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Agriculture as a means of Employment Generation (Aquaculture development)

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Abstract
Over the past one decade, Nigerian government had initiated a plethora of policies and programmes which was intended to reposition agriculture to its pride of place. However, various efforts for promoting investment and generating employment in the agricultural sector have not yielded appreciable dividends. Population in poverty and related statistics such as unemployment and income inequality in Nigeria is quite unacceptably high. According to National Bureau of Statistics (NBS), in 2012, Nigeria has unemployment of 23.9 per cent broken down to 17.1 per cent in the rural areas and 25.6 per cent in the urban centres. All over the world, the development of an enduring economy goes hand in hand with agricultural development. Agriculture is considered a catalyst for the overall development of any nation. It is thus a critical sector that drives the economic development and industrialization of the developing nation, and also holds the ace for reducing unemployment. Thus, its' development is critically important for ensuring food and nutritional security, income and employment generation, and for stimulating industrialization and overall economic development of the country.
Nigeria still depends largely on oil exports instead to learn from past experiences. The initial
exceptionally high oil prices that brought a huge inflow of oil revenues that raised the per capita income from $1,300 in 1972 to $2,900 in 1980 thereafter collapsed. Furthermore, as a result of the countries over reliance on oil as its main source of income, a decline in the international price of oil resulted into drop in real per capita income of the country, expenditure, consumption and rise in poverty. Countries that have succeeded in reducing poverty significantly indicate the importance of diversification from the mono-economic system, sustained growth and development in achieving better result. But high growth is not enough, the pattern and sources of growth are extremely important from the point of view of raising the incomes of the poor (ILO, 2004).
Growth in agriculture is recognized as the most effective means to reduce poverty in developing countries. Cross-country studies show that growth in gross domestic product originating from agriculture is at least twice as successful in reducing poverty as growth in gross domestic product originating outside of agriculture. Until 2000, agriculture was the mainstay of employment around the world. Since then, the services sector has assumed this mantle and the gap between the two has widened. Although employment growth in agriculture has slowed, the number of workers in this sector reached over one billion in 2009. In sub-Saharan Africa, growth in agricultural employment accounted for half of all employment growth between 1999 and 2009.
Recently, interest in increasing agricultural production and developing agribusiness to meet urgent development objectives has been renewed. Yet this revival has occurred against the backdrop of a slowdown in agriculture productivity growth in recent decades as well as the 2008 food crisis.
In practical terms, agriculture has worked a tremendous miracle in countries like Mexico, India and China where the Green Revolution is one of the great success stories of modern times. It is the major contributor to the export led growth pattern of a country like Taiwan which was able to attain notable increases in per capita GNP. Again, according to Wilber & Jameson (1992), Chile's recent rapid growth has been largely attributed to agricultural exports. In his book titled '' The End of Poverty'' Jeffrey Sachs describes how the Rockefeller Foundation, fearing the grim possibility of massive hunger because of rapidly rising global population, began developing and promoting high yield varieties of staple crops, first as a pilot project in Mexico, and then replicated it in Asia. The importance of the agricultural sector in generating employment and stimulating overall economic development in a developing country such as Nigeria is cannot be undermined. Most public policies in Nigeria, especially since independence in 1960, were tailored towards promoting food security, provision of the

agricultural raw materials needed by the manufacturing sector to provide adequate employment and income to alleviate poverty as well as earn substantial foreign exchange. President Muhammadu Buhari following his swearing-in as President of the Federal Republic of Nigeria on 29th May, 2015 also state that "Unemployment, notably youth un-employment features strongly in our Party's Manifesto. We intend to attack the problem frontally through revival of agriculture"

I. AGRICULTURE (AQUACULTURE)

Aquaculture has been defined by the Japanese Resource Council, Science and Technology Agency as "an industrial process of raising aquatic organisms' up to final commercial production within properly partitioned aquatic areas, controlling the environmental factors and administering the life history of the organism positively and it has to be considered as an independent industry from the fisheries hitherto."

This include

Finfish: Cat fish, Tilapia, carp, trout, milkfish, bait minnow, yellow tail, mullet etc.

Shellfish: Shrimps, prawns, oysters, mussels, pearl oyster for cultured pearls.

Hence, aquaculture is fish farming. It is the art and science of controlled rearing of fish in ponds, farms and in some instances natural water bodies from hatchlings to matured size. Unlike fish that grow in the wild water bodies, without human interference, in aquaculture, activities such as feeding, fertilization, stocking, reproduction and harvesting are controlled.

Types of Aquaculture

The different kinds of aquaculture are:

i. Static water ponds.
ii. Running water culture.
iii. Culture in recirculating systems: in reconditioned water and in closed systems.
iv. Culture in rice fields.
v. Aquaculture in raceways, cages pens and enclosures
vi. Finfish-culture cum livestock rearing.
vii. Hanging, „on-bottom" and stick methods of oyster culture.

Based on the number of species that are cultured in a system aquaculture may be classified into: (a) Monoculture and
(b) Polyculture.

