at VC level is more than 10% below the living wage and/or minimum wage level |

**This indicator is excluded from the assessment as there is virtually no hired labour in the VC (and those that are hired are 'paid' in oysters/in-kind not wages).**

Ec10 A*verage gross wage proxy for family labo*r

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Average wage at VC level is 10% or more above the living wage and/or minimum wage level, and average wage is not below | Average wage at VC level is within 10% of the living wage and/or minimum wage level, and average is wage is not below these | Average wage at VC level is more than 10% below the living wage and/or minimum wage level |

| | | |
|---|---|---|
| these values at any node in the VC | values at any node in the VC | |

Ec11 *Total value of net wages*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If above 25% of net value added | If between 10% and 25% of net value added | If below 10% of net value added |

**Excluded as is intended to assess the extent to which hired labour are paid fairly, but is not suitable for the Gambia VC where almost all actors are self-employed.**

## *3. Value added indicators*

Ec12 *Direct value added*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If making up 25% or more of the total value of output (at all levels) | If making up between 10% and 25% of the total value of output (at VC level) | If making up less than 10% of the total value of output (at VC level) |

Ec13 *Indirect VA at VC level*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If equivalent to more than 10% of the total value of output | If equivalent to between 5% and 10% of the total value of output | If equivalent to less than 5% or more of the total value of output |

**Indirect value added certainly below 10% of value of sales so should be scored 1/red. However higher indirect VA would imply higher costs for the VC actors depressing profits/income, and while the VC creates little multiplier effects from inputs this is not necessarily a negative thing, so scored 2/yellow.**

Ec14 *Total VA*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If equivalent to more than 35% of the total value of output | If equivalent to between 15% and 35% of the total value of output | If equivalent to less than 15% or more of the total value of output |

Ec15 *Total value of output*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Cannot be assessed as good or bad. Increase is good. | | |

**Excluded as cannot be assessed as good or bad. Does not appear in heatmap.**

## *4. Effects in the national economy indicators*

Ec16 *Contribution to GDP*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Cannot be assessed as good or bad. Increase (grows faster than other VCs or shrinks slower) cannot be assessed as good or bad. | | |

**Excluded as cannot be assessed as good or bad. Does not appear in heatmap.**

Ec17 *Contribution to agriculture GDP*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Cannot be assessed as good or bad. Increase cannot be assessed as good or bad. | | |

**Excluded as cannot be assessed as good or bad. Does not appear in heatmap.**

Ec18 *Contribution to fisheries GDP*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Cannot be assessed as good or bad. Increase cannot be assessed as good or bad. | | |

**Excluded as cannot be assessed as good or bad. Does not appear in heatmap.**

Ec19 *Net impact on the balance of trade*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If positive | If zero | If negative |

Ec20 *Rate of integration (*indicator of the extent to which the VC depends on domestic factor)

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If above 50% | If between 25-50% | If below 25% |

Ec21 *Net impact on public funds*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If positive | If zero or negative but small | If large and negative |

Ec22 *Contribution to national budget*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| As a relative measure (%), cannot be assessed as good or bad. Increase (grows faster than other VCs, or shrinks slower) cannot be assessed as good or bad. | | |

**Excluded as cannot be assessed as good or bad. Does not appear in heatmap**

Ec23 *Contribution to the line ministry budget*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| As a relative measure (%), cannot be assessed as good or bad. Increase (grows faster than other VCs, or shrinks slower) cannot be assessed as good or bad. | | |

**Excluded as cannot be assessed as good or bad. Does not appear in heatmap**

Ec24 *Private investment*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If significant relative to the VA generated (above 20%) | If a medium % (10-20%) of VA generated | If only a small % of the VA generated |

**Excluded as not considered a strong indicator. Investment and borrowing, from private or formal sources, may be viewed as either positive or negative.**

Ec25 *Investment borrowing*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If significant relative to the overall investment (above 50%) | If between 10% and 50% of the overall investment | If only a small % of the overall investment (less than 10%) |

**Excluded as not considered a strong indicator. Investment and borrowing, from private or formal sources, may be viewed as either positive or negative. Borrowing may be required to grow businesses, but depending on amounts and costs may result in poor business performance and indebteness.**

Ec26 *Formal investment borrowing*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If significant relative to the overall investment borrowing (above 50%) | If between 10% and 50% of the overall investment borrowing | If only a small % of the overall investment borrowing (less than 10%) |

**Excluded as not considered a strong indicator. Investment and borrowing, from private or formal sources, may be viewed as either positive or negative.**

Ec27 *Total borrowing*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Cannot be assessed as good or bad. Increase is good. | | |

**Excluded as not considered a strong indicator. Investment and borrowing, from private or formal sources, may be viewed as either positive or negative.**

Ec28 *Formal borrowing*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If significant relative to the overall borrowing (above 50%) | If between 10% and 50% of the overall borrowing | If only a small % of the overall borrowing (less than 10%) |

**Excluded as not considered a strong indicator. Investment and borrowing, from private or formal sources, may be viewed as either positive or negative.**

*Ec new Access to capital*

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If access to capital is generally available from different sources (formal and informal) and at competitive rates (costs of capital) | If access to capital is not available to some actors from different sources (formal and informal) and/or at rates which considered uncompetitive | If access to capital is generally not available to all actors from different sources (formal and informal) and/or only at uncompetitive rates |

**This indicator is added as considered more useful than Ec25-28. Where actors may need/want access to capital, it should be available from different sources and at costs of capital that can be considered reasonable.**

## *5. International competitiveness indicators*

Ec29 *Nominal protection coefficient (NPC)*

Hotspot classification: [152]

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If significantly below 1 | If around 1 | If significantly above 1 |

Ec30 *Domestic resource cost ratio (DRC)*

Hotspot classification (illustrative):

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| If significantly below 1 | If around 1 | If significantly above 1 |

**Excluded as difficult to assess, and there are very few input costs involved in the collection and processing of oysters so indicator is not meaningful.**

## *6. Value for end-consumers indicators*

Ec 31 *Consumer price benefit surplus*

Hotspot classification (illustrative):

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Market price is around or more than 20% below parity price | Market price is comparable with parity price | Market price is 20% of more above parity price |

Ec 32 *Number of annual food safety violations recorded in the VC*

Hotspot classification (illustrative):

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Low | Medium | High |

**Excluded as no data are available and there is no consistent testing programme of oyster products in markets**

[152] Indicator that goes above 1 if the market is protected and less competitive (consumers pay a higher price for the domestic fish than what they would pay if the fish was imported), and goes below 1 if the market is not protected and more competitive (consumers pay a lower price for the domestic fish).

