

SOCIO-ECONOMIC FACTORS INFLUENCING THE OUTPUT OF CATFISH FARMERS IN CHANCHAGA LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA.

¹Muhammed*, Y., ¹Muhammad, H. U., ¹Ajogwu, C. E., ²Umaru, A. and S. ³Jibrin

1. Department of Agricultural Extension and Rural Development,
Federal University of Technology, Minna, Niger State

2. Department of Agricultural Economics and Extension Services,
Ibrahim Badamosi Babangida University, Lapai, Niger State

3. Department of Agricultural Extension and Management
College of Agriculture, Mokwa, Niger State, Nigeria

*Corresponding Author's E-mail address: mohd.yak@futminna.edu.ng GSM: +2348036576697

ABSTRACT

This study determined the socio-economic factors influencing the income of catfish farmers in Chanchaga Local Government Area of Niger State, Nigeria. Data were obtained using a structured questionnaire complemented with an interview scheduled. Out of 80 questionnaire administered, only 77 questionnaire were returned by the respondents. The data collected were analyzed using descriptive statistics (frequency counts, percentage and means) and inferential statistics (Ordinary Least Squares (OLS) regression analysis) as well as farm budgeting technique. The result of the socio-economic characteristics of the farmer revealed that most (57.2%) of the respondents were between 26 - 55 years of age with mean age of 34 years, while 58.4% were males and 54.5% were married. The mean household size was 4 people, while mean farming experience was 6 years. Majority (84.4%) of the respondents acquired tertiary education implying high level of education. The costs and returns evaluation result revealed that the respondents incurred more expenses in labour (₦30,150.00) aside the fixed cost (₦55,630.00). The return from catfish production in the study area was ₦223,176.00 with a profitability and efficiency ratio of 1.14 and 2.14%, respectively. The OLS result revealed that age, education and experience of the respondents found to be positive and statistically significant at 1% and 5% level of probability, respectively, have a direct influence on the income of catfish farmers. The majority (63.6%) of the respondents identified inadequate farm for fishing which ranked 1st among others as the constraint faced in catfish farming. It was concluded that the catfish farmers were making reasonable income from catfish farming. Therefore, it was recommended that Government and relevant stakeholders should partner to formulate policies that will enhance and guide job creation through catfish farming in order to reduce over-dependency on fish importation.

KEYWORDS: socio-economic, catfish farmers, income

INTRODUCTION

Agriculture is very important in the economic development of a nation. It plays a vital role in alleviating poverty of a country and serves as a

useful key to human survival (International Fund for Agricultural Development (IFAD), 2007). Fish is the cheapest source of animal protein consumed by the average Nigerian, accounting for about 40% of the total protein intake (Atanda, 2007). Fish farming falls under the animal production sub-sector of agriculture which can also be described as aquaculture.

Food and Agriculture Organization of the United Nations (FAO/UN) (2011) defined aqua-culture as the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants with some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding and protection from predators. There are various stages of aqua-culture operations including hatchery operations, nursery operations and grow-out operation which farms fingerlings or juveniles to marketable sizes. Depending on the species being farmed, aquaculture can be carried out in freshwater, brackish water or marine water. It can be extensive, semi-intensive or intensive, depending on the level of input and output per farming area and the stocking density (Akankali and Jamabo, 2011).

Catfish farming is the most lucrative and under exploited fish farming business in Nigeria (Ejiola and Yinka, 2012). Catfish is a profitable and fast-growing business because it can easily adapt to an artificial environment (like tanks and ponds), withstand long distance transportation shock and have a high market demand because of its high proteinous content (Akinrotimi *et al.*, 2009). Nigerians are large consumers of fish and it remains one of the main products consumed in terms of animal protein. However, only around 20% of demand for fish is currently being met by local supply (Ejiola and Yinka, 2012). The fisheries sector is estimated to contribute 3.5% of Nigeria's gross development product (GDP) and provides direct and indirect employment to over six million people (Ejiola and Yinka, 2012).

