EFFECT OF SOCIO-ECONOMIC VARIABLES ON THE PROFIT LEVELS OF HOMESTEAD CATFISH FARMERS IN EDO STATE, NIGERIA

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ABSTRACT

This study was carried out to investigate the effect of socio-economic variables on the profit levels of homestead catfish farmers in Edo State, Nigeria. Multistage random sampling technique was used to select agricultural blocks, circles and catfish farmers. Data were collected using a structured questionnaire administered to sixty catfish farmers. A multiple regression analysis (double-log function) result showed that variable input, farming experience, amount invested, fish pond size, and number of fish ponds had positive effect on the profit levels of homestead catfish farmers. The combined effects of explanatory socio-economic variables (fixed inputs, variables inputs, household size, level of education, fish farming experience, amount invested, fish pond size, number of fish ponds and labour) explained 77.9% of the total variation in the profit levels of homestead catfish farmers, which were statistically significant at 1.0% probability level. Unimproved fingerlings and irregular supply of feeds and fingerlings were the major problems encountered by the farmers. Subsidies on variable inputs, low interest rates on intending catfish farmers and distribution of hybrid fingerlings were recommended to boost production.

Key-words: *Socio-economic, homestead farming, catfish production. Edo State*

INTRODUCTION

The aim of fish culture (husbandry) or farming is generally for fish production for human consumption. Fish farming is a technique of hunting or gathering of natural stocks from the wild or confining them into enclosures for production (Acosta *et al.,* 2006). Fish farming is a relatively new study in agriculture. It is about 50 years old in Nigeria (Olukunle, 2004; Olagunju *et al.,* 2007), with establishment of a small experimental station at Onikan Lagos and an industrial farm about 20 hectares at Panyam, Plateau State by the Federal Government. In the past, rural farming in Africa concentrated on tilapia because its production is cheaper, but the returns from tilapia farming is not as much as catfish which is a fast growing fish (Olakunle, 2004). The most commonly cultured species in Africa include *Clarias gariepinus* and *Heterobrunchus species*. In

the past 30 years, the global appetite for fish has doubled from 45 million metric tons in 1973. Total fish production jumped to more than 91 million metric tons in 1997 (Delgado *et al.,* 2003). A temporal trend in fish production in Nigeria between 1991 and 2000 showed that there was a general increase in the rate of local fish production and fisheries products. In 1991, about 252,340 metric tons of fish was produced, which in the year 2000, local production totaled 467,095 metric tons of which 94.5% was obtained from fisheries and 5.5% from fish farming (FAO, 2002).

In recent years, there has been increase in demand for sea food that exceeds supply. Total production of fish per annum in Nigeria is about 452,146 metric tons, while demand on the other hand is about 2,168,000 metric tons (FAO, 2002). The global appetite for fish and fisheries products has continuously increased (Delgado *et al.,* 2003; Kapedi, 2002). About one billion people worldwide rely on fish for their major source of animal protein (FAO, 2001). Fish forms at least 50% of the essential protein and mineral intake for 400 million people from the poorest African and South Asian Countries (World Bank, 2004; FAO, 2007). The protein demand for fish accounts for about one fifth of world total supply of animal protein has risen five fold over the last 40 years from 20 million metric tons to 98 million metric tons in 2003 (Flake and Nzeka, 2007). Fish farming generates employment directly or indirectly in terms of people employed in the production of fishing output and allied business. It also generates income for all categories of people involved in fish farming and thus contributes to the national income (Olagunju *et al.,* 2007; Onu and Unaeze, 2009).

The consumption of fish in the developing countries is low, despite the rapid growth of fish consumption in the developing countries, the per capita consumption was lower than in the developing countries in 1990 (FAO, 2000). The

recommended quantity of animal protein by FAO per person is 35 grams, but less than 7grams is consumed on the average in Nigeria. As a result of this, many Nigerians suffer from protein deficiency disease due to low protein intake. The shortage of the fish protein source in Nigeria may have been responsible for the importation of the product in the country. Total fish production from all sectors in Nigeria does not exceed 600,000 metric tons per year while fish demand is above 1.5 million metric tons per year. There is demand deficit of 0.9 million tons per year in a population growing at an estimated 2.5% annually (Ezenwa, 2006). Flake and Nzeka (2007) observed that there has been importation of frozen fish to augment domestic fish production. According to their study, majority of the fish consumed in Nigeria is imported. The country's fish production in 2006 was 1.5 metric tons (valued at US$1.7 billion), about 800,000 metric tons of this valued at approximately $900 million were imported. Increased demand for fish products and together with declining inland and marine fisheries calls for alternative ways of boosting output of fish (Amaefula *et al.*, 2009; 2010). Fasasi (2003) stated that the demand - supply gap of fish production in Nigeria is 1.0 million metric tons, while fingerlings demand - supply gap is over 500 million.

