



The United Republic of Tanzania  
Ministry of Livestock and Fisheries

## Livestock and Fisheries Commodity Value Chain Briefs

Brief No. 5



## AQUACULTURE

### Key Messages:

- Aquaculture production is a critical option to bridging the demand gap of more than 350,000 metric tons of fish and raising the national per capita fish consumption from 7.6 to 20.3 kg per person per year which is the global recommended consumption.
- The country has a tremendous water resource for aquaculture industry and needs only strategic policy support.

## SUMMARY STATISTICS

Number of farmers	Annual production (MT)	Per capita consumption (Kg)	Number of companies in the value chain	Annual export (MT)	Annual export earnings (mil USD)	Annual import (MT)	Annual import bill (mil USD)
27,742	18,081.6	7.6	19	44,972	13,551,91,193	10364.79	5,894,09,093

### 1. INTRODUCTION

Aquaculture in world fish consumption contributes 53% globally compared to capture fisheries<sup>1</sup>. This should prompt most of the developing countries to invest in the aquaculture industry for sustainable fish source proteins. Tanzania has several commendable tropical and temperate farmed fish species including tilapia, rainbow trout, and catfish for freshwater aquaculture and milkfish, pearl oysters, mud crab and prawns farming in marine waters. There is also seaweed farming along the Indian Ocean. The aquaculture industry is characterized by primitive farming in earthen ponds. However, there are some larger vertically integrated production units in cage farming along Lake Victoria and Lake Tanganyika. Also, there is commercial shrimp farming in coastal areas, specifically for foreign markets. There are private and public hatcheries producing slightly over **6,221,076** freshwater fingerlings and about **11,080,000** prawn seeds per year. There is an apparent lack of good quality fry, and the excess demand over supply results in lower quality and higher levels of mortality, undermining productivity<sup>2</sup>.

### 2. PRODUCTION, PRODUCTIVITY AND FARMING SYSTEM

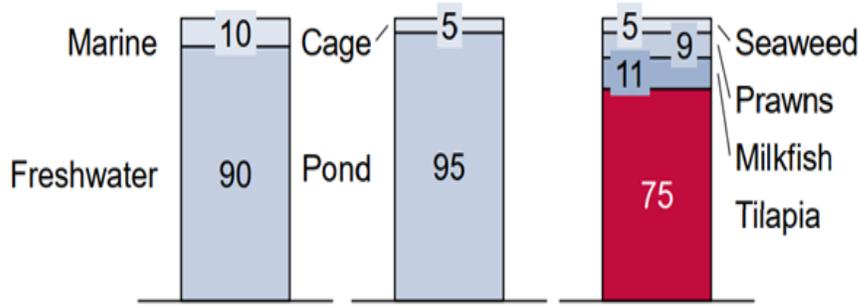
Aquaculture production in Tanzania is characterized by numerous small earthen ponds over the countries. The freshwater aquaculture dominates the subsector with **26,445** earthen ponds, **408** cages (346 Lake Victoria, Lake Tanganyika (**9**) and **53** in charcoal dams) and one recirculating aquaculture system (RAS). The most culture fish are Nile tilapia followed by African catfish. The current tilapia and catfish production stands at **16,288** MT per annum<sup>2</sup>. Aquaculture production is currently at only 2% of total production, with the potential to increase cage fishing, domestic hatcheries, and in-grower pond scheme.

With available fish farming methods (Figure 1), more capital investment is needed to scale up the productivity of aquaculture industry in Tanzania. More holistic aquaculture business packages for various production modes is needed to maximize the production efficiency and develop the competitive industry.

