Academic Journal of Plant Sciences 2 (1): 56-59, 2009
ISSN 1995-8986

Economics of Catfish Farming in Rivers State, Nigeria

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Abstract: This paper examined the economics of catfish farming in Rivers State, Nigeria. Specifically, the study examined the socioeconomic characteristics of catfish farmers in Rivers state, estimated the relationship between fish output and some inputs in a production cycle and identified constraints of catfish farming in Rivers State. Collected data were analysed using frequencies and percentages as well as the ordinary least square (OLS) technique. The linear model gave the best fit with an R^2 value of 0.839 implying that 83% of the variations in the output of catfish measured in kilogrammes were explained by the variables (feed cost, labour cost, chemical cost and stocking capacity). Feed cost as one of the variables is observed to be highly significant at (1%) in the lead equation. The study concluded that catfish farming though a good option to providing protein is burdened by factors such as cost of inputs especially feed. The study therefore recommended that feed research that helps to reduce the cost of catfish feeds without reducing the efficacy of the feeds should be highly encouraged.

Key words: Catfish · Feed · Stocking capacity · Inputs

INTRODUCTION

Fish is a vital source of food for people. It is man's most important single source of high-quality protein, providing 16% of animal protein consumed by the world's population according to FAO [1]. It is a particularly important protein source in regions where livestock is relatively scarce. FAO [2] states that fish supplies less than 10% of animal protein consumed in North America and Europe, 26% in Asia, 22% in China and 17% in Africa while in Nigeria it is estimated to be 40%[3].

Finn [4] reported that due to the world's shortage of protein, fish and its products have been considered extensively as a source of high quality protein. As a source of protein, fish holds the promise of reducing protein deficiency in the country since all food nutrients except carbohydrate are known to be present in fish [5]. More so, Tabor [6] asserted that fish also provides lower health risks than livestock due to the high cholesterol constant in meat.

Also, asides from being consumed by man, its products serve as a source of protein for livestock. Fish also plays an important role medicinally as it replenishes the body with vitamins A and D, calcium, phosphorous and lysine, sulphur and amino acids. With the attendant benefits of fish consumption, its production becomes a cause for concern, as most of the fishes available for consumption and in circulation in the country are gotten from artisanal (small scale) fishery. The artisinal sector is however characterized by subsistence fishing, remoteness and difficulty to access outdated and outmoded fishing gears and grafts. Hence, the need for a better and more convenient method of production is highly encouraged. Therefore, to help overcome these problems and meet the ever increasing demand for fish, the art of fish farming has evolved and has expanded rapidly and is now the fastest food producing industry in the world. FAO [2] estimated that by 2030, over half of the fishes consumed by the world's people will be produced by fish farming as presently 40% of the world's fish production is gotten from this source. FAO [7] states the fish farming could actually cover the gap between supply and demand. Hence, a critical and in-depth look into the economics of fish farming particularly catfish is necessary and timely. This is the background in which this study is set.

The general objective is to access the economics of catfish farming in Rivers State. The specific objectives include:

- To examine the socioeconomic characteristics of catfish farmers in Rivers state.
- To estimate the relationship between fish output and some inputs in a production cycle.
- Identify constraints of catfish farming in Rivers State.

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MATERIALS AND METHODS

Study Area and Data Collection: The study was carried out in Rivers State located in the Niger Delta (south-south) region of Nigeria. The State has a total landmass of 11,077 SqKm and is located on latitudes 40 32' and 5053' North and longitudes 70 25' and 80 25' east of the equator. Mean annual rainfall of the State is 2,200mm for upland or dry regions where water bodies are few and 3,500mm for wetland or lowland regions which comprises of land areas being surrounded by water bodies. Temperature range is between 23-31°C and vegetations found in the State include the saline water swamp, Mangrove swamp and the rain forest. Major seasons are the dry (November – February) and wet seasons (October – March). Also, the seasonal condition of the State presents a healthy environment for fish farms as water supply for catfish ponds is not a problem.

