

## **NIGERIA'S MONO-CULTURAL ECONOMY AND THE AFRICAN CATFISH AQUACULTURE INDUSTRY**

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### **Abstract**

*Crude oil was discovered in Oloibiri, Bayelsa State, Nigeria in 1956. This paper provides that oil at the period of discovery was not lucrative until the Arab-Israeli war of 1973 otherwise known as the Yom Kippur war which was characterized by Arab states boycotting oil supplies to the western world who were allies of Israel. It was the period from 1973-1983 that witnessed a boom which was the most luring temptation Nigeria was faced with and which she gradually fell into. Since the oil-boom period, Nigeria's economy tended towards a mono-cultural direction where other sectors of the economy were abandoned for just one single sector giving Nigeria's economy another alias "mono-product" economy. This paper employed the key informant interview as the method for sourcing primary data from the African catfish aquaculture field and also engaged content analysis for data derived from secondary sources. Comparative Advantage theory is the theoretical framework used in explaining this research. The paper concludes by suggesting the African catfish aquaculture industry as a viable contribution to the diversification of the economy based on its lucrative potentials of earning foreign exchange and providing massive employment for the teeming unemployed population in Nigeria.*

**Keywords:** African catfish, aquaculture, economy, mono-cultural

### **INTRODUCTION**

Nigeria's major economic woes are rooted in the discovery of crude oil in Oloibiri on the 15<sup>th</sup> of January, 1956 after a long period of exploration. The Yom Kippur war, otherwise known as the Arab-Israeli war or October war of 1973 was characterized by a massive boom of oil price in the global market when the Arabs boycotted oil supplies from the Western states because of their support for Israel (Clark, 2016). Due to this fact, Nigeria who was now an oil producing country concentrated her forces solely on the exploitation of this commodity. Other sectors that once created wealth, employment and a good standard of living for the average Nigerian were abandoned. At this point in Nigeria, her economy tended towards a mono-cultural direction as oil now became the mainstay of the economy with the export revenue accruing to over 90% and 80% of the government's budget (Anyaehe & Areji, 2015). Of course, not everyone had the opportunity to work in the oil sector which further made millions of able bodied Nigerians

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jobless as non-oil sectors of the economy were abandoned and redundant. Nigerian leaders during the oil boom period were short-sighted and could not imagine a time will come when oil price will collapse. Now that oil price has collapsed globally, USA, a major consumer of Nigeria's crude oil has stopped purchasing from Nigeria since 2014 due to the discovery of shale oil and natural gas in commercial quantity which serves as a better substitute for Nigeria's crude oil since it is cheaper and also due to the fact that they have a reserve of oil which is believed to last them nearly a hundred years (Obama, 2012). This reflects trouble for the mono-product Nigerian economy and in solving this problem, recommendations of diversifying the economy is made (Olaleye *et al.*, 2013). Various scholars have made different recommendations but this research introduces a somewhat different approach by contributing an underestimated commodity which can help diversify and save the ailing economy from the recession it suffers today. The African Catfish is the most popular species of Nigeria's aquatic life. An average fish farmer prefers to stock African Catfish due to its ruggedness, high mortality rate and the increased and consistent demand for it (InterAfrican Bureau for Animal Resources, 2015). Also, the African Catfish is a cheap source of protein which is needed by everyone in order to function optimally. The reality of its consumption in various ways of preparation is also an added advantage to why African Catfish is preferred to other species. The African Catfish could be boiled and seasoned, it could be grilled and it could also be dried for the sake of preservation and exportation. It takes a collective effort in ensuring the diversification of Nigeria's economy. Every development proponent has a role to play. Most proponents of development economics are of the view that the way out of Nigeria's mono-cultural economy is to refocus on the non-oil commodities but never suggests a major one. This paper suggests a non-oil commodity, the African catfish as a lucrative and viable commodity with the potential and capability of contributing to the diversification of the mono-cultural economy of Nigeria based on the facts that it is the most demanded species of the aquaculture industry and its potential to earn foreign exchange since Nigerians in the diaspora crave for it.

