

Coastal fisheries value chain analysis in Tanzania

Value chain analyses assist in informing policy dialogue and investment operations. They help the understanding of how agricultural, aquaculture and fisheries development fits within market dynamics. They permit an assessment of the value chains' impact on smallholders, businesses, society, and environment.

The European Commission has developed a standardised methodological framework for analysis (<https://europa.eu/capacity4dev/valuechain-analysis-for-development-vca4d/documents/methodological-brief-eng>). It aims to understand to what extent the value chain allows for inclusive economic growth and whether it is both socially and environmentally sustainable.

Inland fishing dominates and contributes to at least 85% of the national fish production volume. Marine fisheries contribution is 10–15%, while aquaculture is negligible. The artisanal sector accounts for approximately 95% of all catches.

Tanzania has a coastline of about 2,300 km available for coastal fisheries, representing both important ecological and economic resources. Coastal marine ecosystems are found in five coastal regions (Tanga, Coast, Dar es Salaam, Lindi, and Mtwara) of the mainland Tanzania (MLT) and the semi-autonomous archipelago state of Zanzibar (ZNZ), comprised of two main islands: Pemba and Unguja.

The European Union intervention

The European Union (EU) is engaged in supporting interventions to contribute to Tanzania's National Development Plan objectives of creating job opportunities and fostering inclusive and sustainable economic growth. This is in line with the sustainable Blue Economy framework, the African Blue Economy strategy, and the European Green Deal, in which the fisheries sector is recognized as an essential component. The EU Delegation's Multiannual Indicative Programme (MIP) 2021/2027 identifies three priority areas: Green Deals, Governance, and Human Capital and Employment. The Blue Economy for Sustainable Transformation (BEST) program will support, among others, the development of sustainable fisheries and aquaculture VCs to contribute to food security, nutrition and livelihoods; the sustainable management of coastal ecosystems and the productive use of the marine and coastal ecosystems and targeted inland waters.

The value chain context

Fishing in the United Republic of Tanzania is an important source of income and nutrition. Fisheries on coastal resources or inland lakes are a source of livelihoods for a quarter of the population (estimated 60 million people in 2020). The sector is the third contributing to the Gross Domestic Product (GDP) after tourism and mining, and shows an annual growth rate of around 9%.

The fisheries sector can be divided into inland fishing and freshwater aquaculture; and marine fishing and mariculture.

