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Impact assessment of aquaculture technology on income of homestead fish farmers in Kainji Lake Basin

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ABSTRACT: The need to make Nigeria self sufficient in fish production necessitated the development of aquaculture technology. This technology was disseminated with a view to boost productivity and increase the income of fish farmers. The present study is an attempt to assess the impact of aquaculture technology disseminated and adopted on income of homestead fish farmers in Kainji Lake Basin. The sample size of 21 respondents was selected from NIFFR list of contact farmers through a simple random technique in New Bussa. The instrument used for data collection was a structured questionnaire. Data were analysed using t-test, frequency counts and percentages of the respondents. The results showed that the majority (71.0%) of the respondents are middle aged, 81% were male, 76% were married and had higher education. The most important fisheries technology adopted by the farmers is natural fish food formulation. Fifty-seven percent of the respondents earned between N10,001 and N15,000 income from homestead farming. Thirty-eight percent indicated high cost of formulated fish feed as the most important problem encountered. There was no significant difference between the number of male and female fish farmers who adopt fisheries technology ($t = 0.038$, $p > 0.05$). It is recommended that adequate incentive and grants should be given to farmers to finance fish production.

Key Words: Aquaculture technology; Fish culture; Homestead fish farmers; Kainji Lake Basin; Nigeria.

Introduction

Aquaculture in Nigeria dates back to about 50 years (Miller, 2003). It was borne out of the need to check overexploitation of aquatic resources for the teeming population. Several studies have shown that farmers have adopted backyard fish farming commonly referred to as "homestead fish farming" and improved fisheries technologies (Otubusin, 1992; Okomoda et al., 1994).

Ayanda (2003) has shown that the level of aquaculture practices in Nigeria over the years has been extensive and semi-intensive. In spite of the development of fisheries technology and its adoption, the quantity of fish imported into the country in 2002 was 681,151.80 metric tonnes valued at US \$375,027,917.90, thereby making Nigeria the highest fish importer in Africa (Miller, 2003; Eyo, 2004).

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Improved fisheries technology is intended to increase productivity and the income earning capacity of fish farmers. According to the Federal Office of Statistics (1999), the decline in fish production in the country could be attributed to the low use of information and the improved technologies. The adoption of proven technology should increase fisheries output and household disposable income. In the last twenty years, the National Institute for Freshwater Fisheries Research (NIFFR) has developed a number of aquaculture technologies that were also disseminated within the Kainji Lake Basin area. The extent to which these technologies have increased the income of the fish farmers and the contribution to fish supply in the Kainji Lake Basin have not been assessed.

The objective of the present study is to assess the impact of aquaculture technology on the income earning of homestead fish farmers in the Kainji Lake Basin. In specific terms, the study is to: (i) determine some selected personal characteristics of the respondents in the study area, (ii) identify the various fisheries technologies adopted by the respondents; (iii) ascertain problems associated with adopted fisheries technology; and (iv) to find out income derived from homestead fish farming.

Materials and Methods

Study Area

Kainji Lake Basin lies within the Northern Guinea Savannah vegetation zone of Nigeria. It spans 1,270 sq. km in area (136 km long and 24 km wide) (Otubusin, 1989). The basin is surrounded by several villages and towns sparsely scattered within its shores. New Bussa, being the headquarters of Borgu Local Government, was purposively selected for the study because of easy accessibility and the demonstration ponds established by the NIFFR within the area in the 1980s. Borgu LGA has a population of 110,336 in 1991 census with a projection of about 144,770 in 2005 (National Poverty Eradication Programme, 2001).

Research Methodology

A total of 21 active fish farmers were randomly selected from the study area to form the sample size. A semi-structured questionnaire containing open and closed questions was used in gathering primary data. This was obtained by interview schedule. Data were analysed using simple percentages, frequency counts and t-test.

Results and Discussion

Selected personal characteristics of respondents

Table 1 shows that 81% of the fish farmers in the study area are males while 19% are females. The low percentage of female fish farmers could be attributed to limited access to information and credit facilities, among other factors. In fisheries, women are mainly involved in fish processing, fish mongering and fish marketing. This is in agreement with the findings of Uchola (2000) and Alama (1999) that women prefer marketing and distribution. Seventy-one percent of the fish farmers are middle aged (41 – 59 years) with the potential to sustain fish culture. This finding also suggests that the respondents are economically active and independent.

Seventy-six percent of the respondents have higher education which enable them to grasp the techniques of fish culture. Seventy-six percent are also married, a factor that has implication on the quantity of labour available for fish culture activities.

