



MARKET RESEARCH ARTICLE ON  
**FISH FARMING**  
IN GHANA





# FISH FARMING

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## EXECUTIVE SUMMARY

Fish makes up 60 percent of the average Ghanaian's protein diet. It is the next popular animal protein after chicken and beef, and expected to overtake them in a few years. Global trends currently show a growing demand for healthier substitutes to beef and chicken, and fish can be a much leaner and lower calorie source of protein.

The fishing industry in Ghana is generally made up of the marine, inland (freshwater) and aquaculture. With recent decline in marine catches, aquaculture development has been on the rise.

Ghana has a natural potential for aquaculture, yet after years of adoption, aquaculture's contribution to the economy has been quite low. According to Ghana's 2018 budget statement, aquaculture contributed 3.5% to Ghana's Real GDP, a decline in the 5.7% recorded in 2016.

The growing population and increasing urbanization in Ghana means the market for Ghanaian aquaculture is also expanding, hence the need to revamp the sector.

The aim of this article is to outline the various bottlenecks in the fish industry, and create awareness of the great investment opportunities for investors to take advantage of. These include, but not limited to;

- production of fish feed
- rearing and stocking high quality fingerlings
- and training and capacity building in fish farming

Ghana's fish consumption requirement is about 720,000 metric tonnes, yet fish supply stands at 400,000 annually. Aquaculture happens to be a good business venture for Ghana, if the above mentioned opportunities are identified to expand the industry.





## Historic Market Growth/ Industry Structure

The fisheries sector in Ghana is categorized into marine catches from sea, lagoons & inland fisheries and aquaculture systems. The sector is dominated by the marine subsector which has the highest level of production. It is followed by the lagoon and inland and then the aquaculture subsector. The marine and inland fisheries have recently reached maximum sustainability and have led to declining stocks. The overexploitation and decline in fish stock can be attributed to illegal activities and unauthorized vessels on sea, resulting large stocks of fish are gradually disappearing from the waters. In an effort to compensate for the declining marine catches and to meet the demand, aquaculture has been widely promoted with the hope of bridging the gap. For some years now, aquaculture has been seen as a possible alternative for the overburdened wider fisheries sector, and an important new source of food for the poor (FAO 1995; Williams 1996).

**Table 1: Fish Production in Ghana, 2015 - 2016**

Type of Production	Tonnes per year (2015)	Tonnes per year (2016)
Marine	312,535	328,541
Aquaculture Production	44,515	52,470
Inland	86,268	84,344

*Fisheries Commission, 2015 - 2016*

The above table shows the contribution of marine, inland and aquaculture subsector to total fish production in Ghana. Fish and fishery products are now the country's most important non-traditional exports, accounting for over 50 percent of earnings. Approximately 50,000 tonnes of fishery products are exported from Ghana to European markets. Annual fish production (from marine, inland and aquaculture) averages approximately 440,000t. The Volta Lake, reservoirs, aquaculture and coastal lagoons are the main sources of inland or freshwater fish. Lake Volta alone hosts about 140 species of aquatic life, and it is the main hub of Ghana's aquaculture system. Marine fishing is an important traditional economic activity for the coastal communities and contributes over 70% of the total catch as illustrated by Table 1 above.

The main fish cultivated is Tilapia (especially, *Oreochromis niloticus*) and African catfish (*Clarias gariepinus*). In 2012, Tilapia formed 80% of aquaculture production. Tilapia is best suited for farming because they mature quite quickly and are sturdy. Tilapia fish stocks have the potential of growing exponentially if the environment is suitable; taking about five to seven months to mature. They are not the easiest of fish to rear but are desired mostly on the international market because of their white flesh and mild taste.

Many small-scale farmers use organic manure to fertilize their ponds. Poultry droppings are the most typical organic manure used. Such integrated fish and animal rearing techniques are yet to gain popularity in Ghana. Most commercial fish farmers only produce Tilapia and use their own fingerlings. In some cases, the fingerlings are produced as a result of crosses in concrete tanks. Others hold the parent Tilapias in earthen ponds and the fertilized eggs are recovered from the mouth of the female and incubated in re-circulating troughs.

