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Determinants of Consumers Willingness to Pay for Fish Safety in Bayelsa State of Nigeria

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Abstract: This study was undertaken to estimate the factors that determine an average consumers willingness to pay for a given quantity of safely prepared fish demanded than not having it at all in Bayelsa State. Data were obtained using a survey instrument specially designed with images of safe and unsafe food guides to aid consumers preference for safety. Data were analyzed using simple descriptive statistical tools with cross tabular analysis and a dichotomous choice logistic model. A mean age and educational level of 40 and 12 years respectively which shows that the consumers are relatively young and can understand the implications of health risk associated with unsafe food consumption. Consumers are actually aware (68.3%) of some fish safety measures available and can show interest (58.3%), but surprisingly 65% of them are not willing to pay the bid amount for the safe measures built in the safe fish consumption. The study showed that economic reasons rather than health factors can reduce preference for food safety. Increase in income and house hold size can increase the marginal effect to safety by 28 and 21%, respectively, while the bid price increases with a decrease in demand for safety of a unit quantity of fish consumed. Consumers Protection Agencies should guide fish producers to channel their efforts towards building the safety measures in the fish at a reduced cost and restrict an open and unsafe food vending outlet to the public.

Key words: Fish safety, consumers willingness, food consumption, fish producers, Nigeria

INTRODUCTION

Food safety refers to the level in which food is kept from dangers and risk associated with illness and death. It explains the level of reliability and or certainty to which a unit measure of food taken into the body is free from both organic and inorganic contaminants which may lead to food poisoning, ill health and consequently death. The ultimate consumer is most times ignorant of these factors in the food he consumes unless when he is properly informed. The consumers protection level from safety is partly dependent on his knowledge about the safety of his foods and drinks and partly on his socio-economic disposition as at the time he reveals his preference for whichever type of food (Mattoo and Hasha, 1994; Aaker and Kevin, 1990).

In any case, consumers revealed preference of a product is based on the assumptions that a consumer is aware of certain alternatives of a particular commodity in such a manner that the satisfaction derived from consuming the product is as large as possible (Henderson and Quandt, 1980). Safety is necessary for survival and so may introduce sensuous connotations according to Henderson and Quandt (1980) but it may not give maximum utility to some socially (poor) consumers who have affordability problems or share ignorance of its presence in the food they consume. It becomes obvious that such consumer is exhibiting lassitude to economic value of food safety. Hicks and Streeten (1979) opined that asymmetric health and safety information among social groups can place the less advantaged group on poor health and low life expectancy at birth and this is a social indicator that points to low economic development of most third world countries. The poor with less access to food safety often spend higher proportion of his income on medical treatments than prevention of health risk associate with food safety (Hicks and Streeten, 1979), hence food safety measure is imperative to sustainable economic development since it contributes immensely that basic need is provided to the public (Jhingan, 2005).

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Hawkin and Best (1984) pointed out that an information gap about safety from the production and consumption of a product could be a strong pointer to increase in poor health status of the final consumer. The food protection agencies believed that with complete information about food safety status, consumers are in better position to prevent the risk associated with health problems. Knowledge of the food safety status, safety jingles and product warnings provided on food labels and through advertisements by food retailers have strong economic implications towards preference for safety as it raises the bid amount (Caswell, 1998; Mattoo and Hasha, 1994; Aaker and Kevin, 1990). Caswell (1998) further noted that consumers' socio-economic and attitudinal factors may have explanation to this changes.

Consumer protection agencies are already aware of this nature of handicaps facing the ultimate consumer but are handicap in directing consumers attitude towards safety preference in the market. Hence, the awareness and sensitization programmes using print and electronic media are the measures adopted to set up warning code on safety of some products consumed by the public (CPC, 2004; SON, 2004). Agricultural products are prone to disease contamination during production, processing and distribution of the product. Quagrainie *et al.* (1998) observed that some human diseases such as typhoid fever and parasitic worms like tape worms could be transmitted from the livestock products consumed and most of them originated from the feed use during production. Nwufor (2004) further observed that wounds sustained through mechanical injuries during transportation of harvested agricultural products provides a good site for disease penetration. Again, gaseous pollutants in the air are attracted by foods that are exposed to free atmosphere in an open market as it is found in many part of Nigeria including Bayelsa state. Nigeria was recently banned from exportation of fish due to processing flaws. The fish products exported contains a chemical called *benepyrene*. which comes from the fuel wood used in smoking the fish.

