

Adoption Of Homestead Fish Farming: Panacea For Reduction Of Rural Poverty In Southeast, Nigeria

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Abstract—The study was carried out in Southeast Nigeria to identify how adoption of homestead fish farming could reduce poverty in south east, Nigeria. Current estimate puts the rural population of Nigeria at over 80% of the entire population of about 170million. The rural poor of southeast constitute 36% of this population. Adoption of homestead fish farming provides succor for rural poverty. A total of 270 respondents were selected for the study. Structured questionnaire and focused interview schedule were used to elicit information. Data generated were analyzed using descriptive statistics to describe socio-economic characteristics of the respondents while Gross Margin(GM) and Net Farm Income (NFI) were used to analyze the revenue from the result, 24.82% of the respondents were within the age of 40-49 with mean age of 48.31 years, 51.11% were males, 72.5% were married, majority (38.89%) had formal education, 40.74% with mean of 22.22 years had experience in fish farming. The Gross Margin was ₦137,989.42 while NFI was ₦44,538.76/ sale. Constraints militating against adoption of homestead fish farming for reduction of rural poverty as was revealed by the study include: lack of fund, high cost of feeds, lack of proven fingerlings. Investment in homestead fish farming will not only increase domestic fish production but can go a long way in reducing the whooping amount spent on fish importation especially in current economic predicament.

Keywords—Overview, Adoption, Homestead, Fish, Farming, Panacea, Reduction Rural Poverty

I. INTRODUCTION

In the 1960s, Nigeria made a breakthrough in agricultural production. Within this period, over 84% of Nigerian population was living above poverty profile line. Rural poverty, a dominant feature of life in all regions of the world affects the lives of nearly one

billion people. The rural poor constitute 36 percent of the population in developing countries while urban poverty is also a growing phenomenon [1]. Adoption of homestead fish farming can provide succor for rural poverty. Today a country that made such breakthrough in the agricultural sector is now a net importer of food. The current demand for fish is estimated at 1.55 metric tons and domestic fish production is about 511,000 metric tons. This presents an ugly picture of Nigeria as the largest importer of fish and fish products, which is estimated at 700,000 metric tons annually, amount to about N30 billion annually [2].

Homestead fish farming simply involves the production of fish in an enclosure environment such as ponds, which if adopted can reduce rural poverty. These ponds earthen or concrete must be located very close to a living environment. Fishes can be grown in these ponds singly (monoculture) or in combination with other species (polyculture) within a production period of 6-9 months to a marketable size [3]. of necessity in fish farming are site selection water supply in terms of quality and quantity, topography where a gentle slope for ease of draining where gradient is considered, dimension of 3m X 7m X 1.5m is required [3]. Catfish (*Dutch-Clarias/Heterobranchus*) which have known history of ability to grow very fast, high feed conversion efficiency, tolerance to poor water quality and acceptability to consumers. Stocking rate of 10 - 15 per square metre for water flow through system and 25-50 per square meters for water re-circulation system. Fishes in ponds feed on both natural fish food in the ponds (phytoplanktons) as well as supplementary feeds to enable them grow very well and mature to a reasonable size within the period of production [4]. Fishes can be fed twice or once daily with the adoption of either spot feeding/ broadcasting feeding method at a determined quantity based on the percentage body weight of the fishes (3-5%) [5],

Homestead fish production can be integrated with poultry production. This can be achieved by adopting the horizontal integration method or the vertical integration method. The horizontal integration involves the construction of both the poultry house and the fish pond close to one another, while the vertical integration involves the construction of the poultry house on top of the concrete fish pond. They are managed simultaneously with maximum utilization of wastes.

Homestead fish production is a source of protein. Nigerians are known to have high affinity for consumption of fish because fish is a source of high quality protein. FAO recommended minimum crude protein intake per head in developing countries like Nigeria is 65gms per caput/day, out of which 35gms (54%) must come from animal protein. According to [4], it is estimated that the current demand for fish is 1.55million metric tons and domestic fish production is about 511,000 metric tons. In order to reduce the alarming increase in fish demand as well as huge amount spent annually on fish importation, there is need to adopt homestead fish production. Fish production provides income, reduces poverty in both urban and rural areas, as well as increase the standard of living and generates employment [6];[7].