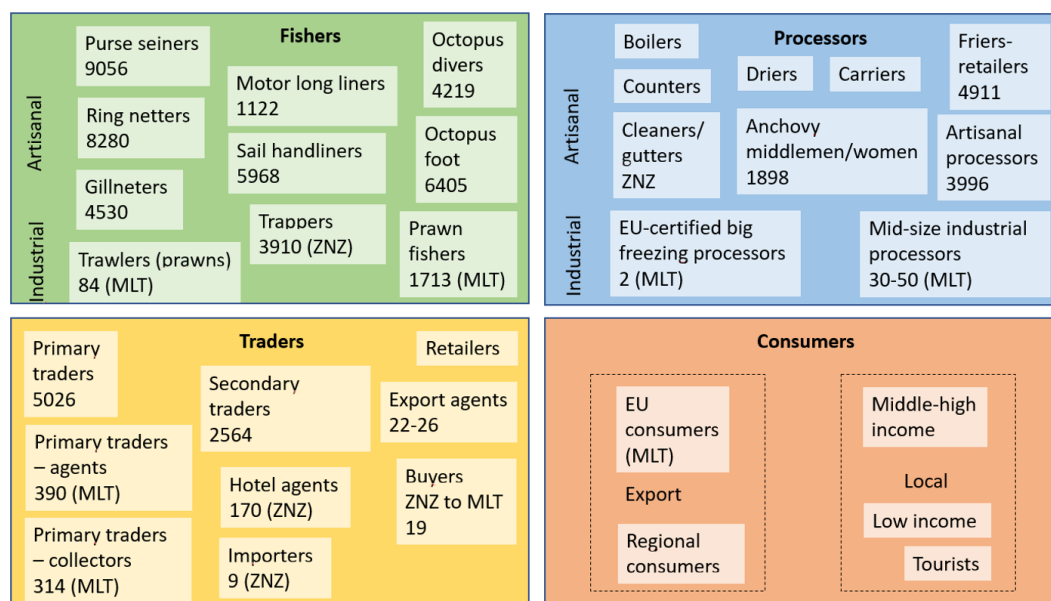


Figure 1: Typology of actors of the coastal fisheries value chain in Tanzania

Functional analysis

Technical features

In both MLT and ZNZ the primary production systems depend on artisanal fisheries, which involve **different types of fishing vessels and fishing gears** (Figure 1). The boats, of various sizes and mainly made from wood, use sails and/or outboard engines as means of propulsion. The majority of fishers are not confined to one specific type of fishing but may move from one to another depending on factors such as season and catch rates. **The final seafood products are similar** in both MLT and ZNZ: fresh/chilled fish (whole fish or cut), frozen products (fish, octopus and prawns), fried fish for local consumption (mainly small-medium pelagic, and small reef fish), and dried fish (mainly for small pelagic, particularly anchovy and anchovy-like for domestic and export market). The **main sub-chains** for both MLT and ZNZ are anchovy and anchovy-like small pelagic; other small, medium, and large finfish; octopus. For MLT there is also the prawns sub-chain.

Production and flows

MLT and ZNZ annual productions are estimated both within the **same range of 70,000 t**: 67,000 t in MLT, 71,000 t in ZNZ (Live Weight Equivalent). The volume of seafood imports in ZNZ represents a minor share. **The local market absorbs 50% and 36% of the volumes in MLT and ZNZ respectively.** The main reason for this variation in the volume allocation between MLT and ZNZ is linked to the small pelagic sub-chain (for instance 6% of export for MLT, compared to 18% in ZNZ). The tourist and high-income consumers' market capture 23% of the volumes in MLT and 19% in ZNZ. The "losses" from the marketplace, representing the wasted post-harvest biomass or the auto-consumption (seafood consumed by fishers' households etc.), are very similar, within 19-20% for both MLT and ZNZ (Figure 2).

Governance and policies

Coastal fisheries (within the territorial waters) **are managed separately**, in MLT by the Ministry of Livestock and Fisheries, through the Department of Fisheries Development of the United Republic of Tanzania; in ZNZ by the Ministry of Blue Economy and Fisheries of the Revolutionary Government of Zanzibar, and the district officers. Off-shore fisheries (within the Exclusive Economic Zone) are co-managed by these

two authorities, through the Deep-Sea Fishing Authority. Regional and district agencies are involved in planning and implementing government policies, as well as working with communities. This includes in MLT establishing and supporting **Beach Management Units (BMUs)** which are intended to be multi-stakeholder organizations aiming to manage, protect and conserve fisheries through co-management arrangements. In ZNZ regional and district agencies interact with the **Village Fishermen Committees, the "Sheha"**, the administrative unit that encompasses several villages.

Tanzania has a wide and complex legislative and policy framework to manage fisheries at various levels. The most important one in MLT is the Fisheries Policy (2015), under revision; in ZNZ recent policies are the Fisheries Policy (2014, and new draft in 2016), and the ZNZ Blue Economy Policy in 2020. No Blue Economy Policy has been formalized yet for MLT. Tanzania is a lead country taking forward the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security & Poverty Eradication (SSF guidelines); a National Task Force and Plan of Action for implementation currently focuses on MLT.

Key differences between Mainland and Zanzibar

Key differences in the characterization of actors in MLT and ZNZ are less pronounced at the fisher's level, but more **significant in terms of primary and secondary traders:**

- Industrial processors operate only in MLT. They are associated with the octopus, prawn and, to a lesser extent, with high-value finfish sub-chains.
- The tourist market is important in both MLT and ZNZ. In ZNZ this has led to a specific category of agents/buyers, while in MLT, the tourist market is handled by industrial actors, inducing a competition between industrial and small-scale traders.
- Different tax and royalty regimes exist and are generally lower in ZNZ than in MLT. This may have a) favoured the presence of fish importers in ZNZ and b) contributed to the higher volume of exports to regional markets of dried anchovy from ZNZ compared to MLT.
- The Ferry Fish Market in MLT is acting as a central market node, capturing more than 10-15% of the total volumes of marine seafood, and does not have an equivalent in ZNZ.

