

Key Challenges for Entrepreneurship in Nigeria's Fish Farming Sector

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Abstract

The fish farming sector in Nigeria hold significant potential for contributing to the country's food security and economic growth and development. However, entrepreneur's in this sector face numerous challenges/constraints or limitations that obstruct the full realization of this opportunities. This paper explore the key challenges confronting entrepreneurship in Nigeria's fish farming industry, focusing on areas such as Financial, Technical, and Ecological challenges. Additionally, issues related to Product, Market, Business, Regulatory/Policy and Climatic challenges were revealed. The study highlights how these challenges impact the growth and profitability of fish farming enterprises and suggest some strategic recommendations that could mitigate these challenges. Addressing these challenges is critical for enhancing the productivity and competitiveness of Nigeria's fish farming sector, which in turn could stimulate broader economic development and poverty alleviation in the country.

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1. Introduction

Fish farming is an innovative strategy for improving economic growth and well-being of communities [1]. In sub Saharan Africa, it has rapidly picked up pace as an innovative and economic mechanism for yielding employment, increasing household income, improved nutrition and contributing to food security [2, 3].

In Nigeria, the fishery sub-sector plays a very distinguished role in the livelihoods of a large percentage of the nation's population over the years [4]. In Africa, available records have shown that Nigeria has the largest market for fish and fish products and it is said to be second in the region in terms of the production of the commodity [5]. Consumption of fish is about 40% of the protein sources consumed in the country. Apart from the sector contributing to the provision of food, it provides employment opportunities for several people irrespective of their age and social status, hence, the sector plays a great role in foreign exchange as obtainable in other climes [6]. Historically, capture fisheries have been the most popular in the country, however it is facing climatic and social challenges. This has led to a shortfall in both production and consumption [7]. However, in spite of the great prospects of fish farming in Nigeria, Nigeria is still unable to fill the gap in the shortfall between total domestic fish production and total domestic demand. According to Food and Agriculture Organization (FAO) (2019), total domestic fish production is far less than the total domestic demand [8]. According to Fishery Committee for the West Central Gulf of Guinea (FCWC), (2016), the total fish demand for Nigeria based on the 2014 population estimate of 180m is 3.32m Mt [8]. It has been observed that even though Nigeria is regarded among major producing nations of aquaculture in Africa, producing about 307,000 tons of fish, this is trivial compared to the projected yields evaluated at two million tons. This indicate that in order to meet the FAO requirement of 12.5 kilograms per head per annum, Nigeria imports about 1.2 million tons of fish to meet the basic protein needs of her citizens [8].

Moreover, Fish farmers are undergoing many limitations and problems. These can be described as the challenges of fish farming. In fish farming business, limitations are the internal restrictions and constraint of fish farm. Again, problems in fish farming business can be defined as the external arduous conditions for the fish farmers to do his fish farming business [9].

Although fish farming sector has shown some upward growth in Nigeria, several entrepreneurs undergo multiple constraints. Typical and substantial challenges faced by developing entrepreneurs, mostly the youth and emerging farmers are water access, land, technology, production plans, business plans, high transaction cost and also the lack of supporting policies and legislation [10]. This article seeks to detail some of the challenges facing entrepreneurs and recommend some solutions that might assist in solving the challenges that obstruct fish farming.

2. Entrepreneurship and fish farming

2.1 Entrepreneurship

Entrepreneurship is the way of starting new organizations or strengthening mature organizations, mainly new businesses generally in response to identified opportunities [11]. Eroglu and Picak [12] further defined "entrepreneurs as individuals who utilizes market opportunity through technical and/or organizational

innovation”, or a person who tend to be involved in creating and innovating something of recognized value around perceived opportunities”. An entrepreneur as stated by Onuka and Olaitan [13] is a person who creates or manage a business venture and bears risk for the sake of profit Eroglu and Picak [12] argue that the study of entrepreneurship should be spread out to international markets to examine the conditions and characteristics that encourage entrepreneurial activity in various countries and regions.

2.1.1 Types of Entrepreneurship

Barot [14] documented two types of entrepreneurship. First is opportunity-based entrepreneurship where an entrepreneur detects a business opportunity and creates the business as his career choice. While Diandra and Azmy Reference [15] revealed that opportunities-based entrepreneurship is establishing venture activity because of new idea and personal amplifications. Second, the necessity-based entrepreneurship which is as a result of the entrepreneur having no option to earn a living. In this case, entrepreneurship is not the choice but obsession. The people in this stage do not know the significance of entrepreneurship; because the situation arises when there are no other available labour market options [15].

