

Overview of Fisheries Industry in Tanzania

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Abstract Tanzania is a coastal state on the western Indian Ocean in Africa. In an artisanal or small scale fishery, the combination of large numbers of fishers and landing places, mixed gears and migrant fishers makes fisheries management an often complex task. Lack of capital, low level of technology, poverty and high cost of transport are major socio-economic problems in Tanzanian fisheries. The combined approach of community-based management and provision of education and training for extension workers and fishers themselves are required. It is also necessary to build the capacity of fisheries institutions to meet the human resources development challenge.

Key words : Fisheries industry, fisheries management, Tanzania

Introduction

Tanzania is a coastal state on the western Indian Ocean. The country shares three of largest lakes in Africa; Lake Victoria, Lake Tanganyika and Lake Nyasa. Also, there are several rivers and dams. Fishing takes place in all these mentioned water bodies. Important resources at the Lake Victoria are *Rasteneobola argentea*, *Oreochromis niloticus*, and *Lates niloticus*. Important resources at the Lake Tanganyika fishery are *Stolothrissa tanganyicae*, *Limnothrissa miodon*, and *Luciolates* spp. Important resources at the Lake Nyasa fishery are *Engraulicypris sardella*, *Haplochromis* spp., and *Tilapia* spp. Marine Fishery are mainly crustaceans, tuna, shark and rays, *Stolephorus* spp. (dagaa). Top ten producer countries for inland capture fisheries in 2002 are China by 2,248 thousand tones (25.7%), India by 814 thousand tones (9.3%), Bangladesh by 688 thousand tones (7.9%), Cambodia by 360 thousand tones (4.1%), Indonesia by 316 thousand tones (3.6%), Myanmar by 305 thousand tones (3.5%), Egypt by 293 thousand tones (3.3%), Tanzania by 274 thousand tones (3.1%), Uganda by 222 thousand tones (2.5%), Brazil by 218 thousand tones (2.5%), and the other countries by 3,001 thousand tones (34.3%) [3,4]. In Tanzania,

contribution of fisheries sector to the Gross Domestic Product (GDP) is 2.5-3%. There is still rooms for fisheries development since potential yield stands at about 730,000 tons, while landing is half way (300,000-400,000 tons per annum). It is being estimated that fish landing in Tanzania for the year 2007 was about 332,179 metric tons. Artisanal fisheries generated about 99% and the industrial sector (from shrimp trawlers) was just 1%. Freshwater fishery produced 87% and the remaining 13% was obtained from the marine fishery. For Employment in fisheries, a total of 163,037 fishers are full time employed in artisanal fisheries whereas a total of 199 fishers were employed in shrimp fishery in 2007 [2]. It is being estimated that there are another group of 4 million people in allied industry to include processing, net-making and boat construction. Leading fishery exports are Nile perch fillets of 74 %, other Nile perch products of 12.5%, and lake sardine (dagaa) of 13.5% [2].

For Fisheries Management system, we have Centralized (by central government) system for industrial fishery and co-management through Beach Management Units (BMU) for artisanal fishery. In both cases, management plans are developed and implemented. Also, there is marine parks arrangement. Fisheries management in

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Tanzania is oriented towards the reduction of fishing efforts both in industrial and artisanal sectors. Environmentally unfriendly fishing methods (e.g. beach seines and dynamite) are prohibited. Protected areas have been established, as have marine reserves and parks.

Legal and institutional framework

The fisheries policy in Tanzania revolves around the country's central policy of poverty reduction. The goal is to regulate, promote, conserve, develop and up-hold sustainable exploitation and utilization of fish and other aquatic living resources. It focuses on provision of food, employment, income to fishers and export revenue. Fisheries institutions in Tanzania are Department of Fisheries under the Ministry of Livestock Development and Fisheries, local governments/district councils, village government (environmental committee), Tanzania Fisheries Research Institute (TAFIRI), Mbegani Fisheries Development Centre, Nyegezi Freshwater Fisheries Institute, and Beach Management Units.

The basic fisheries law in Tanzania is The Fisheries Act no. 22 of 2003, which provides for the development and control of the fishing industry, and the promulgation of regulations [7]. The regulations are the Fisheries Principal Regulations amended in 2005.

