



Fish Production In Nigeria: An Update

GREMA, H.A., GEIDAM^{*} Y.A., EGWU, G.O.

Department of Veterinary Medicine, Faculty of Veterinary Medicine, University of Maiduguri, P. M. B 1069, Maiduguri, Borno State
^{*}Correspondence: Tel.: +234 8036568615; ygeidam@yahoo.com

SUMMARY

In recent times, veterinarians and animal scientists have contributed to the development of techniques to increase the sources of animal protein in order to supplement existing sources of protein. Fish is an important source of protein and provides about 40% of the dietary intake of animal protein. With the need for self reliance at both national and grass-root level, fish production offers a good potential if properly adopted. Additionally, increase in small scale aquaculture projects in towns and villages will create employment and alleviate poverty. Fish production involves controlling culture environment and rearing of fish in captivity; to enhance production and prevent diseases and predators as well as good husbandry management practices. However, the main factors affecting aquaculture in Nigeria include extreme climatic conditions, flood, water pollution, ignorance and lack of adequate technology, lack of loans and grants, fish diseases and problems of preservation. Despite all these challenges, fish production has the potential to expand the national resource base, generate foreign exchange and elevate the socio-economic status of fish farmers.

KEYWORDS: Fish production, Poverty alleviation, Fish Health Management, Nigeria

INTRODUCTION

Fish farming otherwise known as fish culture is a branch of aquaculture which involves the domestication and rearing of different types of fish. This practice allows feeding, breeding, growing and harvesting of fish in a well planned manner. A wide range of fish farming does exist including growing of fish in earthen ponds, concrete tanks, cages, pens, or run-ways (Swift, 1993). Several methods of successful production of fish is practiced but the popular and simple technique is the earthen pond, which is the basic unit of fish farming worldwide and it is dependent on natural production of fish feed (Plumb, 1999).

Previous study had confirmed that land, water, labour and capital are the most essential resources in that order (Kudi *et al.*, 2008). In spite of availability of these resources, fish farmers identified lack of finance, lack of good market, pest and diseases as other important issues in fish production (Agbebi *et al.*, 2006; Ndu, 2006). Another problem faced by fish farmers is the processing and preservation needs of fish. Davies and Davies, 2009 reported different methods of preservation such as drying, smoking, chilling and brining, but the most prominent method of fish preservation in Nigeria is smoke-drying (Akinola *et al.*, 2006).

According to Momoh (2009), several Nigerian government parastatals planned to collaborate to establish industries for canning and further processing of excess fish produced, particularly tilapia which easily multiply in large numbers and grow rapidly.

Aquaculture alone has the potential to supply the national requirement for fish and produce excesses for export generation and foreign exchange. Therefore, concerted effort is needed to be able to explore the potentials of aquaculture for the purpose of food security programme and poverty alleviation.

GENERAL BACKGROUND OF NIGERIAN FISHERIES

Nigeria, with a population of about 140 million (National Population Commission, 2006) is a multi-ethnic country has a land area of 923,768km² with a continental shelf area of 47,934km² and a length of 853km (FAO, 1995). It also has a vast network of inland waters like rivers, flood plains, natural and man-made lakes and reservoirs (FAO, 1995, Kudi, *et al.*, 2008). However, the entire production of the rivers and lakes is hovering between 500,000 to 700,000 metric tons of fish per annum but Nigeria needs a minimum of million metric tons of fish to feed a

population of over 140 million (Momoh, 2009; Dauda, 2010).

Nigeria is the largest single consumer of fish and fish products in the African region with a demand estimate of 1.4 million metric tons. It currently imports 0.7 million tons of frozen fish annually making Nigeria the highest importer of frozen fish in the world with annual foreign exchange drain of N35 billion (Dauda, 2010). The demand supply gap of at least 0.7 million metric tons exist nationally with import making up the short fall at a cost of almost 0.5 billion US dollars per year (Kudi *et al.*, 2008). According to Adekoya and Miller (2005) domestic fish production of about 500,000 metric tons is supplied by 85% of artisan fish-folk. Despite these considerably high potentials, local fish production has failed to meet the national demand (FAO, 1995). The imminent challenge therefore, is to bridge the wide gap between fish demand and supply by encouraging farmers to learn the simple techniques of fish production.