There appears to be two main channels of distribution in fish farming. Firstly, fish farmers sell to either domestic traders or local processors, mostly women who deal in the salting, smoking and drying of fish, and who in turn sell to final consumers. In the second option which is mostly used by large scale farms, fish farmers sell directly to consumers and wholesalers/ retailers.



## **Investment Opportunities in fish farming**

To stimulate local fish farming, the government has banned the import of frozen tilapia and farmed fish. With only a total production of between 50,000 to 60,000 tons yearly, investment opportunities exist in fish farming such as production of fish feed, rearing and stocking of high quality fingerlings and training and capacity building in fish farming.

### **Production of Fish Feed**

Locally sourced fish feed for both extensive and semi intensive farmers are a market need. Raanan Feeds (Indian company) which is one of the largest feed mills in Ghana, is responsible for 70 percent of total production. Some farmers may opt to import fish feed but it is estimated at a 30 percent increment after all import duties and charges, as opposed to the locally produced ones. Intensive farmers do invest in their own feed composition but for majority of the semi intensive and extensive farmers they are unable to do so. Raanan Feeds produces annually 25,000 tons of fish feed for Ghana and 5,000 tons for the sub- region. It is currently running at its maximum and there is market for an additional 30,000 tons per year of local feed production. At the moment, Raanan Feeds has a monopoly in-market, but the introduction of another feed mill would promote competitive pricing of fish feed.

### **Production of Fingerlings**

There has been an increase in private hatcheries to aid the development of aquaculture, yet there is a deficit of 50 million fingerlings annually. The Akosombo strain of fish is the only legally authorized Tilapia strain for cultivation. The deficit supply of fingerlings limits the number of potential fish farmers in Ghana and further leads existing farmers to resort to undesired species to reproduce. There is a market need for a reliable hatchery which can produce fry and fingerlings of high quality.

### **Training in Fish Farming**

Local fish farmers, especially those from communities that rely on fish farming as a means of livelihood need training and capacity building to manage their ponds/cages effectively. Most farmers who run into difficulty abandon their cages mainly because their farms may have suffered from low productivity and low returns on investment. Some farmers tend to adopt a trial and error strategies which lack direction. Training and education for the youth across the entire value chain; new fish farming methods, technology, harvesting, draining ponds, stocking cages and ponds and fish farm maintenance are key industry skill requirements. There are numerous opportunities existing for the private sector to fill this gap.

## **Diversifying Products of Aquaculture**

Tilapia dominates aquaculture, but there is room for other species to be introduced. An increase in catfish production for domestic and regional markets as well as other crustaceans and aquatic life such as crabs, shrimps etc. will help to expand the market. Catfish fingerlings at subsidized rates would push the farming of catfish. There is room for introduction of crustaceans and other aquatic life into the local culture to feed the growing expatriate community living and working in Ghana. With the existing 15% tax on imported sea food, the introduction of locally cultured sea food would make for competitive pricing. Sea food is also a viable business for export across the ECOWAS region.







## Drivers of the Fish farming market

### **Alleviation of Poverty & Provision of Food Security**

Poverty alleviation and food security are the major drivers of the market and the development of the sector in general. Also due to the role fishery plays in its contribution to GDP, the government has promoted aquaculture as a means of augmenting the declining marine catches yearly. The prospect of Foreign Direct Investment has also pushed the development of this sector because the future of aquaculture will come from increased participation of investors through funding and the sharing of sustainable practices with small scale and large scale fish farmers. It could mean access to current market information and institutional support both domestically and internationally for Ghanaian farmers. For example, with the introduction of Raanan Feeds in 2011, as a local manufacturer of quality fish feed, it surged cage culture because prices of fish feed compared to the imported ones dropped considerably.

### **Increase in Demand for Fish**

The increasing demand for fish globally and nationally and the declining supplies facing Ghana's economy is another reason for the development of aquaculture. In Ghana, more and more people are shying away from red meat as a source of protein due to health implications and are resorting to fish. The hope is that aquaculture will attract foreign direct investment and urge economic growth of the country.