A study conducted by Aulet and Murray [16] divided entrepreneurship into two categories:

The first category is entrepreneurship driven by innovation: This type of innovation-driven entrepreneurship shares the idea of invention in business with the objective to pursue the international prospects or worldwide opportunities.

Second, is the small business entrepreneurship or small medium enterprises: This is another category of entrepreneurship which has a restricted entry to the global market, serve local markets traditionally and it does not possess significant advantage over its competitors. These two types of entrepreneurship are very different. Why? Because invention need talented teams that engage on business model, process, and technology faced by business organization instead of thinking about revenue, cash flow, and jobs eventually [16]. Moreover, other studies categories entrepreneurship into different categories; High-growth, technology-enabled, venture capital-backed business such as Yahoo, Google, Apple and Amazon which focuses on technology business and growth to enable the owner to make billionaires, generate thousands of jobs, and to offer a diverse range of goods and services promptly [15].

2.1.2 Benefits of entrepreneurship

The benefits of entrepreneurship according to Chirani, and his colleagues [17] include

- Entrepreneurship plays a great role in inspiring investment.
- Entrepreneurship serves as a catalyst for stimulating and fostering competitive dynamics.
- Entrepreneurship promote change and innovation.
- Entrepreneurship leads to generation of job opportunities.
- Entrepreneurship enhances standard of living.
- Entrepreneurship facilitates equitable distribution of income.

2.2 Aquaculture

Aquaculture is the rearing of aquatic organisms such as fish, molluscs, crustaceans, aquatic plants, crocodiles, alligators, turtles, and amphibians [18]. Aquaculture is mainly a way of supplementing unpredictable production via capture on commercial fisheries [19]. Aquaculture has been one of the fastest-growing animal food-producing sectors. In Sub-Saharan Africa, fish consuming levels remain so low and the people are failing to gain from the contributions that fisheries and aquaculture are increasingly making elsewhere in terms of sustainable food security and income. Aquaculture worldwide has progressed remarkably to emerge as an economically significant industry [18].

2.3 Fish farming

Fish farming involves rearing of fish commercially in tanks or enclosures such as fish pond. Fish farming can also be defined as the raising of fish for personal use or profit. Similarly, fish farming is a form of aquaculture in which fish are raised and cultivated in enclosures for consumption as food and it is considered as the fastest growing sector of animal food production. Today, more than half of the global fish consumption is met with the help of fish raised in these artificial environments. Common farmed species include salmon, tuna, cod, trout and halibut, tilapia, pangasius etc [20]. Fish farming is the leading form of aquaculture, which is expanding remarkably throughout the world and has a high capacity for the provision of valuable protein in less developed countries Reference [21].

2.3.1 History of fishing and fish farming in Nigeria

The history of fisheries advancement in Nigeria is a comparatively current one, though it has been reported that a fishing company operated from the coastal waters of Lagos long before 1915. Deliberate efforts at the developing country's resources can be said to be originated from the second world war when, as a result of the naval blockage of the high seas, the colonial administration resolved to develop the country's local resources including fisheries. A fisheries organization was inaugurated in 1941 as Fisheries Development Branch of Agriculture in the colonial office with headquarters at Apese village in Onikan, Lagos State. A senior Agricultural officer was assigned to carry out a survey of the industry. A preliminary survey of the canoe fisheries of Apese village and Kuramo waters around Victoria Island, Lagos was carried out. Small motor fishing crafts were obtained for exploratory fishing in estuaries, lagoons and creeks. Major efforts were made at expanding the artisanal fisheries programme to the coastal areas of Nigeria between 1948 and 1956. Trawling surveys were undertaken in the vicinity of Lagos and Cameroon. An active extension service was established to display the benefits of advanced fishing techniques and gear to the coastal canoe fishermen [19].

The bulk of the domestic fish production in Nigeria currently comes from the capture fisheries overpowered by artisanal fishery sub-sector which produces over 80% [19] It is therefore mandatory to step up fish production through agriculture so as to accomplish fish self- sufficiency for the country.