Total fish production

The history of fish culture in The United Republic of Tanzania is not well documented. Fish culture started in 1949 with experimental work on the culture of tilapia at Korogwe (in Tanga Region) and Malya (in Mwanza Region) during which many ponds were constructed [1]. These ponds ended up being largely non-productive

due to lack of proper management and use of incorrect technology coupled with physical problems such as drought and poor infrastructure. According to reports from FAO, 8,000 fishponds had been constructed in The United Republic of Tanzania by 1968. However, some of the ponds were too small in size (at times as small as 20 m²) and with very low production, probably resulting from poor management.

Water reservoirs constructed for use in homes or for livestock, irrigation and factories or for flood-control were stocked with tilapia. This practice started in 1950 and by 1966, 50% of the reservoirs in the country had been stocked by the Fisheries Division. In 1967, the government launched a national campaign on fish farming which was unsuccessful, again due to improper management. In 1972, aquaculture was, for the first time, given some importance in the fisheries policy. After that aquaculture was included in the Fisheries Policy, although always as a low priority sector. Several small aid projects have been directed towards the development of aquaculture in the country but have not had the expected success. Interest in mariculture began with early investigations of seaweed farming including work by Mshigeni who introduced the concept from the Philippines. The first seaweed farms in Zanzibar were started in 1989.

The United Republic of Tanzania has a good potential for development of mariculture. In 1996, a survey was conducted along the entire coastline for selection of a preliminary shrimp culture site, with support from the United Nations Economic Commission for Africa (UNECA). The findings indicated that the country has a big potential for shrimp culture which can be developed from the northernmost region of Tanga to the southern most area of Mtwara. The total area identified as suitable for shrimp farming was 3,000 ha from which

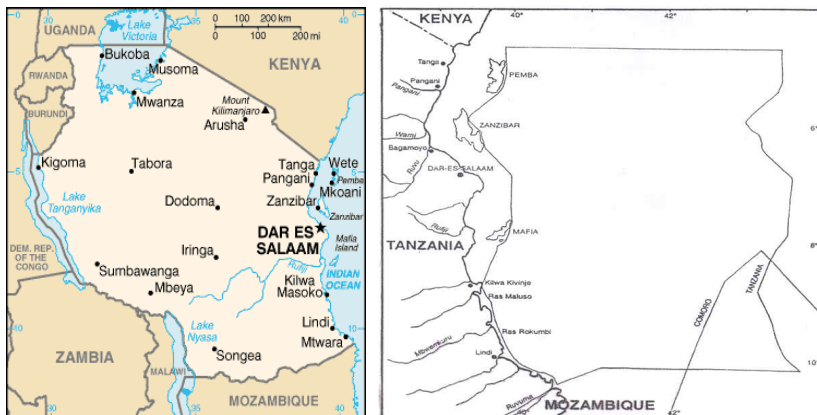


Fig. 1. Map of Tanzania showing Indian Ocean and three major lakes (Left). Schematic representation of exclusive economic zone and overlap with Comorian EEZ (Right).

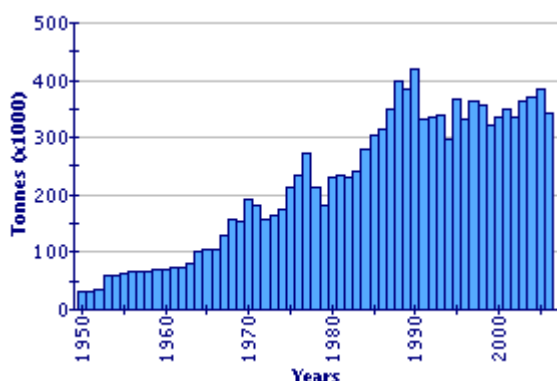


Fig. 2. Fish production in Tanzania (1950-2006) [3].

potential production was estimated at 11,350 tonnes. However, seaweed farming is so far the only form of mariculture which can be considered an established success in The United Republic of Tanzania. The following graph shows the gross fish production from 1950-2006 (Fig. 2)

Capture fisheries

Estimated landing amount from Lake Victoria is approximately 200,000 tons annually, that is composed of 56% of total stocks. Estimated potential of fish stock is 300,000 tons from the Lake Tanganyika, 200,000 from the Lake Victoria, 100,000 tons from the Lake Nyasa, and 100,000 tons from In-shore marine stocks as shown in Table 1 [2]. Fish crafts in Tanzania is demonstrated in Fig. 3. Some examples of fishing gears and methods in Tanzania are shown in Fig. 4. A typical shrimp fishing vessel on the In-shore marine water of

Table 1. Status of fish stocks in Tanzania. Unit is in metric tons [2].