Ec 33 *Consumer evaluations of the different aquatic products*

Hotspot classification (illustrative):

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| VC fish is perceived mostly positive to very positive | VC fish is perceived mostly positive to very positive | VC fish is perceived mostly positive to very positive |

Ec 34 *Consumer preference relative to the four most direct substitute food products*

Hotspot classification (illustrative):

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| VC fish is preferred over substitutes | VC fish is comparable to substitutes | Substitutes are preferred over VC fish |

**Excluded as oysters are a niche product with no direct substitutes. And consumer survey did not explore preferences related to substitutes.**

Ec 35 *Price relative to the four most direct substitute food products*

Hotspot classification (illustrative):

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| VC fish is 20% of less expensive than substitutes | VC fish is priced at the same level as substitutes | VC fish is 20% of more expensive than substitutes |

## Social analysis - Scoring

The table below shows the full list of FISH4ACP indicators, and those which are included/excluded in the social assessment of The Gambia oyster VC

**TABLE 42: INCLUSION/EXCLUSION OF FISH4ACP SOCIAL INDICATORS IN ASSESSMENT OF THE GAMBIA OYSTER VALUE CHAIN**

| Components | Question #* | Included/Excluded and basis for scoring | Source of data (or justification for exclusion) |
|---|---|---|---|
| **Inclusiveness** | 1.1.1 | Included, quantitative | Actors survey |
| | 1.1.2 | Included, quantitative | Actors survey |
| | 1.1.3 | Included, quantitative | Actors survey, Focus groups, Expert groups |
| | 1.2.1 | Included, quantitative | Actors survey |
| | 1.2.2 | Excluded | All actors in the VC are small. Excluded since it is not relevant |

| | | | |
|---|---|---|---|
| | 1.2.3 | Included, quantitative | Actors survey |
| | 1.3.1 | Included, quantitative | Actors survey |
| | 1.3.2 | Included, quantitative | Actors survey |
| | 1.3.3 | Included, quantitative | Actors survey, Expert groups |
| | 1.4.1 | Excluded | There are basically no 'workplaces' and so little labour/employment |
| | 1.4.2 | Excluded | Given the informality of the VC, no standards or practices are likely to be in place |
| | 1.4.3 | Included, qualitative | Focus groups, expert groups |
| **Gender equality** | 2.1.1 | Included, quantitative | Actor survey |
| | 2.1.2 | Included, quantitative | Given guidance and nature of indicator, indicator excluded as so few men make part of the VC |
| | 2.1.3 | Included, qualitative | Expert groups |
| | 2.2.1 | Included, qualitative | Expert groups |
| | 2.2.2 | Excluded | Given guidance and nature of indicator, indicator excluded as so few men make part of the VC |
| | 2.2.3 | Excluded | Given guidance and nature of indicator, indicator excluded as so few men make part of the VC |
| | 2.3.1 | Included, qualitative | Expert groups |
| | 2.3.2 | Excluded | Most VC actors are women, comparison not meaningful |
| | 2.3.3 | Excluded | Most VC actors are women, comparison not meaningful |
| | 2.4.1 | Included, qualitative | Expert groups |
| | 2.4.2 | Included, qualitative | Actors survey |
| | 2.4.3 | Included, qualitative | Actors survey |
| **Food Security, Safety and Nutrition** | 3.1.1 | Included, qualitative | Actors survey, Focus groups |
| | 3.1.2 | Included, qualitative | Consumer survey |
| | 3.1.3 | Included, qualitative | Expert groups |
| | 3.2.1 | Included, quantitative | Actors survey |
| | 3.2.2 | Included, qualitative | Expert groups |
| | 3.2.3 | Included, qualitative | Expert groups |
| | 3.3.1 | Included, qualitative | Consumer survey, focus groups |
| | 3.3.2 | Included, qualitative | Consumer survey |
| | 3.3.3 | Included, qualitative | Secondary data |
| | 3.4.1 | Included, qualitative | Actor survey, focus groups |

| | | | |
|---|---|---|---|
| | 3.4.2 | Included, qualitative | Key informants |
| | 3.4.3 | Included, qualitative | Actor & consumer survey, focus groups |
| **Decent Employment** | 4.1.1 | Excluded | All the oyster VC actors are self-employed, and the VC is informal |
| | 4.1.2 | Included, qualitative | Actors survey, focus groups |
| | 4.1.3 | Excluded | All the oyster VC actors are self-employed, no contracts exist |
| | 4.2.1 | Included, qualitative | Expert and focus groups |
| | 4.2.2 | Included, qualitative | Expert and focus groups |
| | 4.2.3 | Included, qualitative | Expert groups |
| | 4.3.1 | Included, qualitative | Focus groups |
| | 4.3.2 | Included, qualitative | Expert and focus groups |
| | 4.3.3 | Included, quantitative | Actors survey |
| | 4.4.1 | Included, qualitative | Actors survey |
| | 4.4.2 | Included, quantitative | Actors survey, focus and expert groups |
| | 4.4.3 | Included, qualitative | Key informants, focus groups, actor interviews |
| **Social and cultural capital** | 5.1.1 | Included, quantitative | Actors survey |
| | 5.1.2 | Included, qualitative | Focus and expert groups |
| | 5.1.3 | Included, qualitative | Focus and expert groups |
| | 5.2.1 | Excluded | Main actor in the oyster VC conduct the three functions: collect, process and retail, hence even if vertical linkages in the VC are very well established, no contracts apply. The material used to collect, process and sell is very basic and accessible in different shops in the country, hence there are no contract neither for input providers. |
| | 5.2.2 | Included, qualitative | Expert groups |
| | 5.2.3 | Included, qualitative | Expert groups |
| | 5.3.1 | Included, qualitative | Expert groups |
| | 5.3.2 | Included, qualitative | Expert groups |
| | 5.3.3 | Included, qualitative | Actors survey, focus and expert groups |
| | 5.4.1 | Included, qualitative | Focus groups |
| | 5.4.2 | Included, qualitative | Actors survey |
| | 5.4.3 | Included, qualitative | Expert groups |

| | | | |
|---|---|---|---|
| **Institutional strength** | 6.1.1 | Included, qualitative | Expert groups |
| | 6.1.2 | Included, quantitative | Actors survey |
| | 6.1.3 | Included, qualitative | Expert groups |
| | 6.2.1 | Included, quantitative | Actors survey, AFRACA FISH4ACP reports |
| | 6.2.2 | Included, qualitative | AFRACA FISH4ACP reports |
| | 6.2.3 | Included, qualitative | AFRACA FISH4ACP reports |
| | 6.3.1 | Included, qualitative | Expert groups |
| | 6.3.2 | Included, qualitative | Expert groups |
| | 6.3.3 | Included, qualitative | Actors interviews |
| | 6.4.1 | Included, qualitative | Key informants |
| | 6.4.2 | Included, quantitative | Actors survey, expert groups |
| | 6.4.3 | Included, qualitative | Expert groups |

*list of questions provided below

The objective of the social sustainability assessment is to measure the social impacts of the value chain activities (positive and negative) across six core social **domains**:

- Inclusiveness
- Gender equality
- Food security, safety and nutrition
- Decent employment
- Social and cultural capital
- Institutional strength

Each domain is broken down into four **sub-domains**, with key **questions** per sub-domain. Across the sub-domains, a number of indicators are measured to assist in the determination of the score for the subdomain questions.