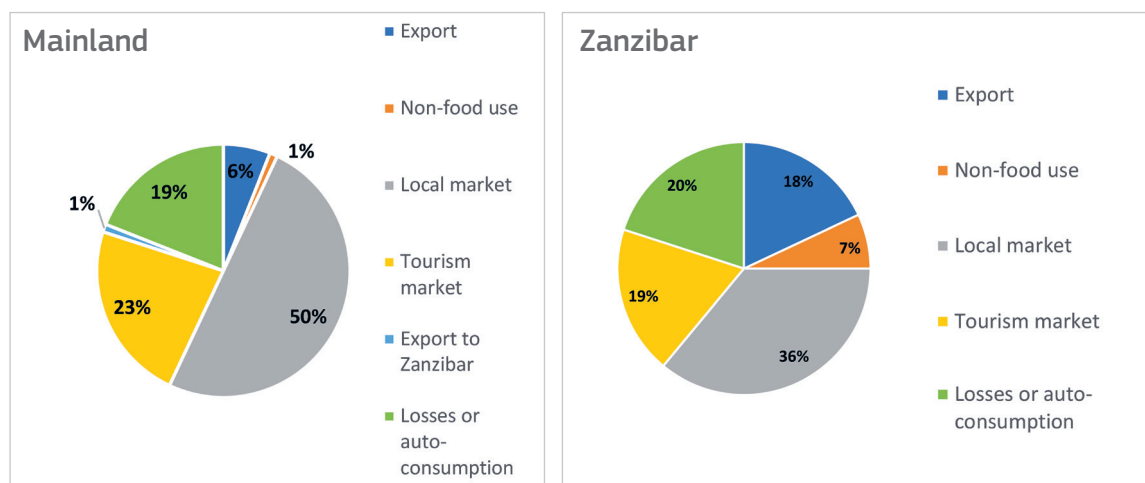


Figure 2: Distribution of seafood by destination (% of total production in Tanzania based on Live Weight Equivalent-LWE)

What is the contribution of the value chain to economic growth?

Profitability for actors

Profit is shared between the boat owner, the captain/skipper and the crew (Figure 3). The profitability, expressed by the individual fisher's income, varies between 143,000–1,740,000 TZS/month (€55–670/month) in MLT and 97,000–662,000 TZS/month (€37–255/month) in ZNZ, depending on the practices, the costs incurred, the catch volume, the fish landing price. **Some crew members are potentially vulnerable**, with an income below the minimal wage (which is 184,000–300,000 TZS/month (€70–115/month)). **The most critical cases are related to the purse seiners, targeting small pelagic** in ZNZ and MLT, with monthly incomes around 115,000 TZS/month (€45/month) or less. Cost structures are mainly determined by the fisheries' technologies and particularly by the engine characteristics of the fishing vessels. Significant operational costs include also bait, maintenance (boat and engine), fishing gears, and various fishing accessories. The profit generated by the boat owners (as expressed by the Return on Turnover (ROT) = Net Operating Profit/Output) varies from 4% to 36%.

The main trading and processing costs are related to transport, electricity, firewood, ice, handling, and processing labours. The profitability for traders and processors varies greatly between actors, sub-chains and the two regions of MLT and ZNZ. **The ROT for traders and processors is always lower in ZNZ (< 7–8%) than the ones observed in MLT (around 16–17%), except in the small pelagic sub-chain, where the situation is more beneficial to traders and processors in ZNZ than in MLT.**

Total effects within the economy

The total value added (Direct VA + Indirect VA) of the coastal fisheries value chain is estimated at 398,451 MTZS (€142 million) in MLT; 262,058 MTZS (€110 million) in ZNZ; and **660,509 MTZS (€252 million) for the country as a whole**. In MLT, the finfish sub-chain generates 68% of the total VA. The small pelagic, octopus and prawn sub-chains represent 11%, 14% and 7% of the total VA, respectively, showing the **importance of frozen octopus and prawns as exports of high value products**. In ZNZ, the finfish sub-chain is also very significant, creating 71% of the total VA. The small pelagic and octopus sub-chains share 25%, and 4% of the total VA, respectively. However, **the small pelagic sub-chain displays**

a strong profile with overall economic performances.

