

Sustainable Aquaculture Practise: A Profitable Venture In Nigeria

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Abstract

Aquaculture, which involves the farming of fish for nutritional and economic benefits as well as food security and income generation, has in the last few years witnessed spectacular growth in Nigeria. The level of intensification witnessed in recent times has raised several issue that need to be addressed for the sustainability of the industry. This paper reviews relevant literature and examines the status and profitability of this green business in Nigeria. While it notes that economic viability of aquaculture depends on the interplay of various determinants (resources). It highlights land, water, labour and capital as resources employed for the optimum production in fish farming. The paper also discussed prospects that emanated from yearly shortfall in fish supply which is an indicator that there is a stable and ready market for fish. Possible suggestion were proffered to the problem of poor quality fish seed, high cost of fish feed, poaching, lack or insufficient of capital and marketing of fish and fish products identified as the hindrance militating against aquaculture development in Nigeria. The investigation reveals that aquaculture is very profitable in Nigeria due to the diversity in the culturable species in the country and its ability to yield between 30-100% return on investment in some very successful cases. Therefore, if taken as a full time occupation or venture it makes a significant economic impact on the investor.

Keywords: Aquaculture, determinants, problems, profitability, prospects.

1.INTRODUCTION

Fisheries occupy a unique position in the agricultural sector of the Nigerian economy. In terms of Gross Domestic Product (GDP), the fishery sub-sector has recorded the fastest growth rate in agriculture to the GDP. The contribution of the fishery sub-sector to GDP at 2001 current factor cost rose from #76.76billion to 162.61billion in 2005 (CBN report, 2005). It however has diverse sub-sector and this included fish farming (Aquaculture) which involves the rearing of fish for nutritional and economic benefits. More specifically for food security, the production of fish offers the prospects of improved local nutrition by providing ready source of high quality protein as well as an opportunity to generate income (Otubusin, 1998).

Aquaculture account for 25,000 metric tonnes which is currently far below its estimated potential of 2.50million metric tonnes annually, yet it has contributed 6% to the local domestic fish production in 2002 (FDF, 2005).

The awareness on the potential of aquaculture to contribute to domestic fish production has continued to increase in the country. This stems from the need to meet the much needed fish for domestic production and export. Fish species which commonly cultured include *Clarias* and *Heterobranchus* spp. (catfish), *Tilapia* spp. (Tilapia), *Cyprinus carpio* (Common carp), *Heterotis niloticus* (Slap water). This culturable species usually grow to a minimum acceptable marketable size in a reasonable growing period (usually between 4-9 months of culture) depending on the production system.

Despite the growing aquaculture, livestock and poultry industries, the problem of protein deficiency still persist (Adewuyiet. al., 2010). The protein deficiency in diet is equally associated with the inability of fish farming industry to supply the required quantity of fish despite its huge potential. The situation causes poor health, low efficiency, low productivity and poor standard of living. It is therefore expedient to review the profitability of fish farming in Nigeria in order to review the profitability of fish farming in Nigeria in order to unveil the golden opportunities in this green business. Investment in fish farming will increase local production of fish for consumption and importation. Specifically, it has a special role of ensuring food security, alleviating poverty and provision of animal protein.

2.IMPORTANCE OF FISH FARMING

Source of food: Fish as a product provides an excellent balance of calories. Fish is high in good quality protein. The percentage of edible lean tissue in fish is appreciably greater than that in beef, pork or poultry. Fish has a concentration of calcium and phosphorus in the bones. Conquer and Holub (2002) noted that fish oil significantly lower blood pressure, protect against blood vessel construction thrombosis and heart arrhythmia. Fin fish consumption also decreases the risk of blood cancer and reduces insulin resistance in skeletal muscles.

Employment generation: Fish production also occupies a very significant position in the primary sector providing direct employment for over a million people (FDF, 2005). The IFC (2004) estimated that some of the fish consumed in Nigeria is catfish and farmed raised fish is increasingly contributing to this market, which to date remains largely a live, fresh market. Employment opportunities are not only in the production, credit for aquaculture farms and consultancy services.

Source of income: Many fish farms are established yearly to produce fish, rivers and streams are continuously utilized as regular fish ponds, generating revenue to the individual fish farmer and other resource holder. Most recent investment in aquaculture has been targeted towards catfish farming. Presently live catfish attracts premium price in Nigeria, with a high ROI (Return On-Investment) ranging between 30-100 percent in some very successful enterprises and considered a viable option of increasing income of the investor.

Source of raw materials to local manufacturers: Fish is a ready source of raw materials to manufacturers and producers of all types of feeds and animal rations. Fish trashes, offal, gills, scales and even lesser-utilized fish can be converted to fish meal which is often an expensive unit of all animal feeds. Fish are supply to convenience store and relaxation center for its availability to the individual customer at their convenience.