Each subdomain question is given a rating (1-to-5 scores, with 1 means “very concerning” (or red) and 5 means “no concerns” (or dark green)). These ratings of the questions are averaged out to obtain the scores at sub-domain level, which in turn are averaged out to obtain the score at the domain-level.

**TABLE 43. SCORING SYSTEM FOR SOCIAL SUSTAINABILITY QUESTIONS WITH ILLUSTRATION**

| 5 - No concerns | 4 – Minor concerns | 3 - Moderate concerns | 4 - concerning | 5 -Very concerning |
|---|---|---|---|---|
| Specific conditions | Specific conditions | Specific conditions | Specific conditions | Specific conditions |

| Example question & scoring guidance | | | | |
|---|---|---|---|---|
| 3.1.1 To what extent does current national production meet national demand for this commodity? | | | | |
| Meets > 90% of national demand | Meets 75-90% of national demand | Meets 50-75% of national demand | Meets 20-50% of national demand | Meets <20% of national demand |

The following lists the domain and subdomain questions and their respective scoring guidance for the indicators in the assessment of The Gambia oyster VC:

**1. Inclusiveness:** How equitably are the economic benefits distributed across the value chain?

**1.1 Wages and employment distribution:**

5.1.1. How equitable are the wages between workers hired by the different types of value chain actors?
Scoring guidance: 5- very equitable, 4 – equitable, 3 - somewhat equitable, 2 – unequitable, 1- very unequitable

5.1.2. To what extent is the value chain contributing to national employment with equal opportunity jobs (through core and extended value chain)?
Scoring guidance: 5 - very high contribution of jobs, 4 - high contribution, 3 - moderate contribution, 2 - low contribution, 1 - very low contribution of jobs

5.1.3. To what extent are vulnerable and marginalised groups capturing jobs in the sector and receiving equitable wages?
Scoring guidance: 5 - Very many vulnerable and marginalized groups included and receiving an equitable share of income, 4 – many, 3 – some, 2 – few, 1 - very few to no vulnerable and marginalized groups involved

**1.2 Value added distribution:**

1.2.1 How equitably is value added distributed between the different types of VC actors and stakeholders (i.e. Government, workers, firms and owners)?
Scoring guidance: 5 - very equitable, 4 – equitable, 3 - somewhat equitable, 2 – unequitable, 1 - very unequitable

1.2.2 Is direct net value added (after-tax wages and profits) equitably distributed between small vs. large VC actor types?
Scoring guidance: 5 - very equitable, 4 – equitable, 3 - somewhat equitable, 2 – unequitable, 1 - very unequitable

1.2.3 How equitable are the net profits of the VC actors distributed between VC functions?
Scoring guidance: 5 - very equitable, 4 – equitable, 3 - somewhat equitable, 2 – unequitable, 1 - very unequitable

**1.3 Poverty and vulnerability:**

1.3.1 What is the prevalence of poverty across the value chain amongst VC participants (comparing incomes to national poverty line)?
Scoring guidance: 5 - no to very low poverty or <5% below the national poverty line, 4 - low poverty or 5-20% , 3 - moderate poverty or 21-50%, 2 - high poverty or 51-80%, 1 - very high poverty or >80% below the national poverty line, N/A – no national poverty line

1.3.2 What is the prevalence of extreme poverty across the value chain amongst VC participants (comparing incomes to the international poverty line of USD1.9/day)?
Scoring guidance: 5 - no to very low poverty or <5% below the international poverty line, 4 - low poverty or 5-20% , 3 - moderate poverty or 21-50%, 2 - high poverty or 51-80%, 1 - very high poverty or >80% below the international poverty line

1.3.3 To what extent do impoverish VC participants diversify income to reduce the risk of poverty (e.g. ownership of assets, production/catch of multiple species)?
Scoring guidance: 5 - very good income diversification or >80% have 2 or more income sources; 4 - good or 60%-80% have 2 or more income sources; 3 – moderate or 40-60% have 2 or more income sources; 2 – low or 20-40% have 2 or more income sources; 1 - very low-income diversification or <20% have 1 or more income sources; N/A - no impoverished actors

**1.4 Discrimination:**

1.4.1 Application of national/ international laws preventing discrimination in the workplace across the value chain.
Scoring guidance: 5 - laws are well-respected and enforced, 4 - laws could be better respected or enforced, 3 - laws not well-respected or enforced, 2 - laws are not respected or are unenforced, 1 - laws are not respected, unenforced or no laws in place.

1.4.2 Application of formal or informal business-level standards or practices to prevent discrimination in the workplace across the value chain.
Scoring guidance: 5 – most or >90% of firms have standards in place to prevent workplace discrimination, 4 – many or 70-90%, 3 – some or 50-70%, 2 – few or 20-50%, 1 - very few or <20% of firms have standards in place to prevent workplace discrimination.

1.4.3 How do value chain actors influence sociocultural norms related to workplace discrimination (based on age, gender, ethnic group, migration status, etc.)?
Scoring guidance: 5 - strongly positive influence, 4 - positive influence, 3 - neither positive nor negative, 2 - negative influence, 1 - strongly negative influence

**2. Gender equality:** How well does this value chain promote gender equality?

**2.1 Women's economic empowerment:**

2.1.1 To what extent are women economically involved across the value chain overall, and by VC function (considering also support services)?
Scoring guidance: 5 - About 50% are women, 4 - 25-50% women, 3 - 10-25% women, 2 - 5-10% women, 1 - <5% are women

2.1.2 How equitable is the share of value added (wages and profits) captured by women VC participants compared to men?
Scoring guidance: 5- very equitable, 4 – equitable, 3 - somewhat equitable, 2 – unequitable, 1 - very unequitable

2.1.3 Does gender discrimination prevent women from actively engaging in VC activities?
Scoring guidance: 5 - no gender discrimination, 4 - low gender discrimination, 3 - moderate gender discrimination, 2 - high gender discrimination, 1 - very high gender discrimination

**2.2. Gendered division of labour:**

2.2.1 Are overall domestic workloads of women and men VC participants in the value chain equitably distributed (including domestic work and child/elderly care)?
Scoring guidance: 5 - equal share of time spent on domestic work between women and men or 50%-50%, 4 - nearly equal share or 55%-45%, 3 - somewhat equal share or 60%-40%, 2 - unequal share or 70%-30%, 1 - highly unequal share or 80%-20%

2.2.2 Are VC activities equitably distributed between men and women VC participants by the level of effort (considering time, technology, transport, and working conditions, etc.)?
Scoring guidance: 5 - equal level of effort for VC activities conducted by women and men or 50%-50%, 4 - nearly equal or 55%-45%, 3 - somewhat equal or 60-40%, 2 – unequal or 70%-30%, 1 - highly unequal level of effort 80-20%, N/A - there are no differences in activities conducted by men and women

2.2.3 To what extent are the jobs and businesses that women are engaged in equal to men in terms of formality (business registration and employment contracts) across the value chain?
Scoring guidance: 5 - equal formality between women and men or 50%-50%, 4 - nearly equal or 55%-45%, 3 - somewhat equal or 60%-40%, 2 – unequal or 70%-30%, 1 - very unequal or 80%-20%