<sup>1</sup> The State of the World Fisheries and Aquaculture 2018

<sup>2</sup> Ministry of Livestock and Fisheries, 2019

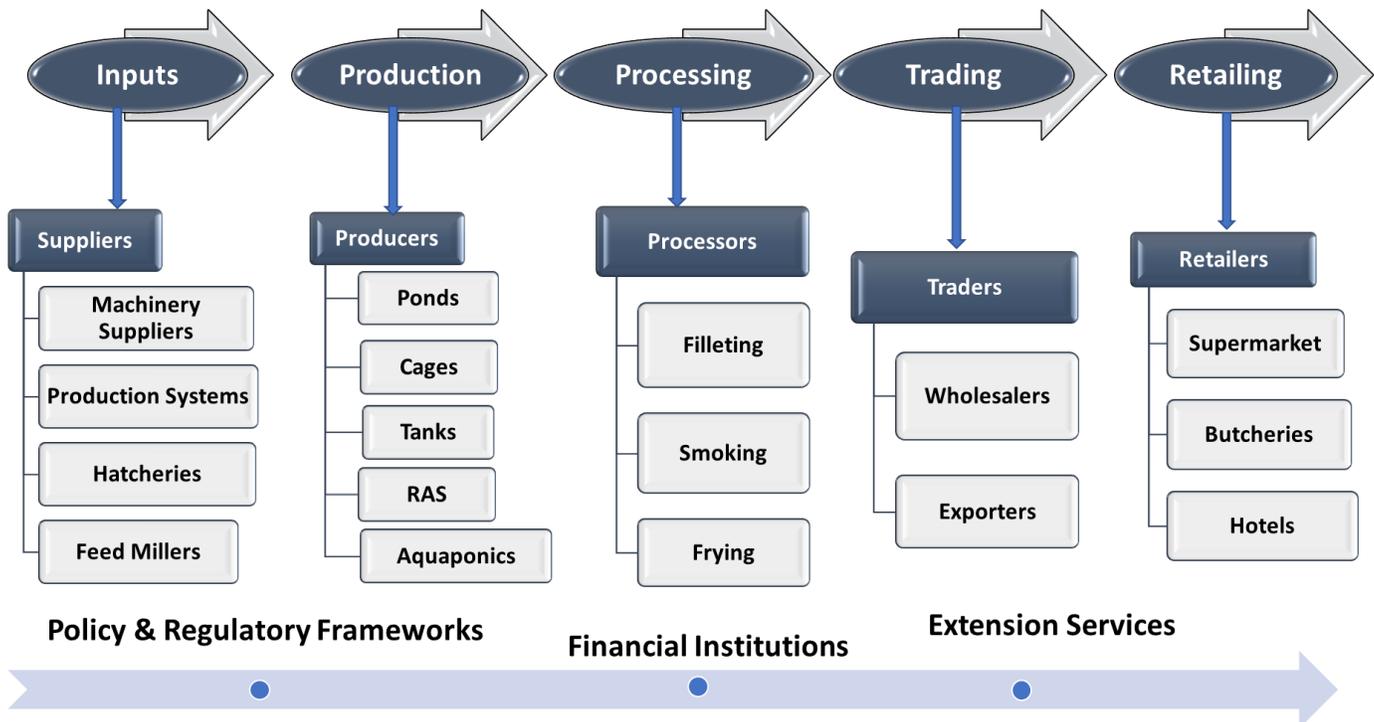
Figure 1: Aquaculture production by type, method, and species (%)



### 3. VALUE CHAIN

Most of the aquaculture products are consumed domestically. Tilapia is the main product of aquaculture accounting about **98%** of the aquaculture products. Most of the high-value species include prawns and mud crabs and trout are sold directly in domestic touristic hotels or are exported to developed country markets. The raw and seaweeds are exported and few are domestically used to produce local shampoos, detergents, and freshers. The value chain below portrays the tilapia value chain in Tanzania.