Contrary to expectation in many Nigeria homes, the percentage of animal protein in the daily total crude protein is estimated at about 9.75% out of which 94% is of fish protein [8]. These points to the fact that fish farming could be a means by which rapid transformation in animal protein consumption could be achieved in developing countries. For effective production, there is need to treat ponds to lime such as calcium carbonate (CaCO_3), quick lime (CaO), caustic lime calcium hydroxide (CaOH), organic and inorganic fertilizer where sufficient water is available and soils are suitably water retentive. The integration of aquaculture with agriculture could make a significant contribution to food supplies.

In response to a request by the Federal Government for the development of homestead fresh water fish culture, FAO in 1965 initiated development of brackish fish culture in Niger Delta. This was followed by a second in Lagos in 1968. There has since been a steady growth in the number of fish ponds and fish farms all over the country. Although, there is considerable potential for aquaculture in Nigeria, the present contribution to domestic fish production from this sector is still rather low. According to [9], out of the estimated annual production of 700,000 metric tons, less than 10% came from fish pond production.

The low contribution of fish farming is largely due to wide ratio of extension staff of 1: 25,000 to farm families[10]. Available records show that the rate of population growth by far exceeds the rate of food production. Nigeria finds it difficult to feed her population of 170million people. The situation has already reached a deplorable level that we can hardly survive without massive importation of rice and fish from other countries like India, Indonesia, Norway etc. Thus, the food situation in Nigeria should long cease to be a matter of mere academic rhetoric's. The staggering amount spent on mass importation has depleted our foreign exchange [11]. Before now, we had depended on protein of animal/ game which is now lacking in our daily food, or fish supply from natural water bodies.

Fish from natural water bodies have been on a steady decline because of increased demand arising from high population. The current demand for fish is estimated at 1.55 metric tons and domestic fish production is about 511,000 metric tons. This presents an ugly picture of Nigeria being the largest importer of fish and fish products, which is estimated at 700,000 metric tons annually, amounting to about ₦30 billion annually [4]. The main objective of this study is to determine how adoption of homestead fish farming can reduce rural poverty. Other objectives are to;

- i. Determine the socio-economic characteristics of the respondents,
- ii. Determine income from fish farming,
- iii. Determine constraints of fish farming in the study area.

There are presently over 200,000 homestead fresh water fish ponds covering an area of over 1000 hectares all over the country owned by communities, schools, co-operatives, universities and private individuals. Fish farming has been developed to alleviate the problem of protein scarcity, reduce vicious cycle of poverty among the rural dwellers. Fish culture in artificial water is one of the best ways of increasing production of protein more economically, source of way for improving income for low income class and complement opportunities for the unemployed. Normal fishes to be stocked include catfishes (*Dutch-clarias/Heterobranchus*) which have known history of ability to grow very fast, high feed conversion efficiency, tolerance to poor water quality and acceptability to consumers. Fish in the ponds feed on both natural fish food in the pond (phytoplankton) as well as supplementary feeds to enable them grow well and mature to a reasonable size within the period of production.

In homestead fish farming, farmers can formulate their own supplementary feeds using available low-cost agricultural by-products, such as wheat bran, corn waste, fish meal, soybean waste, groundnut wastes, bone meal, oyster shell, vegetable oil, vitamin premix etc at certain percentage inclusion. Homestead fish farming is an integral part of agricultural diversification and rural opportunities and other infrastructure are provided and maximum use made of land. The recent economic situation in Nigeria has created high and unacceptable rate of poverty which fish farming if adopted widely can help to reduce drastically. Fish produce is vital for their economies, in so far as it contributes to food security and to fight against poverty and may be an important source of income [12]. Aquaculture also contributes to human nutrition indirectly through the growth of unicellular algae (*algniates*) used in animal feeds [13]. According to [14], aquaculture provides a way of using agricultural waste to make marginal land more productive, provided that soil is water retentive.

