

TECHNICAL EFFICIENCY OF CATFISH FARMING IN DELTA NORTH AGRICULTURAL ZONE OF DELTA STATE, NIGERIA

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ABSTRACT

This study was carried out to examine the technical efficiency of catfish farming in Delta North Agricultural Zone, Delta State, Nigeria. Specifically, the study described the socioeconomic characteristics of catfish farmers and estimated the technical efficiency and its determinants. A multistage sampling procedure was used to select 240 catfish farmers. Primary data were used for the study. Data were collected using structured questionnaire. Descriptive statistics and Cobb-Douglas stochastic frontier production function were used to achieve the objectives. The result of the study revealed that 75.84% of the fish farmers were males while females constituted 24.16%. Result of the efficiency level revealed that catfish farmers in the study area were 61% technically efficient. Education, age, contact with extension workers, access to credit and farm distance were found to determine technical efficiency. The study recommends among others that the Ministry of Agriculture should intensify efforts to encourage more fish farmers' contacts with extension workers in the agricultural zone.

INTRODUCTION

Fish is the most essential animal protein food accessible in the tropics (Amao *et al.*, 2009). It supplies about 40% of the dietary intake of animal protein of the typical Nigerian (FDF, 1997). Apart from human consumption, fish is vital for animal feed, a source of raw materials in allied businesses and a source of employment opportunities for many Nigerians (Esu *et al.*, 2009).

Catfish has wide acceptability as food in Nigeria. Despite these considerably high potentials, in local fish production including catfish, the existence of a demand-supply gap of at least 0.7 million metric tonnes still exist in Nigeria (Onyekuru *et al.*, 2019). The rising in population together with the reduction in the world's most important wild fisheries has led to an increase in claim for aquatic foods. Increasing demand for fish products has led to the growth of fish farms globally to meet up a considerable part of the world's food obligation, of which is Nigeria is among the countries in Sub-Saharan Africa with great likelihood to attain sustainable fish production through aquaculture, bearing in mind extensive mangrove ecosystem existing in the country (FAO, 2015).

Conversely, in spite of this ever-growing biological activity, insufficient attention has been dedicated to the viability of the business itself. According to Mwangi (2017) catfish farming engrosses more than the biological procedures of fish growth. Lack of economic information on the feasibility of catfish farming has adverse effects. It affects decision making when evaluating possible investment options, accessibility to financing required for investment and it makes insurance of such investments difficult (Pillay and Kutty, 2015). These factors have impacted negatively on catfish investment and therefore development (Mwangi, 2017). Hence, this study seeks to examine technical efficiency of catfish farming in Delta North Agricultural Zone of Delta State, Nigeria. The main objective of the study is to examine technical efficiency of catfish farming in Delta North Agricultural Zone of Delta State, Nigeria. The specific objectives are to; describe the socioeconomic characteristics of catfish farmers in the study area, and estimate the technical efficiency of catfish farming. The following research questions guided the study: What is the nature of the socioeconomic characteristics of catfish farmers in Delta North Agricultural Zone of Delta State?. How technically efficient are catfish farming?

METHODOLOGY

The Study Area

The study area is Delta North Agricultural Zone, Delta State has three agricultural zones, namely Delta South, Delta Central and Delta North. Delta North is made up of nine (9) Local Government Areas (LGAs)

Sampling and Sampling Procedure

Multistage sampling procedure was used to draw samples for the study. In the first stage, four LGAs were randomly selected from the nine local government areas that comprise Delta North, Agricultural zone. They were Aniocha South, Oshimili South, Ika North East and Ndokwa West LGAs. In the second stage, six communities were randomly selected from each local government area. This gave a total of 24 communities. The third stage involved the selection of 10 catfish farmers from each of the randomly selected communities. This gave a total of 240 sampled catfish farmers. The snow ball or chain sampling technique was used to identify catfish farmers in each community.

Data Collection and Analysis

Primary data were used for this study. They were obtained through the use of structured questionnaire. Descriptive and inferential statistics were used in the study. Descriptive statistics include means, tables, percentages and frequencies while inferential statistics used was the Cobb-Douglas stochastic frontier production function.

