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Towards boosting aquaculture production: An identification of key determinants of catfish (*clarias gariepinus*) consumption in Ibadan metropolois of Oyo state, Nigeria

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Abstract

Recent climatic events and poor fish catch technology have significantly contributed to the decline in the quantity of domestic fish production in Nigeria, while the need to augment local fish supply through importation with hard earned foreign reserve have been inevitable. Presently, aquaculture is fast gaining increasing relevance as a way of reducing the present gap, between fish demand of 2.66 million metric tons and local production of 0.62million metric tons. Specifically, catfish production has shown great promises in terms of geographic spread, climatic suitability and acceptability in Nigeria. In other to boost aquaculture production through this fish species, it becomes pertinent to investigate the key factor that affects its consumption among different socio-economic and income strata in Ibadan metropolis of Oyo State, Nigeria. The study utilised stratified random sampling to obtain information from 120 households using well structured questionnaire. The respondents were classified into low, medium and high income groups based on infrastructural developments in their respective residential locations. The logit regression analysis was used to identify the important determinants of catfish consumption. Results showed that 56% of catfish consumers were female, 88% had tertiary education, 72% had household size of 1-5people, 39% earn below ₦50,000 monthly, 70% spent below ₦20,000 monthly on food, 92% consumed between 1-5kg of catfish monthly. Also, 91% of the total respondents consume fish generally while 68% consume catfish. The logit analysis showed that the amount spent on other fish types and amount spent on other non-fish proteins showed positive significant relationships with the probability of consuming catfish. It is recommended that producers should take advantage of the wide acceptability of catfish and explore all avenues so as to increase their present level of production.

Keywords: Catfish (*Clarias gariepinus*), protein consumption, socio-economics condition and water resources.

Introduction

The Food and Agriculture Organization (1994), asserted that fish contributes about 60% of the world's supply of protein and that 60% of the developing world derives more than 30% of their annual protein from fish. According to Ojo (2008), a small amount of fish is an important dietary supplement for people who cannot easily afford animal protein and rely mainly on starch. In Nigeria, fish production is from both domestic or internal and external sources. Of the internal source, aquaculture is the second most important after artisinal and supplied between 5 -13.8% of total domestic fish production between 2000 -2007 (Table 1). This increasing production most appropriately suggests increasing consumption because of the already existing fish demand – supply gap of 2.04 million metric tons (Federal Department of Fisheries, 2007). This portrays a highly promising potential for both increasing production and consumption.

Table 1: Nigeria fish supply by sector and percentage contribution of each sub sector to domestic fish supply

SECTOR/YEAR	2000	2001	2002	2003	2004	2005	2006	2007
ARTISANAL	418,069.4	433,537	450,965	446,203	434,830	513,537	513,537	504,227
(%)	89.5	89.1	88.1	87.4	85.4	84.7	81.4	81.9
AQUACULTURE	25,720	24,398	30,664	30,677	43,950	56,355	84,533	85,087
(%)	5.5	5.0	6.0	8.6	6.0	9.7	13.3	13.8
INDUSRTIAL (Commercial trawler)	23,308.3	28,378	30,091	33,882	30,421	32,595	33,778	28,193
(%)	5.0	5.8	5.9	6.6	6.0	5.6	5.3	4.3
DISTANT WATER (external source)	557,884	648,197	681,152	663,180	648,033	611,520.5	646,484	739,666
(%)	NA	NA	NA	NA	NA	NA	NA	NA

Source: Federal Department of Fisheries, 2007

Furthermore, while other sources of fish production are now very unpredictable due mainly to technological, environmental and climatic constraints which are outside the reach of fish farmers in Nigeria; fish supply from aquaculture is more predictable. Interestingly, The Federal Department of Fisheries (FDF), 2007, estimates the total available land for aquaculture development as 1.7million hectares of which only 60,000 hectare is utilized. Also of the estimated aquaculture production potential of 2.5million tons only 85,087 is produced per hectare. Consequent on the preceding argument it is glaring that fish supply from aquaculture is under exploited.

Though there are over hundred species of catfish in the world, *Clarias gariepinus* represents the most dominant of these fish species (Omole et. al. 2006). They are scale- less, eel like in appearance, can survive in mud, can tolerate high temperature and low dissolved oxygen and grow very fast. This makes them the most successfully cultured fish species in Nigeria and they are reared in all the agro ecological zones in the country. If the fish production and consumption nexus would be full exploited, it implies that encouraging fish production from aquaculture would also mean encouraging its domestic consumption. It thus becomes important to investigate the key determinants of catfish consumption in Nigeria.

Materials and Methods

The study was undertaken in Ibadan South West local government area (LGA) of Oyo state. The choice of this area was because of its unique social and physical infrastructural spread which had already naturally classified the area into low, medium and high income residential areas. Ibadan metropolis is cosmopolitan and comprises individuals with diverse occupations such as trading, government employee, private sector workers, artisans, farmers, etc.