ROLE OF FISHERIES IN NATIONAL ECONOMY

According to Kudi *et al.* (2008), fisheries occupy a unique position in the agricultural sector of the Nigerian economy. In terms of gross domestic product (GDP), the fishery sub-sector has recorded the fastest growth rate in agriculture to the GDP (CBN Report, 2005). The contribution of the fishery sub-sector to GDP as at 2001 current factor cost rose from N76.76 billion to N162.61 billion in 2005 (CBN Report, 2005).

Fish and fish products constitute more than 40% of total protein intake in adults especially in the rural areas (Adekoya and Miller, 2005). Apart from its richness in vitamins, it also contains some quantities of calcium, phosphorus, fats and other nutrient needed for human growth and health. Therefore, it is believed that fish is more nutritious than meat (Dauda, 2010). Similarly, Amiengheme (2005) also enumerated the importance of fish in human nutrition above other animal protein. These include:

- Fish is a good source of thiamine as well as extremely rich source of vitamins (A, D and E), vitamins B complex and minerals (calcium, phosphorus, iron, iodine and selenium).
- Fish is also a good source of sulphur and essential amino acids such as lysine, leucine,

valine and arginine. It is therefore suitable for supplementing diets high in carbohydrates content.

- It contains both Omega- 3 polysaturated fatty acids and polyunsaturated fatty acids, which are important in lowering blood cholesterol level and high blood pressure.
- It reduces the risks of sudden death from heart attack and age related muscular degeneration and vision impairment.

Fish production from aquaculture accounted for only about 20,000 metric tons in the year 1994 whereas reaching 96,000 metric tons in the year 2000 (Davies *et al.*, 2008). It is therefore obvious that aquaculture has the potential to expand the resource base and reduce the pressure on conventional sources of fish, generate employment, foreign exchange and elevate socio-economy of the farmers (Davies *et al.*, 2008).

CONCEPT OF FISH FARMING

Fish farming is an aspect of aquaculture involving all activities associated with the scientific and organized rearing and cultivation of fish. It is a form of controlling of the environment or intervention in the rearing process to enhance production such as regular stocking, feeding, protection from diseases and predators as well as good husbandry practices (Enabulele, 2009). Generally, there are wide variations of husbandry techniques, not only from country to country but also between levels of development and technical sophistication. Apart from earthen ponds, concrete lined ponds are also used by farmers (Ndu, 2006), the disadvantage of which includes constant feeding of the fish by farmers. However, netting enclosure is a combination of pond and cage cultures where natural food production can occur (Plumb, 1999).

Depending on the stocking density, single species of fish can be reared in a pond or multiple species of fish may grow in the same pond (Swift, 1993). In the integrated system of fish production, fish farming is usually combined with either poultry or animal husbandry where the excrement fertilizes fish ponds and stimulates food production (Ayinla *et al.*, 1989). The principal fish species stocked in Nigeria are Catfish: *Clarias gariepinus*

(Oresegun et al., 2007); Carp: *Cyprinus carpio*, *Heterobranchus bidorsalis*, *Gymnarchus niloticus* and Tilapias: *Oreochromis niloticus* and *Heterotis niloticus* (Anetekhai et al., 2004).

PROSPECT OF FISH FARMING

The fish industry remains the most unexplored investment sector in Nigeria compared with the importation of frozen fish in the domestic market (Kudi et al., 2008). A sure means of substantially solving the demand-supply gap is by embarking on widespread small scale fish production. The potential of fish farming in developing countries is great, as it offers economical source of protein rich food. According to UN survey, the fish production from aquaculture in 1985 stood at 10 million tons close behind beef, pork and poultry (FAO, 1995). Comparatively, fish do not use much energy to maintain body heat or for locomotion and have a food to flesh conversion rate of 1.5 to 1.0 as against beef's 7.0 to 1.0 and chicken's 2.3 to 1.0 (Nazri, 1991).