Since there is growing demand for protein food in Nigeria, farmers have resorted to growing of culture fisheries in Nigeria, Edo State in particular. Fish production in Nigeria is no where near optimum when compared with the positive national endowments of Nigeria for greater fish production. Being tropical, Nigeria has virtually uninterrupted year round environmental conditions for the growth of fish and other aquatic organisms (Amaefula *et al.*, 2010). Edo state is a natural habitat for fresh water fish and other aquatic organisms. There is abundant rainfall, effective harvesting and storage of surface water run-off which has made it suitable for catfish production. Despite this, the area is still faced with low productivity (Adikwu, 1999). Evidence has shown that profitability of catfish is highly influenced by socio-economic determinants of farmers. It is on this background that this study was specifically designed to:

Describe the socio-economic characteristics of catfish farmers in the study area.

Determine the effect of socio-economic variables on the profit levels of the farmers.

Identify the problems encountered by catfish farmers in the study area.

It was assumed that profit levels of homestead catfish farmers is positively related to level of education, farming experience, marital status, age of farmers and negatively related to number of ponds and labour used.

METHODOLOGY

The study was carried out in Edo State. The state is one of the major fish producing states in Nigeria and had a land area approximately 19,281.93km^2 with a population of 3,218212 people (NPC, 2006). Edo state is located between Latitude 6^0 20^1 N and Longitude 5^0 36^1 E of the Greenwich Meridian. The state experiences two distinct peaks of rainfall annually, one in June and the other in September. The rainfall is between 1,500mm to 3000mm and temperature of 18^{o}C to 35^{o}C. The State is divided into three agricultural zones namely, Edo Central, Edo South and Edo North. A multistage random sampling technique was used in the selection of agricultural blocks, circles and catfish farmers. First, two blocks were randomly selected from each of the three agricultural zones vis-a-viz Oredo and Ikpoba Orha (Edo central); Ekpoma and Iguaben (Edo South) and Okpella and Auchiestako central (Edo North). This gave a total of 6 blocks. Also, two circles each were randomly selected from the six blocks which gave a total of twelve circles. Finally, five catfish farmers were randomly selected from the twelve circles which summed up to a total of sixty catfish farmers. Descriptive statistics such as frequency, means and percentages were used to realize objective 1 and 3, while multiple regression analysis was used to achieve objective 2.

Model Specification of Multiple Regressions

The model is specified implicitly as:

$$Y = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8)$$

Where Y = the profit level of fish farmers

X_1 = fixed input (N).

X_2 = variable inputs (N).

X_3 = Level of education (Years).

X_4 = Fish farming experience (Years).

X_5 = Amount invested (N).

X_6 = Labour (family or hired in man days).

X_7 = Fish pond size (hectares).

X_8 = Number of fish ponds in the farm (N).

E_i = Stochastic error term.

Nwaobiala *et al.*, (2009) adopted these functional forms which were expressed thus:

i. LINEAR FUNCTION

$$Y = b0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + ei.$$

ii. SEMI LOG FUNCTION

$$Y = Lnb0 + b_1Lnx_1 + b_2Lnx_2 + b_3Lnx_3 + b_4Lnx_4 + b_5Lnx_5 + b_6Lnx_6 + b_7Lnx_7 + b_8Lnx_8 + e.$$

iii. EXPONENTIAL FUNCTION

$LnY = b0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8$

iv. DOUBLE LOG OR COBB-DOUGLAS FUNCTION

$LnY = b0 + b_1Lnx_1 + b_2Lnx_2 + b_3Lnx_3 + b_4Lnx_4 + b_5Lnx_5 + b_6Lnx_6 + b_7Lnx_7 + b_8Lnx_8 + ei.$

RESULTS AND DISCUSSION

Socio-economic Characteristics of Homestead Catfish Farmers.

