IJASVM

International Journal of Agricultural Sciences and Veterinary Medicine

ISSN : 2320-3730
Vol. 2, No. 4, November 2014

www.ijasvm.com

E-Mail: editorijasvm@gmail.com or editor@ijasvm.com

International Journal of Agricultural Sciences and Veterinary Medicine

ISSN 2320-3730 www.ijasvm.com
Vol. 2, No. 4, November 2014

Research Paper

CONTRIBUTIONS OF FISH FARMING TO POVERTY ALLEVIATION IN NIGERIA

Ochiaka C D[1], Mgbakor M N[1*], Ugwu J N[1] and Okorie A[2]

*Corresponding Author: Mgbakor M N, ✉ miriamngo2000@yahoo.com

Over 840 million people lack adequate access to food and about 25% of these are in sub-Saharan Africa. Fish farming is often cited as one of the means of efficiently increasing food production thereby alleviating poverty. Aquaculture production has intensified throughout many regions of the world including Nigeria. Of the different global food production system, fish farming is generally viewed as an important domestic provider of much needed high-quality animal protein and other essential nutrients, generally at affordable prices to the poorer segments of the community. it is also an important provider of employment opportunities, cash income and valuable foreign exchange. Aquaculture production in Nigeria stands at about 200,535 metric tones per annum representing 24.52% of the total domestic fish production. Nigeria needs about 1.8 to 2.6 million metric tones of fish annually to satisfy her fish demand to meet the 13.2 kg per capital global requirement for fish consumption. Inadequate access to land and water resources, fingerlings, feed, capital, research and human resources development have been cited as constraints for fish farming development. In future, there will continue to be a shift away from traditional fishing as the world continues to experience a paradigm shift in seafood production. Much of the current research in the field of aquaculture is being directed towards making the industry more sustainable and environmentally friendly.

Keywords: Fish, Aquaculture, Food production, Poverty alleviation, Nigeria

INTRODUCTION

One of the key objectives of several nations of the world is the eradication of food insecurity and rural poverty. Several organizations including the Food and Agriculture Organization (FAO), have initiated several programmes like the Special Programme for Food Security (SPFS), the Telefood programme and Special Assistance to countries in the contex of the Technical Cooperation Programme, all aimed at increasing food production and income of the farmers (Central Bank of Nigeria, 1999; Augustsson *et al.*, 2003; Bousquet *et al.*, 2007; and Central Bank of Nigeria, 2010).

[1] Department of Agric. Economics and Extension, Enugu State University of Science and Technology, Enugu.

[2] Department of Agric Economics, Management and Extension, Ebonyi State University, Abakaliki.

FAO (2002) reported that an estimated 840 million people lack adequate access to food, and about 25% of these are in sub-Saharan Africa. Given this scenario, it is therefore pertinent to provide the poor and hungry with low cost and readily available strategy to increase food production using less and per capita and less water without further damage to the environment (FAO, 2001, 2003 and 2010; Inoni, 2010; and http://www.agriculturaits.czu.cz/p). With the specific focus on poverty alleviation broadly accepted and understood in public for a, the challenge is to convert these development principles into practical and reliable strategies for actions. Fish farming cited as one of the means of efficiently increasing food production in food-deficient countries. It is an entry point for reducing poverty and improving rural livelihoods under appropriate circumstances (Tobor, 1990; Olayemi, 1995; Jamu and Ayinla, 2003; Miller, 2003; Omotoso and Fagbenro, 2005a; and Nair and Connolly, 2008).

In Nigeria, total domestic fish production fluctuated between 467,095 to 817,517 metric tones between 2000 and 2010; while the output of fish farming during this period was 25,718 to 200,535 metric tones (FAO, 2010). Fish farming accounted for between 5.51% and 24.52% of the total domestic fish production in Nigeria within this period, while the bulk of production came from artisanal fishing.

Although the outlook of fish production is worrisome given the growing demand for fish and the declining yield of natural fish stocks due to over-exploitation, fish farming still holds the greatest potentials to rapidly boost domestic animal protein supply in Nigeria. According to (Tobor, 1990; William, 1996; and Walter *et al.*, 2005), there are about 1.75 million hectares of suitable land for aquaculture in Nigeria and 25% of this will yield 656,820 tonnes of fish per year when placed under cultivation.

