

Introduction to the Fisheries Industry in Ghana

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Abstract Fisheries constitute an important sector in national economic development, and estimate to contribute about 3% of the total GDP and 5% of the GDP in agriculture. Fish production from aquaculture has been estimated at 950 tonnes for 2004. In 2003, Ghana produced only 51.7% of its requirements from its domestic sources and in 2004, achieved 68.1% of its fish requirement through domestic production and imports. It has been estimated that the production from ponds and culture-based fisheries is worth about US\$ 1.5 million a year. The aquaculture sub sector comprises largely small-scale subsistence farmers who practice extensive aquaculture in earthen ponds in contrast to the intensive practices of commercial farmers. There is one cage facility which produces 200 tonnes or 21.1% of the total output. There are several laws to regulate and govern the sector and the government has set up institutions that are responsible for developing fisheries and aquaculture policy and directing and establishing research priorities. The Directorate of Fisheries (DoF) is the lead government agency for aquaculture development and the Water Research Institute of the Council for Scientific and Industrial Research (CSIR) is mandated to carry out aquaculture research. To promote fish farming, imports of farm fish are not allowed.

Key words : Aquaculture, fisheries, Ghana

Introduction

Ghana is located on the west coast of Africa, about 750 km north of the equator and approximately between latitude 4 ° N and 12 ° S & longitudes 3° W and 1° E. It has a total land area of about 238,537 km² and a coast line of 550 km with 23,700 km² continental shelf. Ghana is surrounded on the north by Burkina Faso, on the west by Cote d'Ivoire, on the east by Togo and on the South by the Gulf of Guinea (Fig. 1). It has a tropical climate with ambient temperatures generally between 21°C & 32°C. There are two major seasons known as the dry and the rainy seasons; dry season b/n October to March & rainy season b/n April & September.

Fisheries sector considered as an important sector in national economic development, and is estimated to contribute 3% of the total GDP and 5% of the GDP in agriculture. In 2004 total production from fish farming was 950 tonnes, valued at €14.25 billion (US\$



Fig. 1. Map of Ghana.

1.5 million). Average production from culture-based fisheries in the reservoirs is 150 kg/ha/yr. Average productions from the ponds of small-scale operators are estimated at 2.5 tonnes/ha/yr and the total value of production by small-scale operators is US\$ 0.463 million.

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The estimated production from the commercial cage culture facility is 200 tonnes/ha/yr valued at US\$ 0.316 million. The production from a commercial fish farm of 8.7 hectares was 85 tonnes valued at US\$ 0.134 million.

Ghana has a large number of fish landing sites, both along the coast and on Lake Volta, serving industrial, inshore and artisanal vessels. Total inland fish production for 2002 was about 88,000 tonne, implying that Lake Volta contributed 85% of total inland fish production that year. The artisanal landing sites are estimated to have accounted for 20,769 tonne of fish, equivalent to 69% of total marine fish output in 2002. An estimated domestic demand of about eight hundred and forty thousand (840,000) metric tonnes of fish is needed annually to feed about 22 million people. Out of this number, only four hundred and thirty five thousand (435,000) metric tonnes of fish is produced or supplied to the citizens. There is therefore said to be a short fall of four hundred and five thousand (405,000) metric tonnes. An, average per capita fish consumption in the country is about 29.2 kg annually [3].

Marine resources

By far the marine sub-sector is the most important source of local fish production, delivering more than 80% of the total supply.

Main resources of the marine sub-sector

In Ghana, there are small pelagic species of the families Clupeidae (Sardinellas, Scombridae - chub-mackerels and Engrulidae (anchovies), large pelagic species of the family Thumidae (tunas). There are also fisheries for demersal species of the families Sparidae, Lutjamdae, Mullidae, Pomadasydae, Serranidae, Polynidae and Penaedae. It is however estimated that the maximum catch the small pelagic fishery can sustain is 180,000 tons. The main commercial tuna resources which occur in Ghanaian Waters are the yellow-fin, skip-jack and big-eye tuna [8]. A Tuna Task Force set up by Government of Ghana in 1989 recommended that the country's tuna production be increased from an average of about 36,000 mt to 60,000 mt annually. In 1999, the total catch was over 83,000 mt but the average landing for the period 2000-2002 was 09.400 mt.

Estimates of the biomass of surveys show that the potential yield of the total demersal biomass on Ghana's

continental shelf is between 36,000 and 55,000 mt per annum with an average of about 43,000 mt. However, last decade landings of about 50,000 mt annually exceeded the potential yield, which clearly demonstrates the stress under which the fishery has been operating.