The first attempt of fish farming was in 1951 in Onikan, Lagos at a small experimental station, where different tilapias were cultured, though the result were not remarkable. Modern pond culture started with a pilot fish farm

(20ha) in Panyam, Plateau State for rearing the common/mirror carp, *Cyprinus carpio* following the discouraging result with *Tilapia* culture. Since then, adequate interest has been generated that made regional government set up fish farms, such as Buguma in River State, Abagana in Anambra State, Agodi Garden farm in Ibadan etc [19]. Although, the main species cultured included fin-fish (tilapias, catfish and carp), catfishes of the family Clariidae are the major farmed fish. Since the culture of *Clarias gariepinus* through hypophysation was established in Western Nigeria in 1973 [19] the procedure has been widely practiced throughout Nigeria hence resulting in increase of farm-raised catfishes from the 8s to date. The preferred catfish species include: *C. gariepinus*, *Heterobranchus bidorsalis*, *Clarias* x *Heterobranchus* (hybrid *Heteroclarias*) and *Chrysichthys nigrodigitatus*. The Clariid fishes have been preferred in aquaculture as a result of their hardiness, ability to accept a vast range of natural food organisms and affordable supplementary feed [19].

3. Challenges for fish farming and entrepreneurship

3.1 Internal and external challenges

Fish farming entrepreneurs are not devoid of challenges. Challenges are problems that need attention and consideration. These challenges are the responsible factors affecting the level of production. Fish farmers experience many problems during the production process. However, in fish farming practices, these obstacles are divided into internal and external challenges.

Internal challenges are “inner strengths and deficiencies that strongly effect how a business can accomplish its target. And external challenges were defined as “an outside influence that have impact on business which effect the ability to accomplish its objective/target. It can be competition, social, legal, technological changes or political environment”. The above definition shows that internal challenges are characterized as an entrepreneur’s weakness and is viewed as an internal restriction. On the other hand, external challenge is viewed as an external hindrance that creates difficult conditions for a person with which to deal [22].

The internal challenges are highlighted as follows: Inadequate financial management skills, poor ability to handle fish diseases and parasites, low water quality, poor quality of fish feed, poor quality of fish seed, poor quality control, inadequate fish farming experience, insufficient start-up capital, lack of technical abilities. Similarly, based on the definition of external challenges, the following are described into uncontrollable external challenges: poor potential market, lack of government support, poor training provided by the government, insufficient profit, low selling price, inability to secure a sufficient loan [22].

Below are some of these challenges grouped into cluster:

(a) Financial challenges

For any business, finance is regarded as the backbone. The success fish farming business hinges on securing venture capital for operations [23]. Capital is anything used at the start of a business, and it determines the growth rate of any enterprise. Paucity of capital is a challenge faced in fish farming. Fish farming is capital intensive and demands huge capital investment for appreciable profit to be achieved. It requires huge capital especially for pond

construction. Sufficient and much capital will help the farmer to enlarge his/her fish farming business; procure materials needed and more stocks. Fish farms normally belong to lower income family with limited funds to start up. The capital needed for water management, harvesting and marketing. The fish farmers have to secure sufficient loans from institutions that provide loans; be it government or private provider. The inability of the fish farmers to secure sufficient loans is one of the major problems in the developing countries [9]. The fish farmers, when unable to secure sufficient loans, it forces them to take loans from other money lenders at higher interest rates. However, Loan application requires a well-planned financial projection. But many fish farmers cannot plan out and set up such financial plans [9]. The factors which may appear as financial challenges for the fish farmers in their business can be identified in Table 1

Table 1: Financial challenges encountered by fish farmers

| Financial challenges | Reference |
|--|-----------|
| Insufficient fund | [21] |
| Difficulty in getting institutional credit | [9] |
| Lack of knowledge on financial tools to start business | [18] |
| Unwillingness to use available financial tools | [9] |
| Hindrance in getting loans for expansion | [18] |

Fish farmers face challenges in managing their fish farming business when they lack access to adequate loans and lack sufficient financial management skills.

Lack of family support is a serious constraint to fish farmers because family members were the closest people to fish farmers in their ability to influence how the fish farmers conduct their business. Without a supportive family, fish farmers may be despaired in developing their businesses. This includes their ability to generate and implement sustainable aquaculture in order to attain product sustainability. Additionally, many small-scale fish farmers obtain direct assistance from family members in running their businesses. Many family members assist in providing capital, in managing the fish ponds, which involve managing fish feed and fish seeds, and hence their direct assistance impacted product sustainability [22].