Figure 2: Aquaculture value chain in Tanzania, specifically for tilapia production



## Problems facing different actors in the value chain<sup>3</sup>

- ✦ The main constraints affecting earthen pond-based fish farming are shortage of water supply to fish ponds, high cost of inputs, lack of proper knowledge on fish farming, lack of good quality fish feeds, low profitability, slow growth of the cultured species and theft of fish.
- ✦ The problems which affect fish traders are lack of appropriate infrastructure for fish handling and storage, low capital and inadequate supply of fish.
- ✦ The constraints for hotels/restaurants include fish scarcity, low capital and unfaithful suppliers who supply spoiled fish.

## Weakness for the value chain

The main weaknesses in the value chain were:

- ✦ Lack of contractual arrangement between input suppliers and fish farmers, fish farmers and fish traders and fish traders and consumers.
- ✦ Fish farmers consider fish farming as a secondary economic activity and, hence, invest little in terms of time, labor and money.
- ✦ Most value chain actors depend on self-financing even though they have low capital.

## 4. MARKETING AND TRADE OPPORTUNITIES

### *Fish and fisheries products:*

- ✦ The fish demand gap in Tanzania is over 350,000 tons per year as capture fisheries production has been stationary for 30 years with an increasing population. Today, aquaculture accounts for a mere 1% of fish production in Tanzania. Regional and international imports of frozen aquaculture products are starting to enter the market to meet the gap.
- ✦ Opportunities for fish farmers included readily available markets for fish in the villages and nearby towns.
- ✦ Opportunities for traders include high demand for fish and fisheries products due to availability of tenders in hotels and increase of the middle-class group in the country.

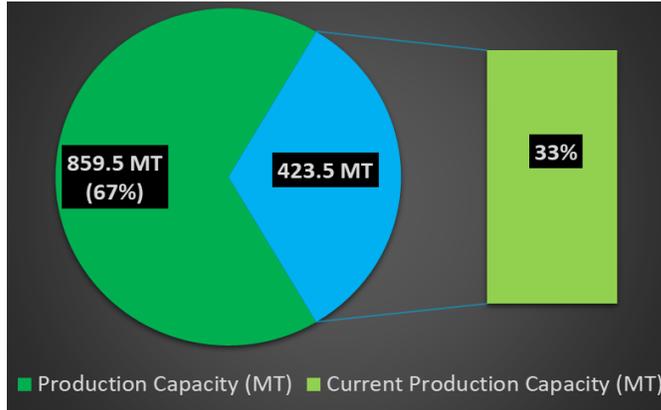
### *Fish feeds:*

The fish feed production in Tanzania is not sufficient. The actual demand for fish feeds in Tanzania is not yet established. There are several farms which are unregistered fish feed mills scattered over the countries and six small scale fish feed processing industry producing for farm and sales. These include Eden Agri-Aqua Services, Jans Aqua Centre, TanFeed, Kise Farm, Kisima Farm, Hill Feed Company, Feed and Fingerlinks Co. Ltd, Aquasol Tanzania Ltd and Mother and Child Hope (Mcheeo). The annual feed production for these mills is approximately **859.5 MT**. However, currently the production is only **423.5 MT** per year (Figure 3 below).

Domestic  
market

<sup>3</sup> Chenyambuga, *et al.*, (2016). Assessment of Value Chain of Farmed Nile Tilapia (*Oreochromis niloticus*) in Coastal and Lake Zones of Tanzania