II. MATERIALS AND METHODS

The study was conducted in South-East Agro-Ecological Zone of Nigeria. South-East is one of the six geopolitical zones of Nigeria and is made up of five states. It is located within latitudes 5°N to 6°N and longitudes 6°E to 8°E (Microsoft Corporation, 2009). The inhabitants are predominantly farmers who produce as subsistence level. The five states are Abia, Anambra, Ebonyi, Enugu and Imo. Using a multistage sampling technique, three states (Imo, Abia, Ebonyi) were randomly selected. Three agricultural zones according to the state Agricultural Development Programmes (ADPs) delineation were selected from each state and three extension blocks from each agricultural zone. Two circles were selected from each extension block while five farmers were selected each circle. This gave a grand total of 270 farmers. An interview schedule using questionnaire and focused interview were used to collect data. Data generated were analyzed using descriptive statistics in describing the socio-economic characteristics of the respondents while Gross Margin (GM) was used to analyze the cost and benefit of the enterprise.

III. RESULTS AND DISCUSSION

As shown in Table 1, 24.82 of the respondents were within the age of 40-49 years followed by those of 50-59 years (23.70%) 60 years and above (23.33%), 30-39 years (17.78%), and lastly 20-29 years (10.37%). The average age of the respondents was about 48 years, showing that there were a relatively high

proportion of middle aged fish farmers among the respondents. Moreover, the farmers were still in their active years, as majority (66.30%) of them were between 30 and 59 years, a situation that is likely to favor youths' participation in fish farming. About 51% of the respondents were males. This indicates that those who adopt fish farming are more males than females. This statement agrees with [4] who stated that women have been slower to take up fish farming than men. He further stated that women have more domestic and farming responsibilities and so have little time to spare. Table I further indicated that 38.89% had tertiary education, 20.74% had secondary education, 26.30% had primary education while 14.82% had no formal education. This means that majority of the respondents were literate as about 86% of them had one form of education or the other. A literate farmer will be better disposed to adopt new technologies. The high proportion of literate people among the farming population implies that majority of them are in a better position to be aware of, adopt and diffuse innovations. This assertion is in agreement with [15] who affirmed that education has always played a positive role in the adoption of improved technologies among farmers. Collaborating, [16] stated that farmers with educational background tend to be more technically equipped to adopt than those without formal education.

The Table 1 equally revealed that 27.78% of the respondents had 1-10 years of homestead fish farming experience; 31.48% had 11-20 years of experience, while 40.74% had 21 or more years farming experience. The mean years of farming experience was 22.22 years, implying that the respondents had long period of farming experience that will sustain fish farming in the area. The Table 1 also revealed that 72.59% of the respondents were married, 14.82% were widowed, 9.26% were single and 3.33% were either divorced or separated. This means that majority of the fish farmers in the study area were married, thus confirming the assertion of [17] who stated that majority of the rural farmers consisted of married people. This finding equally implies that offspring of married farmers will provide household labor force. This result corroborates the findings of [18].

The Table 1 further indicated that household size of 1-5 people were 37.78%, 6-10 members were 49.26% while those households with 11 persons or more were 12.96% of the respondents. The average household size was 7 persons. The table equally revealed that only 4.44% of the respondents were involved in formal or informal credit for their scale of operation while

majority (95.56%) of the respondents uses personal savings (equity fund).

Table 1: Distribution of Respondents According to Socio-Economic Characteristics (N= 270)

Variables	Percentage	Mean
Age (years)		
20-29	10.37	48.31 years
30-39	17.78	
40-49	24.82	
50-59	23.70	
60 and above	23.33	
Sex		
Male	51.11	
Female	48.89	
Marital Status		
Married	72.59	
Widowed	9.26	
Single	14.82	
Divorced/separated	3.33	
Formal Education		
Tertiary	38.89	
Secondary	20.74	
Primary	26.30	
None	14.07	
Fish Farming Experience		
1-10	27.78	22.22 years
11-20	31.48	
21 and above	40.74	
Household Size		
1-5	37.78	7 persons
6-10	49.26	
11 or more	12.96	
Source of fund		
Formal/informal	4.44	
Personal savings (equity)	95.56	