The potential of fishing has gone beyond mere practice of aquaculture; it is now a tool for promoting tourism. Argungu fishing festival is becoming an international festival incorporated with boat racing, hotel business, car racing etc. But the climax of the festival is the grand fishing where people win prizes for catching the biggest fish (Momoh, 2009). With regular public enlightenment, more people will engage in fish production as a source of income and tourism, employment and high quality protein. The establishment of suitable extension services with qualified staff, exchange of information and personnel between countries, and an expanded system of collection and dissemination of information are all good for aquaculture development in Africa (FAO, 1995).

PROBLEMS OF FISH FARMING

Unlike other developed countries, Africa has little aquaculture traditions and has been affected by a number of external problems that have prevented proper management and development, despite investment by the government. The main constraints facing the activity in Nigeria are:-

- **Environmental Factors:** Environmental factors are mainly physical forces of nature that arises due to extreme climatic and

meteorological conditions (Agbabi and Fagbenro, 2006). These factors include excessive rainfall and flooding, water pollution, oil spillage, excessive heat and drought (Moyle et al., 1990; Enabulele 1999; Plumb, 1999). Other socio-cultural constraints include theft, pilferage and fraud. These factors may be external (from individuals) or internal (from employees) (Odoye et al., 2005).

- **Financial Factors:** These are due to unstable government financial policies. Fish farmers require repeated loans, in addition to loans for capital investment and start-up operational cost. Short term loans are meant for annual supplies of seed, feed, new equipment and expansion (Odoye et al., 2005)
- **Disease Factors:** Fish being a poikilothermic animal tend to react quickly to environmental changes and this increases susceptibility of fish to infectious agent due to compromised immune response (Plumb, 1999). Moyle (1990) also stated that stressed fish are more susceptible to diseases and parasites than fish which are held under optimum condition. Ahmed and Ambali (2005) reported that parasitic infections were found to be a common feature in fish population with nematode being significantly prominent.
- **Physical Factors:** Lack of adequate technology or technical information and expertise as regards hatchery, propagation and husbandry management affect fish production. Fish farmers should be provided with effective machinery and comprehensive information on the availability of tools that will enhance productivity of fish in Nigeria. Processing and preservation of fish are of utmost importance since it deteriorates immediately after harvesting. Therefore, processing of fish after capture using high quality machines and preservation is imperative to prevent serious economic losses (Davies and Davies, 2009).
- **Business Factors:** Fish farmers also face market and consumer related risks. Such risks are due to loss of quality products, lack of market information, and health regulations.

CONCLUSION

In conclusion, it is obvious that aquacultures has the potential of expanding the resource base and reduce pressure on fish exploitation. If practiced properly, it will generate foreign exchange and elevate the socio-economy of the farmers. Therefore, involvement of farmers in small scale aquaculture projects will create employment, alleviate poverty and improve nutritional status of the population.

RECOMMENDATION

Government should encourage farmers economically by evolving ways such as grants, government insurance, leasing of facilities and compensation schemes. Loans and subsidies for construction and equipment supplies should be made available to farmers. Research institutes and universities should conduct industry-targeted research towards solving problems and extending solution to the fish- farmers through Agricultural Development Projects (ADPs) and extension services. Vital information on improved techniques and machineries for fish production, processing and preservation should also be disseminated to farmers (particularly rural farmers) to boost the production level and tackle problems associated with fish production.