Fisheries technology adopted by the respondents

During the course of the study the aquaculture technologies disseminated include (1) fish breeding technology, (2) disease control and management, (3) water quality management, (4) fish feed formulation,

(5) natural fish food production and utilization, (6) integrated fish farming, and (7) fish processing and preservation. The various degrees of adoption of the technologies are shown in Fig. 1.

Twenty-nine percent of the respondents adopt natural fish food formulation while 5% each adopted integrated farming and fish processing/preservation. In fish culture, fish feeds account for about 60% of variable cost (Akiyama, 1998; cited by Eyo, 1989). This could be attributed to the fact that the majority of fish farmers resort to adopting natural fish food formulation. The use of natural fish food reduces the high cost of procuring conventional feed since natural food is sourced locally. The low level of adoption of integrated fish farming and fish processing/preservation cannot be easily explained. However, an appreciable number of the fish farmers adopt technologies such as feed formulation (24%), disease control management (14%) and water quality control management (14%).

Income derived from homestead fish farming

Fifty-seven percent of the respondents earned between ₦10,001 and ₦15,000 from homestead fish farming (Fig. 2). The low income level derived could be attributed to the subsistence level of aquaculture production in the study area.

Table 1: Distribution of respondents according to selected personal characteristics.

Characteristics	Variable	Frequency	Percentage
Sex	Male	17	81.0
	Female	4	19.0
	Total	21	100.0
Age	Below 19	0	0
	20 – 39	3	14.3
	40 – 59	15	71.4
	Above 60	3	14.3
	Total	21	100.0
Marital Status	Married	16	76.2
	Single	2	9.5
	Divorced	1	4.8
	Widowed	2	9.5
	Total	21	100.0
Educational Background	Non-formal	1	4.8
	Koranic	1	4.8
	Elementary	0	0
	Secondary	3	14.3
	Higher Education	16	76.1
	Total		100.0

- Fish breeding
- Disease control management
- Water quality management
- Fish processing and preservation
- Feed formulation
- Natural fish food formulation
- Integrated fish farming

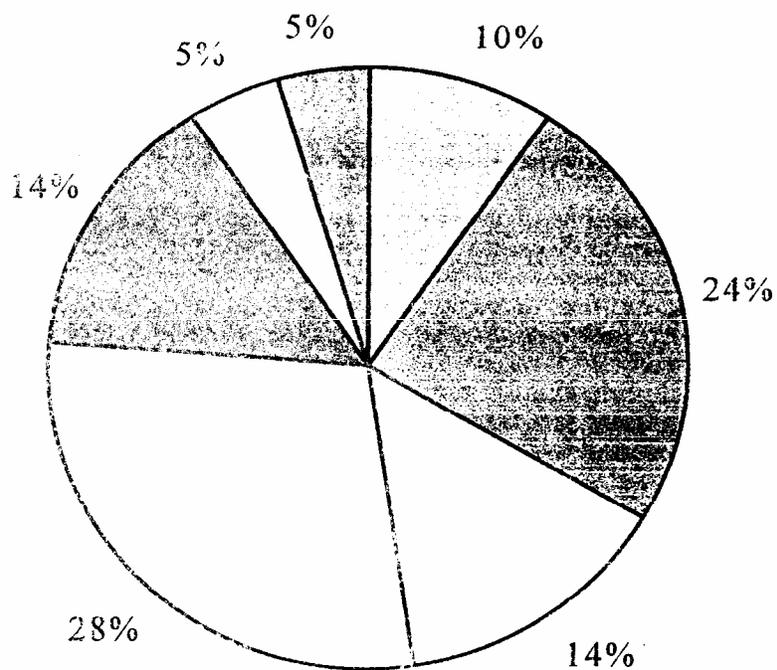


Figure 1: Percentage level of fisheries technologies adopted from extension agent