Table 1: Domestic Fish Production in Nigeria by Sectors, 2000-2010 (Metric tones)

Year	Domestic Fish Production	Capture Production	Aquaculture (Fish Farming)
2000	467,095	441,377	25,718
2001	476,544	452,146	24,398
2002	511,719	481,056	30,663
2003	505,839	475,162	30,667
2004	509,201	465,251	43,950
2005	579,537	523,182	56,355
2006	636,901	552,323	84,578
2007	615,507	530,420	85,087
2008	744,575	606,981	143,207
2009	751,006	598,210	152,769
2010	817,516	616,981	200,535
Total	**6,615,440**	**5,737,476**	**877,429**

Source: Federal Department of Fisheries; Fisheries Statistics of Nigeria (2010), FAO Fishery Statistics (2010)

Table 2: Fish Farming as Percentage of Domestic Fish Production, 2000-2010

Year	Fish Farming (metric tones)	Percentage of Domestic Fish Production
2000	25,718	5.51
2001	24,398	5.12
2002	30,663	6.00
2003	30,667	6.06
2004	43,950	8.63
2005	56,355	9.72
2006	84,578	13.28
2007	85,087	13.82
2008	143,207	19.23
2009	152,796	20.34
2010	2000,535	24.52

Source: Federal Department of Fisheries; Fisheries Statistics of Nigeria (2010), FAO Fishery Statistics (2010)

Poverty, according to Central Bank of Nigeria (CBN) (1999), is the state where an individual is

not able to carter adequately for his/her basic needs of food, clothing and shelter; is unable to meet social and economic obligations, lacks gainful employment, skill assets and self-esteem; has limited access to social and economic infrastructure such as education, health, portable water and sanitation as a result has limited chance of advancing his/her welfare to the limit of his/her capabilities.

Although Nigerian's economy is projected to continue growing, poverty is likely to get worse as the gap between the rich and the poor continues to widen. Despite the fact that the Nigerian economy is growing, the proportion of Nigerians living in poverty is increasing every year. Some of the causes of poverty in Nigeria include:

- Inadequate access to employment opportunities;
- Inadequate access to market for the goods and services that the poor can sell;
- Inadequate access to education, health sanitation and water services, and
- Destruction of natural resource endowment, which has led to reduced productivity of agriculture, forestry and fisheries (CBN, 1999).

The World Bank (1996), identification four major measures to increase the income of the poor.

These are:

- Increasing the demand and therefore, the price for those factors of production that the poor own (e.g., their own labour);
- Transferring physical assets such as land to the poor;
- Providing social services such as education to the poor; and
- Transferring current income to the poor through cash or food subsides.

According to Olayemi (1995), there are three approaches to poverty reduction: those that focus on rapid economic growth, those that focus on basic need of the poor, and those that focus on rural development. Applying the United Nation's definition of a poor person in dollar terms, it was revealed that 54.4%t of Nigerians were living below one dollar per day in 2004 but this increased to 61.2% in 2010.

According to the breakdown, the North-West and North-East geo-political zones recorded the highest poverty rate in Nigeria with 77.7% and 76.3% respectively. Thus using the relative, absolute and dollar per day poverty measures, National Bureau of Statistics estimates that poverty may have further risen slightly to about 71.5%, 61.9% and 62.8% respectively in 2011. Even though the country's Gross Domestic Growth (GDP) had grown since then, it had little impact on poverty situation.

Table 3: Population of Poor People in Nigeria (2000 to 2010)

Year	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Population (million)	115.2	118.8	112.4	126.2	129.9	135.5	140.0	140.0	143.4	145.0	112
Percentage	70.0	NA	NA	NA	54.4	54.4	54.4	54.0	54.5	54.5	61.2

Note: NA = Not available.

Source: CBN (2010) draft

FISH FARMING

Aquaculture also known as aquafarming is the farming of aquatic organism including fish, mollusks, crustacean, aquatic plants, crocodiles, alligators, turtle and amphibians. Fish farming is the principal form of aquaculture. Fish farming involves raising fish commercially in tanks or enclosures usually for food. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. The most common fish species raised by fish farms in Nigeria include:

Catfish - *Clarias gariepinus*

Tilapia - *Oreochromis niloticus*

Common carp - *Cyprinus carpio*

Bony tongue - *Heterotis niloticus*

Grass eater - *Distichodus sp*

Moon fish - *Citharimus sp*

Truck fish - *Gymnarchus niloticus*

Tarpon - *Tarpon alanticus*

There are two major fish enterprises in Nigeria namely, fingerling production and table food market production. In fingerling production, operators raise fingerling for sale to commercial fish farmers and wholesalers. While in table food market production, operators grow fingerlings to table market size for restaurants, food stores, farmers and markets, etc. FAO (2003) identified three methods of fish culture these are: Extensive system, semi-intensive system and intensive system.