REFERENCES

- ADEKOYA, B.B. and MILLER, J. W. (2004): Fish Cage Culture Potential in Nigeria: An overview. *National Cultures Agriculture Focus* **1**(5): 10.
- AGBEBI, F.O. and FAGBENRO, O.A. (2006): Tilapia culture and Risk Management in Nigeria. American Tilapia Association. In Collaboration with International Symposium on Tilapia in Aquaculture.
- AHMED, M.I. and AMBALI, A.G. (2005): Helminth of Fresh water Fish in North Eastern Nigeria: In proceeding of the 21st conference of Nigerian Veterinary Association Maiduguri, Nigeria.58.
- AKINOLA, O.A.; AKINYEMI, A.A. and BOLAJI, B.O. (2006): Evaluation of Traditional and Solar Drying Systems towards Enhancing Fish Storage and Preservation in Nigeria. *Journal of fisheries International*. **1**(2-4): 44- 49.
- AMEIENGHEME, P. (2005): The Importance of Fish in Human Nutrition. A paper Delivered at a Fish culture Forum, Federal Department of Fish Farmers, Abuja.
- ANETEKHAI, M. A.; AKIN-ORIOLA, G.A.; ADERINLA, O. J. and AKINTOLA, S.L. (2004): Steps Ahead for the Development in Sub-Saharan African: The case of Nigeria. *Aquaculture*. **239** (1 -4): 237 - 248.
- AYINLA, O. A.; ONUOHA, G. G.; OLADOSU. G.A. and NEEDOM, J. G. (1989): Research on the Economics of Integrated Fish and Poultry farming In: NIOMR Annual Report, 91-99.
- CENTRAL BANK OF NIGERIA (2000): Annual Report and Statement of Accounts. Central Bank of Nigeria (CBN) publishers, Abuja. 36-38
- DAUDA, O. (2010):The Nation Newspaper. Agriculture: Lagos - UNILAG Partner on Fish Production. 23rd April 2010. 35.
- DAVIES, R. M.; DAVIES, O. A.; INKO-TARIAH, M. B. and BEKIBELE, D. O. (2008): The Mechanization of Fish Farms in Rivers state, Nigeria. *World Applied Sciences Journal*. **3**(6): 926-29.
- DAVIES, R. M. and DAVIES O. A. (2009): Traditional and Improved Fish Processing Technologies in Bayelsa State, Nigeria. *European Journal of Scientific Research* **26**(4): 539 -48.
- ENABULELE, H. N. (1999): Power Point seminar presentation: Impact Assessment of the Agriculture Development Projects (ADPs) on Fish Farming in Nigeria. Department of Agribusiness and Consumer Science, College of Food Systems, United Arab Emirate University.
- KUDI, T. M.; BAKO F. P. and ATALA, T. K. (2008): Economics of Fish Production in Kaduna State. Asian Research Publishing Network (ARPN). *Journal of Agricultural and Biological Science*. **3**(5-6): 17-21.
- FOOD AND AGRICULTURAL ORGANISATION (1995): ADCP/RFP/75/1, Aquaculture Development in Africa. Report of the First Regional Workshop on Aquaculture Planning in Africa, Accra, Ghana. In collaboration with FAO of the United Nations and United Nations Development Programme
- MOMMOH A. (2009): Interview with Dr. Aminu Raji on 2nd August 2009. Published in Sunday Trust News Paper. Nigeria Pp 28-29
- MOYLE, P. B. (1990): Department of Wildlife and Fisheries Biology University of California - Davis. *American Fisheries Society*. **20**: 633.
- NATIONAL POPULATION COMMISSION (2006): Human Population Figures of Census in Nigeria. Africa Masterweb @ <http://www.africamasterweb.com/>
- NAZRI, M. M. (1991): Prospect of Fish Farming in Developing Countries with Reference to Pakistan. Proceedings of the workshop on Economic Review. *Marine Reference collection*. 123-125.
- NDU, N. R. (2006): Fish Farm Layout, Pond Construction, Management and Maintenance Hatchery Techniques. A paper presented at the National Workshop on the Principles and Techniques of Fish Farming Organized by Nigerian Agricultural, Cooperative and Rural Development Bank, Kaduna, with collaboration of Life Riches consulting. Life Riches Publishers. 95-97
- ODOYE, F. M.; SEIBOTA, A. and WOSU L. O. (2005): Constraint of Fish Farm Production in Bayelsa state, Nigeria. 42nd Annual Congress NVMA, Book of Abstract. Theme: National Food Security, Current Challenges for the Veterinarian.53-4.
- ORESEGUN, A., OGUNLADE, O. R. and AYINLA, O. A. (2007): A Review of Catfish culture in Nigeria. *Nigerian Journal of Fisheries*. **4**(1): 27-52
- PLUMB, J. A. (1999): Health Maintenance and Principal Microbial Diseases of Cultured Fishes, Iowa State University. 1:3
- SWIFT D. R. (1993): Aquaculture Training Manual: Fishing News Book, Second Edition. **8**: 66- 82 and 7:58 - 65.