### Production of fish in Tanzania



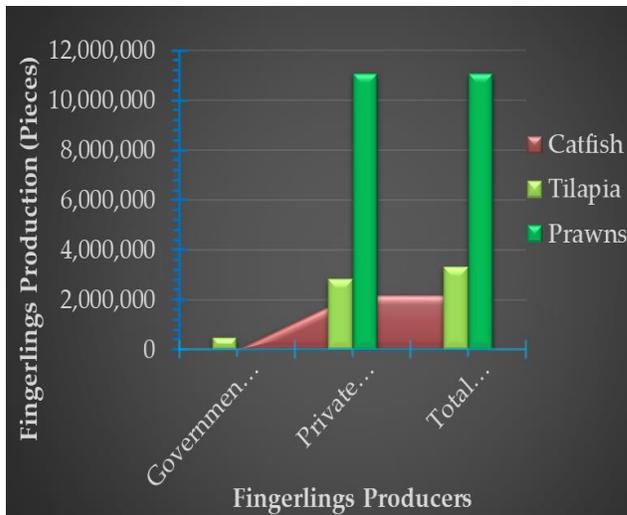
To fill the gap, **638.87** MT of fish feeds is imported including Denmark, Kenya, Uganda, China, The Netherlands, Zambia and Zimbabwe. The imported improved fish products have been prominent in commercial-based tilapia farms including cage culture and tilapia hatcheries. The pending issue with imported fish products is their cost in which most of them are sold at US\$1.2-2 per Kg which is not affordable to most farmers.

Figure 3: Annual production of fish feed in Tanzania.

### PRODUCTION OF FINGERLINGS

Domestic market

Quality fingerlings is a key ingredient for the competitive aquaculture industry. In 2019, the total fingerlings were **17,301,076** including **6,221,076** fish fingerlings and **11,080,000** prawns' seeds. Most of the fingerlings are monosex tilapia and are from both public and private hatcheries. There is a total of seven tilapia hatcheries with the capacity to produce over **20,000,000** fingerlings per year but they can produce only below **7,000,000** tilapia fingerlings. The annual catfish fingerlings production capacity is **6,240,000** and currently produce only **2,165,268** fingerlings per annum. The farm-based prawns' seeds commercially produced in two hatcheries are 10,080,000 per year and are not usually distributed to farmers (Figure 4 below).



There is high demand for quality fingerlings and affordable fish feed for the Nile tilapia. However, there are some emerging issues existing amongst farmers and fingerling producers. Fingerling producers claim there are no buyers for fingerlings but apparently farmers buy fingerlings from Kenya and Uganda claiming that there is no fingerling in Tanzania. Poor linkage among aquaculture actors in the value chain has been hindering the sector growth and have implications in marginal profitability of

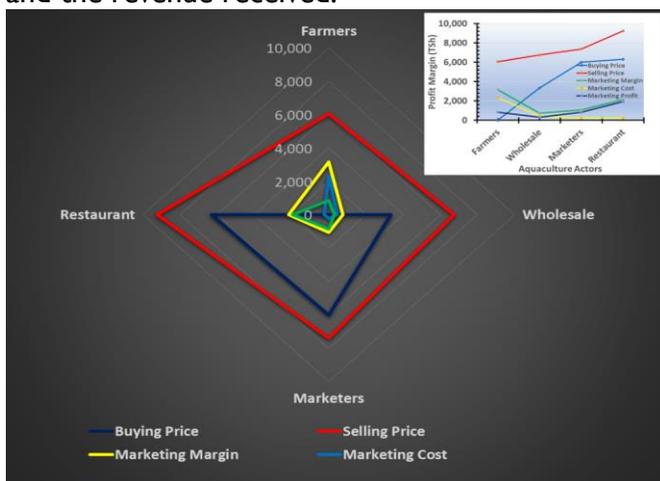
Figure 4: Annual fingerlings production

### 5. CONSUMPTION

Most of the aquaculture products are consumed locally. Dried seaweed products are exported to the to the USA and Asia. Small quantities of seaweeds are used locally to produce soaps, detergents, and shampoos.

### 6. PROFITABILITY

This is based on tilapia farming in Tanzania as reported in 2017<sup>4</sup>. Actors in the chain have different Gross margins. The Gross Margin (GM) has been calculated based on the availability of data. For the Nile tilapia farmers' margin was calculated by using the total cost of production which includes the cost of fingerlings, feeds, hired labor and transport, and the revenue received.



The Gross Margin for Nile tilapia farmers differs depending on the actor whether being farmer, wholesaler, middlemen or restaurants as per the illustrations in the figure 5 beside.