According to the Federal Government of Nigeria (FGN) (2014), production of catfish stood at about 0.78 metric tonnes, with an estimated domestic demand of about 2.66 metric tonnes, thereby leaving an estimated shortfall of about 1.8 metric tonnes. This shortfall is supplemented by imports of frozen fish from Europe, Latin America and Eastern

countries. Nigeria spent over ₦100 billion on the importation of over 780,000 metric tonnes of frozen fish in 2010 (FGN, 2014). The shortfall of fish supply in the country has led to a low annual per capital fish consumption rate of only 7.5 kilogrammes as against 15 kilogrammes per annum as recommended by the Food and Agriculture Organization (FAO, 2009). Therefore, there is need for the country to turn to their under-utilized inland water to improve fish production. This is necessary to meet up with the shortfall in fish demand and reduce importation of frozen fish. This will help save cost in foreign exchange and impact positively on the well-being of fish farmers especially in study area.

It is as a result of the aforementioned that this study was conceived to determine the socio-economic factors influencing the income of catfish farmers in Chanchaga LGA of Niger State; hence the following research objectives:

- i. describe the socio-economic characteristics of catfish farmers in the study area,
- ii. examine the cost and returns of catfish farmers,
- iii. determine the socio-economic factors influencing the income of catfish farmers, and
- iv. identify the constraints faced by the catfish farmers in the study area.

METHODOLOGY

The study was conducted in Chanchaga Local Government area of Niger State. Chanchaga is one of the 25 LGAs in Niger State. It is located between latitude 9° 36' 50" North and longitude 6° 33' 2" East of the equator. The LGA has a population of about 202,151 people with a total land mass of about 72km² (National Population Census (NPC), 2006). However, the projected population as at 2017 using growth rate of 3.2% was 285,860 people. Annual temperature ranges between 27°C to 33°C with an average temperature of 30°C, while the pH varies from 6.6 – 9.5 with a mean value of 7.8 which is good for agricultural practices. The State is dominated by sandy-loam soil and the vegetation zone is typically Guinea Savannah. The major languages of the LGA are Hausa, Gwari, Nupe, Yoruba and Igbo, while mineral resources are Marble and Gold.

Multi-stage sampling technique was adopted in selecting respondents in the study. The first stage was purposive sampling of 4 wards based on the dominance of catfish farming. In the second stage, 2 communities were selected at random from the wards to give 8 communities. In the third and last stage, 10 catfish farmers were randomly selected from each of the communities to give a total sample size of 80 catfish farmers. Primary data were collected using structured questionnaire to obtain first-hand information from the respondents in the study area. Other relevant information were sourced from published journal articles, textbooks and internet.

Descriptive statistics (frequency count, percentages and mean) and inferential statistics (Ordinary Least Square (OLS) regression analysis) were used to achieve the objectives. Farm budgeting technique was also used to analyze cost and returns of the respondents.

Model specifications

Farm Budget Technique

The farm budget tools or budgetary technique involves the cost and return analysis. The analyses comprises the Fixed Cost (FC), Variable Cost (VC), Total Cost (TC), Total Revenue (TR), Gross Margin (GM) and Profit.

$$TC = TVC + TFC.$$

$$TR = P * Q \text{ (P = Price and Q = Total output (kg))}$$

$$GM = TR - TVC$$

$$\text{Profit} = GM - TFC \text{ or } TR - TC$$

In addition, the following profitability ratio was also determined such as:

$$\text{Benefit cost ratio (BCR)} = \text{Total revenue} / \text{Total cost}$$

$$\text{Gross ratio} = \text{Total Cost} / \text{Total revenue}$$

$$\text{Rate of Return} = \text{Net return} / \text{Total cost}$$

Ordinary Least Square (OLS) Model

The Ordinary Least Square (OLS) was employed to determine the socio-economic factors influencing the income of catfish farmers. The OLS model was specified in its implicit form as follows

$$Q = f(X_1, X_2, X_3, X_4, X_5, X_8)$$

The model in its explicit form is presented as:

$$Q = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + e$$

Where;

Q = catfish output measured in Naira (₦)

X₁ = Age (years)

X₂ = marital status (dummy: male = 1, otherwise = 0)

X₃ = Household size (number)

X₄ = Educational level (years of schooling)

X₅ = Farming experience (number of years)

X₆ = Access to credit (₦)

X₇ = Extension visit (number of visit)

X₈ = Cooperative (number of members)