Even though there is specialized shrimps fishery in Ghana, Shrimps are caught by all fleets (except tuna fishing vessels) mainly from shallow waters and close to estuaries. Artisanal operators catch shrimps mainly in beach seines, these are normally juvenile shrimps of very low commercial value (ibid). Through a modelling approach, the maximum sustainable yield (MSY) of shrimps is estimated to be 350 met per annum excluding catches of artisanal fishers.

Fishing units

The marine fishing industry in Ghana consists of three main sectors, namely small scale, (or artisanal on canoe), semi-industrial (or inshore) and industrial sub-sectors.

Artisanal units

The artisanal sub-sector is the most important in terms of fish outputs in the marine sector; it in fact contributed 60-70% of the marine fish output. In 2001 census, there were 9,981 marine artisanal canoes operating, many of which are wooden. Many large canoes are motorised with 40HP outboard engines and smaller craft use sail power. Commonly used fishing gears are purse seines, beach seiners, set nets, draft gill nets and hook and line.

Inshore fleet

The semi-industrial fleet consists of locally built wooden vessels 8-37 m in length with in-board engines of between 60 and 400 HP. Most vessels are dual purpose; they are able to use trawls or purse seines. The latter are more commonly used during the major and minor up welling seasons and trawling is practiced in shallow waters during off-season. In 2000, there were 169 inshore vessels.

Industrial fleet

Industrial vessels are large, steel-hulled foreign-built trawlers, shrimpers, tuna pole and line vessels and purse seiners. A recent development in the sector has been the introduction of demersal pair trawling. As deep-sea

vessel the industrial trawlers by law are to operate in waters deeper than 30 m deep.

The industrial fleets have freezing facility for preserving fish at sea and can stay for months at sea. It is reported that the industrial fleet have undergone radical expansion in number since 1984 when Government of Ghana policy targeted industrial fishing as a mechanism for promoting non-traditional exports. The number of operating trawlers as reported to have increased from 10 (10) in 1984 to 48 in 1997 (Table 1).

Catch profile

Over 300 different species of commercially important fish, 17 species of cephalopods, 25 species of crustaceans and 3 turtle species are caught from marine sources in Ghana. Most domestic marine fish supply is from artisanal fishery and the most important marine resources are small pelagics, especially, the round sardinella, flat sardinella, anchovy and chub mackerel. These species account for about 70% of total marine fish landed. Average annual domestic marine production has been 358,000 tonnes between 1993 and 2000 and is approximately 80% of overall fish supply.

Inland fisheries

Inland fish catches in Ghana, are taken from Lake Volta, Other Lakes, major rivers and aquaculture. The Lake Volta is the most important inland fishery. Other Lake fisheries include Bosomtwi, Weija, Barekese,

Tano, Vea and Kpong. Total fish landings declined from 36,000 tons in 1971 to 28,373 tons in 1998, with annual decline in catch per unit effort estimated at 0.255 kg/boat/day. The average yield of fishery decreased from 46.8 kg/ha in 1976 to 32.6 kg/ha in 1998. Lake Volta's potential yield of 40,000 tonnes per annum has been exceeded annually since 1995. The Lake Volta account for about 16% as national output.

Aquaculture

Aquaculture is one of the inland fisheries even through is largely under-exploited. Whilst there are traditional measures and management measures such as 'atidjas' (brush parks in lagoons and reservoirs) 'hatsis' (fish holes) 'whedos' (mini dams in coastal lagoons and the culture of fresh water dams (Egeirradiata) in the lower Volta, more modern forms of aquaculture were introduced in the early 1950s. The available data suggests that there are about 2000 ponds in Ghana covering about 240 hectares.

Both extensive and semi-intensive cultures are practised in the aquaculture facilities in Ghana. Extensive culture is associated with dams, dug-outs and small reservoirs which are fished and restocked. Fish are cultured semi-intensively in earthen pond either of monoculture or poly culture. *Tiplapianiloticus* is the main species cultured with *Clarias gariepinus*, *Heterobranchus* and other endemic species [2]. There is a clam fishery in the lower Volta River. Other species which have been introduced and grown on an experimental scale are common and silver carp and tiger prawn (*Penaeus*

Table 1. Number of Marine Fishing Vessels in Ghana [4].

