Contribution of aquaculture to poverty reduction and food security in Nigeria

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ABSTRACT

Food security exists when people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The challenge to food insecurity is to rapidly accelerate the pace by which hunger and malnutrition are eliminated. Aquaculture has an important role to play in this effort by providing fish (marine and fresh-water) products, which commonly are rich sources of protein, essential fatty acids, vitamins and minerals, and by providing incomes and employment opportunities. Total contribution of fisheries to the Nigerian economy has been estimated at ₦126.417 billion gross output with a capitalization of ₦78.530 billion. In addition, the total aquaculture investment and capital contribution in the country are put at ₦7 and ₦20 billion, respectively. The major problem hindering the promotion and development of the aquaculture industry in Nigeria has been the scarcity of fish fingerlings. If an effective enabling environment is created, cultured fish and other aquatic products could play a significant role in achieving the Millennium Development Goal of eradicating extreme poverty and hunger. This review therefore highlights how the contribution of fisheries to poverty reduction and food security can be maintained or enhanced.

INTRODUCTION

The first essential requirement for social and economic justice is adequate food production. A nation should be able to feed her population to occupy a place of pride in the community of nations. Nigeria is a country richly blessed with abundant natural and human resources that if properly harnessed can feed its people and export the surpluses to other countries to generate more revenue. Yet, she is experiencing persistent food crisis both in terms of quantity and quality (Amao et al., 2006). Cases of malnutrition and under nutrition are growing by the day. The energy food intake requirements of majority of Nigerians have fallen far below the international standard. According to FAO/WHO/UNU (2004) the minimum international energy requirement per person for children and adolescents is obtained by multiplying the reference body weight for attained-heights, by the recommended energy requirement per kilogram of body weight for each sex and age population group, using the total energy expenditure equations.

According to Foluke (2007), as a coastal nation, Nigeria has a coast line of 853 km and the Nigerian continental shelf area is 37,934 km². Nigeria declared 200 nautical miles Exclusive Economic Zone (EEZ) and thus has the sovereign rights for the purpose of exploiting, conserving and managing its fisheries and natural resources within the EEZ. These have tremendous potentials for economic prosperity of Nigeria. She further stressed that, it is also interesting to note that Nigeria is blessed with a rich diversity of fin- and shell-fish resources. Investing in the...
harvesting of these natural resources would result in the generation of employment for several thousands of Nigerians engaged in processing activities, both in the small and large scale (that is, smoking and canning). It can also earn the country substantial foreign exchange from its export. In addition to creating employment through storage, transportation, marketing, facilities maintenance and food businesses, those who engage in fish production; fisheries education and consultancy; processing of fish and fishery products both for local consumption and export and marketing are in direct employment. On the other hand, those who are into areas such as fish transportation, net repair and fabrication, outboard engines repair and maintenance, vessel repair and cold storage operations among many others are directly employed in the industry.

Fish can make a unique contribution to improve and diversify dietary intakes and promote nutritional well-being among most population groups. Fish have a highly desirable nutrient profile providing an excellent source of high quality animal protein that is easily digestible and of high biological value. According to Tacon (2001) fatty fish, in particular, are an extremely rich source of essential fatty acids, including omega-3 polyunsaturated fatty acids (PUFAs), so important for normal growth and mental development, especially during pregnancy and early childhood. Fish are also rich in vitamins and minerals (especially calcium, phosphorus, iron, selenium and iodine in marine products). Fish therefore can provide an important source of nutrients particularly for those whose diets are monotonous and lacking in animal products. Increasing the availability of fish in the diet increases palatability and leads to increased consumption of a range of foods thereby improving overall food and nutrient intakes.

The aim of this review is to identify how fisheries and aquaculture contribute to maintain or enhance poverty reduction and food security.

THE CONCEPT OF FOOD SECURITY

Food security refers to the availability of food and access to it. A household is considered food secure when its occupants do not live in hunger or fear of starvation (FAO, 2001). Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (Idachaba, 2006). Food security for a household means access by all members at all times to enough food for an active, healthy life, while food insecurity exists when people do not have adequate physical, social or economic access to food as defined above.