**2.3 Gendered access to productive resources:**

2.3.1 To what extent do women VC actors have equal access to land / fishing tenure as men?
Scoring guidance: 5 - equal access between women and men, 50%-50%, 4 - nearly equal, 55%-45%, 3 - somewhat equal, 60%-40%, 2 - unequal, 70%-30%, 1 - very unequal, 80%-20%

2.3.2 To what extent do women VC actors have equal access to formal finance as men?
Scoring guidance: 5 - equal access between women and men or 50%-50%, 4 - nearly equal or 55%-45%, 3 - somewhat equal or 60%-40%, 2 – unequal or 70%-30%, 1 - very unequal or 80%-20%

2.3.3 To what extent do women VC actors have equal access to non-financial support services as men?
Scoring guidance: 5 - equal access between women and men or 50%-50%, 4 - nearly equal or 55%-45%, 3 - somewhat equal or 60%-40%, 2 – unequal or 70%-30%, 1 - very unequal or 80%-20%

**2.4 Women's decision-making and leadership:**

2.4.1 To what extent do women have equal control over spending of income earned or decisions related to shared assets at the household level?
Scoring guidance: 5 - equal control between men and women or 50%-50%, 4 - nearly equal or 55%-45%, 3 - somewhat equal or 60%-40%, 2 – unequal or 70%-30%, 1 - highly unequal or 80%-20%

2.4.2 Are women VC actors equally and meaningfully involved in cooperatives/associations, industry associations, trade unions, etc. as men?
Scoring guidance: 5 - equal [and meaningfully] involvement of women to men 50%-50%, 4 - nearly equal share 55%-45%, 3 - somewhat equal share 60%-40%, 2 - unequal share 70%-30%, 1 - highly unequal share 80%-20%, N/A - no sector cooperatives, trade unions etc.

2.4.3 Are women VC actors equally involved in leadership/ decision-making positions as men in the VC?
Scoring guidance: 5 - equal share of men to women leaders 50%-50%, 4 - nearly equal share 55%-45%, 3 - somewhat equal share 60%-40%, 2 - unequal share 70%-30%, 1 - highly unequal share 80%-20%

**3. Food Security, Safety and Nutrition:** How does the value chain contribute to a secure, accessible, safe, nutritious and stable food supply?

**3.1 Availability of Food:**

3.1.1 To what extent does current national production meet national demand for this commodity?
Scoring guidance: 5 - Meets > 90% of national demand, 4 - Meets 75-90% of national demand, 3 - Meets 50-75% of national demand, 2 - Meets 20-50% of national demand, 1 - Meets <20% of national demand, N/A - 100% export-oriented VC

3.1.2 How does trade of this commodity (imports/ exports) impact national food security?

Scoring guidance:5 - trade is very supportive of national food security, 4 – supportive, 3 - somewhat supportive, 2 – unsupportive, 1 - not at all supportive, N/A - there are no impacts of trade on national food security, or no trade of this commodity

3.1.3 To what extent is the availability of this commodity consistent across the country?
Scoring guidance: 5 - consistent availability, 4 - nearly consistent availability, 3 - somewhat inconsistent availability, 2 - inconsistent availability, 1 - very inconsistent availability, N/A- export-oriented commodity

**3.2 Accessibility of Food:**

3.2.1 Is the current cost of this commodity relatively affordable considering all types of consumers?
Scoring guidance: 5 - highly affordable to most consumers (>80%), 4 - affordable to many consumers (60-80%), 3 - somewhat affordable (25-50%), 2 - affordable to few (10-25%), 1 - affordable to very few (<10%), N/A - export-oriented VC

3.2.2 Is this commodity equally accessible to all household members? (intra-household dynamics)? (SADD)
Scoring guidance: 5 - equal access amongst household members, 4 - nearly equal access, 3 - somewhat equal access, 2 - unequal access, 1 - very unequal access, N/A - export-oriented VC

3.2.3 Are the prices of this commodity becoming more accessible to consumers relative to household incomes (purchasing power) in the past five years?
Scoring guidance: 5 - much more accessible, 4 - more accessible, 3 - same accessibility, 2 - less accessible, 1 - much less accessible, N/A - export-oriented VC

**3.3. Utilization of Food:**

3.3.1 Is this commodity prepared and consumed in a healthy and safe manner (at consumer level)?
Scoring guidance: 5 - very healthy and safe consumption and preparation practices, 4 - mostly healthy and safe, 3 - somewhat unhealthy and safe, 2 - unhealthy and unsafe, 1 - very unhealthy and unsafe consumption and preparation practices

3.3.2 To what extent does this commodity contribute to national food and nutrition security?
Scoring guidance: 5 - very high contribution, 4 - high contribution, 3 - medium contribution, 2 - small contribution, 1 - very small contribution

3.3.3 Is this commodity consumed as part of a healthy balanced diet (dietary diversity)?

Scoring guidance: 5 - very high dietary diversity (e.g. HDDS 8+), 4 - high dietary diversity (e.g. HDDS 6-8), 3 - moderate dietary diversity (e.g. HDDS 4-6), 2 - low dietary diversity (e.g. HDDS 2-4), 1 - very low dietary diversity (e.g. HDDS 0-2)

**3.4 Stability of food:**

3.4.1 To what extent is this commodity consistently available throughout the year?
Scoring guidance: 5 - consistently available, 4 - nearly consistently available, 3 - somewhat inconsistently available, 2 - inconsistent availability, 1 - very inconsistent availability, N/A- export-oriented commodity

3.4.2 To what extent is the price of this commodity stable throughout the year (seasonal variability) for the past 5 years?
Scoring guidance: 5 - very stable, 4 – stable, 3 - somewhat stable, 2 – unstable, 1 - very unstable

3.4.3 To what extent do value chain activities stabilize the supply of this commodity (e.g. cold storage, product diversification and processing)?
Scoring guidance: 5 - very high contribution to stabilizing supply of the commodity, 4 - high contribution, 3 - some contribution, 2 - very low contribution, 1 - no contribution to stabilizing the supply

**4. Decent Employment:** How does this value chain ensure that working conditions are safe, secure and decent?

**4.1 Respect of labour rights:**

4.1.1 To what extent do firms respect national labour laws on the right to organise and collective bargaining?
Scoring guidance: 5 - >90% of firms respect national laws on the right to organize and collective bargaining, 4 - 70-90%, 3 - 50-70%, 2 - 20-50%, 1 - <20% of firms respect national laws on the right to organize and collective bargaining, N/A - there are no national labour laws on the right to organise and collective bargaining

4.1.2 To what extent do firms respect national labour laws regarding working conditions?
Scoring guidance: 5 - >90% of firms respect national laws on working conditions, 4 - 70-90%, 3 - 50-70%, 2 - 20-50%, 1 - <20% of firms respect national labour laws or there are no national labour laws on working conditions

4.1.3 To what extent do workers benefit from enforceable and fair employment contracts (SADD)?
Scoring guidance: 5 - 85 - 100% of workers have fair and enforceable contracts, 4 - 65-85%, 3 - 25-65%, 2 - 10-25%, 1 - <10%