Consumers are not sure of the sources nor the hygienic condition of the fish products they consume considering the fact that most of the fish outlets do not have any identification labels, no registration and so were not subject to thorough supervision by the Consumers Food Protection Agencies in the State (CPC, 2004; SON, 2004). Fish production, processing and distribution in Bayelsa State of Nigeria faces one or more of these environmental problem considering their location in an oil polluted environment. Contrary to expectation is the poor socio-economic disposition of Bayelsa farmers and consumers (NDDC, 2004). Fish are sold in an open space charged with gas and oil pollution. The production procedures are neither supervised nor do the farmers adopt the use mechanized technology in the processing and storage and distribution of perishable agricultural products.

The increasing environmental impact on harvested and processed fish products in addition to poor socio-economic disposition of an average consumer have posed a serious question on economic value of food safety in Bayelsa State. Based on this pertinent questions, twofold objectives are addressed in this study; to establish an association of consumers attitude towards preference for food safety nets and to isolate the factors affecting consumers willingness to pay for fish safety. No study has focused on consumers behaviours towards food safety nor determine factors of safety preference in Africa but some survey on economic impact of accepting food safety measures in America and Europe been studied (Quarrainie *et al.*, 1998; Loureiro and McCluskey, 2000; Schupp and Gillespie, 2001). The study becomes relevant in guiding the concerned food protection agencies in enforcement of food safety rules in the area. The testable hypotheses are that consumers behavioural features or attitudes have no significant association with preference on food safety guidelines and socio-economic variables have no significant effect on consumers preference for food safety in Bayelsa State, Nigeria.

MATERIALS AND METHODS

The study is carried out in Bayelsa State of Nigeria. The State is located in the oil rich south-south part of Nigeria. It is bounded in the south by the Atlantic Ocean covered with mangrove swamp suitable for captured fisheries. The area is characterized by high rainfall and relative humidity, polluted air from gas flaring and oil silage on surface water.

Data used for this study were obtained using well structured questionnaire with scanned imageries (photographs) of two existing fish market sites in Bayelsa State. This comprises of the open markets and a registered food joint with their label such as Mr BIGG'S an the products sold to the public. The use of Imageries according to Okojie (2006) is to create awareness, sensitization and re-awaking consumers knowledge on food safety nets provided by supervisory unit of Consumer Protection Agencies and National Agency For Food and Drug Administration and Control (NAFDAC) in the country. The open markets undergoes a minimal supervision by these agencies but do not reflect proper safety since the fish products displayed do not have labels of origin and would be difficult to hold claims of health risk if the food eventually becomes unsafe.

Data obtained for this study, include consumers preference for safety and his willing ness to pay, the amount a consumer will be willing to pay for a kilogramme of fish he wishes to buy than not having it at all as displayed in the instrument, his reasons for not willing to pay for the other alternative. The data also elicited information on the amount he is willing to pay for the alternative product than no having it at all the quantity the consumer is willing to buy depending on the proportion of income allocated to fish (animal protein) for the week. Other information obtained from the instrument is the consumers socio-economic variables, knowledge, attitude and interest towards fish safety nets. Data is analyzed using both statistical and econometric tools. The socio economic features and attitudinal behaviours of the respondents were analyzed using descriptive statistics such as mean, mode and relative (percentage) frequency and contingency tabular analysis, respectively. The determinants of consumers' willingness to pay for safety is analyzed with econometric tool like the dichotomous choice logistic model. This model was adopted by Loureiro and Umberger (2003). The use of logit in this case was based on following logistic probability that a consumer will make a certain choice "Yes" given his socio-economic features and random bid amount for safety. The expression is expressed as;

$$P_i = f\{WTP_i\} = 1/1+e^{-WTP_i} = 1/1+e^{-(xi,\beta)} \quad (1)$$

The probability that a consumer answers "NO" is thus represented

$$1-P = 1/1+e^{WTP_i} \quad (2)$$

To estimate the odd ratio for a yes response for fish safety consumption, the ratio of both probabilities is denoted by

