

A Review of Aquaculture Production in Nigeria: Problems and Prospects

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Abstract

Nigeria is the most populous black nation in the world, with a population an estimated population of about 150 million people. Its citizens as at the end of 2012 have a projected fish demand of 2.66 million tonnes of fish. Fish supply within the said period was 1 32 million tones. This figure was made up of 0.7 million tonnes from importation and 0.62 million tonnes from both artisanal and aquaculture. Of the local production aquaculture contributes only 200,000 tonnes. Studies have shown that fish catch from the wild has reached its maximum production limit and production from this area is currently on the decline. The country has about 1.75 hectares of suitable sites for aquaculture development. Aquaculture production for 2012 was a meager 200,000 tonnes. Aquaculture though a veritable means is faced with a lot of constraints ranging from Government's wrong focus on industrial fisheries instead of aquaculture, poor policy formulation and non-implementation fisheries development programmes among others. In spite of these constraints, the following aquacultural investment opportunities such as Production of fishing equipment, Establishment of modern fish farms, Shrimp fishing, fingerling production, Table size fish production, Brood stock production, Fish feed production, Ornamental fish farming, Production system design and construction, Capacity building in project management, Packaging and branding.

Aquaculture can be defined as the rational rearing of fish in an enclosed and fairly shallow body of water where all its life processes can be controlled. It is an important sector for the nation's economic development, at a time when government is seeking for ways to diversify the economy, from being purely oil based. It is a potential means of contributing to the food security of the nation, directly by producing fish for food and indirectly by generating employment for the teaming unemployed populace, save foreign exchange and generate foreign exchange through export of fish and fish products.

Aquaculture according to Ayinla (2012) is the fastest growing food producing industry in the world. He stated that global aquaculture production has quadrupled over the past twenty years and that aquaculture production is likely to double in the

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next fifteen years, as a result of wild fisheries approaching their biological limits and the world demand for cultured fish continuing to increase. In Nigeria the annual fish demand as at 2012 is 2.66 million metric tonnes with supply being only 1.32 million metric tonnes. Out of this figure local production is 0.62 million metric tonnes while 0.7 million metric tonnes is from importation. Of the total fish supply aquaculture account for only 200,000 metric tonnes. The current aquaculture production, is a far cry from its potential production of 2.5- 4.0 million metric tonnes.

Nigeria is a coastal state bordered in the South by the Atlantic ocean. It has a land mass of 923,766 km², with about 1.75 million hectares of suitable sites for aquaculture development. The aquaculture sub-sector is considered a very viable alternative to meeting the nation's need for self sufficiency in fish production. This is based on its high reliability in return on investment and low capital intensity, relative to capture fisheries.

The Federal government of Nigeria is of late, actively pursuing the development of the fisheries sub-sector in order to cope with the rising demand for fish and fish products and also to diversify its oil-based economy. The Federal government's aim is to achieve self-sufficiency in fish production and ultimately to have fish products available for export. Unfortunately the fisheries sub-sector is under-developed despite it being the source of livelihood for many of the coastal populace. Rapid population growth in developing countries such as Nigeria, increased disposable income and changing consumer preferences has drastically increased the annual demand for aquatic food source. Proliferation of more efficient capture technologies, decades of government subsidies, increased market access even for remote fishing communities, and development programs aimed at increasing production from the fragile open-access resource has led to large scale depletion of fish resources. Thus there is growing concern over the sustainability of wild fish stocks. The need for long-term investments to ensure the sustainability of production from aquaculture cannot therefore be over-emphasized. Intervention in this seemingly critical but neglected sector, can be in the areas of planning, ecosystem-based resource management, post harvest sector, human resource development This seeks to review the principles, status, trends, and future needs for investments in fisheries and aquaculture.