β₀ = Constant

β₁ – β₈ = Coefficients of the independent variables

X₁ – X₈ = Independent variables

e = error term

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Table 1 shows that more than half (57.2%) of the respondents were within the age group of 26 to 55 years with mean age of 34 years. This implies that the respondents were young and actively involved in catfish farming. This finding agrees with the work of Adewumi and Olaleye (2011) who reported that the youth are actively involved in catfish farming in their study area. Most (58.4%) of the respondents were male, while 41.6% were female. This implies that there were more male involved in catfish farming than female in the study area which could be because catfish farming require both physical and mental skill

with much time and energy requirement which many women do not have the capacity. This finding is in line with Brinker (2009) which says that male are actively involved in catfish farming nationwide because of the stress involved in production of catfish. Furthermore, the result shows that more than half (54.5%) of the respondents were married implying that matured and responsible people are into catfish production in the study area. It is also a means of providing family labour through procreation in order to minimize the cost of hired labour. According to Ajayi *et al.* (2016), marriage is highly cherished in our society because it confers some responsibility to individuals.

In terms of household size, majority (75.3%) of the respondents had household size between 1 – 5 people with mean household size of 4 people. This implies that the respondent had few household sizes which could help in fish farming activities. This is in agreement with Olorunshola (2014) who posited that household size has a great role to play in family labour provision in the agricultural sector. Majority (84.4%) of the respondents acquired tertiary education implying high level of illiteracy in the study area. Educated individual are involved in catfish farming which could be associated with unavailability of white collar job, hence the need to engaged themselves positively. This finding is in agreement with the work of Ajayi *et al.* (2017) who reported that the respondents in their study area were educated with majority attaining tertiary education. More so, majority (85.7%) of the respondents had fish farming experience between 1 – 5 years with mean age of 6 years. This implies that the respondents have been relatively into catfish farming for few years.

Costs and Returns of catfish farmers

Farm budgeting technique was used to examine the cost and returns of the catfish farmers in the study area as presented in Table 2. This encompasses the gross margin, net farm income, the revenue and total costs (variable and fixed cost). The result shows that the average variable cost per annum for the catfish farmers was ₦48,980.00 representing 46.8% of the total cost, while the fixed costs of the catfish farmers ₦55,630.00 representing 53.2% of the total cost. Among the variable cost of catfish production, cost of labour (₦30,150.00) representing 28.9% constitute the highest cost incurred by the farmers, followed by cost of purchasing fingerlings (₦10,678.00) representing 10.2% of the total production cost. Other costs incurred include cost of medication (₦3,470.00) and cost of feeding ₦4,592.00 representing 3.3% and 4.4%, respectively. This implies that labour usage recorded highest variable costs incurred in catfish farming by the respondents in the study area. Therefore, the total revenue for catfish farmers in the study area was ₦223,176.00 per annum, while the gross margin and net farm income was ₦174,286.00 and ₦118,656.00 per

annum, respectively. The profitability ratio and efficiency ratio was reported to be 1.14 and 2.14, respectively, implying catfish production is profitable in the study area.

Socio-economic factors influencing income of catfish farmers

Ordinary Least Square (OLS) regression analysis was used to determine the socio-economic factors influencing income of the catfish farmers in the study area and the results are presented in Table 3. The empirical results of the OLS regression shows the coefficient of determination (R^2) value of 0.5231 which implies that about 52% variation in the income of the catfish farmers was explained by the independent variables included in the model. From the t-value of the regression, three variables out of the nine independent variables in the model were found to be significant at 5% and 1% level of probability. Age, education and experience of the respondents were found to be positive and statistically significant at 1% and 5% level of probability, respectively. This implies that these variables have a direct and statistical influence on the income of catfish farmers in the study area.

The age has positive coefficient (2.822) and statistically significant at 1% level of probability. The positive coefficient with respect to age implies that age has direct influence on the income of catfish farmer; as the age of the respondent increases, the income also increases while other variables are held constant. Furthermore, the education has positive coefficient (2.19) and statistically significant at 5% level of probability. The positive relationship with respect to educational level implies that the higher the level of education of the respondent attained, the higher the income level in catfish farming. Experience is another socio-economic factors that has positive coefficient (2.12) and statistically significant at 5% level of probability. This implies that the higher the experience of the catfish farmers, the higher the income realized from catfish farming. This finding is in agreement with the work of Fara and Bahman (2013) who reported that education, age, experience and limited capacity of extension workers are the main factors influencing income of the fish farmers in their study area.