## **Investment Opportunities in fish farming**

The aquaculture development in Ghana is constrained by several factors, characterized by two components: limited availability of inputs to promote aquaculture and not enough support for farmers through funding, training etc.

### **Limited Availability of Inputs**

- o There is a lack of fingerling production in Ghana, and there exists a ban on farmed fish. Without a steady production of sturdy fingerlings, many farmers may not be able to grow them.
- o There is also a lack of affordable feed throughout Ghana, especially for startup companies who are not situated near large consumer centers.

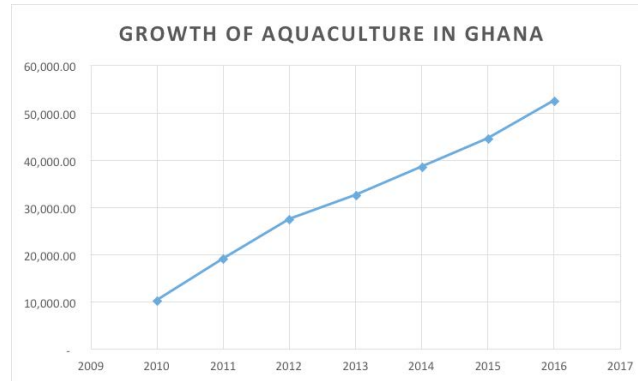
### **Lack of Support for Farmers**

- o There are not so many investors in this sector because not so much information exists concerning the profitability of the sector.
- o Due to the lack of financial support for small scale fish farmers. Most large scale farms are self-funded in Ghana.
- o With the absence of research on fish farming practices in Ghana, farmers struggle with knowledge on sustaining their farms and even starting these farms.

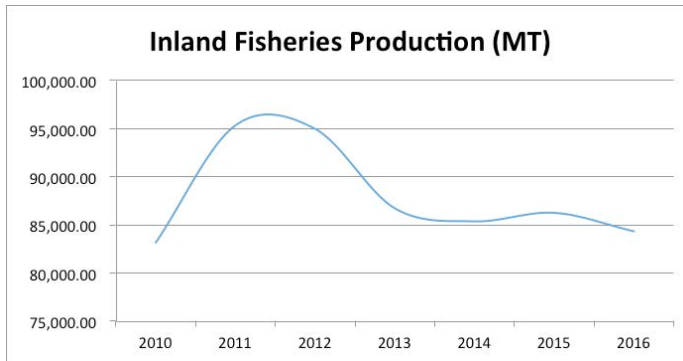


## **Forecast Market Growth**

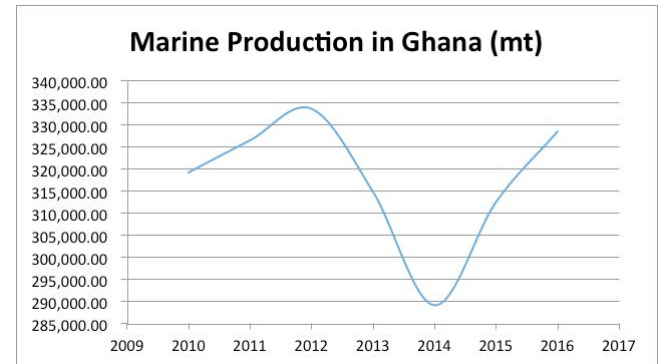
Aquaculture has seen a tremendous increase in participation over the years, it is a viable business and potential stream of significant income if managed properly by government. From 2009 to 2016, available data collated from the Ministry of Food and Agriculture shows aquaculture's steady rise in yearly fish production. In comparison to catches of marine and inland fisheries, the output of aquaculture rises steadily every year, as shown in Graph 1 below.



**Graph 1, Source: MOFA**



**Graph 2** shows a massive spike in 2011- 2012 and then gradual decline of the inland fisheries sector production annually. The inland fisheries sector decline is due to the overfishing in Ghana's waters, with the increase of fleet at sea.



**Graph 3** above shows that marine production trend is similar to inland fisheries production trend. Aquaculture is the only fishery sector not declining, it is the only sector that has been termed as underexploited with massive potential.