Extensive system—here operators utilize outdoor facilities such as ponds. These operators generally have low investment cost and are able to utilize natural food and water sources.

Semi-intensive—this system is intermediate between extensive and intensive systems. Operators utilize outdoor facilities such as ponds but fish are feed on supplemental basis.

Intensive system—here operators require more sophisticated management techniques. It is capital intensive and quite demanding in form of labour, facilities and experts because high productivity is the ultimate goal and artificial becomes inevitable.

Contributions of Fish Farming to Poverty Alleviation

Employment

Many persons are employed in fish industry as producers, processors or marketers. Employment in fisheries has grown substantially in the last three decades, with an average rate of increase of 3.6% per year since 1980 (William, 1996; World Bank, 1996; and Walter *et al.*, 2005). It is estimated that in 2009, 44.9 million people were directly engaged, full time or more frequently, part-time in capture fisheries or in fish farming and at least 12% of these were women. The majority of fishers and fish farmers are in

Table 4: Fish Farmers in 2010

Continent	Number of Fishers and Fish Farmers	Percentage of Person
Africa	4,186,606	9.3
Asia	38,438,646	85.5
Europe	640,676	1.4
Latin America/ Caribbean	1,287,335	2.9
North America	336,926	0.7
Oceania	55,796	‘0.1
Total	**44,945,985**	**100.0**

Source: FAO (2010), State of the World Fisheries and Aquaculture

developing countries, mainly in Asia, 85.5% followed by Africa, 9.3%, Latin America and the Caribbean 2.9%, Europe 1.4%, North America 0.7% and Oceania 0.1% (ibid). When people are gainfully employed and poverty is alleviated.

Income Generation

Trade in fish has become is common in Nigeria and other parts of the world and has taken place from time immemorial. Given its cheaper price, fish has become an integral part of Nigerians diet and remain the main product consumed in terms of animal protein. Trade in fish represents a significant source of foreign currency earnings, in addition to the sectors important role in employment, income generation and food security.

Table 5: Nigeria Aquaculture (Fish Farming) Production and Value 2000-2010

Year	Quantity Tonnes	Value (Naira 000)
2000	25,718	4,864,517
2001	24,398	6,079,949
2002	30,663	8,396,578
2003	30,667	9,811,131
2004	43,950	16,171,480
2005	56,355	21,684,656
2006	84,578	31,541,322
2007	85,087	30,094,125
2008	143,207	49,172,400
2009	152,796	73,671,588
2010	200,535	85,440,842
Total	**877,964**	**336,928,5**

Source: FAO Fishery Statistics (2010)

Economic studies have demonstrated that fish farming in Nigeria can be a good source of income. Findings of Omotoso and Fagbenro (2005a) show that fish farming provides cash to a family in addition to supplementing the diet of the farmers. Fish can be an important cash crop even for farmers with limited resource. According to Jamu and Ayinla (2003), the high domestic demand for fish, the stagnation of inland capture fisheries and changing macro-economic environment in most sub-Sahara. Africa implies that investment in aquaculture can be profitable in Nigeria.

Nutrition

Fish is highly nutritious, rich in micronutrients, minerals, essential fatty acids and proteins, and represents a valuable supplement to diet otherwise lacking essential vitamins and minerals. In Nigeria, the average per capital fish consumption may be low, but even in small quantities, fish can have a significant positive impact on improving the quality of dietary protein by complementing the essential amino acids that are often present only in low quantities in vegetable-based diets. It is estimated that contributes about 20 to 30 kilocalories per person per day. The role of aquaculture in fighting hunger and poverty and promoting rural development cannot be overemphasized. In Nigeria, fresh water and coastal fisheries traditionally provide an important source of food and livelihood for millions of people. Nigerians are among the largest fish consumers in West Africa (Miller, 2003) with some 1.4 million tones of fish consumed annually.