Data used for this study were primary data obtained from catfish farmers in Tai, Eleme, Oyigbo and Obio Akpor Local Government Areas of Rivers State. A total of twenty five catfish farms were sampled using purposive sampling techniques based on the willingness to divulge information about their production operations.

Structured questionnaires were used to elicit information from farmers concerning the operations in their farms.

Analytical Technique: Simple analytical tools such as descriptive statistics which involved the use of frequency distribution and percentages were used for result discussions. Also, to estimate the production function, various functional forms such as linear, semi log, double log and exponential functions of the multiple regression analysis were used [8].

The production function was specified thus

$$Y= f(X_1, X_2, X_3, X_4)$$

Where:

Y = Output (catfish) in Kg
X_1 = Feed cost (N)
X_2 = Amount spent on salary/ labour (N)
X_3 = Cost of chemicals (N)
X_4 = Stocking capacity (Number of fishes)

RESULTS AND DISCUSSION

Socioeconomic Characteristics of Respondents: The study revealed that most (88%) of the persons involved in catfish farming in Rivers state were males and (12%) are females (Table 1). An interaction with the farmers revealed that women and children were mostly used in daily farm routines. The men were considered the major investors while the women assist them.

Table 1: Socio- economic characteristics of respondents

	Frequency	Percentage
Sex		
Female	3	12
Male	22	88
Total	25	100
Age		
25-34	7	28
35-44	14	56
Above 45	4	16
Total	25	100
Marital status		
Single	8	32
Married	17	68
Total	25	100
Family size		
1-5	19	76
6-10	6	24
Total	25	100
Educational level		
Primary	1	4
Secondary	3	12
Tertiary	21	84
Years of Experience		
1-5	19	76
6-10	6	24
Total	25	100

In terms of age distribution, the study revealed that 56% of the respondents engaged in catfish farming were between the ages of 36-44 years, while 28% fall between 25-34 years of age and 16% were above 45 years. It was observed that more of younger persons were involved in catfish farming. This gives an indication that the youth were becoming gainfully employed and that they are now realizing their potentials, instead of solely depending on "white collar" jobs as in the past.

Sixty-eight percent of the respondents were married while 32% were single (includes widows, divorced and never married) (Table 1). Most catfish farmers had small family sizes as 76% had family sizes that fell between 1–5 persons. These family sizes though small could provide adequate labour for the catfish farms if and when the need arose as explained by the farmers. On the other hand, 20% had family sizes of 6–10 persons.

Table 2: Estimated production functions coefficients of catfish

Functional form	Constant	X_1	X_2	X_3	X_4	R^2	$\bar{R}^2$	F
Linear	-32.2013	0.0048	0.0028	0.0111	-0.0008	0.84	0.81	26.11
	(-0.34443)	-6.3719	-0.4685	-0.5918	(-0.5733)			
Semi-log	5.3479	6.10E-06	1.70E-05	7.80E-05	5.60E-07	0.82	0.78	22.84
	-3.1963	-4.8249	-1.5905	-2.126	(-0.253)			
Double-log	-2.231	0.6484	-0.0559	0.3312	-0.1195	0.79	0.74	18.45
	(-1.1861)	-4.1111	(-0.322)	-1.695	(-1.1277)			
Exponential	-6.215	0.4306	0.1374	0.7195	-0.0017	0.71	0.65	12.47
	(-4.3905)	-4.0339	-1.0958	-0.5393	(-0.8680)			

Where; X1 = Feed cost (N); X2 = Amount spent on salary/ labour (N); X3 = Cost of chemicals (N); X4 = Stocking capacity (Number of fishes)

In terms of educational level, the study revealed that 4% of the respondents had primary education, 12% had secondary education and 84% had acquired tertiary education. A personal discussion with respondents who had tertiary education revealed that these degrees were in agricultural related fields. This gives an indication that graduates of agriculture are becoming more practical in applying the trainings acquired from schools. Most of the respondents have been involved in catfish farming for 1-5 years (76%), while 24% have been involved in catfish farming for 6-10 years (Table 1). This may have been because the field is relatively new and most persons took some time to understudy it before joining.