#### **A BRIEF REVIEW OF RELATED WORKS**

The current position of the Nigerian economy is mostly blamed on the oil boom factor between the period of 1973 to 1983 based on a consensus in literature but it is also important to observe a different view of one Ammani (2011) whose work statistically proves that there was a significant increase in the capital expenditure allocated to the agriculture sector during the oil boom period. His study also finds out that more capital expenditure was allocated to the agriculture sector than in any other sector of the economy at that period (Ammani, 2011). The questions to ask are what then happened to the agriculture sector that boomed prior to the oil boom era? And if according to Ammani, funds were disbursed to this sector, what then happened to the funds? There is only one simple and straight forward answer to the questions- the funds allocated were mismanaged due to a distraction by the oil boom period. The revenue the oil sector was generating was enough temptation for the federal government to overlook the misappropriation of funds

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disbursed to the agriculture sector hence, the agriculture sector was abandoned whether huge funds were disbursed or not.

The aquaculture industry is an arm of the agriculture sector. According to literature, the existence of the African catfish dates back many centuries but no actual date of its origin is recorded. Although, its first domestication trial was in the 1950's with various experimentations over the years until the 1970's which ushered in the African catfish as the most desirable aquaculture species particularly in Central and Western Africa (Inter African Bureau For Animal Resources, 2015).

In the words of Kofi Annan,

Aquaculture offers an increasingly attractive solution to meeting food needs. Aquaculture is already the fastest growing animal food producing sector, but the potential for further expansion is great. I do not ask you to change direction but I ask you to accelerate progress (Annan, 2012).

These words of Kofi Annan signify the importance of the aquaculture sector to the Nigerian economy and can be validated by the research of Fakoya, *et al.* (2015) that resulted in the findings that aquaculture is the only viable option to guarantee food security and generate a chain of multipliers effects on the Nigerian economy and other countries in the Sub-saharan Region (SSR). Adewumi and Olaleye (2011) provide that "the story of aquaculture in Nigeria is essentially the story of catfish culture and the hope of fish supply in Nigeria hangs on its development and culture" however; the potential of this sector has not been fully exploited. This therefore calls for the Nigerian government to look into this sector because of its lucrative tendencies in generating immense wealth and also contributing to the diversification of the mono-cultural economy of Nigeria which can also address the challenge of unemployment. Since Nigeria has a population advantage and her high demand for fish positions her on the path of a strong market compared to other African countries (Miller & Atanda, 2011). This indeed proves the fact that she is the leading producer of fish in Africa which has a whole lot of untapped potentials which her economy could abundantly benefit from (Adewumi & Olaleye, 2011). To further prove the lucrative benefit of the aquaculture sector,

It is reported that 30 per cent of new investments in agriculture programmes are in fish farming with bankers now more informed and willing to consider loans in this sub-sector. With high demand for fresh fish and consumer preference for fresh water catfish (*Clarias gariepinus*), the Nigerian private sector launched fish farming in earnest around 2000, with the rehabilitation of many abandoned fish farms and new investments in others. By 2003, a nation-wide inventory totalled 2,642 fish farms (Miller, 2003; AIFP, 2004; Brummett, 2007) with annual production estimated at some 30,000mt by the Federal Department of Fisheries (FDF, 2007). Increased market demand has dramatically impacted annual



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production which has now reached some 120,000mt annually, whereas tilapia production is less than 5,000mt per year (Miller & Atanda, 2011).

Based on the above citation, it can be deduced that the African Catfish has more market value than other species of fish due to its high demand. This next citation also proves this fact coupled with the pioneering innovations Nigeria has displayed in the past. Miller and Atanda (2011) further record that-

The Nigerian experience is a useful study, as it brings into focus several innovative 'firsts' in African aquaculture development. Responsibility for these innovations was primarily attributable to the awakening of a range of private sector agents, the strong consumer preference for catfish and the consequent market opportunity. Much pond infrastructure had already existed and was relatively easily put into production, moving from subsistence low-input tilapia culture to more intensive and commercialized catfish farming (Miller & Atanda, 2011).

Again, the economic advantage of Catfish over tilapia is reflected in the above citation. The essentiality of fish has informed its lucrativeness in that it serves as a vital source of food, income, employment, and even as recreation for people around the world. It also serves as a good source for protein for both man and animals in developed and developing economies. Studies have shown that in Nigeria, the current demand for fish is about four times the level of local production thus, reflecting the underperformance of this sector. Research also finds out that Humans consume approximately 80 percent of fish as food while the remaining 20 percent goes into the manufacturing of products such as fish oil, fertilizers, and animal food. Fisheries and aquaculture are an integral part of agriculture which have been found to have positive effect on the country's GDP and has the potential to solve unemployment woes provided it is optimally managed (Ozigbo *et al.*, 2014).

