



Original Contribution

GENDER, WATER QUALITY AND CATFISH PRODUCTION FOR LIVELIHOOD SUPPORT: EVIDENCE FROM CATFISH FARMERS IN LAGOS STATE, NIGERIA

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ABSTRACT

This research was undertaken to examine the gender perspective of Catfish farming as a livelihood base and the issue of water quality using a case study of Lagos state, Nigeria. Primary data elicited from a sample size of 70 Catfish farmers (38 male and 32 female Catfish farmers) were employed in the data. Analysis of the data was done using descriptive statistics, gross margin analysis and Z statistic. The result of the data analysis revealed that the profitability of the male Catfish farmers was higher than that of the female Catfish farmers and this implies that women with a lower profitability compared to men will tend to have a lower livelihood support from Catfish production in contrast to men who will tend to have a higher livelihood support from Catfish farming as a result of their higher profit margin. All the women catfish farmers attributed poor water quality to be the major constraints militating against their profitability in Catfish farming and invariably their source of livelihood. It is recommended that mainstreaming gender in manpower training, equitable distribution of resources and access to supportive services should be prioritized towards enhancing their Catfish productivity and improving their livelihood support.

Key words: Aquaculture, Female, Gross margin, Profitability, Male.

INTRODUCTION

Fisheries occupy a unique position in the agricultural sector of the Nigerian economy. The contribution of the fisheries sub-sector to agriculture GDP was estimated as 1.3% in the year 2010, out of the total estimate of 40.9% being contributed by agriculture to GDP (1). Although fish production is traditionally considered as masculine enterprise, women's role in fisheries is complementary and crucial (2). Women play a major role in aquaculture production around the world as labourers and managers of the production process; their roles are very much restricted and often ignored. The gender roles of women in aquaculture production are recognized in three ways or stages of production: fishing, processing and marketing. Gender is a concept used in social science analysis to look at roles and activities of men and women. The focus of gender analysis is not on

biological differences between men and women but rather on their experiences as members of society. It is often assumed that men are farmers while women are farmers' wives and helpers. This has been the case in many international and national agricultural development policies and programs in the past. In some cases, such assumptions have led to the failure of targeting programs effectively or achieving program objectives.

Fish farming is the least exploited fishery sub-sector with the vast brackish water fishing grounds almost unexploited (3). Less than 1.0 per cent of the fresh water grounds and about 0.05 per cent of the brackish water grounds are under aquaculture to produce a current average yield of 20,500 tonnes of fish per annum. Despite the increase of fish production in Nigeria, production level is still very low and this has been attributed to high cost of input, lack of credit to fish farmers at low interest rate, lack of skilled manpower and an ineffective aquaculture extension service system(4). This represents only 3.12 per cent of the estimated

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fish culture potential of 656,815 tonnes per annum. Nigeria spends ₦100 billion on fish importation annually and the current fish demand consumption in Nigeria stands at over 2.66 million tonnes per annum, while the present importation rate is over 750,000 metric tonnes (4). With importation of more than 750,000 MT of fish, more than USD 600 million are spent in hard currency and thousands of jobs are exported (5). The continuous importation of fish portends a colossal loss of foreign exchange earnings to Nigeria (6).

The most popular fish species that have proved desirable for culture in Nigeria are the *Clariid* fishers; *Clarias gariepinus*, *Heteroclarias sp.* and *Heterobranchus species* (7). Other species that are commonly cultured are the Tilapias (*Oreochromis niloticus*, *Sarotherodon galilaeus* and *Tilapia guineensis*). *Heterotis niloticus*, *Gymnarchus niloticus*, *Mugil cephalus* and *Chrysichthys nigrodigitatus*. These species are adaptable to different patterns under various natural and socio-economic conditions. In Lagos State, the importance of *C. gariepinus* has no less than elsewhere in Nigeria based mainly in the farmers' and consumers' preferences (7).

Although several Studies (8; 9; 10) on Catfish farming have been carried out in Nigeria but without any recourse to the issue of gender, water quality and livelihood support. Therefore, this study was designed to bridge the knowledge gap by providing empirical information on gender perspective of Catfish farming as a means of livelihood and the issue of water quality in Catfish farming using Alimosho Local Government Area of Lagos State of Nigeria as a case study.

HYPOTHESIS

Null hypothesis (H_0): There is no significant difference between the profitability of Catfish fish production of male and female Catfish farmers.

Alternate hypothesis (H_a): There is no significant difference between the profitability of Catfish fish production of male and female Catfish farmers.

METHODOLOGY

DESCRIPTION OF THE STUDY AREA

The study area is Alimosho Local Government Area in the North-western part of Lagos State. It is located at latitude 6.61056° N and longitude 3.29583° E with a temperature range of 28°C to

33°C . It occupies a land area of 173.6sq.km (67sq. miles). It is the largest Local Government Area in Lagos state with 1,277,714 inhabitants according to the official 2006 Census. It is estimated that the population will increase to 1,592,911 at the end of 2013 based on an annual population growth rate of 3.2%. The state has vast water resources for fish farming activities.