USAID (2011) proposes several key steps to increasing agricultural productivity which is perceived to be vital to increasing rural income and reducing food insecurity. They include:

- Boost aquacultural science and technology. Current aquacultural yields are insufficient to feed the growing populations.
- Securing property rights and access to finance.
- Enhancing human capital through education and improved health.
- Conflict prevention, resolution mechanisms, democracy, good governance based on principles of accountability, transparency in public institutions and the rule of law are basic to reducing vulnerable members of the society.

The United Nations Millennium Development Goals (MDGs) aims at achieving food security in the World. In its list of goals, the first Millennium Development Goal states that the United Nations is to eradicate extreme hunger and poverty or to halve it by 2015 in relation to 1990 as the base period and that agricultural productivity is the key player if this is to be achieved. Of the eight MDGs, eradicating extreme hunger and poverty depends on agricultural productivity entirely (Odion, 2009).

STATUS OF AQUACULTURE IN NIGERIA

Although aquaculture activities in Nigeria started about 50 years ago (Olagunju et al., 2007), Nigeria has not been able to meet domestic production demand for the populace. According to EKunwe and Emokaro (2009), statistics indicate that Nigeria is the largest African aquaculture producer, with production output of over 15,489 tonnes per annum. This is closely followed by Egypt with output of about 5,645 tonnes. Only five other countries: Zambia, Madagascar, Togo, Kenya and Sudan produce more than 1,000 tonnes each. From the data obtained from FAO (2015) based on production by continents Asia is the largest producer of 41,645,069 tonnes, followed by Africa with 1,594,069 tonnes and Oceania been the least with 4,042 tonnes.

In Nigeria, aquaculture development has been driven by social and economic objectives, such as nutrition improvement in rural areas, generation of supplementary income, diversification of income activities, and the creation of employment. This is especially true in rural communities, where opportunities for economic activities are limited. Only in recent years has aquaculture been viewed as an activity likely to meet national shortfalls in fish supplies, thereby reducing fish imports. The fisheries sector accounts for about 2% of National Gross Domestic Product (GDP), 40% of the animal protein intake and a substantial proportion of employment, especially in the rural areas. The sector is a principal source of livelihood for over three million people in Nigeria (Adedeji and...
Okocha, 2011). In terms of economics and trade, aquaculture makes a minor contribution to overall fish and protein supply and GDP. This can be attributed to emerging nature of the sector when compared with agriculture and fisheries which are important primary sectors. Agriculture contribution to GDP between 1999 and 2002 was 34% while aquaculture contribution alone to GDP within the same period was 0.154%. In relation to meat production, capture fisheries and aquaculture contributed 475,162 and 30,677 respectively to meat production. Culture fisheries contribution to fish supply was 6.06%. Per capita fish consumption between 2003 and 2004 was 7.3% per kg per year as compared to the recommended rate of 12.0% per kg per year (Adeogun et al., 2008). Nigeria has the natural resources such as land, rivers, streams, reservoirs and lakes; and human resource and potential to compete with the world leading aquaculture countries. According to Ukuedojar (2013), Nigeria has about 264 medium and large dams with a combined storage capacity of 33 billion cubic meters of water. Of these dams, 210 are owned by the Federal Government, 34 are owned by States, while 20 are owned by private organizations. These dams can be used for cage aquaculture and pen aquaculture.

According to Olujimi (2010) the total contribution of fisheries to the Nigerian economy has been estimated at ₦126,417 billion gross output with a capitalization of ₦78,530 billion. In addition, the total aquaculture investment and capital contribution in the country are put at ₦7 billion and ₦20 billion, respectively. From this figure, fisheries contribute about one billion US dollars to the nation’s GDP, adding that the demand for fish and investment in commercial fish farming in Nigeria is rapidly expanding at 25-33% per year. She further noted that aquaculture has been clearly demonstrated to be an economically viable, private enterprise in Nigeria, with some 2,642 fish farms inventoried and counting. When compared to projected yields estimate of two million tons, 85,000 mm of fish are produced in fish farms in Nigeria, making the country the largest aquaculture producer in Africa, but this production is negligible.

The contribution of fisheries to poverty reduction and food security

The most direct contribution of fishing activity to food security at the household level is through consumption of the household’s catch. Certainly for many poor households engaged in full-time, seasonal or occasional small-scale fishing activities, such contributions are crucial to individual / household food security. The percentage of total household catch that is consumed by the household varies greatly. However, it may depend on both the level of commercialization in the fishery and the level of poverty in the household (Edwards, 1999). The role that fish can play in improving diets is undisputed, and this can be particularly important in regard to children's diets and child nutrition.