Graaf and Janssen (1996) cited in Okechi (2004) talk about the possibility of a year round supply of African catfish. That is, due to artificial reproduction, there is the tendency of a consistent availability. Okechi also lists certain benefits of this aquatic species. In his words:

In the culture of this species artificial reproduction ensures a year-round supply of fish seed. The African catfish is relatively insensitive to disease and does not have high water quality requirements. It tolerates high concentrations in the water of ammonia (NH<sub>3</sub>) and nitrite (NO<sub>2</sub>). Low oxygen concentrations are tolerated because the fish utilizes atmospheric as well as dissolved oxygen, (well developed air breathing organs). It grows fast and feeds on a large variety of agriculture by products (cited in Okechi, 2004).



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Based on these benefits, the African catfish is on a higher demand compared to other aquatic species. These facts have contributed to its lucrateness. A study by FAO (2003) on the UK market for West African smoked catfish from Nigeria and other traditional exporting fishery countries show that majority of smoked fish are sold to consumers through Afro-Caribbean grocery shops and Afro-Caribbean restaurants in London. It was also found that some of these importers have their own grocery shops. FAO further records that retailers of the smoked fish are concentrated in certain areas of London such as Brixton, Peckham, Dalston in the south and Finsbury Park in the north. It was observed that six retailers own groceries in Brixton Market alone, four run by Nigerians, one by Ghanaians and one by Sierra Leoneans (FAO, 2003). These pieces of information about the aquaculture, particularly the African catfish suggests the potential benefits which if can be exploited by the Nigerian government will benefit the economy and deliver it from the pangs of mono-culture. Also, it is observed that most exporters of African catfish are in the private sector. The government should endeavor to put measures in place by providing incentives such as funds in order to increase the scale of exportation. As in the words of Adewumi (2015), "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".

### **Theoretical Framework**

The framework of analysis is based on the theory of Comparative Advantage which was propounded by David Ricardo in 1817 as a counter to Adam Smith's theory of Absolute advantage. Since this theory talks about the ability of a country to produce those products in which it has a low marginal cost or opportunity cost compared to other countries. This theory was preferred to the theory of Absolute advantage since a country could have more than one commodity in which it has an absolute advantage over other countries it is in trade relations with. Adam Smith's argument was based on one commodity in which a state has high efficiency in producing while Ricardo's theory of comparative advantage answers the question - 'what if that country has more than one commodity in which it has high efficiency in producing?' And since Nigeria potentially has the ability to efficiently produce African catfish amidst other commodities as against her African counterparts, this is solely the reason why this theory was picked in explaining this work (Maneschi, 1998). As old as this theory is, it is the most popular in International trade literature and despite scholarly critic as against its benefits, contemporary scholars like development economist Ha-Joon Chang supports and embraces the idea that every country benefits from free trade and in his work, *Bad Samaritans*, According to Chang (2007),

Ricardo's theory is absolutely right- within its narrow confines. His theory correctly says that, accepting their current levels of technology as given, it is better for countries to specialize in things that they are relatively better at. One cannot argue with that. His theory fails when a country wants to acquire more advanced technologies- that is, when it wants to develop its economy. It takes time and experience to absorb new technologies, so technologically backward

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producers need a period of protection from international competition during this period of learning. Such protection is costly, because the country is giving up the chance to import better and cheaper products. However, it is a price that has to be paid if it wants to develop advanced industries. Ricardo's theory is, thus seen, for those who accept the status quo but not for those who want to change it. (Chang, 2007, p. 30-31)

### **METHODOLOGY**

The area of study for the research is Ondo west local government, Ondo, Ondo state. The research adopted two methods in sourcing for data. Both the Primary and Secondary methods were utilized. The primary method used in sourcing for data is the key informant interview. This is because the primary method of data collection is perceived to have a high degree of reliability in social science (Olorunfemi, 2004 cited in Folarin, 2010). Three key players of the African catfish aquaculture were interviewed based on their experience and vast knowledge in the field of African catfish aquaculture.

A purposive sampling technique was adopted in that five out of the twenty two ponds in the research area were picked for study based on consistency and functionality.

The secondary sources for this work include: internet materials such as online journals, related articles, existing literature, library materials and published thesis.

### **ANALYSIS AND RESULTS**

The main objective of this paper is to recommend the African catfish as a valuable commodity which can contribute to the diversification of Nigeria's mono-cultural economy. But first, it is paramount to prove its viability and its potential capability of contributing to economy diversification. The proofs of its viability are evident in the results and analysis gathered from the field work below.