Indirect VA (i.e., the VA generated by the supplies of goods and services to the actors of the VC) expressed through the **driving effect ratio** (indirect VA/direct VA) is important and very similar for MLT and ZNZ (estimated at 0.2). **The rate of integration**, on the other hand, indicates the portion of the value of the VC production which eventually remains within the national economy and **is quite high in both MLT and in ZNZ**. The calculated contribution of coastal fisheries in MLT, and of fisheries in ZNZ, to economic growth was higher than the official figures: with 0.3% of the overall GDP and 1.1% of the agriculture GDP in MLT and 6.3% of the overall GDP and 30% of the agriculture GDP in ZNZ. For the whole Tanzania, **the contribution of coastal fisheries VC to the national GDP is 0.5% and 1.7% of the agriculture GDP.**

Macro-economic indicators

The public fund balance (tax income minus subsidies) **is positive for both MLT and ZNZ**; no subsidies were identified. Income tax is estimated at 25,496 MTZS (€9.8 million) for the whole Tanzania.

Total imports of goods and services by the VC actors range between 10–11% of the total production for both in MLT and ZNZ. There is a **slightly negative VC balance of trade of 4,700 MTZS (€2 million) for MLT, and positive of 11,000 MTZS (€4 million) for ZNZ**. When considering these figures jointly at the country level, the VC balance of trade is positive thanks to the ZNZ dried anchovy exports to the foreign regional market.

Competitiveness

The **Domestic Resource Ratio (DRC)** are 0.44, and 1.12, for MLT and ZNZ respectively. This indicates that the **VCs of coastal fisheries in MLT are viable in the global economy. This situation is different in ZNZ**, where the value of domestic factors which are consumed are higher than the value added they produce. The **Nominal Protection Coefficient** (Domestic price of the product/International parity price of the product) for all the sub-chains **are estimated to be around 1**, indicating that all the actors of the VCs generate equivalent incomes that they would have on international markets.

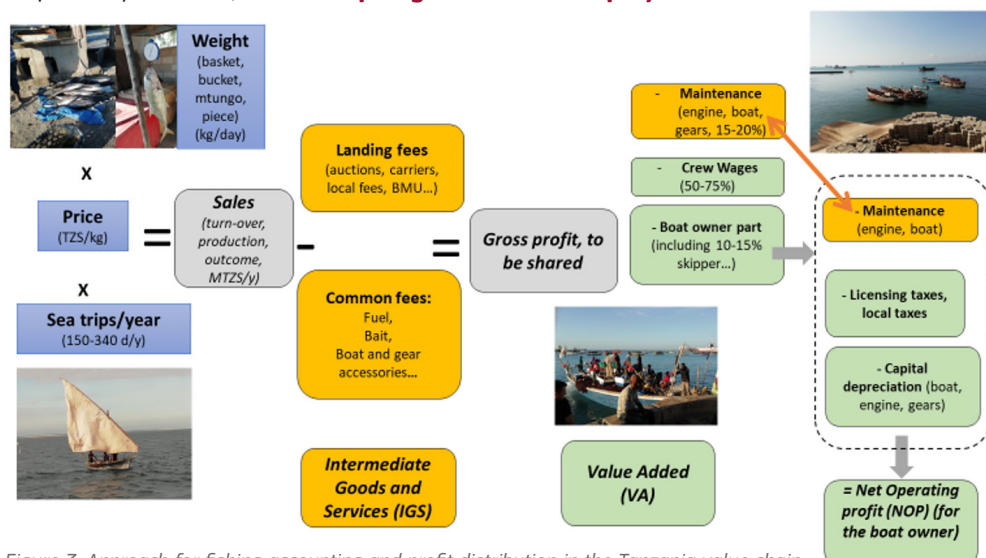


Figure 3: Approach for fishing accounting and profit distribution in the Tanzania value chain

From an overall economic growth perspective, all the considered sub-chains in both Mainland and Zanzibar are playing major and complementary roles. For instance, the octopus and prawn sub-chains in Mainland are less significant in terms of direct value added, but they are contributing to the balance of trade, through the export earnings, and become therefore quite significant from a macroeconomic perspective. In Zanzibar, the small pelagic sub-chain plays a similar role because of the very significant export trades. The contribution of coastal fisheries to economic growth is higher in Zanzibar, nevertheless with the same volume of production, they generate 34% less (total) value added.

Is this economic growth inclusive?

Equality of income distribution

The **estimated monthly incomes compared to a reference minimal wage 300,000 TZS/month (€115/month)** range from 0.5 to 4 times this rate for all the categories of actors. **The share of the fisher's landing price in the final end-user price** widely varies indicating a **potential higher inequality on some sub-chains**. **The Gini coefficient** is indicating **less inequality in MLT, compared to ZNZ**. The more equal situations are in MLT in the low-value finfish sub-chain covering medium pelagic and reef fish, for local markets. The more unequal ones are in ZNZ, in the small pelagic and the octopus sub-chains.