**4.2 Child and forced labour:**

4.2.1 To what extent are firms respecting national labour laws with regards to child labour (e.g. minimum age for employment)?
Scoring guidance: 5 - >90% of firms respect child labour laws, 4 - 70-90%, 3 - 50-70%, 2 - 20-50%, 1 - <20% of firms respect child labour laws OR there are no national child labour laws

4.2.2 What is the prevalence of child labour across the value chain, particularly where children are missing school to participate in VC activity or support HH activities in VC households (SADD)?
Scoring guidance: 5 – none or 0% of workforce is child labour, 4 - very low or <5% with sporadic cases, 3 – moderate or 5-10% with regular occurrence in one or more VC segments, 2 – high or 10-15% with regular occurrence in one or more VC segments, 1 - very high or >15% with regular occurrence in one or more VC segments

4.2.3 Is forced labour, including debt bondage and trafficking for labour exploitation, an issue across the VC?
Scoring guidance: 5 - no forced labour in the value chain, 4 - very few cases of forced labour, 3 - some forced labour, 2 - high prevalence of forced labour, 1 - very high prevalence of forced labour

**4.3 Job safety and security:**

4.3.1 To what extent do firms across the value chain implement and enforce formal workplace safety standards?
Scoring guidance: 5 - >90% of firms implement and enforce safety standards, 4 - 70-90%, 3 - 50-70%, 2 - 20-50%, 1 - <20% of firms have safety standards in place

4.3.2 What is the prevalence of occupational injuries across the value chain?
Scoring guidance: 5 - none to very low, 4 – low, 3 – moderate, 2 – high, 1 - very high

4.3.3 To what extent do VC actors and workers persist in the VC (turnover)?
Scoring guidance: 5 - very low turnover, 4 - low turnovers, 3 - moderately high turnover, 2 - high turnover, 1 - very high turnover

**4.4 Attractiveness:**

4.4.1 To what extent are remunerations fair and competitive based on national standards (e.g. living wage and social benefits)?
Scoring guidance: 5 - very competitive remunerations, 4 - competitive remunerations, 3 - somewhat competitive, 2 - uncompetitive remunerations, 1 - very uncompetitive remunerations

4.4.2 To what extent are the business opportunities and activities along the value chain attractive?
Scoring guidance: 5 - very attractive, 4 – attractive, 3 - somewhat attractive, 2 - a little attractive, 1 - not at all attractive

4.4.3 To what extent are technologies, practices or innovations adopted, particularly to reduce strenuous activities across the value chain?
Scoring guidance: 5 - very high adoption rates across the VC, 4 - high rates, 3 - moderate rates, 2 - low rates, 1 - very low to no adoption of technology/innovation

**5. Social and cultural capital:** How are social and cultural capital protected and enhanced through this value chain?

**5.1 Collective action (horizontal governance):**

5.1.1 To what extent are value chain actors organized into cooperatives or producers' organizations, industry associations, trade unions, etc. (SADD)?
Scoring guidance: 5 - 85 - 100% are organized into groups, 4 - 65-85%, 3 - 25-65%, 2 - 10-25%, 1 - <10%

5.1.2 To what extent does participation in such organizations result in improved socioeconomic gains for members (benefits)?
Scoring guidance: 5 - very good benefits, 4 - good benefits, 3 - some benefits, 2 - few benefits, 1 - very few to no benefits

5.1.3 Do VC actors work together to share resources, or engage in joint advocacy for the sector for mutual benefit?
Scoring guidance: 5 - Almost all VC actors work together, 4 - Majority of VC actors work together, 3 - Minority of VC actors work together, 2 - Majority of VC actors do not work together, 1 - Few to no VC actors work together

**5.2 Coordination of transactions (vertical governance):**

5.2.1 To what extent do VC actors have contracts or agreements at the functional level - for product procurement and sales (SADD)
Scoring guidance: 5 - 85 - 100% have contracts, 4 - 65-85%, 3 - 25-65%, 2 - 10-25%, 1 - 0 <10%

5.2.2 To what extent do VC actors report reliable and secure access to markets?
Scoring guidance: 5 - Almost all VC actors report secure access to markets, 4 - Majority of VC actors report secure access to markets, 3 - Minority of VC actors report secure access to markets, 2 - Majority of VC actors report insecure access to markets, 1 - Almost all VC actors report insecure access to markets

5.2.3 To what extent are the relationships between value chain actors perceived as trustworthy?
Scoring guidance: 5 - Almost all VC actors indicate relationships are trustworthy, 4 - Majority of VC actors indicate relationships are trustworthy, 3 - Minority of VC actors indicate relationships are trustworthy, 2 - Majority of VC actors indicate relationships are untrustworthy, 1 - Almost all VC actors indicate relationships are untrustworthy

**5.3 Social Cohesion:**

5.3.1 To what extent are VC actors able to contribute to decision-making processes that affect the sector?

Scoring guidance: 5 - Almost all VC actors contribute to decision-making, 4 - Majority of VC actors contribute to decision-making, 3 - Minority of VC actors contribute to decision-making, 2 - Majority of VC actors do not contribute to decision-making, 1 - Few to no VC actors contribute to decision-making

5.3.2 To what extent do VC actors engage in networking and information sharing for the benefit of the VC?

Scoring guidance: 5 - Almost all VC actors engage in regular networking and information-sharing, 4 - Majority of VC actors engage in periodic information-sharing, 3 - Minority of VC actors engage in periodic networking and info-sharing, 2 - Majority of VC actors do not network or share info, 1 - Few to no VC actors engage in networking and information-sharing

5.3.3 To what extent do value chain actors collaborate with the public sector (e.g. public-private collaboration)?

Scoring guidance: 5 - very good public-private collaboration, 4 – good, 3 – moderate, 2 – low, 1 - very low to no public-private collaboration

**5.4 Cultural traditions:**

5.4.1 To what extent do VC activities support or strengthen positive traditional beliefs, knowledge and artisanal techniques on the sector?

Scoring guidance: 5 - very supportive, 4 – supportive, 3 - somewhat supportive, 2 – unsupportive, 1 - very unsupportive, N/A - there are no traditional beliefs, knowledge on the sector that should be maintained.

5.4.2 How do VC activities impact sociocultural norms (e.g. gender norms, consumer habits, fishing as a business or entrepreneurship)?

Scoring guidance: 5 - very positively, 4 – positively, 3 - neither positively nor negatively, 2 – negatively, 1 - very negatively

5.4.3 To what extent do VC activities support or strengthen positive traditional beliefs, knowledge and artisanal techniques on the sector?