**Table 1 shows the number and gender of interviewees**

<b>Interviewee(s)</b>	<b>Gender</b>
<b>1</b>	<b>Female</b>
<b>2</b>	<b>Male</b>

Three players in the field of African catfish aquaculture were interviewed based on their experiences and vast knowledge about the African catfish aquaculture industry. Pieces of information were gathered via a one-on-one interview with the informants. Observations were also made for the period of two weeks on the field of study.

Secondary information was also gathered from five articles which corroborate with the first-hand information gathered from the field of study.



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**Demand for African Catfish**

**Table 2 shows the quantity of African catfish sold at each farm under study**

Farm	Quantity sold (kg)	Amount (₦)
A	3500	2,275,000
B	7000	4,550,000
C	4700	3,055,000
D	2007	1,304,550
E	9800	6,370,000

Source: Field survey, April, 2017.

It was gathered that the African catfish has the potential of positively influencing economic growth based on observations made from cropping (harvesting) from 5 African catfish farms in Ondo west local government, Ondo State. The observations made it clear that domestic demand for this commodity is high as consumers and retailers were present to purchase in large number. The first farm sold product weighing 3500 kg, the second farm sold product weighing 7000 kg, the third 4700 kg, the fourth 2007 kg and the fifth pond sold 9800 kg. All sold at the same price of 650 Naira per kilogram. The number of the buyers was astounding and makes one wonder the experiences of other farms around the country. The demand of this product is on the increase. This has informed the decision of fish farmers to stock more African catfish than other species. This experience can be triangulated by the statement according to the Fishsite (2012) that “catfish farming in Nigeria is an untapped goldmine based on the fact that there is an ever increasing need for it as the best alternative to meet the protein need of the people” (FishSite, 2012).

Based on the imperative that export is possible only when a commodity has met the domestic need and spillovers are expected to be exchanged for foreign currencies, with the activity experienced at the 5 African catfish farms and the corroborative statement by Fishsite, it is deduced that if the African catfish aquaculture sector is given the due attention, it will pass for export excellently since the demand is high and definitely can lead to a spill over if enough investment is pumped into this sector.

Furthermore, re-iterating the fact that the experience and information gathered from the field indicates a high demand for this product, this fact is corroborated in journal articles such as FishSite (2012) that says “Fish farming in Nigeria is currently a very lucrative business and it is mainly boosted by the continuous rise in the demand for catfish” (FishSite, 2012). Adewumi (2015) also provides that, with Nigeria being highly populated, her citizens as at the end of 2012 had a projected fish demand of 2.66 million tonnes of Catfish (Adewumi, 2015). Although, an interviewee, Tunde Sanni attests to the fact that there is a high demand for African catfish, but domestic production has not been able to meet this demand. This information is corroborated by

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a statement made by the national president of Catfish Farmers Association of Nigeria (CAFAN), Mr Tayo Akingbolagun that the aquaculture potential in Nigeria is estimated at four million metric tonnes annually as against the expected 2.66 million tonnes (Osehobo, 2015).

**Table 3 shows an average of each interviewee's export annually**

Interviewee	Quantity exported annually (metric tonnes)
Tunde Sanni	11.7
Deacon Omoboni	7.3
Madam Pat	8.75

Source: Interview, April, 2017.

Tunde Sanni further provided information based on the quantity his farm exports annually. As of the time of the interview, he said he had exported a sum of 60kg smoked catfish in the last 4 weeks. He further said that the quantity export at the moment is unstable. Although, in the past years, the total quantity of African catfish export he made ranged between 10.4 metric tonnes to 13 metric tonnes. This simply implies that on an average, he sells about 225 kg on a weekly basis. Deacon Omoboni who has stopped exportation based on the hike in prices of materials needed to set exportation in motion, ranging from the fish feed, to acquiring fingerlings or juveniles, and also the transportation cost provides an estimate of his past annual exports which ranged from 7 metric tonnes to 7.6 metric tonnes. This implies that he sells an average of about 140 kg per week. Madam Pat., the all-round catfish business woman who is involved in the production of seeds, production of local catfish feed, breeding of catfish, smoking and export provides that on an average, she exports about 8.5-9 metric tonnes per year. This indicates that she exports about 168 kg on weekly basis before halting export to study the market based on foreign exchange fluctuation.

From the above information, all indication point to the fact that the African catfish has a high demand not just domestically, but internationally. Corroborating this fact with an information accessed in an article in a periodical that:

The huge trade in smoked fish is a consequence of the growing demand by the increasing number of Africans living in the Diaspora. The U.S. and Europe remain the major destinations for Africans, who venture abroad (Olumide, 2016).