The fishers appear as a vulnerable group in most sub-chains.

Job creation and employment

The sector (freshwater and marine) directly employed nearly 200,000 fishermen in 2019 and supported more

than **4 million people engaged in fisheries VCs**. **The total number of fishers in coastal fisheries** is around **18,000-28,000 and 24,000-35,000 for MLT and ZNZ**, respectively.

Most of the jobs are unqualified (>90%). The rate of formal employment is important where industrial processors play a major role (octopus and prawn sub-chains in MLT), around 30%.

The coastal fisheries value chain in Tanzania is quite dynamic in terms of job creation and income, but there is income inequality among the actors, particularly in some sub-chains. Many coastal fisheries actors and communities are highly dependent on fisheries and have limited capacity to adapt to socio-economic and biophysical stresses.

Is the value chain socially sustainable?

The following table and Figure 4 provide an indication of the main social consequences and context of the VC activities in six key domains.

Working Conditions	<ul style="list-style-type: none"> Most workers in informal sector where enforcement of rights, job safety and organization of workers is challenging. In spite of challenges, people (including women and youth) are attracted, but returns vary widely.
Land and Water Rights	<ul style="list-style-type: none"> Tanzania is a lead country taking forward the small-scale fisheries (SSF) Guidelines and currently especially in MLT; however this is not the case in ZNZ where previous fisheries policy criticized for being insufficiently aligned with SSF Guidelines. Fishers "property rights" affected by protected areas, and coastal development in ZNZ, (tourism) with limited benefits to local people. Land policy/law implementation often not in accordance with the rules. No recent large-scale acquisitions by private sector coastal fisheries VC actors identified, although other coastal developments are on-going.
Gender Equality	<ul style="list-style-type: none"> High and increasing involvement by women in coastal fisheries postharvest, but relatively low in production (exception of octopus). Some women economically empowered through fisheries VCs and with leadership roles. Unequal division of labour; women expected to earn and do household work. Women's participation shaped not just by gender, but also by e.g. assets, education.
Food and Nutrition Security-FNS	<ul style="list-style-type: none"> In coastal communities, fisheries make a direct and indirect (income) contribution to FNS. In particular in ZNZ fish is frequently consumed (4.6 times/week); only 7% of households caught own fish; 87% purchased and the rest is traded or received as gift, aid, etc. Food production in communities reported as decreasing. FNS increasingly depends on households' ability to buy food. Risks of dependency on income from fisheries VCs are high for fisher and non-fisher households.
Social Capital	<ul style="list-style-type: none"> Coastal fisheries actors belong to a range of formal and informal organisations and are embedded in a complex web of social relations. Goals, performance and inclusivity of organizations in fisheries VCs vary. Many fishers did not feel well represented. Formal support service capacity to fishers is generally weak.
Living Conditions	<ul style="list-style-type: none"> Improved health facilities attributed to the government, although household spending on health is high. Increasing and high proportion of houses considered "modern" (i.e. iron sheet roofs); fisheries income contributed. Rural primary school net enrolment rate 81% in MLT, 78% in ZNZ. Fisheries income contributed to meeting educational costs in MLT, mixed responses regarding link with fisheries in ZNZ.

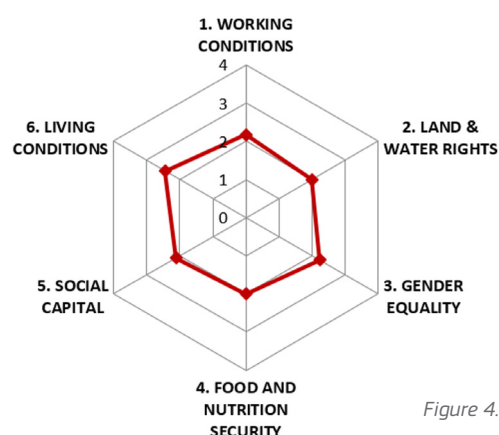


Figure 4. Social profile

People are attracted, in spite of challenging working conditions, to these mainly informal VCs. There are concerns regarding coastal resource property and small-scale fishers' rights. Women are increasingly participating in post-harvest activities, but further improvements can be made. Fishing communities are increasingly dependent on purchased food, increasing their vulnerability to changes in fish stocks and food prices. Limited representation of fishers and weak support to them is to be considered to improve social capital. Education, housing and health facilities are improving and fisheries income is contributing. However, there are concerns, i.e. increasing incidence of non-communicable diseases.