Aquaculture can contribute to improved food security and nutrition through various channels: Local food supplies can be improved through the increased availability of low-cost fish; employment opportunities and incomes can be raised; and consumption of fish can be increased directly. While increasing the quantity and variety of fish and other foods consumed by the poor will reduce under-nutrition, such dietary improvements are not automatic benefits of aquaculture development.

Food consumption and good nutrition are not determined solely by how much food is produced or available. Households must have physical and economic access to an adequate amount and variety of food, and household heads and care-givers must have the time, knowledge and motivation to make the best use of the household’s resources to meet the food and other basic needs of all members. The key to securing the maximum nutritional benefits from aquaculture development is to ensure that the poor and undernourished gain greater access to the increased supplies of fish and that they can enhance their aquaculture-derived income (FAO, 2003).

According to FAO (2003), aquaculture comprises diverse production systems of farming plants and animals in inland and coastal areas, many of which have relevance for the poor. In the context of the rural poor, aquaculture often complements catches from traditional fisheries. The latter continue to play an important role and in many areas, remain adequate to satisfy subsistence needs and provide a valuable source of income for farmer/fishers. In many cases, the captured species form the basis for household food security, enabling the use of livestock or cultured fish as sources of income. Aquaculture becomes an attractive and important component of rural livelihoods in situations where increasing population pressures, environmental degradation or loss of access, limit catches from wild fisheries.

Omotayo (2010) stressed the fact that food security, rural development and poverty alleviation are interwoven. Fish contributes 40% of total dietary protein consumption in Nigeria. It is the preferred source of animal protein with balanced amino-acid and essential minerals for healthy human growth. The proportion of saturated fatty acid (solid fat under normal temperature) and non-saturated fatty acid (smooth liquid oil) in fish is almost at par with beef while the proportion of non-saturated fatty acid is higher in fish. He further opined that fish is relatively cheaper than meat. It is available to all Nigerians in various forms, such as fresh, smoked, dried, canned, chilled or frozen. Thus scarcity of fish in markets is hardly recorded. Its contribution to food security is therefore enormous as there is hardly any religious taboo affecting the consumption of fish unlike
pork and cow meat. This in addition to its cost affordability accounts for the high demand of fish. Thus the contribution of fisheries to the Nigerian economy is significant when viewed from the supply of animal protein and macro nutrient requirement, income and employment generation, rural development and exchange earning potentials. In addition, Olujimi (2010) stated that, the total aquaculture investment and capital contribution in the country are put at ₦7 billion and ₦20 billion, respectively.

Problems of aquaculture in Nigeria

Adewumi and Olaleye (2011) found that a number of problems confront the production of catfish; being a major species in Nigeria. Prominent among these are: poor management skills, inadequate supply of good quality seed, lack of capital, high cost of feed, faulty data collection, lack of environmental impact consideration and marketing for the of products. If the associated problems of production, especially the twin issue of feed production and fingerling supply are tackled, Nigeria will soon become a world exporter of catfish. According to Oota cited in Oyinbo and Rekwot (2013), high cost of input, lack of credit facilities to fish farmers at low interest rate, lack of skilled manpower and lack of aquaculture extension service are attributes contributing to underdevelopment of aquaculture in the country. While George et al. (2010), stated that the major problem hindering the promotion and development of the aquaculture industry in Nigeria has been the scarcity of fish fingerlings and that the major factors militating against this production of high quality fish seeds are good parent stock and water related problems arising from lack of skilled manpower in the industry.

The prospects

Aquaculture benefits are numerous. It fulfils protein demand of the country, helps prevent food insecurity, creates jobs which settle the unemployment issue, it is prolific and profitable, generate income for individuals, serves as recreation centers for relaxation and can attract foreign exchange capable of increasing the country’s GDP (FAOSTAT, 2000).

Over the last 2 decades, Federal Government effort was on artisanal fisheries development in Nigeria because the fisheries were known to contribute over 95% of the local fish production. The National Scheme (National Accelerated Fish Production Programme) introduced by the Federal Government through the Federal Department of Fisheries provided fishing inputs such as engines, gillnets, ropes, lead and twines to fishermen with a 50% subsidy in order to assist them in attaining maximum capture efficiency (FAO, 2009).