3.DETERMINANTS (RESOURCES) OF FISH OUTPUT

Resources used in fish production are Land, water, labour and capital. These resources are employed for the optimum production in fish farming.

LAND: This is the most important resources readily available for production in developing countries. The mode of acquisition of land in the country today is mostly through outright purchase from individual owner or from government by issuance of a certificate of occupancy. However, there are still other areas where land acquisition could be by traditional inheritance. The location of land determines how land is used and the type of fish culture system adopted by fish farmers. Farmers, whose lands are located in swampy area with plenty of water, simply evacuate such lands into earthen ponds. On the other hand, farmers utilized any available empty space in their homes and build them into either concrete or any other types of holding tanks.

WATER: This is basically the most important determinant. Adequate quality water as an essential commodity in fish farming cannot be underestimated. Without assurance of water supply, fish production would be made impossible. The major source water for fish farming are stream water (perennial or seasonal) and domestic water supply (well or borehole).

LABOUR: Labour is a very important factor in traditional agriculture (Norman, 1972). Two kinds of labour identified with fish farming are family labour and hired labour. Family labour is very important in fish production because majority of the fish farms are homestead. The size of the household helps in making this kind of labour available. Hired labour is important in all scale of operation especially farm based operation.

CAPITAL: The capital could be durable and non-durable. The durable capital items used by the fish producers are ponds, vehicle and fixed asset while non-durable capital items are stock (either fingerling or juvenile), feeds (local and imported) and other variable resources. Capital inform of money needed to finance all production activities is also important resources. Kudiet.al, 2008 report that most fish farmers in Nigeria depends on personal savings to finance their production activities while only few have access to either cooperatives or other lending institutions.

Economic viability of aquaculture depends on the interplay of these various complex resources. It is often the aim of fish farm operators to cut down production cost in order to increase the return on investment. However, product cost is a function of operational skills which include selection of sites, fish species and the manipulation of the growth pattern of the stock, management capability of the operators and also the production of the culture. The practical application of these resources will definitely result in viability of the aquaculture business.

4.CURRENT ECONOMIC VIABILITY STATUS OF FISH FARMING IN NIGERIA

The current phase of aquaculture development in Nigeria is the emergence of investment from the private sector as the driving force. This is also complemented with the ability of researchers to provide scale basis. Moreover, there have been proof beyond reasonable doubt that the rate of return is encouraging if well planned before embarking in it.

According to Raufu et.al., (2009) in the study of Alimosho Local Government Area of Lagos state, reported that the total variable cost and total fixed cost represents 32.5% and 67.5% of the total cost of production respectively. The higher value for fixed cost may be due to the high cost of land acquisition in the area as well as high cost of construction materials like cements used in constructing a high standard fish pond. The gross margin of #11,479,304 and a net farm income for #8,985,904 indicates that small scale fish farming is profitable in the area.

Table 1: Budgetary analysis of the study in Alimosho Local Government Area

Variables	Amount (#)
Total variable cost	1,201,186
Total fixed cost	2,493,400
Total cost	3,694,586
Total revenue	12,680,490
Gross margin	11,479,304
Net farm income	8,985,904

Source: Raufu et.al., 2007

In the last ten years, individual has virtually taken over the industry and invested massively in aquaculture especially freshwater catfish farming. Adewuyiet.al., 2010 in the profitability analysis of fish farming in Ogun state shows an equally evident result of an average fixed cost of #243,287 and total cost of #394,380 incurred per annum while gross revenue of #715,030, thereby having returning gross margin of #574,314 and a profit of #320,650. The rate of return on-investment of 0.55 which implies that for every #1 invested, a return of #1.55 and a profit of #0.55 were obtained.

The implication of these is that there is considerable level of profitability in fish farming in consistent with the findings of Ashaolu et.al., 2005; Olukunle, 2004; and Kudiet.al., 2008 from their separate studies on profitability of fish farming in different area of Nigeria.

5. PROSPECTS OF AQUACULTURE IN NIGERIA

5.1. Prospects

Aquaculture has high prospects in Nigeria with a population of over 140 million, the fish demand estimated at 1.6 million metric tones, while the current local supply was 640,000 metric tones (FDF, 2005).

Faturoti (1999) noted that recent trends all over the world point to a decline in landing from capture fisheries which is an indicator that fish stocks have approached or even exceeded the point of maximum sustainable yield. This shortfall in fish supply has led to low annual per capita fish consumption of 7.5kg per annum 2002 even though the WHO/FAO recommended

13.5kg per annum (FDF, 2005). Aquaculture therefore remains the only viable alternative for increasing fish production in order to meet the the protein need of Nigerians.