Scoring guidance: 5 - very positive public perception, 4 - positive public perception, 3 - moderate public perception 2 - negative public perception, 1 - highly negative public perception

**6. Institutional strength:** How are public and private institutions strengthened through this value chain?

**6.1 Policy, regulations and standards**:

6.1.1 To what is extent is a sustainable fisheries management/aquaculture development plan implemented and enforced?

Scoring guidance: 5 - plan in place, up-to-date and enforced; 4 - plan in place and enforced, needs updating; 3 - plan in place, and somewhat enforced; 2 - plan in place, but not enforced; 1 - no plan in place

6.1.2 To what extent are value chain activities formally registered/licensed across the value chain?
Scoring guidance: 5 - 85 - 100% are formally registered; 4 - 65-85%; 3 - 25-65%; 2 - 10-25%; 1 - <10% are formally registered

6.1.3 To what extent are public policies and sector standards supportive of business growth in the sector?
Scoring guidance: 5 - very supportive; 4 – supportive; 3 - somewhat supportive; 2 – unsupportive; 1 - very unsupportive

**6.2 Access to finance:**

6.1.2 To what extent do value chain actors have bank accounts (banked)?
Scoring guidance: 5 - >90% of actors are banked, 4 - 70-90%, 3 - 50-70%, 2 - 20-50% , 1 - <20% of actors are banked

6.2.2 To what extent do VC actors have access to finance (SADD)?
Scoring guidance: 5 - >90% of actors have access to finance, 4 - 70-90%, 3 - 50-70%, 2 - 20-50%, 1 - <20% of actors have access to finance

6.2.3 To what extent are measures (e.g., insurance) used to reduce the risk of lending to firms along the VC?
Scoring guidance: 5 - very good measures used, 4 - good measures used, 3 - moderate measures used, 2 - few measures used, 1 - very few to no measures used

**6.3 Access to natural resources:**

6.3.1 To what extent is national land/ fishing tenure aligned to the Voluntary Guidelines on the Responsible Governance of Tenure (VGGT), including those on small-scale fisheries (SSF)?
Scoring guidance: 5 - National policies are fully aligned and enforced, participatory, equitable and just, 4 - Mostly aligned - could be more participatory, 3 - Somewhat aligned - could be more equitable, 2 - Minimally aligned - insufficiently equitable or participatory, 1 - Not at all aligned - No clear policies, or unjust, unequitable policies

6.3.2 To what extent are VC actors adhering to national land/fishing tenure policies, and international best practices on tenure?
Scoring guidance: 5 - >90% of VC actors adhere to national tenure policies, 4 - 70-90%, 3 - 50-70%, 2 - 20-50%, 1 - <20% of VC actors adhere to national tenure policies, N/A - no national tenure policies in place

6.3.3 To what extent do value chain actors report security of land/fishing tenure (SADD)?

Scoring guidance: 5 - >90% of VC actors have secure land/fishing tenure, 4 - 70-90%, 3 - 50-70%, 2 - 20-50%, 1 - <20% of VC actors have secure land/fishing tenure

**6.4 Access to information:**

6.4.1 What is the national capacity for providing accurate and timely data on fisheries/aquaculture?
Scoring guidance: 5 - very good capacity for data collection, 4 - good capacity, 3 - moderate capacity, 2 - low capacity, 1 - very low capacity

6.4.2 Are technical extension services reaching value chain actors?
Scoring guidance: 5 - Extension services reaching >90% of VC actors, 4 - 70-90%, 3 - 50-70%, 2 - 20-50% , 1 - Extension services reaching <20% of VC actors

6.4.3 To what extent do VC actors have access to market information?
Scoring guidance: 5 - >90% of actors have access to market information, 4 - 70-90%, 3 - 50-70%, 2 - 20-50%, 1 - <20% of actors have access to market information

## Environmental analysis – Scoring

The table below shows the full list of FISH4ACP indicators, and those which are included/excluded in the environmental assessment of The Gambia oyster VC

**TABLE 44: INCLUSION/EXCLUSION OF FISH4ACP ENVIRONMENTAL INDICATORS IN ASSESSMENT OF THE GAMBIA OYSTER VALUE CHAIN**

| Components | indicator # | Indicators | Included/Excluded and basis for scoring | Source of data (or justification for exclusion) |
|---|---|---|---|---|
| **CLIMATE IMPACT** | 1.1 | Electricity use | Included and scored 3 (green = sustainable)<br><br>There is no electricity use along the VC | Observational field visits |
| **CLIMATE IMPACT** | 1.2 | Fuel consumption | Included and score 3 (green = sustainable)<br><br>As canoes used in harvesting are generally paddled, the level of fuel consumption in the value chain is not significant enough | Observational field visits |
| **CLIMATE IMPACT** | 1.3 | Carbon footprint | Included and scored 2 (yellow = concerning)<br><br>Wood burning is required in processing and trees used for | Observational field visits<br><br>Expert group discussion |

| | | | | |
|---|---|---|---|---|
| | | | dugout canoes). It is difficult to quantify but the situation is deemed to be concerning<br><br>The actors currently depend on dead mangroves which needs alternative source (dried palm fronds, briquets, etc) of energy for processing. Depending on fuelwood is a big concern for the status of forest and vegetation.<br><br>Wooden canoes are still in used in most communities. There is need to have alternative canoes such as fibre boats, etc | |
| **CLIMATE IMPACT** | 1.4 | Renewable clean energy use | Excluded as not applicable<br><br>There is no electricity use in collection, farming, or processing of oysters | Observational field visits |
| **WATER FOOTPRINT** | 2.1 | Water and ice consumption | Included and scored 3 (green = sustainable)<br><br>Only sea water is used for boiling and washing; and ice is not used | Observational field visits |
| **WATER FOOTPRINT** | 2.2 | Water pollution and wastewater treatment | Included and scored 1 (red = unsustainable)<br><br>There are no water treatment and water waste standards in place specifically for the oyster value chain | Observational field visits |
| **FISH STOCK SUSTAINABILITY** | 3.1 | Stock status and stock dynamics | Included and scored 1 (Red = unsustainable) | Expert group discussions |

| | | | | |
|---|---|---|---|---|
| | | | Experts judgement revealed that there is over exploitation in some areas for instance in Tanbi complex evidence by following reasons:<br>The size of oysters in some communities has become smaller<br>Some actors travelled far distance to collect oyster shells It should be noted that stock in Greater Banjul Area has gone down compared to non tanbi regions | |
| **FISH STOCK SUSTAINABILITY** | 3.2 | Fishing pressure | Included and scored 1 (Red = unsustainable)<br>The number of actors has increased in most communities.<br>The management plan is not enforced in most oyster collection sites. The number of collectors and the size of oysters to be collected is not regulated | Expert group discussions |
| **BIODIVERSITY AND ECOSYSTEMS** | 4.1 | Impact on associated species | Included and scored3 (green = sustainable)<br>There is no bycatch of non-target species in oyster harvesting | Observational field visits |
| **BIODIVERSITY AND ECOSYSTEMS** | 4.2 | Status of vulnerable ecosystems | Included and scored 3 (green = sustainable)<br>Mangrove forest is the vulnerable ecosystem that may be harmed by the oyster VC. But oysters harvested from roots without damaging | Observational field visits |