Is the value chain environmentally sustainable?

Main areas of protection (AoP) affected

Although some differences exist between MLT and ZNZ in terms of environmental sustainability, in both geographic entities, the impacts associated with the sub-chains affect predominantly **Human Health** and **Climate Change** (Global Warming Potential). This is due to the amount of fossil fuels used for engine operations and other biomasses for processing (i.e. firewood, cooking oil) because of the Greenhouse Gasses (GHG) and particulate matter emissions.

Damage at the different steps of the value chain

The most important phases in terms of environmental performance are **the fishing and the processing phases**. The phase associated with the transport refers mainly to exported seafood and have limited environmental impacts.

Fishing activities having the highest environmental damage/impacts (both on the AoP and Climate Change/Global Warming Potential) are the ones having high Fuel Use Intensity (FUI), i.e. litres of fuel consumed for 1 t landed seafood: octopus fisheries using motorized vessels in MLT, and finfish longliner in ZNZ.

The processing activities showing the greatest impacts are those using firewood and cooking oil for frying (MLT and ZNZ) and firewood for boiling (mostly for ZNZ). Indeed, **the use of firewood has crucial environmental and health consequences** (i.e. particulate matter and GHG emissions, but also deforestation if the wood fuel is cut). However, in the case of MLT and ZNZ, it is likely that a share of the firewood consumed is collected from branches of trees harvested for different reasons. The need for such types of processing practices is tightly linked to the need of avoiding high post-harvest losses.

Transport (until the country borders) of fresh or processed seafood have no major environmental effects compared to the other activities of the VCs.

Biodiversity

There is little information on the state of the exploited stocks. Without stock assessment and not knowing the population size, age structure and size classes of the stocks, it is difficult to calculate the maximum sustainable yield (MYS). However, despite the weak reporting of landed products and the absence of up-to-date stock assessments, most of the fish stocks exploited by Tanzanian coastal fisheries are classified as fully or overexploited. Supporting these observations are also the testimonies of interviewees who observed decreased CPUE (Catch Per Unit Effort) (Figure 5). However, it must be highlighted that the number of people involved in fishing has increased (and this could lead to the fishers' perception of decreased CPUE). With the objective of ecosystems and biodiversity preservation, a range of measures, projects and programmes have been implemented: establishment of marine protection and conservation areas, ban of destructive fishing gears, research projects for the creation of alternative income generating activities.

The value chain could be improved in terms of environmental efficiency. The main drivers of environmental impacts are the use of fuels for the fishing operations (especially the high-Fuel Use Intensity sub-chains, i.e., octopus and finfish in Mainland, finfish longliners and ringnetters for ZNZ) and the use and combustion of firewood and cooking oil for processing activities (boiling and frying). The higher Fuel Use Intensity could be linked to the use of outdated engines. These aspects may be linked also to the overall inefficiency of the machinery used along the VC (e.g., outdated engines, braziers, poor cold chain system). The problem of poor reporting of landed fish products and the overall data flow system is a major issue for the evaluation of the effects of value chain activities on biodiversity.

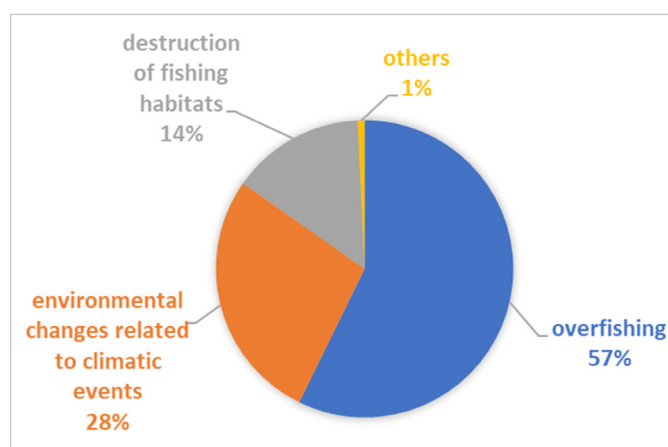


Figure 5. Fishers' perception of fisheries decline drivers in Tanzania over the past decades

Source: (Silas et al., 2020¹)



Fish drying process on the beach in Mafia Island
(credit: R. Le Gouvello)

¹ Silas, M.O., Mgeleka, S.S., Polte, P., Skold, M., Lindborg, R., De La Torre-Castro, M., Gullstrom, M., 2020. Adaptive capacity and coping strategies of small-scale coastal fisheries to declining fish catches: insights from Tanzanian communities. *Environ. Sci. Pol.* 108, 67–76.