The study utilized stratified random sampling to obtain information from 40 households in each of the 3 selected residential locations. Based on the existing infrastructural facilities in the study area, Apata, Challenge and Oluyole were identified as low, medium and high income strata,

respectively. Questionnaire and personal interviews were thereafter used to obtain information from 20 respondents but only 110 questionnaires were fit for analysis.

Furthermore, the logit model was used to identify factors that affect the consumption of catfish. The choice of this maximum likelihood model (MLE) was informed by the fact that the study utilized a binary independent variable thus making the ordinary least square (OLS) model inappropriate for the analysis (Awotide *et al.* 2004 and Oni *et al.* 2004). The study data was only able to determine the direction of influence of the independent variables on the dependent and was unable to estimate the marginal effects of these variables on the dependent variable.

The model postulates that the probability (Pi) that a household will consume catfish is a function of an index Z_i, which is also the inverse of the standard logistic cumulative function of P_i. The probability of a household consuming catfish can be estimated from the average value of zi as;

$$z_i = \ln \frac{P_i}{1-P_i} = b_0 + b_i X_i + b_2 X_2 + \ldots\ldots\ldots\ldots + b_n X_n \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Y is 1 if a household consumes catfish and 0 if otherwise, X1 is age of household head in years, X_2 is sex (1 if household head is male and 2 if household head is female), X_3 is household size, X_4 is average monthly income in Naira (₦), X_5 is average monthly expenditure on food (₦), X_6 is total monthly expenditure on other fish types (₦), X_7 is total monthly expenditure on other types of proteins (₦) and X_8 is total monthly expenditure on Catfish (₦).

Results and Discussion

Fifty six percent of those that consume catfish have female headed households, about 39% of catfish consumer are between 20 – 30 years old, 88% had tertiary education and all respondents have formal education, 45% are self employed and 72% have between 1 -5 persons per household. Also, 39% earn a monthly income below ₦50,000 and a mean monthly income of N85,000. Seventy percent of the households spend below ₦20,000 monthly on food and a mean of ₦21, 322.73. Furthermore, 92% of the household consume between 1 – 5 Kg quantity of catfish and a mean quantity of 2.21Kg monthly. Also, 91% of the total respondents consume different species of fish, while 68% consume only catfish.

Table 2: Summary Statistics of Selected Socio economic variables

Variables	Mean	Minimum	Maximum	Standard Deviation
Age (Years)	38.84	21	70	13.79
Household size (Number of persons)	4.43	1	12	2.14
Monthly Income *(₦)	93,046.67	10,000.00	370,000.00	84,579.73
Monthly expenditure on food (₦)	23,280.00	2,500.00	150,000.00	22,333.66
Monthly quantity of catfish consumed (Kg)	3.24	1	14	2.47
Monthly expenditure on other fish types (₦)	4324-00	400	13,000	2916.21
Monthly expenditure on other non proteins (₦)	4888	400	13,000.00	2916.21

Source: Field survey data 2009
Note: *1US$ = ₦151

Result of the logit regression (Table 3) reveals that the coefficients of total monthly expenditure on other types of fish (X_6) and total monthly expenditure on other types of non-fish proteins (X_7) are significant at both 1% and 5% respectively. That is, these variables have the probability of increasing catfish consumption. This conforms to a priori expectations and similar to the findings of Amao *et al* (2006) that established a positive but linear relationship between fish consumption and substitutes proteins. The result suggests that fish and other protein types are major components of the respondent's diet in the study area. This may be as a result of high exposure to formal education which enables them to understand the importance of including protein sources in their diet and the cosmopolitan nature of the study area which attaches high premium to consuming catfish fresh rather than the frozen fish type which they assume would have declined in nutritive value. It can also be inferred that household would be interested to devote a

substantial portion of their budget to catfish purchase and with the demand- supply gap a lot of opportunities exist for producers to increase their present level of production. Finally, the significance of chi square indicates that the regression line has a good fit.

Table 3: Logit regression result

Variable	Coefficient	Standard Error	T-Value
TMEF (X_6)	1.551***	0.499	3.105
TMEP (X_7)	0.003**	0.139	2.264
Log likelihood	-47.554		
Chi square	42.499*		

*****Significant at 1%, **Significant at 5% and *Significant at 10%.**

Conclusion

Key determinants of catfish consumption in Nigeria were investigated. The coefficients of total monthly expenditure on other types of fish and non fish proteins were important determinants of catfish consumption. This suggests a wide acceptability of fish and catfish as source of protein. Relevant stakeholders therefore need to explore all that is required to increase the present level of catfish production. We recommend improved extension services to existing farmers to enable them benefit from information on procurement of inputs and technical information on catfish production. Government fisheries department should help with pond construction at subsidized rates so as to minimize the cost of entry into the industry. Lastly Government, Non government organization, religious bodies should embark on advocacy to encourage massive production and consumption of catfish.

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