The results in Table 1 revealed that majority (68.33%) of the respondents were males while 31.6% were females. This implies that men were capable of handling fisheries activities than the females. This may be due to the vigorous nature of the business (Eze *et al.*, 2008). Majority (40.0%) of the respondents were in the age range of 51-60 years, while 11.66% fall in the range of 61-70 years. This implies that young and energetic youths in the study area seen not to be actively involved in homestead fish farming. This result agrees with Ezike and Adedeji (2010) who affirmed that fish farming is usually dominated by matured men. The result also indicates that majority (48.33%) of the respondents acquired secondary education, followed by tertiary education

Table 1: Socio-economic Characteristics of Homestead catfish farmers in Edo State, Nigeria. N = 60

Variables	Frequency	Percentage
Gender		
Males	41	68.33
Females	19	31.67
		100.00
Age (years)		
20-30	4	6.67
31-40	5	8.33
41-50	20	33.33
51-60	24	40.00
61-70	7	11.67
		100.00
Educational level		
No formal education	6	10.00
Primary education	14	23.33
ondary education	29	48.33
Tertiary education	11	18.34
		100.00
Fish farming experience		
1-5	3	5.00
6-10	26	43.33
11-15	27	45.00
16-20	4	6.67
		100.00
Fish pond size		
Small size($10m^2 – 87.8m^2$)	10	16.67
Medium size ($90.4m^2 – 175.6m^2$)	37	61.67
Large size ($178m^2 – 276m^2$)	13	21.66
		100.00
Number of ponds		
1-2	3	5.00
3-4	50	83.33
5-6	7	11.67
		100.00

Amount invested (N)		
200,000-250,000	3	5.00
251,000-300,000	4	6.67
301,000-350,000	5	8.33
351,000-400,000	14	23.33
401,000-450,000	24	40.00
451,000-500,000	10	16.67
		100.00

Source: Field Survey, 2010.

(18.33%). This result is in consonance with Olagunju *et al.,* (2007) findings on socio-economic characteristics of catfish farmers in Oyo State which showed that 63.3% acquired secondary education. The study further reveals that 45.0% of respondents had between 11-15 years of fish
farming experience, while 43.34% had 6-10 years experience. The level of experiences that an individual acquires in any business will help boost production (Onu and Unaeze, 2009). Also, majority (61.67%) of the fish farmers produced catfish in medium size ponds ($90.4m^2$ – $175.6m^2$), while majority (83.33%) had fish ponds ranging between 3- 4. Eze and Onuoha (2009) affirmed that, larger fish ponds encourage higher stocking rates which lead to increased productivity of the enterprise. Analysis revealed that 40.0% of the respondents used the amount of ₦401,000 - ₦450,000 as their initial capital. The result agrees with Onu and Unaeze (2009) who stated that the amount invested for the take off of any business may have been responsible for the scale of fish farm size in Rivers State, Nigeria.

Socio-economic factors affecting the profitability of homestead catfish farmers in Edo State, Nigeria.

Table 2 shows the regression model of the profitability of homestead catfish production in Edo stage. All the functional forms were significant at 1.0% risk level, implying that any of the functions can be used to estimate the variation in profit levels of homestead catfish farming. However, the profitability of homestead catfish production was best estimated using the double-log function, which explained 77.9% of the total variation in profit level of homestead catfish farmers at 1.0% significant level. Also, the double-log regression functional form was chosen as the lead equation based on econometric and statistical reasons such as the number of regression coefficients that are significant and the significant level of the F-ratio.

Specifically, the coefficient of the variable input (4.826) is positive with standard error of 2.854. This variable is statistically significant at 1.0% level of probability. Its positive sign implies that increase in the quantities used of this input would result to increase in output which would translate into increased profit. This result agrees with Nwachukwu *et al.,* (2009), where they asserted that, the larger the farm, the more quantity of inputs that would be needed by the farmers. Farming experience with coefficient of 1.397, with standard error (10.411), shows that the variable is statistically significant at 1.0% probability level. The implication of this result is that as fishing experience increased, output would increase, hence will lead to increase profitability (Eze and Onuoha, 2009). Amount invested has a coefficient of 3.748 with standard error of 4.361 and is statistically significant at 1.0% level of probability. This result is in consonance with prior