SAMPLING PROCEDURE AND SAMPLE SIZE

A two stage sampling technique was used in the study. The first stage involved a purposive selection of wards M1, G North, G South, H, D, F, and ward E1 out of the eleven wards in the Local Government Area. The purposive selection of these wards is based on their peculiarity in Catfish farming in the study area. The second stage involved a random selection of 10 fish farmers from each of the 7 selected wards to give a sample size of 70 Catfish farmers (38 male and 32 female Catfish farmers) which represents 50% of the sample frame (140 Catfish farmers) of Catfish farmers in the study area.

METHOD OF DATA COLLECTION

Primary data were used in this study. The primary data were obtained from the respondents using a well structured questionnaire with the aid of personal interview during the field survey. The primary data collected include; administrative information, the socio-economic characteristics of Catfish farmers in the study area, inputs used for catfish production per annum, the output of Catfish production per annum and the constraints militating against the profitability of fish production in the study area.

ANALYTICAL TECHNIQUES

Analysis of the data was done using descriptive statistic, gross margin analysis and Z statistic. Descriptive statistics such as mean, percentage and frequency distribution was employed to describe the socioeconomic characteristics of the male and female Catfish farmers. The gross margin analysis was employed to determine the profitability of Catfish production from a gender perspective. The gross margin was calculated as the difference between the gross farm income and the total variable cost (12). Mathematically it is expressed as:

$$GM = GI - TVC$$

GM = Gross margin ₦/ m^2 of pond per production cycle

GI = Gross farm income ₦/ m^2 of pond per production cycle

TVC = Total variable cost ₦/ m² of pond per production cycle

- i. The Z-statistic: this was used to test the hypothesis of the study. It is expressed as follows:

$$Z = \sqrt{\frac{\mu_1 - \mu_2 - \Delta}{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Where Z = calculated Z value

μ_1 = Mean profitability of the male Catfish farmers.

μ_2 = Mean profitability of the female Catfish farmers.

σ_1 = Standard deviation of the male Catfish farmers.

σ_2 = Standard deviation of the female Catfish farmers.

n_1 = Sample size of the male Catfish farmers

n_2 = Sample size of the female Catfish farmers

Δ = Hypothesized mean difference

RESULTS AND DISCUSSION

SOCIOECONOMIC CHARACTERISTICS OF MALE AND FEMALE CAT FISH FARMERS

The distribution of the socioeconomic characteristics of male and female Catfish farmers is presented in **Table 1**. The result shows that majority of the male (52.6%) and the female (53.1%) Catfish farmers had secondary educational qualification. A larger proportion (50%) of the male Catfish farmers had 5 – 9 ponds while the larger proportion of the female Catfish farmers had 1 – 4 ponds. This implies that the male Catfish farmers had access to more ponds that could enhance their production and livelihood. Most of the male and female Catfish farmers had no access to training on Catfish production. However, the male Catfish farmers had more access to training than the female cat fish farmers as indicated by 10.5% of the male Catfish farmers and 3.1% of the female Catfish farmers respectively. This implies that there is the need for institutional support to in the area of training to Catfish farmers especially the women so as to enhance their productivity in Catfish production. This is in line with (13) who noted that to ensure that women utilize their full potentials in profitable activities, like aquaculture, it is necessary to provide capacity building support to rural women.

Table 1. Distribution of the socioeconomic characteristics of male and female Catfish farmers

	Male		Female	
	Freq	%	Freq	%
Formal Education				
Primary	1.0	2.6	0.0	0.0
Secondary	20.0	52.6	17.0	53.1
Tertiary	17.0	44.7	15.0	46.9
Number of ponds owned				
1-4	16.0	41.1	17.0	53.1
5-9	19.0	50.0	10.0	31.3
10-14	2.0	5.3	4.0	12.5
15-19	1.0	2.6	1.0	3.1
Level of management				
Intensive	34.0	89.5	25.0	78.1
Semi intensive	3.0	7.9	6.0	18.8
Extensive	1.0	2.6	1.0	3.1
Access to training				
No	34.0	89.5	31.0	96.9
Yes	4.0	10.5	1.0	3.1
Access to credit				
Yes	15.0	39.5	16.0	50.0
No	23.0	60.6	16.0	50.0

GENDER BASED PROFITABILITY ANALYSIS

The result of the profitability of Catfish production from a gender perspective is reported in **Table 2**. The gross margin analysis for the calculation of the profitability was carried out on per square metre of fish pond per production cycle. The result shows that the total variable cost incurred by male and female farmers were 6, 170 and 5, 161 naira respectively while the total revenue accrued to the male and female farmers were 14, 252 and 11, 482 naira respectively. The gross margin of the male Catfish farmers (8, 082 naira) was higher than that of the female Catfish farmers (6,321 naira) which indicates that the profitability of the male Catfish farmers was higher than that of the female Catfish farmers. The returns per naira of 2.31 for the male Catfish farmers implies that for every 1 naira invested in Catfish production, the farmers make a return to investment of 2.31 naira. In the case of the female Catfish farmers, a return per naira invested was estimated to be 2.22 naira which indicates that for every 1 naira invested in Catfish production, the farmers make a return to investment of 2.22 naira. Although, the male and female Catfish farmers make profit from investment in Catfish farming, the profit margin of the male Catfish farmers was higher

than that of the female Catfish farmers. A plausible explanation for the observed difference in the profit margin of the male and female Catfish farmers is that access to resources especially quality water for fish production, control of assets, decision-making powers between women and men tend to favour the male Catfish farmers than the female cat fish farmers.