| | | | | |
|---|---|---|---|---|
| | | | mangroves and dead wood. communities are more and more actively involved in protecting and planting mangrove helping it to regenerate. | |
| **BIODIVERSITY AND ECOSYSTEMS** | 4.3 | Status of ETP species | Included and scored 3 (green = sustainable)<br><br>Oyster harvesting is very selective, and it does not generally have no detrimental effect on ETP | Observational field visits |
| **BIODIVERSITY AND ECOSYSTEMS** | 4.4 | 4.4 Responsible use of aquatic genetic resources | Included and scored 3 (green = sustainable)<br><br>Oyster farms don't use modified or introduced species | Observational field visits |
| **ANIMAL HEALTH AND WELFARE** | 5.1 | Application of biosecurity measures | Included and scored 3 (green = sustainable)<br><br>Oyster farms rely on spat naturally attaching to empty shells. Therefore, there is no need of required biosecurity measures | Observational field visits |
| **ANIMAL HEALTH AND WELFARE** | 5.2 | Appropriate animal husbandry and handling | Included and scored 3 (green = sustainable)<br><br>Oyster farms rely on spat naturally attaching to empty shells and are not stocking farms. Therefore, there is no particular required husbandry and handling measure. | Observational field visits |
| **TOXICITY AND POLLUTION** | 6.1 | Responsible use of feed | Excluded as there is no use of feed | Observational field visits |

| | | | | |
|---|---|---|---|---|
| **TOXICITY AND POLLUTION** | 6.2 | Responsible use drug and of chemicals | Excluded<br><br>There is no use of drugs and chemicals | Observational field visits |
| **TOXICITY AND POLLUTION** | 6.3 | Air pollution | Include and scored 2 (yellow = concerning)<br><br>Smoke generated from oyster processing (boiling and grilling) in concerning | Observational field visits |
| **TOXICITY AND POLLUTION** | 6.4 | Inorganic solid waste pollution | Included and scored 3 (green = sustainable)<br><br>Plastic bags used to be used as oyster packing for selling. But as the Gambia has banned the use of plastic bag since 1st July 2015, this is no longer a problem | Observational field visits |
| **TOXICITY AND POLLUTION** | 6.5 | Organic solid waste pollution | Included and scored 1 (red = unsustainable)<br><br>Organic waste in form of shells a big issue and there no controlled waste disposal. Although shells are reused for white lime, it is not a large level that can significantly mitigate the issue of organic waste. | Observational field visits |
| FOOD LOSS AND WASTE | 7.1 | Food loss | Included and scored 3 (green = sustainable)<br><br>There is no significant problem because oysters are so rare and worthy that all actors along the VC do | Observational field visits |

| | | | | |
|---|---|---|---|---|
| | | | whatever possible to avoid food loss | |
| FOOD LOSS AND WASTE | 7.2 | Food waste | Included and scored 3 (green = sustainable)<br><br>There is no significant problem because oyster is so rare and worthy that all actors along the VC do whatever possible to avoid food waste | Observational field visits |

To assess the environmental domains and sub-domains, a score 1 – 3 (corresponding to red (1), yellow (2) and green (3)) is provided to each environmental indicator in the assessment of the Gambia oyster VC, with 1 (red) meaning unsustainable, 2 (yellow) meaning concerning, and 3 (green) meaning sustainable.

**1. Climate impact:** What is the climate impact of the value chain?

**Electricity use**

Indicator: Electricity use (kWh)/ kg of end product

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Electricity use is lower than 0.2 kWh/kg of end product | Electricity use is between 0.2 kWh and 0.5 kWh/kg of end product | Electricity use is higher than 0.5 kWh/kg of end product |

**Fuel use**

Indicators**:** Fuel consumption (MJ) / kg of end product

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Fuel consumption is lower than 20 MJ/kg of end product | Fuel consumption is between 20 MJ and 85 MJ/kg of end product | Fuel consumption is higher than 85 MJ/kg of end product |

**Carbon footprint**

Indicator: Carbon footprint (kg $CO_2$e)/kg of end product

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Carbon footprint is smaller than 2 kg $CO_2$e/kg of end product | Carbon footprint is between 2 kg $CO_2$e and 4 kg $CO_2$e/kg of end product | Carbon footprint is larger than 4 kg $CO_2$e/kg of end product |

**Renewable clean energy use**

Indicators: Share (%) of renewable clean energy in total electricity consumption at actor level, functional level and core VC level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| More than 50 % of total energy supply in the value chain is generated from renewable clean energy sources | Between 20 % and 50 % of total energy supply in the value chain is generated from renewable clean energy sources | Less than 20 % of total energy supply in the value chain is generated from renewable clean energy sources |

**2. Water footprint:** What is the impact of the VC on the water footprint?

**Water and ice consumption**

Indicators:

- Ice consumption (kg)/kg of end product
- Water consumption ($m^3$)/kg of end product
- Sustainability of water supply at core VC level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Water consumption is below 1 $m^3$/kg of end product and ice consumption is below 1 kg/kg of end product and water supply is sustainable | Water consumption is below or equal to 5 $m^3$/kg of end product and ice consumption is equal to or higher than 1 kg/kg of end product and water supply is sustainable or concerning | Water consumption is above 5 $m^3$/kg of end product or water supply is unsustainable |

**Water pollution and wastewater treatment**

Indicators:

- Standards on wastewater treatment in place and well enforced at core VC level
- Proportion (%) of firms that treat and/or monitor wastewater at actor level, functional level and core VC level
- General water pollution issue or risk of water pollution from VC activities at core VC level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| More than 80 % of firms treat and/or control wastewater and standards are in place and well enforced or no negative environmental impact due to water pollution | 50 % of firms or more treat and/or control wastewater and standards are at least partially in place | Less than 50% of firms treat and/or control wastewater or standards are not in place |

**3. Fish stock sustainability:** What is the impact of the VC on fish stock sustainability?

**Stock status and stock dynamics**

Indicators:

- Current fish stock status of target species
- Change over time of stock status

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Fish stock is underfished | Fish stock is maximally sustainably fished | Fish stock is overfished |

**Fishing pressure**

Indicators:

- Level of fishing pressure
- Change over time of fishing pressure

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Underfishing is happening | Fishing effort is concerning | Overfishing is happening |

**4. Biodiversity and ecosystems:** What is the impact of the VC on biodiversity and ecosystems?

**Impacts on associated species**

Indicators for fishery value chains:

- Current fish stock status of non-target species
- Share (%) of bycatch in the overall catch at actor level and functional level
- Proportion (%) of fishers with measures in place to reduce bycatch at actor level and functional level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Fishery: Less than 10 % of total catch is bycatch and more than 70 % of fishers have measures in place to reduce bycatch and non-target species stock is not overfished | Fishery: 30 % or less of total catch is bycatch and 50 % of fishers or more have measures in place to reduce bycatch and non-target species stock is not overfished | Fishery: More than 30 % of total catch is bycatch or less than 50% of fishers have measures in place to reduce bycatch or non-target species stock is overfished |

**Status of vulnerable ecosystems**

Indicators:

- Share (%) of surface/area of vulnerable ecosystems harmed as a result of VC activities
- Share (%) of vulnerable ecosystems that is irreversibly harmed as a result of VC activities