Main findings and recommendations

Main findings

There is a **significant contribution of the coastal fisheries to the economy** of coastal regions of MLT and ZNZ, **and to livelihoods** in local fishing communities.

- The **small pelagic VC** is growing in importance for the local economy, food security and exports, although it is not clear to what extent it is sustainable due to the weak data collection system, and a high degree of inequality is evidenced among actors mainly in ZNZ.
- The **finfish VC** provides a major contribution to economic growth and food security, but attention should be paid to the sustainable management of the resources. There could be a challenge in managing the stocks shared between MLT and ZNZ.
- The **octopus and prawns VCs** in MLT play a role in economic growth and industrial development. The dynamics of these VCs are linked to the export market, which may lead to impacts on coastal fisheries and local communities.

The sustainability of Tanzanian coastal fishery VC is highly linked to tourism development and the associated positive and negative impacts. Potential threats to coastal fisheries are linked to the weak management of fish stocks, overexploitation, climate change, ecosystem degradations, degraded food quality and sanitary situations. Many coastal fisheries actors and communities are vulnerable because they are highly dependent on fisheries and have limited capacity to adapt to socio-economic and biophysical changes.

There is a **challenge** in the future Blue Economy policy implementation to manage the trade-offs in order **to achieve fair outcomes between the coastal fisheries sector and the other Blue Economy sectors** such as marine conservation measures, tourism expansion, and oil/gas extraction activities.

Main recommendations

Data and information system

- ➔ Strengthen capacities (including technical and financial support), systems of information flow, and collaboration among stakeholders.

Environmental issues

- ➔ Co-design ways of reducing the amount of fuel required per trip at sea, improving the efficiency of the kilns used for processing (as well as the choice of the fuel used for processing, e.g. Liquefied Petroleum Gas - LPG).
- ➔ Improve hygienic conditions and modernize infrastructure to reduce post-harvest losses.
- ➔ Decrease fishing efforts and create space for alternative income-generating activities, such as sustainable aquaculture.

Social issues

- ➔ Improve the alignment with the principles of the Small-Scale Fishers guidelines.
- ➔ Give greater attention to understand the relationship between food and nutrition security and fisheries in coastal communities and nationally.

- ➔ Promote multi-stakeholder co-management initiatives, in ways that fairly distribute both costs and benefits.

Coastal fisheries in the context of Blue Economy

- ➔ Develop an integrated planning framework for all aspects of the Blue Economy and appropriate institutional arrangements.
- ➔ Develop actions in relation to the Blue Economy with all donors joined together in an organised group.
- ➔ Support responsible investments, e.g., through the application of principles of sustainable Blue Economy Finance.

Coastal fisheries in the context of agroecology

- ➔ Explore how agroecology practices and principles can contribute to the economic, environmental and social sustainability of coastal fisheries systems.

Value Chain Analysis for Development (VCA4D) is a tool funded by the European Commission / INTPA and is implemented in partnership with Agrinatura.

Agrinatura (<http://agrinatura-eu.eu>) is the European Alliance of Universities and Research Centers involved in agricultural research and capacity building for development.

The information and knowledge produced through the value chain studies are intended to support the Delegations of the European Union and their partners in improving policy dialogue, investing in value chains and better understanding the changes linked to their actions. VCA4D uses a systematic methodological framework for analysing value chains in agriculture, livestock, fishery, aquaculture and agroforestry. More information including reports and communication material can be found at: <https://europa.eu/capacity4dev/value-chain-analysis-for-development-vca4d->

This document is based on the report "Le Gouvello, R., Lamboll, R., Martini, A., Mgawe, Y., 2022. Value Chain Analysis of Coastal Fisheries in Tanzania. Report for the European Union, DG-INTPA. Value Chain Analysis for Development Project (VCA4D CTR 2017/392-416), 211 p + annexes. Only the original report binds the authors.



Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of the following information. The contents of this publication do not necessarily represent the official position or opinion of the European Commission. Directorate General International Partnerships - EuropeAid, Rue de la Loi 41, B-1049 Brussels. For further information: https://ec.europa.eu/international-partnerships/home_en