Regression Analysis Results: A multiple regression was run using the data collected from the field. Various functional forms of the regression are presented in Table 2.

Four functional forms were specified (Table2). The linear form was the best fit and used as the lead equation. This is because on the basis of selection criteria following apriori expectations in terms of signs and magnitude of coefficients, the economic rationale, the significance of the coefficients and the overall performance of the model. The R^2 value was 0.839 implying that 83% of the variations in the output of catfish measured in kilogrammes were explained by the variables (feed cost, labour cost, chemical cost and stocking capacity). Feed cost as one of the variables is observed to be highly significant at (1%) in the lead equation. It is also significant at 10% in the semi log function and 5% and 1% significant in the double log and exponential functions, respectively. In the lead equation, feed cost maintained a positive sign, implying that as feed increases, output (catfish) increases and thus holds true that feed is a very important variable in relation to catfish output.

Labour and chemical costs which are variables that affect output are not significant in the lead equation (Table 2). Although they maintain positive signs, they increase at a very insignificant rate in relation to output. This might imply that very little labour and chemical costs can be used to produce a large output. Furthermore, it was observed that all farms visited had between 1- 10 persons used for labour. This only confirms that catfish farming is not heavily dependent on labour.

Stocking capacity though not significant in the lead equation carries a negative sign in relation to output. This implied that higher stocking capacities lead to reduced output as the space occupied by each catfish in terms of water volume is reduced. Cannibalism becomes frequent and struggle for feed is increased. This results in high mortality rate and thus has an adverse effect on output.

Constraints Associated with Catfish Farming: 90% of the respondents identified feed as the major constraint to catfish farming in Rivers State. According to the respondents, feeds which forms a major input in catfish production is very expensive and in some cases not readily available. Foreign feeds such as Coppens which were used by most farmers cost about N5, 000 per 15 Kg bag and it is estimated that this can be totally consumed by ten brood stocks in two days. andAlso, 70% of respondents revealed that catfish farming requires a huge initial capital outlay especially for pond construction.

Further to this, there is the problem of inadequate infrastructures such as good access roads to farm sites roads and electricity. 70% of respondents greatly complained of erratic power supply which adversely affected the rate of water supply to ponds and in most cases aerators where present could not be used and recycling system was scarcely practiced. These farmers reported that they resorted to the use of generating sets which adds to their overall cost of production.

Recommendations and Policy Implication: This study concludes that catfish farming though a good option to providing protein is burdened by factors such as cost of inputs especially feed and infrastructure. The study therefore recommends that feed research that helps to reduce the cost of catfish feeds without reducing the efficacy of the feeds should be highly encouraged.

Also, basic infrastructures such as good roads (to ease and encourage easy marketing of catfish) and electricity should be put in place. Adequate power generation reduces production cost as farmers spend less on generating plants which aid in water supply.

REFERENCES

1. Food and Agriculture Organization 1997. The state of Fish. Aquaculture.
2. Food and Agriculture Organization 2000. Fisheries Technical Paper 215/ UNP FAO.
3. Adewumi, M.O., 1994. Resource productivity and efficiency in fish farming enterprise: The case of Kwara State of Nigeria. Journal of Rural Development and Administration, 25 (2): 33-42.
4. Finn, M. 1960. Fish Protein for Human Food. Critical Rev. F. Technol.,
5. Ukoha, O.O., 1998. The Fishery Sub-sector in Nigeria: An Analysis of the Output Performance and the Way Forward in Agricultural Development in the 21st century- Concepts and Strategies in the proceedings Farm management conference of 1998, Abubakar Tafewa Balewa University, Bauchi State, Nigeria.
6. Tabor, T., 1984. The Fish Preservation Methods and Future Growth Prerequisite to Cope with Anticipated Increased Production, Paper Presented at Symposium on Fisheries Development, 30th August, Federal Palace Hotel, Lagos, Nigeria.
7. Food and Agriculture Organization/International Development Agricultural Fund, 1998. The state of Artisanal Fisheries in West African in 1997.
8. Heady, E.O. and J.L. Dillion 1961. Agriculture production function. Iowa State University Press Ame, Iowa.