Constraints faced by the respondents

Constraints are element, factor or subsystem that restricts an entity, project or system from achieving its potential or higher level of output with reference to its goal. Table 4 shows the distribution of respondents based on the constraints faced in catfish production in the study area. Majority (63.6%) of the respondents identified inadequate farm for fishing, followed by 44.2% who indicated problem inadequate supply of water and 28.6% who indicated problem of pests and diseases ranked 1st, 2nd and 3rd, respectively among the constraints faced by the respondents in catfish farming. Other constraints

include problem of land for fish farming (26.0%) and problem of adequate market information (5.2%) ranked 4th and 5th, respectively. This finding is in contrast with the work of Sikiru (2010) who identified inadequate finance as a serious problem in catfish production in his study area.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it can be concluded that most of the respondents in the study area were young and active in catfish production. They are highly educated with relatively fair household size. The respondents realized reasonable income as catfish farming is very profitable with high returns in naira invested. Socio-economic factors such as age, education and experience influences the income of the catfish farmers, while the major constraints identified include inadequate farms and water supply for catfish farming. The following recommendations were therefore put forward:

- i. Catfish farming was found to be profitable in the study area. Government and relevant stakeholder should formulate policies that will enhance and guide job creation through catfish farming in order to reduce over-dependency on fish importation.
- ii. Government and relevant stakeholders should also provide basic infrastructures such as electricity, portable water and comprehensive input delivery system that will boost catfish production.
- iii. Since most of the respondents involved in catfish farming in the study were youths and educated, financial institutions should be mandated to provide flexible microcredits that will positively engage them economically, especially in catfish farming.
- iv. As part of Agricultural policies and projects in the State and Nation at large, Governments at various level should ensure adequate and appropriate land allocation to catfish farmers to boost the production.

REFERENCES

- Adewumi, A. A. and Olaleye, V. F. (2011). Catfish culture in Nigeria: Progress, prospects and problems. *African Journal of Agricultural Research*, 6 (6): 1281 – 1285.
- Ajayi, O. J., Muhammed, Y., Tsado, J. H. and Kadiri, M. B (2017). Information and training needs of fish farmers in some selected Local Government Area of Edo State, Nigeria. *Journal of Agriculture and Rural Development*, 16 (1): 40 – 51.
- Akankali, J. A. and Jamabo, N. A. (2011). A review of some factors militating against sustainable artisanal fisheries development in Niger Delta, Nigeria. *Asian Journal of Agricultural Sciences*, 3(5): 369 – 377.
- Akinrotimi, O. A., Abu, O. M. G., Ibemere, I. F. and Opara, C. A. (2009). Economic viability and marketing strategies of periwinkle *tympanotonus fuscatus* in Rivers State, Nigeria. *International Journal of Tropical Agriculture & Food Systems*, 3(3): 238 – 244.
- Atanda, A. N. (2007) Freshwater fish seed resources in Nigeria. In: M. G. Bondad-Reantaso (ed.). Assessment of freshwater fish seed resources for sustainable aquaculture. FAO Fisheries Technical Paper. No. 501. Rome, FAO, pp 361 – 380.
- Brinker, A. (2009). Improving the mechanical characteristics of faecal waste in rainbow trout: the influence of fish size and treatment with a non-starch polysaccharide. *Aquaculture Nutrition*, 15: 229 – 240.
- Ejiola, M. T. and Yinka, O. F. (2012). Comparative cost structure and yield performance analysis of upland and mangrove fish farms in South West, Nigeria. *International Journal of Agricultural Management & Development*, 2 (3): 187 – 198.
- Federal Government of Nigeria (FGN) (2014). National Youth Development Policy. Programmes and Implementation Strategies, Abuja, Nigeria.
- Food and Agriculture Organization (FAO) (2009). Fish Statistics: Universal Software for Fishery Statistical Time Series. FAO, Rome, Italy.
- Food and Agriculture Organization of the United Nation (FAO/UN) (2011). The State of the World Fisheries and Aquaculture. FAO, Rome, Italy.
- International Fund for Agricultural Development (IFAD) (2007). The Status of Rural Poverty in the near East and North Africa. Rome, Italy.
- National Population Commission (NPC) (2006). Provisional Census Figure of Nigeria: NPC/FGN, Abuja, pp 18.
- Olorunshola, A. E. (2014). The Effect of Extension Services on Cassava Production in Akoko North-East Local Government Area of Ondo State, Nigeria. Unpublished Thesis Submitted to the Department of Agricultural Economics and Extension Technology, Federal University of Technology, Minna. Pp 27 – 28.