CANOES/YEAR	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Canoes	8052			8688			8641		8610			
Beach Seine	852			775			790		769			
Others												
Semi-industrial vessels												
	183	169	153	160	155	164	153	165	149	173	173	169
·Trawlers	29	30	30	29	32	32	34	34	48	47	38	46
·Shrimpers	5	8	11	5	8	14	17	16	13	9	12	12
·Tuna Boats	35	34	29	28	25	26	29	35	34	31	33	34
·Pole & line (Bait boat)	35	34	29	28	25	26	29	33	29	24	24	24
Total (Industrial vessels)	69	71	73	63	65	75	81	83	97	91	89	88

monodon).

Aquaculture production

In 2004, a DoF survey estimated aquaculture fish production at 950 tonnes. Although production has not been disaggregated by species, it is known that *O. niloticus* is the dominant species. Both tilapia and North African catfish sell at ₵15,000 (US\$ 1.63)/kg in Kumasi, Ghana's second largest city. In Accra, the largest city and the capital of Ghana, the cage culture farm sells tilapia at ₵35 000 (US\$ 3.80)/kg at its sales outlets, while *Clarias* spp. sells for ₵50,000 (US\$ 5.44)/kg. Farmed fish is cheaper in the villages than in the towns. Given the estimated production of 950 tonnes, sold at an average price of ₵15,000 (US\$ 1.63)/kg at the farm gate, the estimated income generated by aquaculture is about ₵14.250 billion (US\$ 1.5 million). It is estimated that tilapia comprises about 80% of total production with other species such as *C. gariepinus* and *H. niloticus* forming about 20%. The graph below shows total aquaculture production in Ghana according to FAO statistics.

Post harvest use of fish

The most important use of fish in Ghana is domestic consumption (Anon 2003). Average per capita Fish consumption in Ghana is estimated at 20-25 kg higher than the World average of 13 kg. Fish makes up 22.4% of food expenditure in all household 25.7% in poor household. Fish is recognized as the most important source of animal protein in Ghana [1] and all regions of the country, poor or rich, rural or urban. For domestic consumption fish is often purchased fresh, smoked salted, dried, salted and dried, canned, fried or grilled.

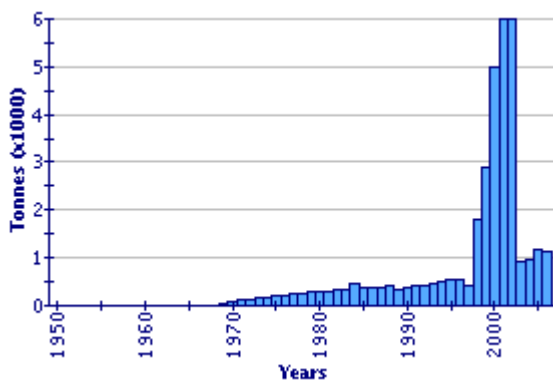


Fig. 2. Reported aquaculture production in Ghana (from 1950 to 2006) [4].

Other than for human consumption, some fish such as anchovy and tuna official are used for fish meal.

Marketing and trading in fish products

Small pelagic species are mostly sold in smoked form whereas demersal species are sold fresh at landing beaches, fish markets or from cold stores. During the main fishing season, the consumption of fish and in particular fresh fish increases in coastal and inland areas. In the lean season fish is mostly sold and purchased for consumption in smoked form from local sources and frozen form from external imports. Some consumers prefer pelagic fish with a high fat content. As regards price, sardinellas, anchovies, mackerel are relatively cheap and popular and consumed by the majority of Ghanaians. Sea bream snapper, shrimp, lobster grouper, cattle fish are sold to and consumed by the more wealthy. Dried anchovies are mostly sold and consumed in the north of the country and remote rural areas. In locations far away from major sources of fish protein, fish is mostly sold and consumed in smoked form. Some ethnic groups prefer or abhor certain types of fish for normal domestic consumption or for certain events.

Fish exports

It is estimated that the total value of fish exports from Ghana increased from US\$ 68,558,638 to 83,849,463 between 1997 and 2000 (Table 2) [8].

As regards foreign exchange earnings, fish exports have remained among the top three most important non-traditional exports [8]. From all indications, tuna is the most important fish export product, in terms of foreign exchange earnings. A wide variety of fish including tiplapia, shark fin classified together as “frozen fish” salted fish or “smoked fish “depending on the form of presentation”. It is estimated that up to 12% of total national fish product is exported. The available data suggests a consistent rise in fish exports over the years. Key on the export destination list of Ghana are the European Union, Japan, United States of America,

Table 2. Value of fish exported 1997 - 2000 [4].