Also, as provided by Foundations for Partnership Initiatives in the Niger Delta (2011), Aquaculture in Nigeria is expanding rapidly, from 16,119 metric ton in 1995 to 25,720 metric tons in year 2000 and 85,087 metric tons in 2007. It further increased to 152, 796 metric tons in 2009. Aquaculture has great potential for growth and for employment in the Niger Delta region. Catfish is the major product from aquaculture and accounts for over 90% of fish cultivation.... The demand for fish is increasing at an annual rate of 3% and current demand nationwide is about 2 million tons while present supply is about 1.5 million tons. (Foundation for Partnership Initiatives in the Niger Delta, 2011).





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Taking the area of study above as a case study for Nigeria, it can be analysed that there is a high demand of African catfish and the content provided above reflects the potential of the African catfish sector in that it is the major produce in the aquaculture industry accounting for more than 90% and the fact that it has the tendency of tackling unemployment in the country. This sector is indeed a lucrative one and can most definitely contribute to the diversification of the Nigerian economy. In the words of Eboh (2015),

At independence in 1960, agricultural commodities accounted for up to 83% of export revenue. But, since 1974, agricultural commodities have declined to below 5% of export revenue. The decline did not come from desirable structural transformation of the export sector. Rather, it reflects the decline in the international competitiveness of agricultural exports brought about by the neglect, consequent to the dramatic earnings from crude oil (Eboh, 2015). These words reflect the nature of the Nigerian economy which has a lot of negative implications.

### **Economic Implications of a Mono-cultural economy**

A mono-cultural economy is one characterized by generating a large chunk of revenue from just one source of export. An epitome of such case is Nigeria that got infested by the Dutch disease from 1973 where she gradually abandoned other sectors of her economy and tended towards a mono-product economy where a huge part of her revenue is generated from only one source at the expense of other potentially valuable sources. Export trade in Nigeria is majorly characterized by one commodity (crude oil) which is responsible for about 90% of the revenue generated by the FGN. This puts the economy of the country in a potential state of quagmire in that, what if crude oil prices collapse in the global market? And what if Nigeria's major customers of crude oil desist from purchasing from her? This of course will put the economy of the country in an ailing state bringing about negative implications discussed below.

**Recession:** A recession simply refers to the event that has an adverse impact on individual's economic well-being (Lee & Shields, 2011). Recession is imminent in a mono-cultural economy in that when the commodity heavily dependent on fails or its price crashes, there are no alternative commodities to play the redeemer role, therefore bringing about an economic crunch. From the definition of Lee and Shields (2011), it is observed that everyone citizen of the country practicing a mono-cultural economy stands to be affected. This is the exact reason why everyone in Nigeria complains and blames the government for running a mono-cultural economy.

**Salary Debts:** In the case of Nigeria, since the 3 tiers of government are heavily dependent on revenue generated from the mono-product, in the case where the product fails or the price collapses, there will not be enough funds to pay government workers. This fact is corroborated by the statement of the Director-General, Lagos Chambers of Commerce and Industry, Muda Yusuf that:

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majority of the states in Nigeria are over 70 per cent dependent on statutory allocations which makes the impact of declining oil price very profound, adding that this is even more so when the culture of big and profligate spending has been entrenched (Shosanya, 2014).

**Exchange Rate Fluctuation:** Since exchange rate is dependent on demand and supply of exports, and Nigeria's major export is crude oil, all indications point to the fact that a decline in the price of this commodity will affect FOREX. Thus, the rate of Naira to Dollar will slump, depreciate or plunge.

**Unemployment:** The case of unemployment is in two folds. The first fold points at the fact that since the country tilts toward an industry and abandons other sectors of the economy, while some are opportune to work in oil companies, others either manage in the private sector or are unemployed and secondly, in a case of oil price collapse, foreign oil companies in the country fold up, thereby leading to a massive job loss.

According to Tunde Sanni, an interviewee, he stated categorically that the mono-cultural nature of the economy can only be tackled by an economy diversification. And that the African Catfish aquaculture is a lucrative venture that can contribute to diversifying the mono-cultural Nigerian economy (Sanni, 2017). This information provided by Tunde Sanni can be triangulated by the statement made by Punam Chuhan-Pole, a World bank lead economist that "export will be affected unless efforts are made to improve production in other sectors" (Vanguard, 2013). Thus, improving production in the African Catfish aquaculture sector is a good idea since this sector of the economy is lucrative and has potentials of bringing about economic growth and development. And has believed by African catfish farmers, this industry can save the ailing economy of the country. This can be corroborated by the words of Adewumi (2015) who says that:

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 product (Adewumi, 2015).