Source	Estimated Potential	Estimated Landing
Lake Victoria	200,000	200,000
Lake Tanganyika	300,000	60,000
Lake Nyasa	100,000	30,000
Minor inland waters	30,000	5,000
In shore marine	100,000	50,000
Deep sea (EEZ)	Not available	Not available
TOTAL	730,000	345,000



Fig. 5. A typical shrimp fishing vessel on the In-shore marine water of Tanzania.

Tanzania is shown in Fig. 5. We have the M/V Mafunzo which is a training vessel with modern equipment for practical training and research activities. Management plans are prepared to highlight different regulatory measures and zones. Zones for balancing effective fishing effort in shrimp fishery are appeared in Fig. 6. Most of the catch in Tanzania comes from capture fisheries (Fig. 7).

Aquaculture

Aquaculture in Tanzania is still at an infant stage.

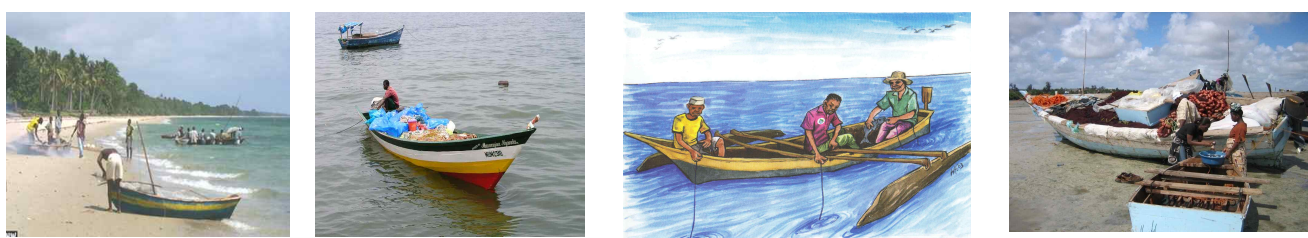


Fig. 3. Some examples of fish crafts in Tanzania.

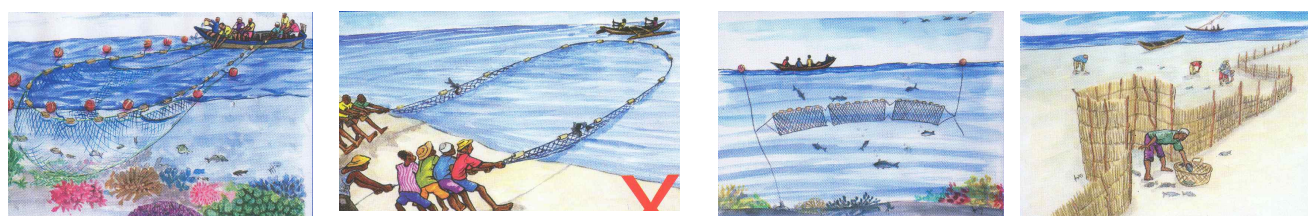


Fig. 4. Some examples of fishing gears and methods in Tanzania.

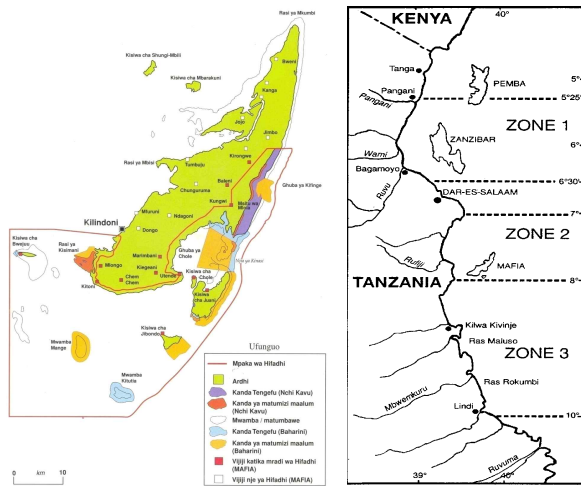


Fig. 6. Management plans to highlight different regulatory measures and zones (Left). Zones for balancing effective fishing effort in shrimp fishery (Right).