However, overfishing activities by fishermen have reduced the yielding capacity of most fisheries.

Aquaculture which is the current tool capable of increasing the country’s total fish production has not received a fair treatment by the government. International assistance for aquaculture development in Nigeria, government subsidy of aquaculture inputs, shifting interest and resources of National Accelerated Fish Production Programme to aquaculture industry, provision of basic infrastructures, electricity and quality water supply, provision of extension services including education program to aquaculturists, government support and involvement in production program at the federal, state and local level will significantly boost the country’s aquaculture production.

Ekunwe and Emokaro (2009), statistics indicate that Nigeria is the largest African aquaculture producer, with production output of over 15,489 tonnes per annum. In relation to meat production, capture fisheries and aquaculture contributed 475,162 and 30,677 tonnes, respectively. The demand for fish and investment in commercial fish farming in Nigeria is rapidly expanding at 25-33% per year.

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Using 2007 data from Federal Department of Fisheries, with total domestic production of 0.62 mmt, per caput fish consumption of 9.8 kg/person/year, total import of 0.74 mmt and total exports of 0.005 mmt and with an estimated aquaculture potential of 2.5 mmt, a lot need to be done to satisfy the total fish demand of 2.66 mmt (FDF, 2008).

CONCLUSION

Fisheries and aquaculture play an important role in providing food and income in many developing countries, either as a stand-alone activity or in association with other income generating activities, such as crop agriculture and livestock rearing. The sector also acts as an economic multiplier in marginal rural areas. In countries endowed with valuable natural fisheries or conditions favoring aquaculture development, they can also provide important contributions to the national economy through trade, tax revenues and license fees.
Hunger and malnutrition remain amongst the most devastating problems facing the world's poor. Tragically, a considerable portion of the global population is currently suffering from one or more forms of nutrient deficiencies. This remains a continuing travesty of the recognized fundamental human right to adequate food, and freedom from hunger and malnutrition, particularly in a world that has both the resources and knowledge to end this catastrophe.

The challenge is to rapidly accelerate the pace by which hunger and malnutrition are eliminated. Aquaculture has an important role to play in this effort by providing fish and other marine and fresh-water products, which commonly are rich sources of protein, essential fatty acids, vitamins and minerals; by providing incomes and employment opportunities. This can be especially important for poor artisanal fisherfolk whose livelihoods depend upon small-scale fisheries activities. With support for aquaculture, the worldwide availability of good quality marine and fresh water animal products can be increased allowing per capita supplies to keep pace with the increase in demand. To ensure that such benefits reach those who need it most, the involvement of the artisanal fisherfolk in this effort must not be neglected.

RECOMMENDATIONS

If an effective enabling environment is created, cultured fish and other aquatic products could play a significant role in achieving the Millennium Development Goal of eradicating extreme poverty and hunger. The following are therefore recommended to attain the required expectation:

- Improve the extension and development approaches used for rural aquaculture, including: a holistic, farming systems-based approach integrating aquaculture into rural livelihoods; a participatory, needs-based approach that takes full account of the capacity of the poor, the resources available to them, and the risks they face; farmer-led extension and research; and promotion of sustainable, appropriate technologies commensurate with the resources available.
- The Ministry of Health should encourage and promote the production of aquaculture products as a source of nutrition for human consumption with the help of targeted nutrition education programmes.
- Relevant agricultural agencies established by the Government should promote effective rural development through sound governance and with the participation of the rural poor in decision making at all levels. Rural aquaculture has to be developed as an entrepreneurial activity that is financially viable, even for small-scale operations. All aquaculture developments should specifically address and minimize any potential adverse impacts on the poor programmes.
- Relevant agricultural agencies established by both the Federal and State, should give greater emphasis to advocacy (outside of the sub-sector) to raise awareness on the role for aquaculture in rural development; while empowering and linking stakeholders to policy decisions programmes.
- The Government at all levels should establish monitoring systems with better indicators and improve information on small-scale rural aquaculture, its role in rural livelihoods, and its impact on food security and poverty alleviation programmes.
- Agricultural agencies should try to increase institutional capacity and the allocation of resources to ensure the appropriate role of aquaculture in alleviating poverty and providing food security.

REFERENCES