Concerted efforts to develop fish-farming (aquaculture) in Nigeria has passed through distinct periods (1950 – 1992) and the attempts to reduce the major constraints for rapid aquaculture development, featured prominently in the second phase of the National Development Plan (Ezenwa, 1994). Extension activities in the 1960's and 70's given by the government demonstration fish farms at Itu and Opopo boosted the awareness process and adoption of the technologies during the early days of aquaculture development in Nigeria (Ajenifuja, 1998). The then enthusiasm resulted in a significant individual participation in fish-farming within the Niger Delta Region of Nigeria (Inyang, 2001). Despite campaigns on the potentials of fish farming for mass reduction in protein malnutrition, poverty level and unemployment,

diminishing production has become a characteristic feature in the region. As posited by Aina *et al* (1995) information has a vital role to play in improving and sustaining aquaculture production of any nation.

This paper will specifically examine:

- the incentives for development of fishery business in the country
- key challenges faced by investors in aquaculture business in the country.
- the market potential or other wise of aquaculture business in the country.
- the role the Federal government could play to make the country investment friendly for development of aquaculture .

Aquaculture Potential in Nigeria

The growth of a country's population is usually accompanied by increases in the demand for the basic necessities of life including water, food and shelter. This is the case with the unrestricted increases in the demand for protein rich food items of animal origin. The Food and Agriculture Organization (FAO, 1991), recommended that an individual takes 35 grams per caput of animal protein per day for sustainable growth and development. However, the animal protein consumption of Nigerians is less than 8 g per person per day, which is a far cry from the FAO minimum recommendation. The major animal protein sources in the country include cattle, goats, sheep, poultry and fish. Out of these sources fish and fish products provide more than 60% of the total protein intake in adults especially in the rural areas (Adekoya, 2004). Therefore, the importance of the fishing industry to the sustainability of animal protein supply in the country cannot be over-emphasized. Regrettably, the supply of food fish has been on the decline. This is due to consistent decline from the country's major source of food fish, (Global Agriculture Information Network GAIN, 2007). Currently, domestic fish production is put at 620,000 metric tons as against the present national demand of about 2.66 million metric tons (Ayinla, 2012). It has been asserted by Adediran (2002) and Ugwumba (2005) that the only way of boosting fish production and thereby move the country towards self sufficiency in fish production is by embarking on fish farming especially catfish farming. This has prompted the Federal Government of Nigeria to package the Presidential Initiative on fisheries and aquaculture development in 2003 to provide financial and technical assistance to government programmes and projects encouraging fish production. Similarly, the Delta State government initiated an agricultural microcredit support scheme with emphasis on fisheries, with a view to complimenting the Federal Government effort at attracting investment into this all important sector.

Rational for Investment in Aquaculture

Fish stocks, aquatic resources, and the aquatic environment are generally public goods requiring coherent public policies and their effective application. In addressing these issues, the World Bank has the comparative advantage of its

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convening power, its experience in economic and sector analysis and strengthening public governance, in developing cross-sector solutions, in fostering effective and transparent natural resource management, and in being able to provide substantial investment funding to support strategic sectors such as. Aquaculture, The Fisheries sub-sector investment addresses a range of ubiquitous Bank issues such as: poverty, governance, knowledge, and environment. poverty and economic development The fisheries sector is an essential source of employment and income for millions of women and children who catch, process, transport, or market fish and fish products. Fish is the principal animal protein consumed by about one billion people worldwide.

The export value of world trade in fish-US\$58 billion in 2002 is more than the combined value of net exports of rice, coffee, sugar, and tea. Demand for fish products is increasing rapidly as income levels rise in Asia and population grows in Africa. Led by Asia, developing nations now produce nearly three times as much fish as the developed countries (Delgado *et al.* 2003).

Governance. There is broad consensus that poor sector governance is a primary cause of the crisis in world fisheries. Policies and institutional frameworks are often deficient at the regional, national, and local level. Allocation of fishing rights often takes precedence over stewardship obligations, while overfishing and economic losses generate demand for subsidies. Knowledge of the state of fish stock and the aquatic environment is fundamental to establish a scientific basis for fisheries management.

Fish as food fisheries and aquaculture play a significant role in global food supplies, and demand for high-quality aquatic protein is expected to increase substantially as income levels rise in Asia and African populations expand. Global fish consumption has doubled since 1973 (increasing by 21 percent between 1992 and 2002), with China, India, and Southeast Asia accounting for almost all of the increase. China accounted for an estimated 36 percent of global fish consumption in 1997, compared with only 11 percent in 1973 (Delgado *et al.* 2003).