$$Pi/1-Pi = 1+e^{WTP_i}/1+e^{-WTP_i} = e^{WTP_i} = e^{Xi\beta} \quad (3)$$

By taking the natural log of Eq. 3, the add ratio in favour of a "Yes" response of safety conscious consumers will be come a linear function of X_I is a sbjective consumer preference when buying fish in the area. This is expressed as;

$$Log\ \{P_i/1-P_i\} = WTP_i = X_i\beta + \xi \quad (4)$$

Where;

P_i = Probablity that an ith consumer will show preference for or make a "Yes" response for safety fish than not having it at all.

WTP_i = Consumers willingness to pay measured as a dummy variable Where a "Yes" response is given one (1) otherwise zero(0)

X_i = This represents the socio-economic variables such as; age of the respondent expressed in years educational levels as the number of years spent in formal education in years, house hold size of the respondent represented by the number of people that depend on the household head income, house hold head income, bid (randomly assigned price) of a unit measure of safer fish in the area and gender capture by dummy variable (male 1 and 0 otherwise).

β = Conformable vector parameters

e = Exponential sign

ξ = Unobservable random variables

The vector parameter β cannot be interpreted as the direct effect on the probability that a safety measure for food can be preferred to an alternative, but a measure of change in the odds ratio for a change in the explanatory variables included in the model. The effect of the explanatory variable on the probability is estimated using the marginal effect. This is adopted by Maddala (1997) and used by Loureiro and Umberger (2003).

RESULTS AND DISCUSSION

Consumers' socio-economics features as shown in Table 1 reveals that majority of the fish consumers Bayelsa State are married (78.3%), male (53%), farmers (61.7%), of average age of and educational level of above 40 and 12 years, respectively. Few consumers are old (3.3%) of above 60 years but less than 80 years, while about 45% of them are young adults. Majority of the respondents have acquired higher degree (43.3%).

The mean age and number of years spent in formal education reveals that the respondents are middle aged youths who are capable of absorbing health risk and moderate educational status which ensues that the consumers have acquired enough information, awareness and knowledge of health risks associated with consuming unsafe food. The indication that majority of the respondents are farmers shows that fish farming is the major occupation compared to trading (10.0%) and civil service (28.3%).

Attitudinal behaviour consumers towards accepting food safety nets in Bayelsa, Nigeria: Associating the attitudinal behaviours of the consumers towards accepting fish safety as shown in Table 2 reveals that

Table 1: Consumers socio-economic characteristics

Variables	Frequency	Relative frequency
Gender		
Male	32	53.3
Female	28	46.7
Total	60	100.0
Age		
21-40	31	56.7
41-60	27	45.0
61-80	2	3.3
Total	60	100.0
Mean age	40.8	
Marital status		
Single	13	21.7
Married	47	78.3
Total	60	100.0
Occupation		
Trading	6	10.0
Civil service	17	28.3
Farming	37	61.7
Total	60	100.0
Educational level		
Non Formal education	1	1.7
Adult education	11	18.3
Primary education	4	6.7
Secondary education	18	30.0
Higher education	26	43.0
Total	60	100.0
Mean educational level	12.0	
Income level (naira)		
Below 10,000	9	15.0
10,001-20,000	27	45.0
20,001-30,000	6	10.0
30,001-40,000	8	13.3
40,001-50,000	6	10.0
above 50,000	4	6.7
Total	60	100.0
Mean	22,833.33	

Source: Survey data analysis by the Author, 2007

Table 2: Association of consumers attitudinal behaviours towards fish safety nets

Attitudinal variables	Frequency (Percentages) Yes	No	Total
Fish safety awareness	36 (63.3)	22 (36.7)	58
Interested on the safety nets	35 (58.3)	25 (41.7)	60
Are you willing to pay for safety provided	21 (35.0)	39 (65.0)	60

Chi-square cal. (X^2) = 11.11, Chi-square tab. (X^2) = 5.99, Source: Computer analyzed result, 2007

although majority of the consumers (63.3%) are aware of safety nets provided by the Consumer Protection Agencies, about 58.3% of the are interested in the programme. Surprisingly, majority of the respondents are not willing to pay for the safety nets provided in fish market. This means that consumers interest on fish safety is not backed up by willingness to pay. This could be partly blamed on consumers' total or partial dependence on government for environmental safety or the level of poverty among the people in the area, which makes them to allocate their income to areas that will maximize the quantity of fish consumed even when the quality is compromised.