## **Regulatory and Legal Framework Governing the Fishing Sector**

The Fisheries Act (2002) is the main statute concerning the development and sustainability of fishery within Ghana. It established the Fisheries Commission with a board composed of senior representatives of Government Ministries and agencies connected with marine or fisheries affairs as well as two representatives from the National Fisheries Association of Ghana (NAFAG), the Director of the Commission, a Chairman and one other expert.

The Directorate of Fisheries is under the Ministry of Food and Agriculture (MOFAD) and is mandated by NAFAG to promote sustainable exploitation and responsible utilization of fishery resources in Ghana through sound management practices, research, appropriate technological development for both culture and capture fisheries, effective extension and provision of other support services to fish farmers, fishermen, fish processors and traders for improved income and fish food security. To ensure the growth of the sector, the government has banned the import of fish, in order to encourage local production. There is also a 15 percent tax on imported seafood of any kind. This is to encourage the local production of such items and to export the excess.

The permits required under the law for aquaculture operations are:

- An Environmental Impact Assessment report approved by the Environmental Protection Agency;
- A permit from Water Resources Commission (WRC) to use water;
- An approval from the Director of Fisheries;
- A letter of consent or a No-Objection to the project from the chief and people of the area (community)
- No objection from District Assembly of the area (community);
- A permit from the Volta River Authority to locate on the Lake Volta to produce fish (if applicable)

The Act is silent on legal rights, protection against other resource users and ownership and tenure. It does not contain anything on fish health, quality assurance or product safety.

## **Tax Incentives for the Fish Farming**

Some businesses enjoy tax holidays or exemption periods. During these exemption periods, income is not taxable. Fish farming enjoys a five year tax exemption period, as a tax incentive.

Also, all farming inputs are duty-exempt to promote the industry.

## **National Policy / Government program for Fish Farming**

government is keen on boosting aquaculture activities in the Northern Region. In 2017, the government officially launched a \$53 million programme at Libga in the Savelugu/Nantong Municipality of the Northern Region to boost aquaculture. "West Africa Regional Fisheries Programme" (WARFP) was formed in fulfilment of the objective of the Ministry of Fisheries and Aquaculture Development and the Fisheries Commission's objective to restock dams and dugouts in the Northern Region. The International Development Association (IDA) of the World Bank presented US\$50.3 million funding while the Global Environment Facility (GEF) provided US\$3.5 million for its implementation (citifmonline, 2017).

The programme is expected to directly benefit an estimated 206,000 Marine and Lake Volta fishers, at least 27,000 women fish processors and over 3,000 fish farmers. They also intend to build 100 dams and dugouts with a total water surface area of about 2,860 hectares in 35 districts nationwide.

Also in 2017, Lake Volta was zoned out after an agreement between governmental bodies so that not all parts of the lake were suitable for aquaculture. Another objective of the zoning was to sustain the viability of fish farming and to not degrade the lake. The zoning commenced in 2015 and takes into account all current farmers on the lake; and will also help with the identification of high priority areas with potential for high yield to maintain the upward movement of aquaculture practice.

There is also the lack of popularity of pond culture as the market grows. Cage culture seems to be leading the way with better results and faster growing fish. The inputs to cage culture are much cheaper than pond culture and the construction of cages are cheaper too.



## Market Analysis and Trends

### Market Characteristics, Demand, Size, Growth

Tilapia is currently the most common fish species for farming, marketing and consumption. The price of Tilapia (farmed and wild) in Ghana is high (US\$2.50 to over US\$3.00 per kg) and is almost double the world market price. Cage farming of Tilapia mainly in Lake Volta, has developed rapidly since 2009 as a commercial activity with an average annual growth of 73%, contributing nearly 90% of the total production from aquaculture.