(b) Technical Challenges

Fish farming business require knowledge and technique. Fish farmers cannot employ viable aquaculture if they do not have sufficient experience and knowledge of the practices. Prior fish farming experience and knowledge is important in equipping fish farmers with technical and managerial skills needed in conducting viable aquaculture. The business potentiality alone cannot yield a successful harvest if the farmer has limited technical skills [22]. Some fish farmers started their fish farming business simply because they spotted their neighbours or relatives successful in fish farming. They tried to copy the activities, but they did not have required knowledge to undertake this type of business. A lack of technical abilities includes a lack of technical skills to implement viable

aquaculture. Limited technical abilities in implementing sustainable aquaculture may lead to failure in obtaining product sustainability and even total fish harvest failure. This technical inability is incorporated in fish feed and fish seed management. The challenges of fish farming in terms of technique can be, thus, highlighted in Table 2.

Table 2: Technical challenges encountered by fish farmers

| Technical challenges | References |
|---|------------|
| Unavailability of skilled labour for pond preparation and inability to expand pond size | [5] |
| Inadequate facilities for water testing | [9] |
| Lack of training programme on fish culture or lack of experience and poor expertise | [24] |
| Inadequate access to extension personnel services | [25] |
| Lack of follow up action by extension workers | [21] |
| Deficiency in technological knowhow | [21] |
| Lack of standardized technology for indigenous fish species | [9] |

Fish farmers cannot implement sustainable aquaculture if they have insufficient experience and lack of knowledge of the practices. Prior fish farming experience and knowledge was vital in equipping fish farmers with technical and managerial skills required in conducting sustainable aquaculture, practices such as how to prepare and manage their pond as well as how to combine fish in poly-culture system [22].

(c) Ecological Challenges

Fish farming is totally water and climate dependent. Therefore, the ecology related issues sometimes stand as a challenge in performance. As the global aquaculture development is significantly growing, the environment sustainability is decreasing [26]. Among all the ecology related issues, fish disease and parasite management is also regarded as a critical factor in attaining sustainable aquaculture [9]. The ecology related challenges of fish farming can be spotted in Table 3.

Table 3: Ecological challenges encountered by fish farmers

| Ecological challenges | References |
|---|------------|
| Insufficient land for fish farming | [8] |
| Poaching of fish | [5] |
| Disease outbreak | [5] |
| High temperature | [24] |
| Challenges of water sources | [24] |
| Lack of suitable temperature for growth of fish throughout the year | [24] |
| Decrease in rainfall and insufficient water for fish farming | [5, 25] |
| Seasonal storms and flooding | [24] |

(d) Production Related Challenges

Fish production is dependent on quality of fish seed, fish feed and proper feeding schedule along with proper pond management. The quality fish seed sometimes are unavailable locally and obtaining such seeds lead to higher operational costs. Sometimes scarcity of fish seed results from limited numbers of hatcheries in the local region [27]. Both the quality and quantity of fish seed are affected by limitations. Along with seed, fish feed is also vital. The success of a sustainable aquaculture system relies on the fish feed and fish nutrition [9]. Moreover, high cost of brooding stocks is another production related constraint and is usually as a result of inadequate local supplies of brooding stocks accredited to abandoned government hatcheries and few private agro-input fish supplies. Producers have no choice than to purchase most of their fingerlings from neighbouring States. Similar constraint was reported by Ugwumba and Chukwuji [28] to have affected fish farming in Anambra State. The factors for which production related challenges occur in fish farming can be thus identified in Table 4.

Table 4: Production related challenges encountered by fish farmers

| Production related challenges | References |
|---|------------|
| Lack of qualitative fish seeds of required size and number at stocking time | [9] |
| Difficulty in specifying good quality fish feed | [25] |
| Difficulty in getting good brooders during breeding | [18] |
| Fingerlings/carried over seeds cost is high | [8] |
| Non availability of formulated fish feed | [8] |
| Limited growth of fish | [9] |

High cost of feed is a major constraint to fish farmers [25]. Feeds, which forms a major input in fish production business is very costly and, in some cases, unavailable. Importation of most commercial feeds into the country; stiff government fiscal policies importation and distribution could be the cause for the rise in feed prices. These commercial feeds possess floating and high protein qualities and are therefore preferred by fish farmers. Adeoye, and his colleagues [29] Identified high cost of feed as very serious drawback to profits realized from catfish farming.

(e)Business Related Challenges

The challenges associated to the business of fish farming are basically the internal ideas and thinking of fish farmers. The importance of family and running the business also has a positive correlation [30]. The attractiveness of the fish farming business for the farmers counts on several factors. However, business related challenges can be distinguished in Table 5.

