



Floating cages for fattening tilapias in Lake Volta

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What's next for tilapia farming in Ghana?

For many, Ghana had succeeded in terms of developing its fish-farming industry. International capital was invested in tilapia cage farming, taking advantage of the favourable conditions of Lake Volta. But despite the authorities' goodwill, the market has been saturated by insufficiently integrated production. Other challenges (such as disease) are also offsetting the advantages offered by this resource.

The start of cage farming

Fish plays a major role in the food security of communities in coastal countries along the Gulf of Guinea. It is often the leading source of animal protein, because it is so accessible. While artisanal fishing in Ghana remains buoyant, over-exploitation of fish resources and population growth have led to higher fish imports (175,000t in 2012 vs 195,000t in 2017). The situation is worrying, and alternatives are being sought.

Between 2004 and 2012, pond fish farming was pushed to the background by a large cage-farming operation in Lake Volta. A few large international operators were attracted by the excellent conditions for tilapia (or *Oreochromis niloticus*): depth, high temperature and good chemico-physical properties. Many other smaller operators followed suit. In 2011 the Israeli company Ranaan set up a fish-food factory, and the sector took off: annual production of 50,000 tonnes (see Table 1), whereas for many operators tilapia

production in the lake never exceeded 25,000 tonnes. That growth was a success for West Africa, and particularly for funding agencies, who saw the positive impact of the public-private partnership.

Positioning of the product

Cage-grown fish come in different sizes, each corresponding to a specific price: especially popular on the market are "regular size" (250g to 300g) and "economy" (150g to 250g). At the start, the price of \$3/kg for regular size was very favourable. Restaurant owners and fish merchants liked this fresh fish of the desired size, which met the expectations of more affluent consumers. The FOB (without freight charges or other taxes) price for imported basic-consumption fish in 2017 was \$0.8/kg (Ghana Fisheries Commission, 2018). Dried and smoked fish from Lake Volta is also bought from the boat at a lower price compared with fresh fish. Cage-raised fish therefore makes up only a small portion of the 600,000 tonnes (or 750,000, depending

on the source) of fish consumed annually in Ghana. Since 2009, large quantities of farmed Chinese tilapia have been imported at less than \$1.5/kg by wholesaler warehouses despite bans. Luckily, farmed fish has a better reputation in terms of flavour and freshness.

Production of fish larvae

Most large farms on the lake produce their fish larvae, male larvae—males grow faster—hormonally sex-reversed as is often the case throughout the world (young larvae are treated with a masculinising hormone to prevent the development of ovaries). Ghana authorises only the raising of fish present within its borders, and carries out its own genetic-selection programme. For this type of industry, having strains selected for their speed of growth reduces the need for working capital by bringing the fish to market faster. The Water Research Institute is in charge of selection and is proposing its eighth improved strain. Genetic studies, however, have reportedly shown that those strains have a few non-Ghanaian tilapia genes.

Food

Food needs to have a high protein content, and it needs to float. The industrial technology used to produce is highly specialised. The food conversion ratio (FCR: ratio of the weight of food distributed to the weight gain of fish) is lower than for other animals. Over the course of one growing cycle for cage-farmed tilapia, from the larva stage and including deaths, the FCR

fluctuates between 1.4 and 1.6. If the food is duty-free, it is most often over \$1.2/kg, which is higher than the prices for commonly consumed fish. On-site production of food by Ranaan is an advantage, but the raw materials are expensive and the country has seen an increase in its deficit for cereals and soy.

Costs and advantages

This production system is highly sensitive to food costs (60% to 70% of total production costs) and to drops in market price. At national level, the method of effects indicates that the gross proceeds of this farming operation, when imported food is used, breaks down as follows: national intermediate consumption (less than 15%), purchase of imported goods (roughly 42%), salaries (3%), with the rest being used to pay off interest and generate profit. The food factory that was set up in the country is improving the share of added value even though its capital is not Ghanaian. The high added value generated in the distribution circuits—particularly fish merchants and restaurant owners—must not be omitted.

General degradation of the sector and its environment

As of 2016, farms managed by Chinese entities began appearing as good relations were established between both countries. Their production was said to represent a quarter of all cage farming. Most of those farms are set up outside regulatory frameworks, use their strains and will increase competition while putting pressure on sales prices, which are currently around \$2/kg. That reinforces the need for cash and reduces profitability. A health crisis in 2016–17 hurt small farms even more. People are having to start using antibiotics and vaccines, which increases production costs by roughly 0.10 cents, not to mention the additional need for larvae to counteract the disease. In 2019, the infectious spleen and kidney necrosis virus led to a mortality rate of over 90% during the larva stages, and often 30% during the production cycles. Production has fallen significantly,

and the food factory's sales are three times lower, even though the stats do not show it. The impacts of those epidemics on the natural tilapia population in Lake Volta (over 50% of captures estimated between 20,000 and 40,000t/year) are not known.

In Ghana, the fish produced is a source of pride and has become widespread in the streets of Accra and Koumassi. The high capital intensity means that a large share of the added value is concentrated in the hands of few individuals, and the benefits for the national economy are not the profits generated. Economies of scale make this growth not very inclusive: according to the World Bank, the ten biggest farms accounted for 80% of production in 2019. But that path was focused on to the detriment of others, such as more artisanal approaches capable of producing more fish in systems that are better integrated and more agroecological, that make better use of local resources and that are less dependent on imports.

The leader of the cage-farming industry at the Sarnissa site in 2014 expressed similar ideas: “Now, let’s imagine Africa’s potential! I have known operators who have almost no costs aside from labour and time (at village level) and who have profit margins above \$2/kg. That’s on a small scale, of course, but imagine hundreds of those small operators teaming up to form an efficient distribution chain.” The latest report by the Directorate of Fisheries indicates a reorientation towards forms of continental fish farming that are potentially better integrated. ■

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Table 1: data on *Oreochromis niloticus* fish-farm production in Ghana and worldwide

Year	2007	2010	2015	2017
Ghana (1,000t)	3.5	9.4	43.3	53.2
Worldwide (1,000t)	1,863	2,502	3,828	4,130

Source: FAO

TO KNOW MORE:

1 - Kassam, L. (2014). Aquaculture and food security, poverty alleviation and nutrition in Ghana: Case study prepared for the Aquaculture for Food Security, Poverty Alleviation and Nutrition project. WorldFish, Penang, Malaysia. Project Report: 2014–48.

2 - Marc Oswald, Olivier Mikolasek, “Le secteur piscicole en Afrique subsaharienne: des outils de financement adaptés aux enjeux ?”, Techniques Financières et Développement 2016/3 (no. 124), p. 81–95.