Health

Fish oil which is oil derived from the tissue of oily fish is recommended for a healthy diet because it contains omega-3 fatty acids that reduce inflammation throughout the body. Also notable trials showed significant evidence to suggest that the omega-3 fatty acids in fish oil acted as a mood stabilizer, i.e., in treating clinical depression and especially bipolar disorder. Studies by Augustsson *et al.* (2003) report possible anti-cancer effect of n-3 fatty acids found in fish oil (particularly breast, colon and prostate cancer). According to Nair and

Connolly (2008), taking fish oil in any form can help regulate cholesterol in the body. The American Heart Association recommends the consumption of 1 g of fish oil daily, preferably by eating fish, for patients with coronary heart disease. Fish oil help protect the brain from cognitive problems associated with Alzheimer's disease (Walter *et al.*, 2005). Also Omega-3 fatty acids has been found to exhert neuroprotective action in parkinson's disease (Bousquet *et al.*, 2007). A lot of money that would have been spent for treatment is saved or used for other things thus poverty is alleviated.

Industrial Uses

Fish and Marine products are used as medicine, ground into vitamins or processed into cosmetics and perfumes, lubricants, varnishes, soap and margarine (Williams, 1996). Industries process many inferior fish and waste products into glue, livestock feed and fertilizers. Thus people are given the opportunity of going into different types of product manufacture thereby reducing poverty.

Contributions of Government and private Organization in boosting Aquaculture in Nigeria

Both the federal and state government, international organization etc have at one point in time made meaningful contributions towards the development of aquaculture in Nigeria. In an effort to improve aquaculture in Nigeria and further make it competitive in the international community, FAO in November 2008 provided $410,000 of funding support in the area of capacity building, seed development, and in other allied areas to support aquaculture development. Also in August 2008, the Kwara State government distributed equipment worth N4.9 million to about 100 fish farmers. The equipment which included storage tanks, rearing tanks, electric water pumps, petrol/water pumps and various types of fish feeds were procured by the state government.

In October, 2008, the Rivers State government embarked on massive aquaculture project called "River state fish project to eradicate poverty" cold rooms were provided to fish farmers to establish fish farms.

In April 2009, the federal government constructed two fish hatcheries in Delta state located at Ekpan in Uvwie L.G.A and Oguma in Ndokwa – West L.G.A. The state government equally earmarked N100 million in the same year for the resuscitation of the 240 hectares Aviara fish farm in Isoko South L.G.A.

In October 2009, the federal government earmarked N33 billion for water, aquaculture and environmental management programmes. The attempt was to encourage private fish farmers master the art of fingerling production and hatchery in a bid to boost local fish production which presently stands at 751,000 metric tones per annum whereas the nations fish demand is about 2.6 million metric tones (FAO, 2010). In September 2010, the Federal Capital Territory (FCT) Agricultural and Rural Development Secretariat (ARDS) distributed fishery input worth N12 million to fishermen in territory in order to increase fish production.

CONSTRAINT FOR AQUACULTURE PRODUCTION IN NIGERIA

The development of aquaculture in Nigeria, in Nigeria, like most other countries in Africa, has been very slow for several reasons: lack of feeds and high quality seed (fingerling), Inadequate access to credit, conflict with other sector,

environmental degradation, poor experience of past attempts in developing aquaculture, inadequate and in appropriate research on aspects of aquaculture and lack of economic viability studies (FAO, 2001). The federal government (including states) has constructed many fish farms, fish hatcheries and feed mills most of which have never contributed significantly towards solving domestic fish production or solving the problems facing the private fish farms in terms of fish fingerlings and fish feeds. According to Tabor (1990), the sector is disadvantaged due to lack of access to ice or refrigerated storage. Therefore, the traditional methods of sun-draying, salting and smoking are used in preserving fish that cannot be sold fresh. Post harvest losses in the sector are a major problem cutting across fishing, processing and marketing, especially during glut. These losses are also a function of the different fishing gears, poor handling, processing and distribution networks.

CONCLUSION

Hunger and malnutrition remain among the most devastating problems facing the world's poor and needy, and continue to dominate the health of the world's poorest nations. Aquaculture has an important role to play in food security and poverty alleviation in Nigeria. However, in order to realize the full potential of aquaculture in Nigeria there is the urgent need to develop and promote aquaculture technologies that increase intensification of production; make it accessible to the poor and the majority of the Nigerian Population. To ensure an increased contribution by aquaculture to food security and incomes, issues such as credit availability (to farmers, producers and local marketing chains), facilitation and promotion of aquaculture enterprises, aquaculture technology adoption and dissemination processes, the protection of the environment, and biosafety need to be addressed. There is a need for the government to continue to concentrate on its role to support the private sector rather than hinder it. This is to encourage more fish farmers into the business thus alleviating poverty.

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International Journal of Agricultural Sciences and Veterinary Medicine

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E-mail: editorijasvm@gmail.com or editor@ijasvm.com
Website: www.ijasvm.com