Weight Range	Price (USD \$)
+800g	\$6/kg
500 - 800g	\$4.5/kg
400 - 500g	\$3.5/kg
300 - 400g	\$2.2/kg
200 - 300g	\$2.2/kg
150 - 200g	\$2.2/kg

Table 2, depicting prices and weight range of farmed tilapia (West African Fish Ltd, 2018)

Ghana has a high domestic demand for fish, and has one of the highest consumption per capita in the world (20 – 25kg/year). Consumption of fish is highest in the south and lowest in the north (10kg/year) of Ghana; the north of Ghana suffers an erratic pattern of rainfall and is more suitable for cultured fish in reservoirs. UN Habitat predicts that the growing population and increasing urbanization means the market for Ghanaian aquaculture is also expanding.

Currently, 87 percent of households in Ghana are recorded to be consumers of Tilapia, especially in the smoked form. Hotels, restaurants and other food services are also large consumers of Tilapia in Ghana. They are estimated to prefer bigger types of Tilapia (500g and above).

### **Processing**

Typically, for small-scale fish farmers especially, Tilapia is sold directly to consumers or to local processors. Local processors are normally women known as “fish mammies”. These women smoke, dry and salt the fish to be preserved and sold later. Normally they buy at subsidized prices from the farms and sell at a mark-up to the final consumers at traditional market places. Larger scale farmers try to dispel the middle women and sell directly to consumers. Farmers who are not located at places close to high consumption centers do not have this luxury, and have to sell to the fish ‘mammies’ to avoid losses. (FAO, 2005)

### **Aquaculture Inputs - Fish Feed**

Fish feed is a very important market within the larger aquaculture context. Fish feed is either produced locally or imported. There is the pelleted size of fish feed which is more ideal because it can be fed to any type of fish and does not have to be cut or divided into smaller bits for easy consumption by fish. There are at least seven different types of imported feeds being sold in Ghana. Notable names include Ranaan, Skretting, Nicoluzzi, Coppens, Cargill AquaFeed, Beacon and Pira. Raanan Feeds consequently altered the landscape with the opening of its local factory in Ghana. Their feed is considerably cheaper to that of other brands; their top seller is a 6 millimeter pelleted fish feed made of 33% protein. Most farmers buy the feed most readily available to them and least expensive. However, Raanan has a monopoly over the market at the moment. With an introduction of other local feed mills, competitive pricing would arise.

### **Fingerlings**

Farmers engaged in pond culture, have two methods of gaining fingerlings. They either get them from other farmers or from the wild. Cage culture farmers get their fingerlings from hatcheries, either private or public. Private hatcheries have experienced a growth with the increase in cage culture, there is the need for desirable quality fingerlings to breed in cages. Currently there are three public hatcheries: the Ashaiman Aquaculture Demonstration Center in Greater Accra; the Pilot Aquaculture Center in Kumasi, Ashanti Region; and the hatchery for the Water Research Institute in Akosombo, Eastern Region.

The Akosombo strain is the only strain that is legally authorized. In an interview with a small scale farmer (Jesko Farms), he complained that this strain is quite difficult to grow and takes a long period to grow. In his opinion there are better performing strains which can also save the market if introduced.

## **Transport**

Transport is a major headache for small-scale farmers, especially those inland. These farmers may not be close to their ideal consumption sites and so must rely on middle men to do the sales and distribution. The catch with these middle men (women), is that they buy wholesale from farmers and sell later at a markup. Some farmers make losses here as they are solely dependent on the middlemen depleting their stock. A solution here that some farming associations have introduced is to pool their fish and pay for transport collectively to get their fish closer to the consumption centers. Larger scale farmers have no problems sending their produce to outlets in urban centers to sell. Fresh fish cannot be sold just like that at markets or on streets, it is better to have an established demand from hotels, restaurants and the like for fresh fish. If this is a problem, then the next option would be to cure the fresh fish either by drying, salting or smoking.



## **Consumer Analysis and Key Buying Criteria**

About 10,000 MT of fresh fish are harvested from other smaller rivers and lakes each year, and processed for sale in urban markets. Inland fishing centres in remote areas are not easily accessible to the major consuming centres. This factor hinders internal as well as intra-regional fish trade. Bad roads from major fish producing towns make fish distribution in Ghana very difficult. These constraints make inland fish products expensive, and also result in deterioration in quality during distribution.