II. OVERVIEW OF NIGERIAN AGRICULTURE SECTOR

Although, Nigeria today depends heavily on oil industry for its revenue, it is still predominantly an agricultural society. Agriculture remains a key sector of the economy providing employment for about 70% of the population. The bulk of this population are engaged in agricultural production at a subsistence level; the holdings are generally small and scattered. The Federal office of statistics in its' 1999 reports indicated that agriculture sector provided 41% of Nigeria's total gross domestic product (GDP) in that year.

Nigeria's enabling of climate allows it to produce a variety of food and cash crops. The staple food crops include cassava, yam, corn, coco-yam, cow-peas, beans, sweet potatoes, millet, plantain, banana, rice, sorghum, and a variety of fruits and vegetable. The leading cash crops are cocoa, citrus, cotton, groundnut (peanuts), oil palm, and rubber. They were also Nigeria's major export in the 1960s and early 1970s until oil took over as the major source of the country's revenue. Among major export destinations for Nigeria agricultural export products were Britain, United States, Canada, France and Germany.

A significant portion of the agricultural sector in Nigeria involves cattle rearing, fishery, poultry,

lumbering, which contributed more than 2 % to the gross domestic product (GDP) in the 1980s. According to the United Nation Food and Agriculture Organization (1987), estimate, there were 12.2million cattle, 13.2 million sheep, 26.0 million goats, 1.3 million pigs, 700,000 donkeys, 250,000 horses and 18,000 camels, mostly in Northern part of Nigeria, and owned mostly by rural dwellers rather than by commercial companies. Fisheries output ranged from 600,000 to 700,000 tons annually in the 1970s. Estimates indicated that the output had fallen to 120,000 tons of fish per year as at 1990, and this has continually declined.

Aquaculture was developed more than 2,000 years ago in countries such as China, Italy, and Egypt. Not long after, aquaculture practices in Europe, China, and Japan commonly involved stocking wild-caught fingerlings captured from rivers in ponds or other bodies of water for further growth Adedeji and Okocha, (2011). The World leading aquaculture producers are Asia (with China having the highest production output in the continent) and America. The United States of America (USA) aquaculture production rose more than 400 percent between 1980 and 2000 (Jhingran, 2001). The substantial increase in aquaculture production in countries like U.S.A is as a result of aquaculture mechanization which has led to increased

productivity, labour efficiency and improved product quality. Unlike Asia, Africa has little aquaculture tradition and has been affected by a number of external problems that have prevented proper management and development despite the investment. A number of countries in sub-Saharan Africa are characterized by low agricultural production, poor management of resources, economic stagnation, persistent political instability, lack of technical knowhow, increasing environmental damage, and severe poverty.

Aquaculture, in Nigeria, is a dynamic industry. New technology and new production enterprises that promise higher returns or lower costs are constantly being introduced. Despite its long history, aquaculture in Nigeria has only emerged as an industry, and has experienced tremendous growth in production during the last two decades. In 2007, production figures from aquaculture indicated a total production (excluding aquatic plants) of 85,087 metric tones (FDF, 2007). It is currently the fastest growing food-producing sector surpassing both terrestrial livestock meat production and capture fisheries. With stagnation being experienced in the capture fisheries coupled with the growing population, putting increased pressure on resources, aquaculture is viewed as a possible solution to meet growing demand for food security. The issues and the challenge of meeting the Millennium Development Goals (MDGs) also place aquaculture in a central role as an important contributor to the reduction of hunger and poverty.

Nigeria Aquaculture Facts and figures

Existence: Since 1956
Local production: 600,000 MT
Variety: Catfish
Productivity: Subsistence up to 1,5 MT per ha, integrated farms up to 3,5 MT per ha
Processing: Filleting, drying, gutting, scaling and deboning, smoking, production past and fish oil. (low quality)
Number of Fish farms: 2642 of which 100 state owned (2003)
Gender: The majority is men; women do processing
Market share: 5-6%
Total market: 1,3 million MT
Import: 56% (Nigeria is largest frozen fish importer in Africa)
Total potential market: 2,6 million MT
SMEs: Most fish companies are SMEs, there are no larger firms
Fish feed industry: 45,000 MT per year
Fish feed input: 25000-30000 MT per ha (low quality domestic produce) 6000 MT high quality per year is imported
Fingerlings suppliers: Medium enterprises produce 3-4 million per year good quality fingerlings. (FMARD 2011)

Supplier constraints and opportunities

There are over 2642 aquaculture farms of which 100 state owned (2003). Most farmers are men while women take care of processing activities (Filleting, drying, gutting, scaling and deboning, smoking, production past and fish oil).
Constraints at farm production are:

- Good practices: lack of knowledge on water quality management, disease management etc.
- Quality of local fish feed, high cost (imported) fish feed causing high cost of production
- High post-harvest losses (40%)
- Poor infrastructural facilities with hatcheries and grow –out farms
- Short supply of wood for processing (smoking)
- Dependency on traders (also for credits in remote areas)
- Lack of market information
- Lack of good transportation
- Access to credits
- Regulation of standards in fish production industry is weak. Particularly in fingerlings production

Opportunities:

- Increasing number of small scale producers (80% of all producers), it is not so difficult to set up profitable farms
- Increasing number of medium/large famers.
- Growing markets (e.g. see increasing imports)
- Growing demand for table sized fish (catfish)
- Increasing middle income class consumers
- Increasing restaurant outlets

Most companies in the sector are SMEs (exporting companies, drying / smoking companies for local markets, outgrowing farms). There are no larger processors.
Constraints at processing or trade level are:

- Insecure supply
- High input prices
- Low quality input
- Good processing practices for producing table sized fish
- Equipment and technology

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- (Access to)Packaging
- Access to (trade) finance for financing seasonal trade
- Marketing: competition in local markets
- Lack of market information (particularly by retail)
- Regulation of standards in fish production industry is weak.
- Export potential is not yet developed due to preservation equipment. Nigeria is less organized than countries such as Senegal and Gambia that produce more cost effective.

III. IMPORTANCE OF FISH FARMING

- **Source of food**: Fish as a product provides an excellent balance of calories. Fish is high in good quality protein. The percentage of edible lean tissue in fish is appreciably greater than that in beef, pork or poultry. Fish has a concentration of calcium and phosphorus in the bones. Conquer and Holub (2002) noted that fish oil significantly lower blood pressure, protect against blood vessel construction thrombosis and heart arrhythmia. Fin fish consumption also decreases the risk of blood cancer and reduces insulin resistance in skeletal muscles. Employment generation: Fish production also occupies a very significant position in the primary sector providing direct employment for over a million people (FDF, 2005). The IFC (2004) estimated that some of the fish consumed in Nigeria is catfish and farmed raised fish is increasingly contributing to this market, which to date remains largely a live, fresh market.
- **Source of income**: Many fish farms are established yearly to produce fish, rivers and streams are continuously utilized as regular fish ponds, generating revenue to the individual fish farmer and other resource holder. Most recent investment in aquaculture has been targeted towards catfish farming. Presently live catfish attracts premium price in Nigeria, with a high ROI (Return On-Investment) ranging between 30-100 percent in some very successful enterprises and considered a viable option of increasing income of the investor.
- Employment opportunities are not only in the production, credit for aquaculture farms and consultancy services.

IV. CURRENT ECONOMIC VIABILITY STATUS OF FISH FARMING IN NIGERIA

The current phase of aquaculture development in Nigeria is the emergence of investment from the private sector as the driving force. This is also complemented with the ability of researchers to provide scale basis. Moreover, there have been proof beyond reasonable doubt that the rate of return is encouraging if well planned before embarking in it. According to Raufu et.al., (2009) in the study of Alimosho Local Government Area of Lagos state, reported that the total variable cost and total fixed cost represents 32.5% and 67.5% of the total cost of production respectively. The higher value for fixed cost may be due to the high cost of land acquisition in the area as well as high cost of construction materials like cements used in constructing a high standard fish pond. The gross margin of #11,479,304 and a net farm income for #8,985,904 indicates that small scale fish farming is profitable in the area.

V. PROSPECTS OF AQUACULTURE IN NIGERIA

Aquaculture has high prospects in Nigeria with a population of over 160 million, the fish demand estimated at 1.6 million metric tones, while the current local supply was 640,000 metric tones (FDF, 2005).

Faturoti (1999) noted that recent trends all over the world point to a decline in landing from capture fisheries which is an indicator that fish stocks have approached or even exceeded the point of maximum sustainable yield. This shortfall in fish supply has led to low annual per capita fish consumption of 7.5kg per annum 2002 even though the WHO/FAO recommended 13.5kg per annum (FDF. 2005). Aquaculture therefore remains the only viable alternative for increasing fish production in order to meet the the protein need of Nigerians. Nigeria is blessed with suitable land where freshwater, brackish and marine fish species can be cultured. Tobor (1990), report that 1.8 million hectares of suitable land for aquaculture out which less than 20% has been put into use. If the available land is put into proper use, fish production will increase from the present level. The yearly shortfall in fish supply is also an indicator that there is a stable and ready market for fish; coupled with disease outbreak in poultry, high cost of beef and other alternative animal protein sources. Aquaculture therefore, has a lot of prospect, not only in alleviating under-nutrition and poverty but as a source of foreign exchange for Nigeria. Aquaculture can also provide a viable socio-economic alternative to capture fisheries.

Aquaculture can be operated either on a small scale, low cost, utilizing family labour or at high cost under intensive operation (Omitoyin, 2007). Apart from providing employment opportunities, it

also provides opportunities for both the poor and the rich to improve their standards of living.

VI. CONCLUSION

According to Tidwell and Allen, (2002) there are not too few fish-there are too many people. In view of the high demand for fish as an important delicacy in Nigerian meal and the Nigerian's domestic fish production is yet to meet up, the outlets are continually looking for high quality fish which gives an affordable source of protein to the people, create opportunity for business diversification and reduces importation of fish and fish products into the country.

Aquaculture is very profitable in Nigeria due to the diversity in the culturable species present in the country and its ability to yield between 30 – 100 percent return on investment in some very successful cases, which can be taken as a full time occupation or venture.

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