expectation. The implication is that amount invested increased the profit level of catfish farmers in the study area. This result agrees with Nwaobiala (2010), where output and profit levels of small holder rice farmers related positively with the amount invested in the enterprise. Fish pond size coefficient is 7.560, with standard error of 2.891, implies that it is statistically significant at 1.0% level of probability. Its positive sign implies that as the size of the pond increased, it may require increased stocking rate, which will lead to increased output and perhaps profit. This result agrees with Oputa (2005 who observed that the larger the farm, the more the quantity of inputs that will be consumed by the farmer. Number of fish pond posted a coefficient of 0.644 with standard error of 0.531 and is statistically significant at 5% level of probability. The positive coefficient signifies that an increase in the number of ponds would lead to increased output, which in turn increases the profit level of fish farmers (Mensahad and Antiwo, 2002).

Table 2: Estimate of Factors Affecting the Profitability of Homestead Catfish Farming in

Edo State, Nigeria.

Variable	Linear	Exponential	Semi-log	Double-log+
Constant	12.486 (0.504)	4.252 (0.561)	-2.392 0.125)	16.332 (1.391)
Fixed inputs (X_1)	0.456 (0.486)	6.610 (2.960)	-0.270 (-1.173)	1.014 (0.654)
Variable inputs (X_2)	1.153 (8.479)***	5.492 (2.804)***	2.368 (2.313)**	4.826 (2.854)***
Household size (X_3)	-0.046 (-0.409)	0.013 (-0.319)	-0.657 (-0.854)	-3.174 (1.313)
Level of Education (X_4)	-0.001 (-0.658)	-0.000 (-0.544)	1.462 (4.020)***	0.321 (0.348)
Fish farming experience (X_5)	-0.002 (-0.282)	0.000 (-0.243)	-3.679 (-0.4171)	1.397 (10.411)***
Amount invested (X_6)	-0.274 (-0.163)	-0.167 (-0.173)	-4.341 (-0.653)	3.748 (4.361)***
Fish pond size (X_7)	-0.085 (-0.347)	0.060 (-0.467)	0.307 (-0677)	3.748 (2.891)***
Number of fish ponds (X8)	-8976 (-0.354)	-2.264 (0.330)	-3.274 (0.020)	0.644 (0.530)**
Labour Man days (X_9)	-0.454 (-0.176)	-0.167 (0.173)	-0.321 (0.534)	-3.648 (-4.741)
R^2	0.633	0.564	0.534	0.779
F-Ratio	4.376***	2376***	10.056***	20.841***

Source: Field Survey, 2010.
Values in parenthesis are t-values.
*** Significant at 1% level, ** significant at 5% level
+ = lead equation.

The result in Table 3 shows that majority of the respondents (70.0%), claimed that unimproved fingerlings is their major problem, while 40.0% identified poor quality feeds as another problem. 33.33% and 26.67% of the catfish farmers ascribed that irregular supply of feeds and fingerlings and government policy on fisheries development are their problems respectively. Finally, 16.67% of the respondents identified poor water quality as their problem as a result of water salinity.

Table 3: Problems Encountered by Respondents on Homestead Catfish Farming in Edo State, Nigeria.

Categories of problems	Frequency	Percentage (%)
Poor water quality	10	16.67
Poor quality feeds	24	40.00
Irregular supply of feeds and fingerlings	20	33.33
Government policy on fisheries development	16	26.67
Unimproved fingerlings	42	70.00

Source: Field Survey, 2010.
* Multiple responses recorded

CONCLUSION

The result of effect of socio-economic variables of homestead catfish farmers profit levels in Edo State showed that variable input, farming experience, amount invested, fish pond size and number of fish ponds had positive influence on catfish farmers' profit. The revenue of the catfish farmers investigated improved with the extent the resources were utilized. The higher their pond size, number of ponds and farming experience, the more the accruable revenues.

RECOMMENDATIONS

Government should give incentives to catfish farmers in order to bridge the gap between demand and supply of proteins in the diets of Edo State inhabitants. Subsidies on variable inputs from Governments such as fingerlings and feeds are advocated to boost catfish production. Young and energetic youths should be encouraged to engage in catfish farming especially around their homes. Funding from relevant agencies and other stakeholders should be intensified to produce early maturing fingerlings. Loan facilities should be made available to the catfish farmers at low interest rates by relevant financial institutions in order to create employment.

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