### **Inception of the African catfish aquaculture in Nigeria**

It is recorded in literature that the existence of the African catfish dates back many centuries but no actual date of its origin is recorded. Although, its first domestication trial was in the 1950's with various experimentations over the years until the 1970's which ushered in the African catfish as the most desirable aquaculture species particularly in Central and Western Africa (Inter African Bureau For Animal Resources, 2015). 40 African catfish gotten from the wild waters of Central African Republic served as the first brood stock that were introduced to Europe in 1976.

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In 1985, the commercial farming of this species commenced in the process known as the recirculation aquaculture systems (RAS) which simply means the transfer of an aquaculture commodity to an artificial habitat mostly enclosed like the aquaria. Later on, brood stocks from Israel and South Africa were introduced to Europe. They were crossed to produce fingerlings which resulted in the present cultured “Dutch species” African catfish (Roosendaal, 2012). By analyzing the content above, it is apparent that African catfish as the name implies originated from Africa and was introduced to the world. This simply means that wherever catfish is found on earth, it has its origin from the African waters.

### **Governmental Projects pertaining to African catfish Aquaculture**

Deacon Omoboni, one of the interviewee stated that the Nigerian government took advantage of the catfish boom period by implementing policies of assistance to the catfish aquaculture industry (Deacon Omoboni, 2017). This information is corroborated with that of Anetekhai (2013) who states that: “Catfish Farming was dominated by Government and its agencies (State and Federal) with direct involvement in Catfish production.” The government provided technical assistance in the construction of fish ponds and provided both fingerlings and feeds. Demonstration farms were established by the government between the period of 1971 and 1981. These farms were situated in the South-West and in the South-East. Ibadan and Akure enjoyed the benefit of hosting it in the South-West while Okigwe in Imo state, Itu in AkwaIbom and Opopo in Rivers state were privileged to host it in the South-East.

A four zonal seed production and training centers were also established by the government. These were in Oyo (South-West), Okigwe (South-East) Panyam (North- East) and Mando-Kaduna (North-West) between the period of 1978 and 1980.

The aforementioned projects were collaboratively sponsored by the Federal Department of Fisheries and the UNDP. According to Anetekhai (2013), The UNDP contribution was derived from the Freshwater Fish Farming Development and Demonstration Project- UNDP/FAO /79/059. In addition, the federal government with the help of FAO established the African Regional Aquaculture Centre (ARAC) at Aluu, Port Harcourt which was charged with the responsibility of providing research support and training for aquaculture development in Sub-Saharan Africa.

Also, the River Basin Development Authorities (RBDA) were established and charged with the responsibility of running commercial Catfish Farms and the function of proving the commercial value of aquaculture in Nigeria. These farms were successful at inception based on the fact that the expertise of expatriates was utilized and funding came from external sources.

Anetekhai (2013) further reveals that the period from 1981 to 1991 sparked the interest of both private sector and state government to engage in the activities of aquaculture based on the immense dividend the sector yielded. However, the period between 1991 and 2001 experienced a

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drastic decline in the assistance of the Nigerian government in that the government started viewing aquaculture as a business concern. Animal husbandry, crop production and other sub-sectors of agriculture were also viewed in the same vein. Thus, this sector started yielding marginal success of Government Farms. This is reflected in the Agricultural Development Programs (ADP) championed in most of the States despite the huge support provided by the World Bank. In contemporary Nigeria today, the case is that while Government provides enabling environment such as signing treaties, the private sector is charged with commercial production (Anetekhai, 2013).