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. Demand for smoked fish is higher in inland areas, such as Ashanti Region, than in coastal zones. There is also a growing demand for live catfish in Nigerian restaurants in Accra and Kumasi.

Most fresh fish farming goes on around Lake Volta; the major trading centres being Yeji, Kpandu-Tokor, Buipe, Atimpoku, Agormenya, Kete and Krachi. Nearly 40,000 metric tonnes of fresh fish are cured and transported from these towns annually to the urban markets, especially in Southern Ghana. The most important domestic market and consumption center is Accra, the capital of Ghana. Other important centers are Kumasi, Tarkwa, Tema and Sekondi-Takoradi. (FAO, 2005)





## Key Players and Products

	Name of Company	Location	Production	Type of Company	Product
1.	Ainoo- Ansah Limited	Central Region	30,000 fingerlings a month	Hatchery	Fingerlings
2.	Raanan Feeds	Pram Pram	25,000t	Feed Mill/ Factory	Fish Feed
3.	Tropo Farms	Eastern Region	2,000t	Cage Culture Farm	Tilapia, White Catfish, Tilapia Fingerlings
4.	West African Fish Ltd	Eastern Region	2,000t	Cage Culture Farm	Tilapia
5.	Sunwoo Culturing Systems	-	500 tonnes	Cage Farm	Tilapia
6.	Safeway Agro	Volta Region	200 tonnes	Cage Farm	Tilapia
7.	Lee's Farm Ltd	Eastern Region	200 – 300 tonnes	Cage Farm	Cage Farm
8.	Maleka Farms	Eastern Region	250 – 300 tonnes	Cage Farm	Cage Farm
9.	Delta Fisheries	Eastern Region	200- 300 tonnes	Hatchery & Cage Farm	Fingerlings & Cage Farm