Investment Opportunities in the Country: Considering the yawning gap between the national annual fish demand and supply, the aquaculture industry is a veritable ground for investment. According to NDES (1997) and Ayinla (2012) opportunities exist in nearly all aspects of the fishing industry. With respect to aquaculture, some of the areas for possible investment include:

- Production of fishing equipment
- Establishment of modern fish farms
- Shrimp fishing
- Establishment of an ice-melting plant
- Fish processing for export
- Fish fingerling production

- . Brood stock production
- . Fish seed production
- . Ornamental fish farming
- . Production system design and construction
- . Processing and preservation
- . Capacity building in project management
- . Fabrication of fish handling equipment
- . Packaging and branding.

Challenges and Constraints Facing Aquaculture Investment in Nigeria

Regardless the efforts by Federal Government, to increase fish production, meeting the fish demand of the country has remained a mirage. This has been due largely to the poor National Fisheries Development plans and Policies, which was focused on the development of Industrial Fisheries, a sector that is not capable of further increase in production, to the detriment of aquaculture (Tobor, 1997). Other constraints faced by the aquaculture industry are inadequate quality fish seed for stocking ponds, dearth of information on modern technologies in aquaculture due to poor extension services, lot of skill gaps between the managerial-supervisory-unskilled personnel, lack of fishermen's cooperative societies, poor infrastructural facilities, poor funding by government and high cost of fish feed (Adeogun, *et al*, 2007; Tobor, 1997; Ugwumba, 2005; Ogwumba and Nnabuife, 2008)

According to Osawe (2007) and Ugwumba and Orji (2007), the constraints to investment in aquaculture in the Niger delta include scarcity of quality seeds (fingerlings), high cost of feeds; high cost of labor; inadequate water supply; lack of land for pond establishment; lack of capital; lack of modern technologies; poor storage facilities, high cost of transportation, mortality of fish due to diseases and water pollution and poaching. Further to the above, aquaculture production in Nigeria, especially in the BRACED states, which form the hob of the Niger Delta states, is seriously constrained by the militant activities of the youths. This has posed security challenges to investment in aquaculture in the area. FAO (2000), observed that the concept of fish farming is perceived as a foreign technology by the small scale, resource poor farmers, most especially in sub-Saharan Africa and it is seen as a donor driven development. Balarin (1985) categorized constraints to aquaculture development among rural fish farmers into three viz: technical, social and economic. Under the technical consideration, poor understanding of the biology of the fish, logistics hindering effective training of personnel and extension support activities among others were mentioned. Ajana (2007) listed about ten major constraints to include inadequate site selection, poor designs and construction of fish pond, low level of fish farm management techniques, high cost of pelleted fish feeds, inadequate hatchery facilities and poor record keeping.

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Aquaculture Investment in Nigeria

Aquaculture Extension workers are often asked by potential fish farmers, “How do I get started in fish farming?” Their response is often to refer such persons to general fish farming publications that discuss getting started in aquaculture. Critical factors that should be considered before starting fish farming/aquaculture investment in the country include; learning, evaluating, planning, and testing. (NDES ,1997 and Olawoye 2001).

Learn all you can about aquaculture. The local Country Extension office is a good place to start. Within the North Central Region some county Extension agents have been trained to respond to requests for aquaculture information from prospective fish farmers. Country Extension agents can direct you to people within your state who are responsible for Aquaculture Extension. Aquaculture Extension specialists will help you find specific information. Visit working fish farms, both private and public. Talk with experienced fish farmers. Join your state aquaculture association. Subscribe to aquaculture periodicals. Read all you can about aquaculture. View videos about aquaculture. Attend aquaculture workshops, seminars, and conferences.

Evaluate your resources—human and natural. Do you have the time, energy and financial resources to develop a fish farm? Do you have both land and water that can be used for fish farming? What equipment will you need to raise fish? Are there local markets for you to sell your harvested fish?