Figure 5: Margin profitability of tilapia production

There are a few commercial operations but currently, policy clarifications are attracting investors:

<sup>4</sup> Ayubu, S. (2017). Value Chain Analysis of Farmed Nile Tilapia in Selected Areas, Tanzania. MSc Dissertation, SUA.

- ✚ There is an immediate opportunity to substitute imports of fresh fish (Tilapia) from China, strong domestic demand in urban centers and regional export potential offering price premiums
- ✚ Other countries have scaled up rapidly to bring down costs of production and increase profitability

## 7. DEVELOPMENT PARTNERS SUPPORTING THE VALUE CHAIN

### ***Development partner support:***

There are some development partners promoting aquaculture for its nutritional benefits and potential to improve farmer incomes and livelihoods, for example:

- ✚ European Union: Funded the study on the economic and financial value of Lake Victoria fisheries
- ✚ World Bank: Aquaculture is at its infancy and has not yet attracted funders to support the industry. Currently, we have the World Bank Financed Project, “South West Indian Ocean Fisheries Governance and Shared Growth Program (SWIOFish)”. SWIOFish supports the design and construction of the National Mariculture Centre. It will offer capacity building courses to extension officers, researchers, and farmers. Also, various researches on mariculture will be conducted. Furthermore, the fish seed of selected marine fish will be produced and supplied to farmers. The brood stock gene pool of various marine fish species will be maintained at the Centre.

### ***Private sector support***

Currently, there are some commercial banks that have fisheries and fish farming lending schemes, including TIB Development Bank and Tanzania Agricultural Development Bank (TADB).

## 8. CHALLENGES AND OPPORTUNITIES

### Challenges and Opportunities<sup>5,6</sup>

#### Challenges to Aquaculture

The aquaculture industry stakeholders have identified a number of challenges to the high performance of aquaculture sub-sector despite its high potential. The challenges include:

- ✦ Low investment capital;
- ✦ Inadequate knowledge and skills for farmers to practice aquaculture commercially;
- ✦ Existence of informal nature of the aquaculture activities;
- ✦ Low capacity of farmers to adopt and adapt appropriate technologies of aquaculture;
- ✦ Inadequate extension services and experienced qualified staff;
- ✦ Unavailability of hatcheries and affordable quality cultured seeds;
- ✦ Inadequate capacity for controlling, diagnosis and treatment of fish diseases;
- ✦ Low Access to credit facilities by farmers for aquaculture development;
- ✦ Lack of manufactured quality feeds;
- ✦ Limited technology leading to poor pond management;
- ✦ Low access of farmers to market information of aquaculture products;
- ✦ Inadequate funding for data collection; and
- ✦ Inappropriate database and information systems.

#### Investment Opportunities in Aquaculture

Tanzania is endowed with large water bodies which include ocean, lakes, rivers, and dams. There is also an appropriate land use plan from which fish and integrated fish, crop and livestock farming can easily be practiced. The opportunities for aquaculture development include:

- ✦ There is a strong demand for the whole tilapia locally and fillets in the regional market. The country has enormous potential sites, with good soil and guaranteed water availability for culturing tilapia and catfish.
- ✦ Hatchery production of fingerlings: The demand for quality tilapia and catfish fingerlings to meet this demand.
- ✦ Cage culture in lakes and the Indian Ocean: Tanzania harbors many water bodies that are suitable for deployment of cages including Lake Nyasa, Lake Victoria, and Lake Tanganyika.
- ✦ Seaweed farming and processing: Establishing plants for total or semi-processing of dried seaweed. International markets for carrageenan and agar are high.
- ✦ Prawn farming: There are vast coastal areas that are suitable for a similar engagement. In 1996 a survey made by the UN Economic Commission for Africa (UNECA) established that Tanzania's coastline harbored **3,000** hectares suitable for shrimp farming which could potentially produce over **11,000** MT annually. To invest in post-larvae (PLs) production in hatcheries. PLs demand will grow with entrants in this field
- ✦ Coastal finfish culture and mud crab farming: Potential for farming groupers, milkfish and mud crab. This includes the potential for farming marine finfish in pens and cages.