Year	Quantity (Tonnes)	Vlue (US\$)
1997	31,709	68,558,638
1998	41,316	100,311,867
1999	51,651	82,911,428
2000	53,060	83,849,463

Canada, Togo, Mali, Cote d'Ivoire, Burkina Faso, Benin, Nigeria, Hong Kong and Singapore.

Fish imports

Given that Ghana is known to be only 60% fish self-sufficient and fish availability from local sources are seasonal, fish is imported to fill the seasonal and annual deficits. Frozen horse mackerel, chub mackerel as well as sardinella are imported through the Tema and Takoradi Ports and distributed through the internal trade channels, during the lean season November to May. Dentex species and (used in the poultry industry) are also imported to a lesser degree. Fish imports to Ghana are mainly from Morocco, Mauritania, Namibia, Norway, the Netherlands, Belgium, Senegal and the Gambia [8]. Up to 64,000 metric tons of fish was imported annually over the past 10 years though the quantities imported fluctuated widely [8].

Contribution to the national economy

The fisheries sector plays a major role in the national economy. It contributes 3% of Gross Domestic Product (GDP), provides employment to the labour force and contributes to the foreign exchange of the country is a major source of animal protein assumption and assists in the alleviation of rural poverty. Livelihood opportunities identified are usually those related to marine and inland capture fisheries. Ten percent of the population is involved in the fishing industry from both urban and rural areas and women are key players in post harvest activities [5,6]. It is estimated that over 150,000 fishers are engaged in marine capture fisheries [8].

Demand and supply of fish

Evidence from the available data [8] indicates on the average (1990-2000) an annual production of fish of 335,000 mt, with wide annual and seasonal fluctuations. The annual demand for fish is currently estimated at about 600,000 mt), implying on an annual fish deficit averaging 265,000 mt.

Trend, issues and development

For the past ten years, aquaculture policy has been part of the fisheries sub sector to produce fish to meet the shortfall in the country's need for domestic con-

sumption and for export. The developmental objective has been to produce enough fish so as to constitute 60% of the protein intake of Ghanaians [1]. The Directorate of Fisheries was a division of MOFA, and part of the former Department of Fisheries. Aquaculture plans have therefore been initiated and finalized by DoF in consultation with stakeholders and other aquaculture related institutions.

These sectoral changes in the structure of the administration of fisheries and aquaculture came together with the increasing importance of fish to the economy of Ghana. Fish is classified as a non-traditional export (NTE) commodity of Ghana. It is the second most important NTE after horticultural products and makes up 5% of total NTEs. The share of fish and seafoods within non-traditional agricultural export products increased from 25% in 2000 to 33% in 2001 [7]. With respect to national economic development, increasing trends in fish exports reflect a major advance in the pursuit of national non-traditional export policy objectives [8]. World Bank funding from 1997 to 2003 for the fisheries sector brought about a strong emphasis on the development of FFAs so that they could provide certain services to their members.

Youths are being trained to construct ponds for farmers in order to reduce the cost of pond construction. Hitherto the ponds were constructed without drainage outlets which led to lower yields. It is significant to note that drainable ponds are the main products of the gangs. Seventeen gangs have been trained so far. Fish farmers are responsible for marketing their produce. There are no price control restrictions. All harvests are sold locally.

The national fish requirement has grown from 676,000 tonnes in 1995 to 840,000 tonnes in 2004, but production has not increased appreciably during the same period. The deficit between fish requirement and production - it was 400,000 tonnes in 2004 - has been the main driving force for pushing the agenda of developing aquaculture.

The reasons for developing aquaculture have remained the same. Aquaculture was promoted to produce fish for human consumption, industrial use and for export. A strong emphasis has been placed on fish culture and culture based fisheries in reservoirs. Imports of farmed fish have been prohibited. Imports and exports of fish are regulated and require a permit. Importers pay a fish importation levy of ₵20,000 (US\$

2.17) per tonne. This goes into the Fisheries Development Fund and is used solely for the development of fisheries, including aquaculture.

Research on several aspects of aquaculture is being undertaken. For instance, the health status of the ponds of some small-scale operators is being analysed and the results are being communicated to the farmers. Research and documentation of the genetic characteristics of *O. niloticus* from the Volta Lake are also being carried out with a view to selecting fast growing strains for aquaculture.

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