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Less than 10 % of surface/area of vulnerable ecosystems is harmed as a result of VC activities and 0 % of vulnerable ecosystems is irreversibly harmed as a result of VC activities | 20 % or less of surface/area of vulnerable ecosystems is harmed as a result of VC activities and 5 % or less of vulnerable ecosystems is irreversibly harmed as a result of VC activities | More than 20 % of surface/area of vulnerable ecosystems is harmed as a result of VC activities or more than 5 % of vulnerable ecosystems is irreversibly harmed as a result of VC activities |

**Status of endangered, threatened or protected (ETP) species**

Indicators:

- Degree of detrimental effect on ETP species at actor level and functional level
- Proportion (%) of firms with measures in place to reduce detrimental effects on ETP species at actor level and functional level
-

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Detrimental effect on ETP species is low and more than 80 % of firms have measures in place to reduce detrimental effects on ETP species | Detrimental effect on ETP species is low or medium and 40 % of firms or more have measures in place to reduce detrimental effects on ETP species | Detrimental effect on ETP species is high or less than 40 % of firms have measures in place to reduce detrimental effects on ETP species |

**Responsible use of aquatic genetic resources**

Indicators:

- Regulations for the introduction of non-native species in place and well enforced at functional level
- Regulations for the hybridization of aquatic species in place and well enforced at functional level
- Change in presence of escaped non-native and/or genetically improved species in the natural environment over the past 5 years
- Proportion (%) of firms with measures in place to avoid escape of non-native and genetically improved species at actor level and functional level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| No records of genetically improved and/or non-native species in the natural environment and more than 80 % of firms with measures in place and regulations in place and well enforced | No records of genetically improved and/or non-native species in the natural environment or stable or decreasing presence and 50 % of firms or more with measures in place and regulations at least partially in place | Records of genetically improved and/or non-native species or less than 50 % of enterprises with measures in place or no regulations in place |

**5. Animal health and welfare:** What is the impact of the VC on animal health and welfare?

**Application of biosecurity measures**

Indicators

- Proportion (%) of firms with measures in place to minimize risk of disease outbreak at actor level, functional level and core VC level
- Aquatic animal disease control plan in place and well enforced at core VC level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Aquaculture:<br>More than 80 % of firms have biosecurity measures in place and aquatic animal disease plan is in place and well enforced<br><br>Fishery:<br>More than 80 % of firms have biosecurity measures in place | Aquaculture:<br>50% of firms or more have biosecurity measures in place and aquatic disease plan is at least partially in place<br><br>Fishery:<br>50% of firms or more have biosecurity measures in place | Aquaculture:<br>Less than 50 % of firms have biosecurity measures in place or no aquatic animal disease plan in place<br><br>Fishery:<br>Less than 50 % of firms have biosecurity measures in place |

**Appropriate animal husbandry and handling**

Indicators for aquaculture and fishery value chains:

- Proportion (%) of firms applying appropriate slaughter techniques as defined by OIE at actor level, functional level and core VC level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Fishery:<br>More than 70 % of firms use appropriate slaughter techniques | Fishery:<br>Between 50 % and 70 % of firms use appropriate slaughter techniques | Fishery:<br>Less than 50 % of firms use appropriate slaughter techniques |

**6. Toxicity and pollution:** What is the impact of the VC on toxicity and pollution?

**Responsible use of chemicals**

Indicators for aquaculture, fishery and downstream activities:

- Chemical application regulations in place and well enforced at core VC level
- Proportion (%) of firms with controlled and/or recorded use of chemicals at actor level, functional level and core VC level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Fisheries VCs:<br>More than 80% of firms with controlled and recorded use of chemicals and chemical application regulations in place and well enforced | Fishery:<br>50% of firms or more with controlled and/or recorded use of chemicals and chemical application regulations at least partially in place | Fishery:<br>Less than 50% of firms with controlled and/or recorded use of chemicals or no chemical application regulations in place |

**Air pollution**

Indicators**:**

- Standards on air pollution in place and well enforced at core VC level
- Proportion (%) of firms with air pollution mitigation measures in place at actor level, functional level and core VC level
- General air pollution issue or risk of air pollution from VC activities at core VC level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| More than 80% of enterprises have measures in place to mitigate air pollution and standards are in place and well enforced or no air pollution issues | 50% of firms or more have measures in place to mitigate air pollution and standards are at least partially in place | Less than 50% of firms have measures in place to mitigate air pollution or no standards in place |

**Inorganic solid waste pollution**

Indicators**:**

- Proportion (%) of firms with controlled[153] disposal of plastic and/or other inorganic solid waste at actor level, functional level and core VC level
- Proportion (%) of firms that reuse and/or reduce plastic and/or other inorganic solid waste at actor level, functional level and core VC level

[153] Controlled disposal refers to waste that is disposed on official waste sites and not disposed of into the environment (e.g. directly into the sea, the beaches, or mangrove forests or buried around the production area).

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| More than 90% of firms have controlled disposal of plastic and/or other inorganic solid waste and more than 20% of firms reuse and/or reduce inorganic solid waste | 70% of firms or more have controlled disposal of plastic and/or other inorganic solid waste | Less than 70% of firms have controlled disposal of plastic and/or other inorganic solid waste |

**Organic solid waste pollution**

Indicators**:**

1. Proportion (%) of firms that reuse organic solid waste at actor level, functional level and core VC level
2. Proportion (%) of firms with controlled[154] disposal of organic solid waste at actor level, functional level and core VC level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| More than 80% of firms have controlled disposal of organic solid waste and more than 20% of firms reuse organic solid waste | 60% of firms or more have controlled disposal of organic solid waste | Less than 60% of firms have controlled disposal of organic solid waste |

**7. Food loss and waste:** What is the impact of the VC on food loss and waste?

**Food loss**[155]

Indicators**:**

- Food loss (tons)/year at actor level, functional level and core VC level
- Food loss/year as a share (%)of total production at core VC level

Hotspot classification:

| Sustainable | Concerning | Unsustainable |
|---|---|---|
| Less than 10% of total production is lost | Between 10% and 20% of total production is lost | More than 20% of total production is lost |

[154] Controlled disposal refers to waste that is disposed on official waste sites and not disposed of into the environment (e.g. directly into the sea, the beaches, or mangrove forests or buried around the production area)

[155] To measure food loss, the quantities of aquatic products lost along the value chain, from production up to, but not including retail, need to be calculated to estimate what share of production does not reach the retail level (FISH4ACP methodological guide).

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This report presents the results of the value chain analysis of the mangrove oyster value chain in the Gambia conducted from 2021-2022 by the value chain development programme FISH4ACP. This report contains a functional analysis of the value chain, assesses its sustainability and resilience, develops an upgrading strategy and an implementation plan to which FISH4ACP will contribute.

FISH4ACP is an initiative of the Organisation of African, Caribbean and Pacific States (OACPS) aimed at making fisheries and aquaculture value chains in twelve OACPS member countries more sustainable. It contributes to food and nutrition security, economic prosperity and job creation by ensuring the economic, social and environmental sustainability of fisheries and aquaculture in Africa, the Caribbean and the Pacific.

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