Table 5: Business related challenges encountered by fish farmers

| Business related challenges | Reference |
|--|-----------|
| Fish farming as a business is unattractive | [31] |
| Lack of expected result from fish culture | [9] |
| Lack of knowledge of social awareness on benefits of fish farming | [9] |
| Business, and from fish farming, nothing beyond livelihood is accomplished | |

(f)Market Related Challenges

The fish farmers face a challenge of lacking potential market. The fish farmers engaged in farming since long time period may have steady customers and may not consider access to market as a problem [22]. Decline in selling price of fish is also another issue regarding market related challenges. Therefore, they sell their harvest at lower prices. Obtaining low sales prices and lacking profits could affects business situation and make it even harder to implement sustainable fish farming. Inadequate infrastructure is also a market related challenge for fish farmers. Inadequate infrastructures include lack of good access roads to farm sites and electricity. The situation of unstable power supply adversely affects the rate of water supply to ponds. Therefore, fish farmers turn to the use of power generating sets, which increase their cost of production. The market related challenges can be highlighted in Table 6.

Table 6: Market related challenges encountered by fish farmers

| Market related challenges | Reference |
|--|-----------|
| Inaccessibility of fish market infrastructure | [9] |
| Low pricing of harvested fish | [18] |
| Fish farmer's inaccessibility to the fish market in some countries | [32] |
| Improper distribution channel | [8] |
| Exploitation by middlemen | [9] |
| Difficulty and cost in transporting fish for sale to distant markets where price of fish is higher | [9] |
| Lack of qualitative storage and carriage facility to the market | [8] |

The lack of potential market has a significant influence on attaining product sustainability. Without fish markets, fish farmers will find it difficult to sell their products. Fish products have limited shelf life and the longer it takes to sell the products, the greater the deterioration and decomposition of the fish [22].

(g)Regulatory and Policy Challenges

Inadequate support and training by the government has a detrimental effect in fish farming [18, 33]. Government has the power to establish policies to support fish farmers. Fish farmers also depends on the government to provide them with training on sustainable aquaculture and other subsidies.

(h)Climatic challenge

The problems of climate change are global, yet Africa is likely to suffer a disproportionate degree compared with other regions. For the aquaculture sector, climate change has had many negative impacts, emerging from direct or

indirect impacts on the cultured organisms (fish—natural food) or the resources required for aquaculture (water, land, seeds, feed, and energy). Changes in temperature and rainfall patterns alter water quality parameters such as pH, salinity, and oxygen, which are expected to impact reproduction, growth, survival, and pond productivity. Furthermore, climate change increases physiological stress, which result in increased disease vulnerability, as well as higher risks and lower returns for farmers [34].

The various challenges and constraints affecting aquaculture and general fishing sub-sectors are almost similar and to a large extent can be addressed by purposeful government policies and programs. These programs and policies must give emphasis on aquaculture and fishery systems that chain out higher production quantities and areas where more people are involved in.

4. Conclusion and Recommendations

4.1 Conclusion

Fish farming is one of the fastest growing industry around the world which plays a positive role in livelihood, employment and economic development. However, this sector is facing many challenges including financial, technical, regulatory, ecological, production related, business related, market related and climatic challenges. These challenges lead to the decrease in the progress of fish farming and hence are required to be addressed in order to achieve sustainable development of fish farming.

4.2 Recommendations

The following recommendations were made for fish farmers in order to manage some of the challenges highlighted:

- Further research should be carried out to identify fish feed ingredients available locally that can be used to produce fish feed instead of importing expensive fish feed.
- Skilled aquaculture extension service agents should be employed and oriented for each agricultural extension block to improve face-to-face contact between the agents and the fish farmers.
- Fish farmers should be motivated through agricultural extension agents to join farmers' associations to strengthen their access to relevant agricultural information and resources.
- The government and other actors in the agricultural sector should help farmers by easing their access to credit facilities which can assist them to adopt a wide range of fish production technologies
- Fish farmers should strictly adhere to the standardized management practices required for an efficient fish production venture. This standardized management practices involve cleaning of the fish pond, clearing weed of the fish pond environment, protecting the fish pond against the predators, controlling water quality of the fish pond, prevention and control of disease, applying pond fertilization, carrying out liming, providing qualitative feed for feeding, sorting out of fish to prevent cannibalism and growth monitoring.
- Fish farmers should stock their ponds based on the pond's carrying capacity, because stocking more or

lesser than the ponds carrying capacity will not precipitate returns of their investment.

- Fish processing via the use of refrigeration, salting, drying and smoking should be encouraged among the fish farmers so as to increase the shelf life of the fish. This will aid in saving extra money that would have been used to feed the fish beyond their required rearing period.
- Feeding guideline should be maintained by fish farmers for their fish at the same time and at stipulated places in the pond.

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