Plan your aquaculture enterprise. Develop a business plan. Such a plan will help you to think through the operation. Look for potential pitfalls. What permits do you need to raise fish for sale? A business plan is essential if you hope to obtain outside financing for your enterprise.

Test your plan on a scale that you can afford. Are you able to grow fish on a small scale? What works? What doesn't work? Build your business after you have worked out the problems in your plan and as you gain knowledge and skill as a fish farmer. Make sure you can grow and sell the fish before you invest large amounts of time and money on production.

Requisites

Land, water, capital, market, and management skills are essential for successful fish farming. Knowledge of these requirements will help one to plan and develop the enterprise Ugwumba (2005).

Water

Water quality and quantity are critical factors to successful fish production. The water should be void of any chemical harmful to fish and be within acceptable pH range of 6.5 – 9.0 (Boyd, 1982). To a large extent, water temperature will

determine what species of fish can be grown successfully. The amount of water available will limit the size of the fish farm. At a minimum you want enough water to drain and fill a fish production pond at least once a year, as well as the capability of replacing any water lost through leakage or evaporation.

Capital

Aquaculture is capital intensive. Financing is generally needed to construct ponds, raceways, wells, buildings, and other specialized fish production equipment. Feed and labor costs are the major variable expenditures in an aquaculture investment. Being a type of business like other agricultural ventures, agricultural lending institutions are more likely to finance it, than commercial banks. To obtain financing for fish production, a business plan is normally required. This is because more than 60 percent of all new non-farm businesses fail within the first five years and commercial aquaculture could not be different. Thus a successful aquaculture business requires good planning from the onset.

Markets

To be successful, aquaculture investors must be proactive in the marketing of their products. Emphasis on careful handling, cleaning, processing, packaging, transport, and retail sales is important in order to develop the market. These farmers must be able to break into the market and carve out a niche for themselves where they can sell their products. This will take time and conscious effort

Management

A fish farm requires continuous proactive management. The ability to anticipate and prevent problems is essential to sound management. Aquaculture involves risk of crop loss due to wide pH fluctuations, oxygen depletion, parasites, water pollution, disease, predators, flooding, vandalism and more. A sound business plan and proactive management will help avoid or minimize these problems. Hard work and a drive to succeed are needed. Knowing 'how to' and a willingness to learn more 'how to' is necessary for success. How to react to problems and being prepared for problems...is essentially a personal commitment to aquaculture. Here the human resource factor is critical to a successful aquaculture enterprise. Ofuoku, *et al* (2008) .

Conclusion

The place aquaculture occupies in the current drive by the Federal Government to achieving self sufficiency in food production, especially in meeting the fish demand of the citizenry cannot be over emphasized, There is need for Government and its agencies to be more proactive and take conscious steps to tackle the problems that have been facing the sector. Among these problems are those caused by poor policy formulation, non-implementation of policies and programmes, lack of subsidy on fish feed as done to fertilizers used in crop production and non-

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availability of quality fish seed to stock ponds. Addressing the issue of food security in the nation is even more critical when considered against the backdrop of the wide gap between fish supply which currently stands at 1.32 million metric tonnes and a demand of 2.66 million metric tonnes.

In the light of the above, there is need for a more pragmatic and concerted approach to the development of aquaculture in the country. This is because this sector is a potential means of increasing the nation's fish production, to meet domestic needs and for export. In achieving this, it will involve a concerted effort by both governmental and non-governmental agencies. This can be achieved by an aggressive extension service by Fisheries extension officers educating fish farmers, prospective farmers and the general populace on the gains realizable from aquaculture venture as well as opportunities open for investment in aquaculture, through the value added chain such as Production of fishing equipment, Establishment of modern fish farms, Shrimp fishing, Establishment of an ice-melting plant, Fish processing for export, Fish fingerling production, Table size fish production, Brood stock production, Fish seed production, Ornamental fish farming, Production system design and construction, Processing and preservation, Capacity building in project management, Fabrication of fish handling equipment, Packaging and branding.

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