Source: Field Survey data, 2015

IV. COST AND RETURNS ON HOMESTEAD FISH FARMING

From the gross margin analysis, the result indicates that the major costs of fish farming came from the fixed cost items such as construction of the ponds and purchase of the fingerlings/juveniles. Table 2 revealed the cost and return analysis of fish farming in the study area. The amount spent on construction of ponds was ₦53,011.83 (38.30%), amount spent on stocking was

₦40,448.83 (29.22%), feed ₦53,000 (38.30%), drugs and medication ₦8,156.99 (5.89%). The total cost spent in the venture was ₦116,627.48. Total fixed cost formed the larger percentage (67.52%), and total variable cost was 28.29% of the total cost.

The total revenue from the sale of mature fish was ₦254,616.90. The gross margin and net farm income were ₦137,989.42 and ₦44,528.76 respectively and the profitability index was reasonable.

Table 2: Gross and Net Margin Analysis

Items	Value(₦)	% of TC
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Fixed Cost

Construction of pond	53,011.83	38.30
Animals	40,448.83	29.22
Total Fixed Cost (TFC)	93,460.66	67.52

Variable Cost

Feed	16,000	11.56
Drugs/ Medication	8,156.99	5.89
Labour	11,993.83	8.67
Cost of water supply	3,000.00	2.17
Total variable cost (TVC)	23,166.82	28.29

Total cost (TC)= TFC + TVC = ₦116,627.48

Total revenue (value of fish sold) = ₦254,616.90

Gross Return or TR = ₦254,616.90 (from farmers' record).

GM= TR- TC

₦254,616.90 – ₦116,627.48

GM= ₦137,989.42

NFI = GM- TFC

= ₦137,989.42- ₦93,460.66

= ₦44,528.76/ sale.

V. CONSTRAINTS OF HOMESTEAD FISH FARMING

Every agricultural enterprise has its own constraints militating against it. According to [19], lack of fund is a serious setback in fish farming. He enumerated other constraints to include: high cost of feed, lack of storage and processing facilities. He reiterated that lack of trained manpower with technical know how has led to some of the problems and failures in fish farming in southeast. Lack of proven fingerlings is the most limiting factor coupled with the fact that most fish that are cultured do not breed well in captivity. There is inconsistency in supply of fingerlings which affects the economy of the system as supply from the wild is prone to ecological disasters. Pollution is also a limiting factor especially for farmers in the southeast area which is a coastal area that are prone to runoffs, from industrial waste dumps and flooding. Above all farmers generally are treated as dregs of the society.

VI. CONCLUSION

The rural poor constitute 36 percent of the population in developing countries while urban poverty is also a growing phenomenon. Adoption of homestead fish farming can provide succor for rural poverty by improving the income as well as improve the livelihood/ standard of living of fish farmers/ fisher folk. It can also provide employment for people especially fish marketers/ fish mongers. Investment in homestead fish production will not only increase domestic fish production, improve fish availability in the diet, but can also go a long way in reducing the whooping amount spent on fish importation in this country as well as bridge the demand supply gap of domestic fish production in the study area. The

increasing demand for fish especially in the urban areas, fast food and eatery centers, and late evening drinking joints, means that there is likely to be a boom in aquaculture.

However, public and private sector roles in fish production need greater intensification. Storage facilities, credit facilities, proven fingerlings etc. should be provided to fish farmers in the study area to encourage those already in practice and would be fish farmers. Rural areas are baseline and cutting edge of economic development, incorporating fish farming into agricultural transformation agenda in the rural areas of south-east will boost rural economy and encourage rural capital retention. Nigeria's economic recovery programmes should necessitate a radical shift from total dependency on government for job to self-employment, especially now that revenue from oil sector is dwindling. Then, the need to re-focus on fish farming agriculture is of great importance.

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