The technical inefficiency model is expressed as:

$$U = \delta_0 + \delta_1 Z_1 + \delta_2 Z_2 + \delta_3 Z_3 + \delta_4 Z_4 + \delta_5 Z_5$$

Z_1 = Educational level (yrs)

Z_2 = Age (years)

Z_3 = Access to credit (dummy)

Z_4 = Farm distance from farm (km)

Z_5 = Types of pond (dummy)

$\delta_1 - \delta_5$ = Parameters to be estimated

RESULTS AND DISCUSSION

Results (Table 1) on socioeconomic characteristics of the farmers revealed that a large proportion of catfish farmers (75.84%) were males while females constitute only 24.16%. Also, majority of the catfish farmers (75.42%) were within the economically active age (40-59 years) with an average age of 50 years. The study also showed that 52% of the catfish farmers were married, 28% were single while the remaining 29% were divorced, separated or widowed. It was also revealed that majority of the farmers were literate and 73% of them spent between 11- and 20-years acquiring education. The mean household size was six (6) persons and mean farming experience of 5.6 years. Also, majority (66%) of catfish farmers had no contact with extension workers. This finding is in line with Amao *et al* (2009) who reported that backyard poultry production activities in Ondo State are performed mostly by married people as they have the responsibility for providing food and family up keep

The result in Table 2 showed that education, age, contact with extension workers, access to credit and farm distance as significant factors affecting technical efficiency in the study area. The mean technical efficiency in the study area was 0.61. The result is in line with findings of Okunola *et al.* (2011) who found that level of education of a farmer positively affects his performance; efficiency facilitates the adoption of new and improved technologies, provides consciousness and awareness and effective decision making at the farm level. The result also agrees with the findings of Okwu and Acheneje (2011) that majority of the fish farmers in Benue and Ogun States Nigeria, had household sizes between 6 and 10 respectively

Table 1: Socio-economic characteristics of respondents.

Characteristics	Frequency n=236	Percentage	Mean/mode
Sex			
Male	179	75.84	
Female	61	25.42	
Total	240	100	Male
Age (Years)			
30 – 39	29	12.29	
40 – 49	104	43.33	
50 – 59	78	33.05	
60 – 69	18	7.63	
70 and above	11	4.66	
Total	240	100	50 years
Marital Status			
Single	66	28	
Married	124	52	
Divorced	21	9	
Separated	17	7	
Widow	12	4	
Total	240	100	Married
Educational Level (Years)			
0 – 5	14	6	
6 – 10	50	21	
11 – 15	78	33	
16 – 20	94	40	
Total	240	100	16-20 years
Household Size (Persons)			
1 – 3	68	27	
4 – 6	101	43	
7 – 9	33	14	
10 – 12	24	10	
13 – 15	14	6	
Total	240	100	6 persons
Fish Farming Experience (years)			
1 – 5	135	57	
6 – 10	42	18	
11 – 15	35	13	
16 – 20	17	7	
21 – 25	11	5	
Total	240	100	6 years

Table 2: Distribution of Technical Efficiency of catfish farmers in Delta North Agricultural Zone

T.E Class	Aniocha South		Oshimili South		Ika North East		Ndokwa West		Pooled Delta North	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
≤ 0.50	32	54	13	22	33	55	29	50	107	45
0.51-0.60	5	9	6	10	8	13	6	11	25	11
0.61-0.70	4	7	8	14	4	6	8	13	24	10
0.71-0.80	6	11	9	15	6	11	5	9	26	11
0.81-0.90	11	19	12	20	6	10	6	11	35	15
0.91-1.00	0	0	12	19	3	5	4	6	19	8
Minimum	0.09		0.17		0.07		0.24		0.07	
Maximum	0.89		0.93		0.93		0.78		0.93	
Mean	0.56		0.67		0.60		0.62		0.61	

CONCLUSION

The study concluded that male farmers with few years of farming experience dominated catfish farming business in the area. Catfish farming in the area was fairly technically efficient. In order to improve the efficiency of catfish farmers, efforts to build their capacity through training and re-training should be put in place by the appropriate Government agencies.

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