There is a significant association between consumers' attitude and acceptance of food safety measures such as; source of production labels, NAFDAC registration numbers, hygienically displaying unit for fish and other food stuff sold in the area. The chi-square value is significant as its calculated value of 11.11 is greater than its tabulated value of 5.99 at 5% critical level. The null hypothesis that the consumers attitudinal factors has no significant link or association with the acceptance of food safety measures in Bayelsa is rejected. Hence, leading to acceptance of the alternative hypothesis that a significant link exit between consumers' attitude and accepting food safety measures in Bayelsa state.

Determinants of consumers willingness to pay for fish safety nets in Bayelsa State, Nigeria: The result as shown in Table 3, is the logistic estimates and the marginal effects for the willingness to pay equation. The mean of the marginal effects were calculated by estimating the changes in the probability of paying a random bid amount for safety with a partial change in a unit factor that determine consumers preference for safety (Loureiro and Umberger, 2003). The model fits reasonably at 65.8%. The log likelihood ratio of -115.83 and a chi square (X^2) statistic of 39.06 (at a critical level of 0.05), which test the likelihood ratio, is greater than its tabulated value of 33.73. This shows an overall significance of the model. The implication of this specification is that the included variables are determinants of consumers willingness to pay for fish safety, although age and gender do not have any significant marginal effect on the change in probability that a consumer will pay a higher bid for consumption of safer fish products in the area.

All parameter estimates and their marginal effects expressed the same sign and level of significance. However, all the parameters estimated with their corresponding marginal effect carried the expected signs except the level of formal education of attended by the respondents.

Educational level is expected to have a positive (direct relationship) with the mean probability of paying more for safer fish than not having it at all, instead the reverse is the case in this analysis. The implication is that despite the higher educational status of the people in the area, preference for food safety is ignored. It does not mean that the consumers are ignorant (or lack the knowledge) of food safety measures but some economic factors have overwhelmed consumers disposition and attitude towards food safety nets. Household head's income and population size of the household positively

Table 3: Logistic estimates of determinants of consumers willingness to pay for safer fish consumption in Bayelsa State, Nigera

Variables	Units	Mean value	Estimated values	Marginal effect
Constant	-	-	-15.43	-1.88
/t-value/			1.48	1.91*
Income	Naira	22,833.33	1.07	0.28
/t-value/			1.97*	1.78*
Bid amount	Naira	223.00	- 0.70	-0.50
(t-value)			2.05**	1.97*
Age	Years	40.8	-0.11	-0.13
/t-value/			0.93	0.17
Educational level	Years	12.0	- 0.53	-0.64
/t-value/			1.79*	1.68*
House hold size	Nominal value	4.23	-1.97	0.21
/t-value/			1.76*	1.71*
Gender	Dummy	0.58	3.74	0.45
/t-value/			1.03	1.65
Log likelihood estimate	-115			
Likelihood ratio test, (χ^2)	39.06			
Percentage of correct prediction	65.8			

Source: Computer analyzed result 2007

related with changes in probability that a consumer will pay for safety than not having it at all. The result shows that as the household head income level and household size increase by one naira and one person, respectively, the change in probability for a preference for food safety in Bayelsa State of Nigeria will increase by 28 and 21%, respectively. The economic implication of this outcome is that the household head is ready to pay more for safety with an additional income he has made than not having it at all as this could offers a cheaper health care and health security than controlling the health problems due to unsafe food consumption. In the same way, an increase in house hold size increases the preference for safe food as the population increase forces the demand for the product up.