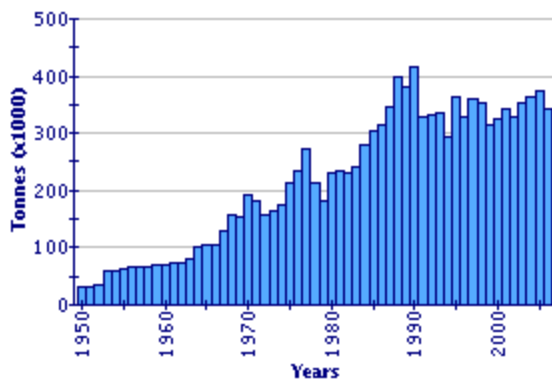


Fig. 7. Capture fisheries production in Tanzania [3].

However, effort is being increased to develop pond culture in both marine and freshwater areas (Fig. 8).

Fish demand for Tanzania's internal market is very high. This demand has not been met from the existing capture fishery, which has also to cater for the export market. Culture of high value species for the export market has a high potential. There is room for investment including but not limited to Prawn farming and



Fig. 8. Some examples of aquaculture ponds in fresh (Left) and marine (Right) waters.

other marine finfish species. Investors in this field are currently exempted from paying export royalties as an incentive towards promotion of aquaculture in the country. Fisheries Legislation and other relevant guidelines are in place. High value species for culture include fresh water shrimp (*Macrobrachium* sp) and crabs. In freshwater fish farming, the Nile tilapia (*Oreochromis niloticus*) has a high potential as it has desired characteristics and popular in consumption markets. Moreover, Large-scale farming is possible for the export market, which is currently banned from the capture fishery. Production from aquaculture is estimated to be 10,000 metric tons of mainly Tilapia, from about 13,075 ponds. Also, the country produces about 8,000 tons of seaweed per annum [5]. Mariculture for shrimp, milk fish (*chanos chanos*) and other species has just begun recently. The overall aquaculture production in Tanzania from 1950 to 2006 is shown in the following graph (Fig. 9).

The African cat fish (*Clarias gariepinus*) is another species with potential for farming especially for the provision of live bait to the capture and sport fishing industries and can be a profitable foreign exchange earner.

Seaweed farming is a relatively new venture in Tanzania with a high potential for development. Investment in farming and processing in the country is highly encouraged by the government. There is room and opportunity for investment in this sub-sector. The potential species for aquaculture in Tanzania is given in Table 2.

Fish processing and handling facilities

Processing facilities for marine products are relatively limited; there are a few (about 6) processing plants for octopus and shrimp. Also, there are about 14 fish processing plant in the Lake Victoria processing

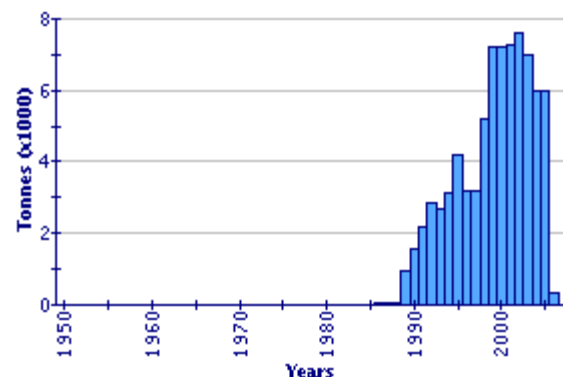


Fig. 9. Aquaculture production in Tanzania [3].

Table 2. Potential species for aquaculture in Tanzania [1].