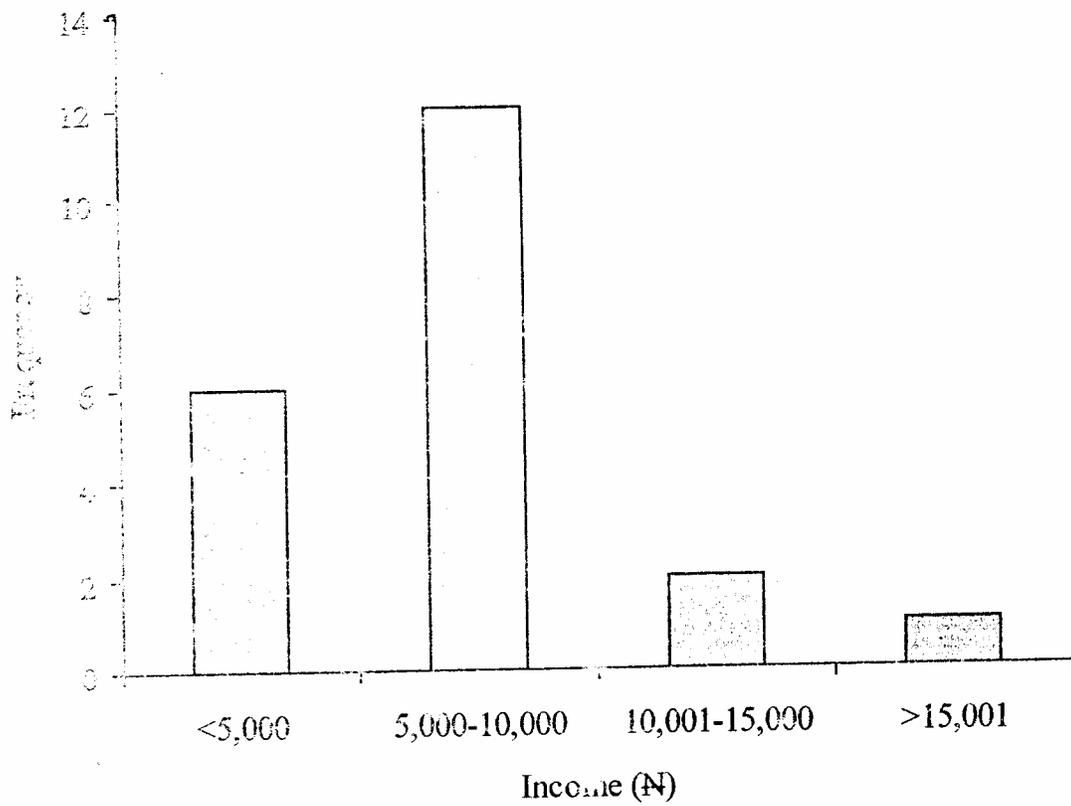


Figure 2: Frequency of income (₦) derived from homestead fish farming

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- Fingerlings are not always available
 - Lack of finance for production
 - Costly formulated feed
 - High cost of fingerlings
 - No information from ADP & extension agents

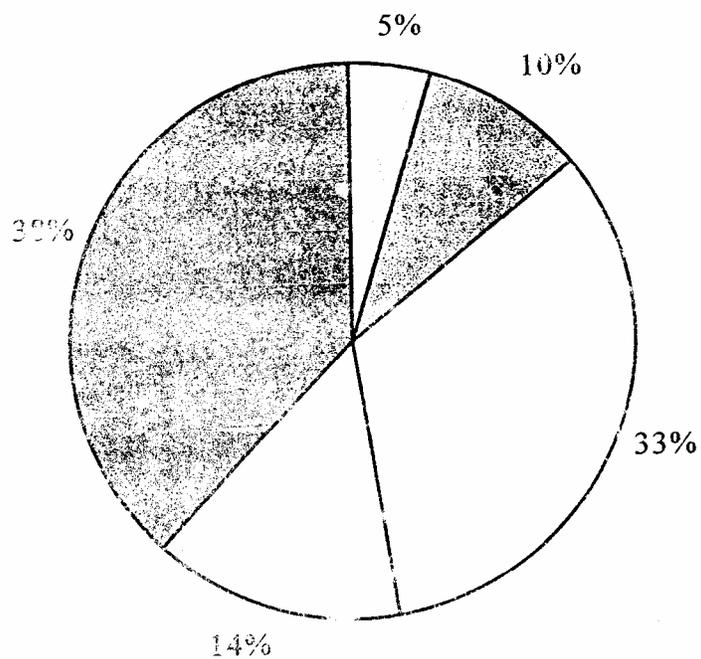


Figure 3: Percentage level of problems associated with adopted fisheries technology

Problems associated with adopted fisheries technology

Figure 3 shows that the most important problems faced by the respondents are the high cost of formulated feed (38%) and lack of finance (33%). This could be attributed to the low level of income among the respondents. High cost of inputs, lack of capital and credit facility has been found to be the primary constraints facing fisherfolks (DFID/FAO, 2004).

The least important problem faced by the respondents is inadequate fingerlings (4%). This could be attributed to the activities of NIFFR in producing and distributing fingerlings to interested fish farmers in the study area.

Conclusions and Recommendations

In spite of the various aquaculture technologies adopted by the fish farmers, a lot still has to be done in order to fully realise the advantage accruable from fish farming in the study area. However, the high cost of formulated feed is a major problem faced by the fish farmers. The following are therefore recommended as solutions to the problem: (1) Adequate incentives and grants should be given to the farmers to finance fish production; (2) Encouraging the formation of credit and cooperative societies among the fish farmers to enable them source for funds; (3) Intensification of the efforts of extension agents towards encouraging fish farmers on the benefits of adopting aquaculture technology.

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