### **Viability of African catfish**

The Cambridge dictionary defines viability as “the ability to work as intended or to succeed” (Cambridge Advance Learner's dictionary, 2017). Therefore, the ability for the African catfish to succeed under harsh conditions unlike other aquatic species makes it preferable for cultivation by the farmers in that it is a rugged aquatic species. Information retrieved from the area of study provides that the African catfish can also serve as a police fish in that it is used to control other aquaculture species. For instance, in a pond that has numerous tilapia fish, the population of this tilapia can be controlled by introducing African catfish into the pond. It is obtained that the African catfish feeds on the tilapia. Thus, drastically reducing its population in the pond. One of the African catfish pond under study had a pond that cultivated strictly tilapia but due to the drop in demand for tilapia, they switched to the cultivation of African catfish based on high demand but before the pond could be used to cultivate African catfish (fingerlings), Big African cat fish were introduced to feed on the remaining tilapia in this pond. This process saved money for de-mudding the pond and at the same time, it provided food for this big African catfish. Although, it is obtained that there are certain chemicals one could apply to kill the unwanted tilapia such as phostoxin but the process of applying big African catfish as predators reflects a striking characteristic of this aquatic species. Also, viability refers to the commercial success of this venture. As of the time of study, the local price of the smoke size catfish is 650 Naira per kilogram while the price of the table size catfish is 1,000 Naira. In the international market, that is when exported, the smoked catfish is \$3.5 USD per kilogram. When converted to Naira as of the rate in the study period, a kilogram of catfish in the international market is 1,225 Naira as against the local price of 650 Naira. This calculation proves the viability of African catfish when exported. Also, taking into consideration the profitability in the local market, an African catfish farmer buys fingerlings for 5 Naira, let's assume he buys 5000 kg at 25,000 Naira and spends 100,000 Naira on feeding until the time of cropping. All things being equal, he sells the 5000 kg at 650 Naira per Kg and makes 3,250,000 Naira. If we deduct the 100,000 Naira spent on feeding until the time of cropping (harvesting), the farmer is left with 3,150,000 Naira (all things being equal) as against the 25,000 Naira initial capital. This is just a rough estimate but it reflects the viability and the profitability of the African catfish venture in Nigeria.

### **African Catfish Cultivation**

The African catfish cultivation involves the process from procreation or producing seed to stocking in a prepared pond and from feeding to the point of cropping or harvesting. Some



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catfish farms produce their products themselves while others buy from those who produce fingerlings. The first stage of the hatching result is known as the fry stage where brownish tiny particle-looking-like products are seen moving at the base of the hatchery can. The second stage of the product is referred to as the fingerling which takes about 3-4 weeks from the stage of the fry. From this stage, sales could be made. Some farmers prefer to buy fingerlings so they could feed them to their taste and to see if the products are good while other farmers prefer going for the third level known as juvenile. Most catfish business people go for juvenile simply because it is reasonably bigger than the fingerling and most believe that they will save more on feeding if they purchase the juvenile. According to Adewumi and Olaleye (2011), "In Nigeria, the minimum fish fingerling requirement is 4.3 billion while the total fingerling supply from all sources is 55.8 million" (Adewumi & Olaleye, 2011). This points at the inefficiency toward the aquaculture sector in Nigeria despite the huge potential.

#### **African Catfish Feed**

There are various types of African catfish feed. Most of these feeds are imported. That is, they are produced abroad. However, there have been various locally made feed companies springing forth particularly for the sole purpose of circumventing the hike in price of these foreign feeds based on the current unfavorable exchange rate. Although, the difference between the local feed and the foreign feed is glaring in that the local feed sinks into the pond while the foreign feed floats on the pond. This signifies a disadvantage and an advantage. The disadvantage is due to the fact that the local feed sinks. African catfish sometimes do not respond to feeding but when they do later, the feed that was initially served won't be accessible due to sinking, unlike the foreign feed with the advantage of being able to float on water. It should be of note that the African catfish feed varies in size. The fingerling feeds on 0.5 mm while the juvenile feeds on 1-2 mm and the moderately medium sized catfish feeds on 3 mm and above. It is obtained that the 0.5 mm is the most nutritious feed. Thus, the feed with the highest price tag.

#### **Economy of African Catfish**

The African catfish aquaculture is a lucrative venture. From what was obtained from an African catfish farmer in the field, what you feed your fish is what you get. That is, the weight of the fish is determined by the amount of feed the farmer provides the catfish. For instance, if a catfish farmer feeds his catfish with a 100 kg of feed, it automatically converts to the weight of the catfish giving it an additional 100 kg. This simply implies that the African catfish aquaculture venture is a business of weight. Therefore pointing to the economics of the African catfish that is, what you put in is what you get back; *ceteris paribus* (provided everything works out as planned) plus the immense potential profit as explained under the viability of African catfish. Also, the fact that money could be made from the numerous platforms the African catfish provides. Such as from the fingerling platform which is currently sold at 5 Naira during the time of this study and the juvenile sold at 10-12 Naira. From the field work, it was observed that certain fish farmers are not interested in stocking ponds, feeding for some time and then cropping. These farmers are concerned with the production of catfish and the sales of fingerlings and juvenile. Also, there is what is known as brood stock. Brood stock refers to very matured