Area	Common names	Scientific name
Freshwater	Tillapia (Nile)	<i>Oreochromis niloticus</i>
	Catfish (African)	<i>Clarias gariepinus</i>
	Freshwater prawn (shrimp)	<i>Macrobrachia sp.</i>
Brackish/Marine water	Prawns	<i>Penaeus monodon</i>
	Crabs	<i>Scylla Serrata</i>
	Clams	<i>Anadara sp.</i>
	Oysters	<i>Saccostrea cuculata</i>
	Ten pounder	<i>Elops macnata</i>
	Milk fish	<i>Chanos chanoa</i>
	Mullet	<i>Mugil sp.</i>

Nile perch for the export market. Landing barges are anchored in some fish landing areas for quality and safety of fish. Methods of fish handling and processing are traditional sun drying on ground, traditional fish smoking, traditional salting method, fresh fish handling, filleting and freezing method for export. Landing beaches are being developed. Sun dried Lake sardine (dagaa) is a valuable commodity in the domestic and regional market (Fig. 10A). Traditional barbecue fish preservation method is also one method in the historical town of Kilwa (Fig. 10B). Sun drying in Tanzania (Fig. 10C) and salting of fish for regional market are also common (Fig. 10D). Lack of ice and poor handling practices are problems in improving quality. Meanwhile, in fish processing for the export market, the export trade is technically supported by the government. Quality assurance and safety services are well in place (Fig. 11).

Fish market and trade

Most of the fish captured in Tanzania is sold in the local and domestic markets. Cured Nile perch, lake sardine and Tilapia is sold in the domestic market as well as within the regional market. Frozen Nile perch fillets and crustaceans are sold mainly to the European market. Generally, the major export markets for Tanzanian fish

**Fig. 11.** Fish processing for the export market.

products are; Portugal, Belgium, Spain, Greece, United Kingdom, Italy, Austria, Netherlands, Japan, Hong Kong, Switzerland, South Africa, Botswana, Kenya, Zaire, Zimbabwe, Uganda, Burundi and Zambia. Trend in fish export by export weight and value is increasing gradually as shown in Table 3.

Applied research, education and training

The United Republic of Tanzania has several institutions responsible for fisheries research, education and training. The Tanzania Fisheries Research Institute (TAFIRI) has overall responsibility for all the research on fisheries; the Faculty of Aquatic Sciences and

**Fig. 10.** Sun dried Lake sardine (dagaa) in the domestic and regional market (A), traditional barbecue fish preservation method in the historical town of Kilwa (B), sun drying in Tanzania (C), and salting of fish for regional market (D).

Table 3. Trend in fish export by export weight and value [2].

Year	Export weight (kg)	Value (US\$)
2001	41,640,247.90	95,435,102.38
2002	32,662,878.21	120,907,850.32
2003	42,252,738.09	129,605,815.44
2004	46,026,817.37	112,761,195.13
2005	57,289,008.96	141,596,500.71

Technology (FAST) at the University of Dar Es Salaam and the Sokoine University of Agriculture (SUA) are both responsible for carrying out research and training on fisheries. The Mbegani Fisheries Development Centre and the Nyegezi Fisheries Institute are involved in training.

The government sets research priorities through the research institutions. Decisions are based on both long term criteria, for planned development, and short term requirements, such as an issue that calls for an immediate response. Government institutions are involved in setting research priorities, in funding research and disseminating research findings and in training of researchers.

Non-governmental institutions also fund research and collaborate with farmers on developing and implementing research projects and information delivery systems.

On-farm participatory research on aquaculture is not yet practiced because the industry is still at the subsistence level.

Trends, issues and development

The Fisheries Policy was formally endorsed in December 1997. This document establishes the development priorities of the aquaculture sub sector and was followed in 2003 by the amendment of the Fisheries Act No. 6 of 1970 [5]. Subsequently the Fisheries Regulations were also amended, in 2004.

The Fisheries Division has developed a strategic plan that subsumes an action plan which is reviewed annually. Studies and trials have been undertaken to as-

sess the viability of expanding aquaculture through diversifying production into other species, and developing the export market. The only aquaculture product exported is seaweed, which has shown an upward trend. However, the vast potential for mariculture is so far largely untapped. There has not yet been any move to integrate aquaculture with other sectors such as the environment because the industry is still at subsistence level. However, in anticipation of the projected development of commercial aquaculture and the possibilities of its negative impact on the environment several management measures have been proposed and already put in place

Acknowledgement

This research was partially supported by a grant from the Fisheries Technicians Training Program for African Countries of the Overseas Fisheries Cooperation Center, KOICA, Korea.

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