Interestingly, the bid price estimate (randomly assigned amount) is significant and negative. This is consistent with the predictions of demand theory that the price of safer fish increases with a decrease in demand for the product (Loureiro and Umberger, 2003). An increase in price per unit quantity of a safe food will reduce the preference or willingness to pay for the product. If the bid amount goes up by one naira, the probability that a consumer who is conscious of the fish safety measures provided in Bayelsa State of Nigeria will pay will decrease by 0.50 or 50%.

CONCLUSION AND RECOMMENDATIONS

The implication of unsafe food consumption has created a lot of concern on consumers health. A lot of factors has been attributed to poor health status of a average farmer. Farmers disposition and attitudinal problems has been associated to this in the past, but increasing awareness to safety and level of education, which were expected to be a control to this problem has failed to solve health problems associated with safety. The determinants to safer fish consumption than not having it was studied with the use of imageries built into a research instrument to ascertain consumer's knowledge and awareness for safety or not and their willingness to pay as well as the bid amount for safety and the determinants for fish safety in the area. Only 60 responses were used for the analysis. Consumers were seen to be quite aware of fish safety measures and can indicate interest, but their willingness or proference for safety dropped due to some economic reasons rather than health or attitude to safety. Increase in income of the house hold head can increase the preference for safety while increase in educational level and bid amount for safety can reduce demand for safety. The study therefore, recommends that Consumer Protection Agencies should advice fish producers and vendors to build in safety measures in the product at a reduced cost to increase consumer's satisfaction and enhance his protection from health risks due to unsafe food consumption thus his preference for safety.

REFERENCES

Aaker, D.A. and K. Kevin, 1990. Cosumers Evaluation of Brand Extension Journal of Marketing JSTOR, Vol 12.

Caswell, J.A., 1998. How labeling of safety and process attributes affects markets for food. Agric. Resource Econ. Rev., 27: 151-158.

Consumers' Protection Commision, 2004. Consumers Protection Council Decree No 66 of 1992, Law of Federal Republic Of Nigeria. www. Nigeria-laworg/consumer protection council decree no 66.htm.

Hawkin, D.I. and R.J. Best, 1984. Consumer Behaviour Mc. Graw Hill New York.

Henderson and Quandt, 1980. Microeconomic Theory: A Mathematical Approach (3rd Edn.), Tata Mc Graw-Hill Publishing Company Limited New Delhi, pp: 5-36.

Hicks, N.L. and P.P. Streeten, 1979. Indicators of Development. The Search for for a Basic Need Yardstick. World Developmnet, Vol. 7.

Jhingan, M.L., 2005. The Economics of Development and Planning. (38th Revised and Enlarged Edn.), Vrinda Publication (P) LTD. vrinda@ndf.net.in

Loureiro, M.L. and J.J. McCluskey, 2000. Accessing Consumers response to Protected Geographical Identification Labeling. Agribusiness: An Int. J., 16: 309-320.

Loureiro, M.L. and W.J. Umberger, 2003. Estimating consumers willingness to pay for country of origin labeling. J. Agricultural Resource Economics Association Western Agric. Econ. Assoc., 28: 287-301.

Maddala, G.S., 1997. Limited-Dependent and Quantitative Variables in Econometrics. Econometric Society Monographs, 3. London/New York: Cambridge University Press.

Mattoo, A. and S. Hasha, 1994. Eco-Labeling Policy Consideration. KYKCOS, Vol. 147.

NDDC, 2004. Niger delta development commission master plan final report agriculture and aquaculture. JOSTRAIG Nig. LTD.

Nwufor, M.I., 2004. Securing the harvest to ensure food for all: A plant pathologist perspective. Federal University of Technology Owerri.

Okojie, L.O., 2006. The economics of deforestation, environmental welfare change and food crop production in Ogun State of Nigeria. Unpublished Ph. D Thesis, Department Of Agricultural Economics University Of Ibadan, Oyo State Of Nigeria.

Quarrainie, K., J. Unterschultz and M. Veeman, 1998. Effect of product origin and selected demographics on consumers choice of red meat. Can. J. Agric. Econ., 46: 201-219.

Schupp, A. and J. Gillespie, 2001. Handler reaction to potential compolsory country-of origin labeling of fresh or frozen beef. J. Agric. Applied Econ., 33: 161-171.

SON, 2004. www.sononline.ng.org. Accessed on 13/11/2005.