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male and female African catfish usually more than a year old, they could be a year old. These mature African catfish are used for the production of fingerlings. I was opportune to experience a hatching process. It was observed that the male brood stock usually is sacrificed during this process as what is called the “milt” is cut out and spread on the eggs gotten from the mature female. The process of squeezing out eggs from the mature female is known as “spawning”. As at the time of this research, a good brood stock will go for 8000 Naira- this is also a lucrative platform. Another platform entails the process of stocking, feeding then cropping which is the most common commercial platform. This platform provides two sub-platforms. The first is the sale of smoke fish. This process involves feeding for 2-3 months then sales are made to those women who smoke them then sell (another platform). Then the final platform involves feeding the catfish for about 4-5 months for the sole purpose of selling as table size. The table size buyers are those who are known for making “pepper soup”. The African catfish provides various lucrative platforms and if exploited well, the returns will be alarming.

According to the Federal department of Fishery, a projection is made for the population and demand of this commodity, particularly the African catfish from 2010- 2025

**Table 4.** Projected population and fish demand 2017 to 2025

Year	Population (million)	Fish demand (million tonnes)
2017	198.0	3.65
2018	204.3	3.76
2019	210.9	3.88
2020	217.6	4.01
2021	224.6	4.13
2022	231.7	4.27
2023	239.2	4.40
2024	246.8	4.54
2025	254.7	4.69

Source: FDF, 2007 in (Adewumi & Olaleye, 2011)

From the above table, it is deduced that the demand for this commodity is on the rise every year. The study finds out that the production of this commodity does not match the demand. That is, the demand for this commodity is higher than the supply. This is because of the shortage in supply of seeds and limited hatcheries around the country. Also, the federal government has jettisoned the African aquaculture industry leaving the private sector as the major dominant of this industry. It is observed that there is little the private sector can do therefore, the call for assistance from the federal government is paramount for this sector to live up to its full potentials.

## RECOMMENDATIONS AND CONCLUSION



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The African catfish aquaculture is recommended as a contribution to diversifying the economy due to its lucrative potentials and viability. The research finds that the increasing demand for this commodity surpasses the supply of the commodity. It also finds that the private sector is the major player in this aquaculture industry as at the time of the research. Although, this sector initially was controlled by the government before the economy of the country tended towards a mono-cultural direction.

It is recommended that FGN should trace its steps back to when it was fully involved in this industry. The private sector needs the corroborative support of the FGN in ensuring the promulgation of effective policies that would help guide the African catfish aquaculture industry to the desired success of meeting the increasing demand thereby leading to spill overs that can be conveniently exported to earn foreign exchange. This industry also has the potential of tackling and solving the problem of unemployment as it can provide employment for a teeming population of unemployed in the country. The following are the recommendations made to ensure a vast exploration of the potentials of this lucrative venture:

1. Federal Government should help resuscitate abandoned Hatcheries and build more hatcheries where seeds can be produced in abundance so as to meet up with the demand of this product.
2. Locally made feeds should be inspired by encouraging already established fish feed mills and also supporting them since it is costly to import and purchase imported feeds.
3. Land should be provided willing African catfish farmers for African catfish cultivation so as to meet the increasing demand.
4. Loans should be granted those fish farmers who are willing to work but do not have any means of financial support.
5. Institutions should be created with the responsibility of controlling and improving the efficiency of the African catfish aquaculture industry.
6. The seriousness of the Federal Government in this industry will attract support from multilateral institutions such as the FAO who had on many occasion supported Agricultural projects in Nigeria.
7. A global market strategy should be launched whereby Nigerian migrants are encouraged to be involved in the diversification process of the economy. This will improve the global market of the African catfish and expand destination market from America and Europe to the rest of the world where Nigerians are found.
8. Firm negotiations and conformity to the laws of WTO is recommended so as to enjoy a hitch free export of this commodity.
9. Consistency is recommended in ensuring that a body is created and charged with the responsibilities of revisiting and revising policies. This body should also be charged with the responsibility of checking lapses and raising alarm where there is short-comings.

In conclusion, from the recommendations, it is observed that they are all channeled to the mercies of the federal government. The little the private sector can do is what they have done so

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far. The government needs to step in like it initially did at the boom period of this industry, take responsibility and ensure the fruition of this sector so as to tap its lucrative potential and also to inspire more contributions from jettisoned sectors in order to achieve a diversified economy and be free from the woes of running a mono-cultural economy.

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