Table2: Projected Population and Fish Demand/Supply, 2008-2016

Year	Population (Million)	Fish demand (Million tonnes)	Fish domestic supply (Million tonnes)	Shortfall (Million tonnes)
2008	143.0	1.09	0.85	0.24
2009	147.1	1.12	0.89	0.23
2010	151.2	1.15	0.93	0.22
2011	155.5	1.18	0.97	0.21
2012	159.9	1.22	1.00	0.22
2013	164.4	1.25	1.04	0.21
2014	169.1	1.29	1.08	0.21
2015	173.9	1.32	1.12	0.20
2016	178.8	1.36	1.16	0.20

Source: <http://www.fao.org/fi/fcp/en/NGA/body.htm> March 2000

Nigeria is blessed with suitable land where freshwater, brackish and marine fish species can be cultured. Tobor (1990), report that 1.8 million hectares of suitable land for aquaculture out which less than 20% has been put into use. If the available land is put into proper use, fish production will increase from the present level. The yearly shortfall in fish supply is also an indicator that there is a stable and ready market for fish; coupled with disease outbreak in poultry, high cost of beef and other alternative animal protein sources. Aquaculture therefore, has a lot of prospect, not only in alleviating under-nutrition and poverty but as a source of foreign exchange for Nigeria. Aquaculture can also provide a viable socio-economic alternative to capture fisheries.

Aquaculture can be operated either on a small scale, low cost, utilizing family labour or at high cost under intensive operation (Omitoyin, 2007). This provides opportunities for both the poor and the rich to improve their standards of living, apart from providing employment opportunities.

5.2.Problems

In spite of the potentials of aquaculture, there are lots of problems militating against its development. Prominent among these as discussed by Omitoyin, 2007 are;

Poor quality fish seed: Many states of the federation lack functional fish hatcheries where farmers can purchase fingerlings and juveniles to stock their ponds. Farmers have to travel long distances to source for fish seeds, or collect from the open waters. Even where there are hatcheries, in some cases, fingerlings of poor genetic quality are produced for farmers to grow. Some hatcheries sell advanced fry as fingerlings. This has resulted in stunted growth of fish, poor survival rate, and poor returns on-investment. Akintunde (2009) estimated fish seed demand to 55million in 2007. There is therefore, the need for more private sector participation in fish seed production and adequate manpower training to bridge this gap.

High cost of fish feed: Although there has been a lot of research work on fish feed production to meet the nutrient requirement of culturable fish in Nigeria, (Faturoti and Akinbote 1986; Falaye 1988; Ayinla 1988; Omitoyin 1995 and Olukunle and Falaye 1998): good-quality fish feed pellet are still sparingly used by fish farmers. This is due to high cost of most fish feed ingredients particularly fish meal and its competitive use by livestock farmers. There are also few commercial fish feed producers in Nigeria, a lot of farmers depend on imported quality fish feed which are expensive and not affordable. This increases their cost of production and reduces their profit margin.

Poaching: This is becoming a serious problem to the development of aquaculture in Nigeria. Many farmers have lost substantial, if not all stocks to poachers. As a result of this, many fish farms have closed down while many more farmers have run into debt. This has also prevented lending agencies from giving out loans to genuine fish farmers. The overall effect is a decrease in fish production.

Lack or insufficient of fund: Many fish farmers lack adequate capital to either operate their farms profitably or expand them. The situation is made more difficult by the unwillingness of financial institutions to grant loans to the farmers. When loans are given, it is usually at very high interest rates. The number of operational fish farms in the country has reduced significantly as a result of lack or insufficient capital and expected fish yield is affected in the long run. Government should therefore encourage financial institutions to give loans to serious minded would-be investors at considerable interest rates but with proper monitoring. This will help to increase farmers' production levels and profitability.

Marketing of aquaculture products: Marketing of aquaculture products is becoming a problem in Nigeria. This is not because the supply is in excess of demand but because of uncoordinated marketing programmes. Many farmers sell their fish in fresh form to middlemen at very low prices. There is, therefore the need for networking and marketing information among fish farmers, processors and consumers on availability of fish and current market prices all over the country to prevent the farmer from being ripped-off. There is also the need to add value to aquaculture products in order to increase the profit margin of farmers. Modern fresh fish distribution chains should be developed as to make fish available to consumers no matter where they are in the country. The quality control of such products should be ensured by regulatory agencies.

6.CONCLUSION

There are not too few fish-there are too many people (Tidwell and Allen, 2002). In view of the high demand for fish as an important delicacy in Nigerian meal and the Nigerian's domestic fish production is yet to meet up, the outlets are continually looking for high quality fish which gives an affordable source of protein to the people, create opportunity for business diversification and reduces importation of fish and fish products into the country.

Aquaculture (fish farming) is very profitable in Nigeria due to the diversity in the culturable species present in the country and its ability to yield between 30 – 100 percent return on-investment in some very successful cases. If taken as a full time occupation or venture it makes a significant economic impact to the farmer. It also has a special ability of ensuring food security, alleviating poverty and provision of accessible animal protein for Nigerians.

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