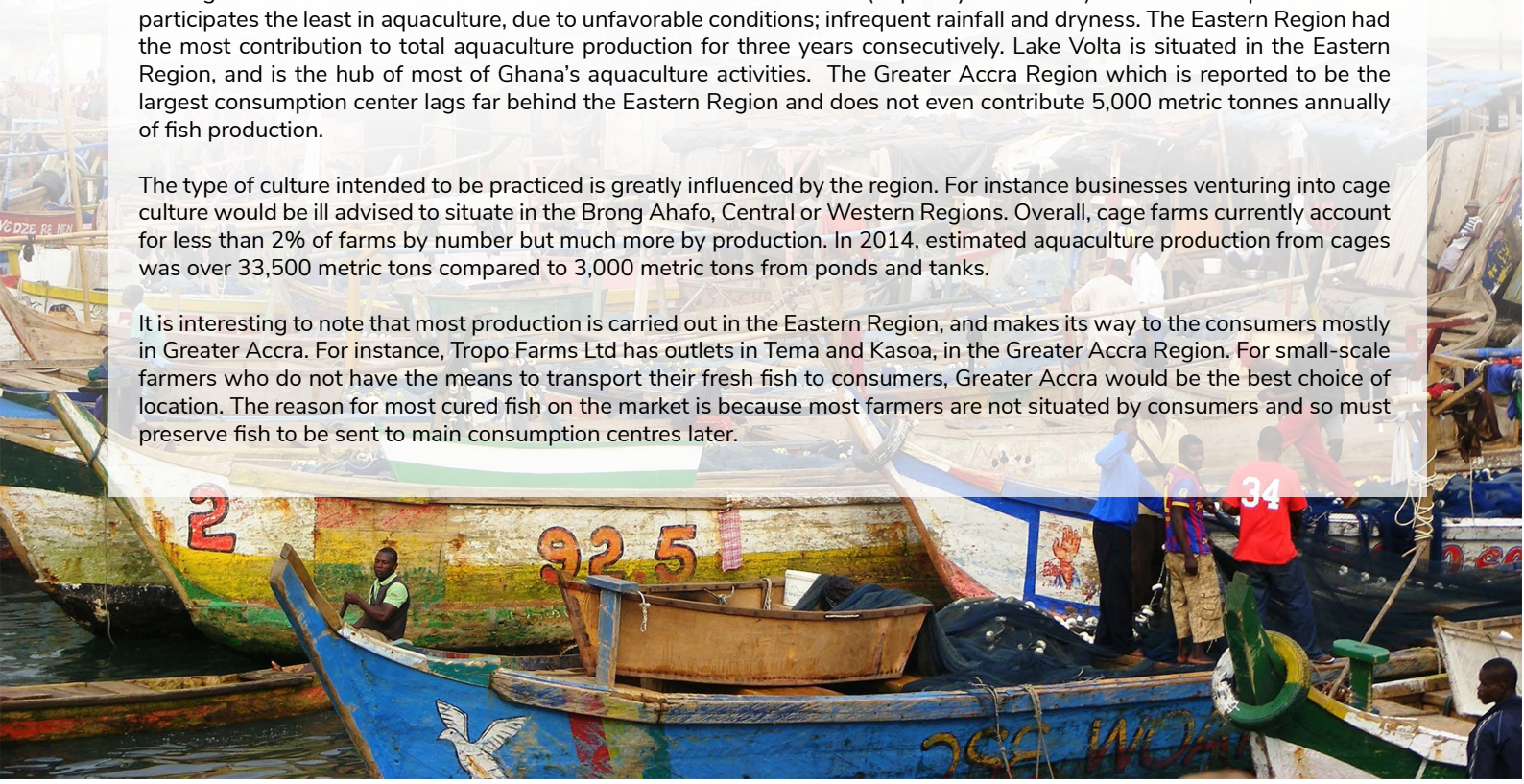


## Locational Analysis - Fish Farming projects

The Upper East and West regions are generally thought to be more suitable for culture-based fisheries (CBF) because there are large numbers of artificial water bodies but low amounts of rainfall (Kapetsky et al. 1991). The Northern part of Ghana participates the least in aquaculture, due to unfavorable conditions; infrequent rainfall and dryness. The Eastern Region had the most contribution to total aquaculture production for three years consecutively. Lake Volta is situated in the Eastern Region, and is the hub of most of Ghana's aquaculture activities. The Greater Accra Region which is reported to be the largest consumption center lags far behind the Eastern Region and does not even contribute 5,000 metric tonnes annually of fish production.

The type of culture intended to be practiced is greatly influenced by the region. For instance businesses venturing into cage culture would be ill advised to situate in the Brong Ahafo, Central or Western Regions. Overall, cage farms currently account for less than 2% of farms by number but much more by production. In 2014, estimated aquaculture production from cages was over 33,500 metric tons compared to 3,000 metric tons from ponds and tanks.

It is interesting to note that most production is carried out in the Eastern Region, and makes its way to the consumers mostly in Greater Accra. For instance, Tropo Farms Ltd has outlets in Tema and Kasoa, in the Greater Accra Region. For small-scale farmers who do not have the means to transport their fresh fish to consumers, Greater Accra would be the best choice of location. The reason for most cured fish on the market is because most farmers are not situated by consumers and so must preserve fish to be sent to main consumption centres later.





## **Conclusion and Recommendations**

Ghana's current per capita fish consumption stands at 28 kg, higher than Africa's current 10.5 kg and the world's current 18.9 kg. Fish comprises 60 percent of a Ghanaian's protein diet. It is the ideal location for fish farming investments.

Ghana's fish consumption requirement is about 720 000 metric tonnes. Its annual fish supply stands at 400 000 tonnes. Ghana, thus, has an annual deficit of up to 320 000 metric tonnes of fish and fishery products. The establishment of large scale fish farms is needed and presents an opportunity for investors to meet the current deficit in fish supply.

On the current market, aquaculture is focused solely on the farming of Tilapia. There can be the entrance of other diversifying aquatic life and a focus on the farming of catfish, shrimps, crabs and other crustaceans to existing farmers to diversify their stock. The deficits in production of fish feed can be met with the introduction of other fish feed mills.

It is a good time to start a fish farming project in Ghana. Specific investment opportunities exist for fish feed processing, farming of other varieties and types of aquatic life, transportation and distribution and training and capacity building in fish farming.