Table 1: Socio-Economic Characteristics of the Respondents

(n=77)

| Descriptions | Frequency | Percent (%) | Mean |
|-----------------------------------|-----------|-------------|------|
| Age (years) | | | |
| < 26 | 24 | 31.2 | 34 |
| 26 – 35 | 19 | 24.7 | |
| 36 – 45 | 19 | 24.7 | |
| 46 – 55 | 6 | 7.8 | |
| > 55 | 9 | 11.7 | |
| Gender | | | |
| Male | 45 | 58.4 | |
| Female | 32 | 41.6 | |
| Marital Status | | | |
| Single | 23 | 29.9 | |
| Married | 42 | 54.5 | |
| Divorced | 3 | 3.9 | |
| Widow | 9 | 11.7 | |
| Household size (number) | | | |
| 1 – 5 | 58 | 75.3 | 4 |
| 6 – 10 | 19 | 24.7 | |
| Education Status | | | |
| Primary | 3 | 3.9 | 14 |
| Secondary | 7 | 9.1 | |
| Tertiary | 65 | 84.4 | |
| Non-formal | 2 | 2.6 | |
| Farming experience (years) | | | |
| 1 – 5 | 66 | 85.7 | 6 |
| 6 – 10 | 11 | 14.3 | |

Source: Field Survey, 2015

Table 2: Costs and returns of the catfish farmers

| Cost/Returns of Items | Cost (₦)/Farmer | % of total cost | Income (₦) |
|---|-------------------|-----------------|-------------------|
| Returns | | | 223,176.00 |
| Variable cost | | | |
| Cost of purchasing (fingerlings) | 10,678.00 | 10.2 | |
| Cost of medication | 3,470.00 | 3.3 | |
| Cost of feeding | 4,592.00 | 4.4 | |
| Labour cost | 30,150.00 | 28.9 | |
| Total variable cost (TVC) | 48,890.00 | 46.8 | |
| Fixed Cost | | | |
| Depreciation (pond) | 55,630.00 | 53.2 | |
| Total Fixed Cost (TFC) | 55,630.00 | 53.2 | |
| Total Cost (TC) | 104,520.00 | | |
| Gross Margin (GM) (GI - TVC) | | | 174,286.00 |
| Net Farm Income (NFI) (GM - TFC) | | | 118,656.00 |
| Profitability Ratio (NFI/TC) | | | 1.14 |
| Efficiency Ratio (TR/TC) | | | 2.14 |

Source: Field Survey, 2015

Table 3: OLS estimates of socio-economic factors influencing output of catfish farmers

| Variable | Coefficient | Standard error | t – ratio |
|------------------------|-------------|----------------|-----------|
| Constant | -153.389 | 176.735 | -0.39 |
| Age | 16.144 | 5.720 | 2.82*** |
| Marital Status | -59.512 | 58.349 | -1.02 |
| Household Size | 50.625 | 74.199 | 0.68 |
| Educational Level | 16.973 | 7.746 | 2.19** |
| Experience | 47.325 | 22.294 | 2.12** |
| Labour | 49.793 | 59.697 | 0.83 |
| Credit | -31.549 | 65.678 | -0.48 |
| Extension visit | -48.358 | 69.114 | -0.70 |
| Cooperative Membership | -44.034 | 77.150 | -0.57 |
| R-squared | 0.5231 | | |
| Adjusted R-squared | 0.5118 | | |
| F-statistics | 36.75*** | | |

Source: Computed From Field Data, 2015

***implies $p < 0.001$, **implies $p < 0.05$

Table 4: Distribution of respondents based on the constraints faced by the respondents

| Variable | Frequency | Percentages | Ranks |
|----------------------------------|-----------|-------------|-----------------|
| Inadequate farm for fish farming | 49 | 63.6 | 1 st |
| Inadequate supply of water | 34 | 44.2 | 2 nd |
| Problem of pest and diseases | 22 | 28.6 | 3 rd |
| Problem of land for fish farming | 20 | 26.0 | 4 th |
| Inadequate market information | 4 | 5.2 | 5 th |

Source: Field Data, 2015