This is in line with (14) who noted that women have more difficult access to water in Lagos state. (15) who opined that gender affects access to labor, land and other important inputs for production and may also affect preferences around production processes and outputs. Also, (16) noted that within the household, women may also have less tenure security than men, which makes them less likely to invest in certain types of agricultural technologies that can enhance their productivity. (17) also noted that women have limited access to land and starting capital for agriculture. The implication of the result of the gender based profitability analysis is that women with a lower profitability compared to men will tend to have a lower livelihood support from Catfish production in contrast to men who will tend to have a higher livelihood support from Catfish farming as a result of their higher profit margin.

Table 2. Average costs and returns of cat fish production per square metre of fish pond

Item	Male cat fish farmers		Female cat fish farmers	
	Amount	% of cost	Amount	% of cost
Variable cost				
Cost of fingerling 27.09	1,691	27.41	1,398	
Cost of labour	583	9.45	496	9.61
Cost of feeds	3,896	63.14	3,266	63.28
Total variable cost(TV)	6,170		5,161	
Revenue				
Output(Kg)	121		92	
Total revenue(TR)	14,252		11,482	
Gross Margin(TR – TVC)	8,082		6,321	
Returns per naira invested	2.31		2.22	

NB: 158 Naira = 1 dollar at the time of data analysis

TEST OF HYPOTHESIS

The null hypothesis which states that there is no significant difference in profitability between male and female Catfish farmers in the study area was rejected because the calculated z value

(76.2) is greater than the z critical one tail (1.64) and two tail (1.96) at 1% level of profitability as shown in **Table 3**. We then conclude that there is a significant difference in the profitability between male and female Catfish farmers in the study area.

Table 3. *z-Test: Two Sample for Means*

	Male cat fish farmers	Female cat fish farmers
Mean	8080.157895	6321.5625
Known Variance	8657.802	9744.62
Observations	38	32
Hypothesized Mean Difference	0	
z	76.21926297	
P(Z<=z) one-tail	0	
z Critical one-tail	1.644853627	
P(Z<=z) two-tail	0	
z Critical two-tail	1.959963985	

CHALLENGE OF POOR WATER QUALITY AND OTHER CONSTRAINTS AFFECTING THE PROFITABILITY OF CAT FISH FARMING

The result in **Table 4** shows that all the women Catfish farmers attributed poor water quality to be the major constraints militating against their profitability in Catfish farming and invariably their source of livelihood. Also, the issue of

proper disposal of water from ponds as indicated by 30 out of the 32 women Catfish farmers is a high ranking constraint affecting the income generation from Catfish farming. The major issue that is militating against the profitability of men Catfish farmers is high cost of feeds as indicated by 28 out of the 38 men Catfish farmers.

Table 4. *Poor water quality and other constraints affecting the profitability of cat fish farming*

	Male		Female	
	Freq	%	Freq	%
a. Poor water quality	15	46.9	32	100.0
b. High cost of feeds	28	73.7	22	68.8
c. Water disposal	17	44.7	30	93.8
d. Inadequate funds	20	52.6	12	37.5
e. Lack of extension services	30	78.9	26	81.3
f. Pest and diseases	16	42.1	25	78.1
g. High cost of labor	9	26.7	8	25.0
h. High cost of pond maintenance	12	31.6	24	75.0
i. High mortality of fish	10	26.3	22	68.8
j. Shortage of fingerling	19	50.0	18	56.3

NB: Multiple responses was allowed

CONCLUSION AND RECOMMENDATION

This study has established that gross margin of the male Catfish farmers(8, 082 naira) was higher than that of the female Catfish farmers (6,321 naira) which indicates that the profitability of the male Catfish farmers was higher than that of the female Catfish famers. Hence, women with a lower profitability compared to men will tend to have a lower livelihood support from Catfish production in contrast to men who will tend to have a higher livelihood support from Catfish farming as a result of their higher profit margin. All the

women Catfish farmers attributed poor water quality to be the major constraints militating against their profitability in Catfish farming and invariably their source of livelihood. It is recommended that differences in conditions, needs, access to resources, control of assets, decision-making powers between women and men based on their assigned gender roles are taken into consideration in manpower training, equitable distribution of resources and access to supportive services by both genders towards enhancing their Catfish productivity and increasing their livelihood support.

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