<sup>5</sup> The Tanzanian Fisheries Sector: Challenges and Opportunities. September 2016. The Royal Danish Embassy, Dar es Salaam, 2016.

<sup>6</sup> Status on The Fisheries Industry and Investment Opportunities. The United Republic of Tanzania, 2009.

## 8. POTENTIAL POLICY ISSUES IN AQUACULTURE

Aquaculture production profile needs to undergo deliberate transformation by the Government by engaging all actors along the production value chain. To experience the planned social and economic impacts of the aquaculture industry, holistic approaches to stimulation investment should be sought. At this stage, two complementary development domains can be pursued. There should be a preliminary policy supports to attract more investment in the industry and establish investment confidence among investors and thereafter develop a supportive corporate atmosphere for aquaculture operations in the country. The whole analysis of this has been compiled under various strategic implementations.

**Preliminary Policy Supports: To increase investors' confidence around government strategic direction and to improve approval/permitting processes**



Investment  
challenges

- ✦ There is a lack of specific aquaculture regulation/ national stagey which undermines the legal basis for investment;
- ✦ Lake zoning is still under development and limited to Lake Victoria, ignoring other lakes and potential inland sites;
- ✦ There is no clear direction on authorization systems and necessary procurement procedures are yet to be established; and
- ✦ Investors are put off by a long and costly environmental approval process and the lack of clear guidelines to navigate the process.



Policy  
Recommendations

- ✦ Roll out zoning on lakes and peri-urban areas: Once the Lake Victoria zoning is complete the government should expand this to other lakes (Tanganyika, Nyasa, etc.) and designated pond fishing land in peri-urban areas;
- ✦ Complete front-end environmental assessment: The Government should plan to complete initial environmental scoping alongside ongoing zoning activities. This would reduce approval time and limit the currently prohibitive burden on investors;
- ✦ Clarify procurement/authorization strategy: A strategy is required with clear guidelines on how operations within zones will be authorized & procured. Initially we would recommend a simple call for proposals, rather than a complex auctioning or PPP approach; and
- ✦ Co-ordinate better all 3rd party approvals: A closely managed approval process, either facilitated by Tanzania Investment Center (TIC) or the Aquaculture Department directly would build investor confidence in achieving timely and strong government approvals.

## Supportive Corporate Atmosphere: To create a conducive environment for aquaculture SMEs to thrive and compete

### Investment challenges

- ✦ Producers face significant competition from cheap frozen imports, new enterprises need support to be competitive and top up domestic earnings with higher value exports sales;
- ✦ The affordability of imported inputs and equipment already limits profitability, even before domestic duties/taxes; and
- ✦ A skilled workforce is key to success, when establishing operations foreign experts are often needed for up to 4 years.

### Policy Recommendations

- ✦ Provide equipment tax and duty relief: Up to 50% of medium/large farm equipment needs to be imported. The government could reduce VAT and excise duties on equipment imports as local supply chains develop, mirroring those available to agriculture actors.
- ✦ Remove VAT and import tariffs on fish feed: Feed is up to 80% of production costs of fish farming and typically imported to ensure quality during early operations. Reducing VAT & import tariffs for a 3-5 years period would enable SMEs to establish, then overtime production growth will help to increase feed demand and make the case stronger for local production of quality feed.
- ✦ Designate priority aquaculture sites as SEZs: Alongside other benefits, Special Economic Zones (SEZ) have higher immigration quotas. This is important as foreign technical expertise is usually needed initially for successful aquaculture operation, then transferring to locals.
- ✦ Remove export royalties, but add quotas: Cultured fish export royalties (approx. 19%) restrict commercial viability as firms can balance domestic demand with targeted higher value exports, quotas better control export volumes.

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