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Factors Associated with Catfish Farmers' Attitude towards Value Addition in Kwara State, Nigeria

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Abstract: The potentials of value addition to minimize loss and improve farmers' livelihood through the provision of additional income is not maximized by catfish farmers in Nigeria. This study examined the attitude of catfish farmers in Kwara State towards value addition in fish production. A well-structured questionnaire was used to elicit data from 135 registered catfish farmers in the study area using a two-stage random sampling technique. Descriptive statistical tools and the Chi-square analysis were used in analyzing the data. Majority of the farmers (79.69 %) had a positive attitude towards value addition. At $p<0.05$, socio-economic characteristics such as age, marital status, primary occupation, fish farming experience, farm size, educational status, access to training, membership of social association, and the number of extension contact had a significant relationship with attitude. The study concluded that the attitude of catfish farmers to value addition in Kwara State was good and influenced by their socio-economic characteristics. Improved extension contact, continuous training and strengthening of social networks are some of the recommendations made towards improving value addition to fish in the State.

Keywords: Catfish, factors, farmers' attitude, technology, value addition.

1. Introduction

Fisheries are important contributors to thefood supply, food security and livelihoods at both the local and global levels. They are a primary source of animal protein in many countries of the world. In 2013, fisheries contributed about 17% of global population's animal protein intake and 6.7% of total protein intake (FAO, 2016). One-third of the world's population depends on fish and other aquatic products for their protein intake (Dulvyand Allison, 2009). Fish is reported to be of high nutritional value due to its ability to supply vitamins A, B and D, iodine, calcium, and iron (FAO, 2005). According to Adekoya and Miller (2004), it supplies 55 percent of the animal protein consumption per average Nigerian. Due in large part to increased health awareness, fish intake in Nigeria is rapidly increasing as fish is fast substituting meat in many menus (FMARD 2015). In addition to its consumption as food, it is also used in medicinal preparations such as in fish oils, in thefashion industry, recreation (fishing sport), fish meals, ornamental and decorations (Bolorunduro, 2004). As global demand continues to grow, so does the opportunities for poverty reduction within the sector if thesupply of fish is to be sustained (Naylor *et al*., 2009). Besides being a source of protein in thehuman diet, all activities along the fish value chain provide employment opportunities and generate income thereby promoting livelihood.

Value addition to fish is an important strategy that adds economic value to fish, widen the market performance and reduces the problem of post-harvest losses in sub-Saharan Africa (Kyule*et al*., 2014, Mohamad *et al*., 2011). The processing and preservation of fish are of utmost importance since fish is highly susceptible to deterioration immediately after harvest and hence the need to prevent economic losses (Okonta and Ekelemu, 2005). Bolorunduro (1996) puts the postharvest loss in the Nigerian aquaculture sector at 50

percent of theharvest. According to Davies and Davies (2009), a major impediment to the realization of increased contribution of fisheries to the Nigerian economy was the problem of high post-harvest losses.Eyo (1992), enumerated different types of preserving methods which included drying, smoking, freezing, chilling and brining. Davies *et al*. (2008) also recommended various traditional processing and storage technologies for fishery products. The Processing of fish either through smoking or drying which is widely used in fish preservation involves the reduction of the moisture content of fish through heating, thereby inhibiting the action of micro-organisms and prolonging its shelflife (Oyeleye, 2003; Amoo *et al.*, 2007).

Many fish species have excellent preservation qualities after salting, sun drying and even smoking (Madu *et al*., 1984). One of such is the African sharptooth catfish (*clariasgariepinus*) scientifically known as siluriformes.Catfish is the most popular fish among subsistent and commercial fish farmers in Nigeria due in large part high market value which is as much as three times that of some other available fish types(Emokaroand Ekunwe, 2009).

Despite the importance of fish and its value addition in Nigeria, the country's fisheriesare not yet developed to satisfy international market requirements as limited value addition is done in the industry, with the result that marketing of fish and its products are limited to domestic markets (Investopedia, 2011). As a fact, even the domestic market demand is not adequately met, and hence, although the country remains Africa's largest aquaculture producer (FOS, 1999), it still is the biggest importer of fish in the continent (FMARD, 2011). The lack of adequate fish handling, processing techniques and storage facilities contribute significantly to the low supply of fish to poor rural dwellers in developing countries (Ayuba and Omeji, 2006). Ayuba and Omeji (2006) also reported that insect infestation is the cause of most prominent losses in quality and quantity of stored and dried fishes in Nigeria.

Like the case in most parts of Nigeria, Many catfish farms in Kwara State sell their harvests off fresh (unprocessed). They do not only suffer from loss due to spoilage which is very likely due to the perishable nature of fish, but they also lose out on additional income accruable from processing. Possibly adduced reasons for this include non-availability of technologies for processing of fish and the disposition of farmers to value addition. It is therefore important to investigate the availability of technologies for fish processing in the state. Alfred *et al.*, (2012), noted that for the Nigerian fish industry to improve there is a need to understandthe attitude and perception of farmers on processing and marketing of fish. It is also possible that some socio-economic factors of the fish farmers affect their attitude towards fish processing. The study, therefore, assessed the relationship between selected socio-economic characteristics of catfish farmers in the study area and their attitude towards fish value addition. Thespecific objectives of the study were to:

1. describe catfish farmers' selected socio-economic characteristics;
2. asses theequipmentin use for fish processing in the study area;
3. examine the attitude of catfish farmers to value addition in the State; and
4. identify the factors affecting catfish farmers' attitude towards value addition

2. Materials and Methods

The study area was Kwara State.Located in the North-central part of the country, It occupies 36,825 square kilometers andshares an international boundary the Benin Republic. The State is popularly referred to as the "gateway" because of its unique geographical position between the north and the southern part of the country. It comprises of 16 local Government Areas andis locatedat latitude 8°30'N and longitude 4°35'E. Agriculture Plays a major role in sustenance in the State with aquaculture as a major part of the agricultural activities in which people are engaged. In addition to the commercial fish farms located mostly around the peri-urban areas,

a commendable percentage of families operate backyard fish farms howbeit on the subsistent level. Fishing is also a prominent activity along the lower River Niger Basin.

The study population comprised of all registered members of the Catfish Farmers' Association in Kwara State. A two-stage random sampling technique was used in selecting the respondents for the study. The first stage involved the random selection of 50% of the 16 Local Government Areas in the State. Secondly, a random selection of 25% of the registered catfish farmers in the eight selected L.G.As provided the sample size of 135. A well –structured questionnaire was designed, pre-tested and used to elicit information from the respondents. A total of 128 copies of the questionnaire administered was found to be analyzable thereby giving a response rate of 94.8%.

The instruments for data analysis included both descriptive and inferential statistics. Frequency counts, percentages and means were used to present the results of the first three objectives of the study. The attitude of the farmers to value addition was assessed with the use of a 5- point Likert Scale. Ten statements were constructed which when added together, adequately sums up the farmers' attitude. The respondents were required to indicate the extent to which they agreed or disagreed with the statements. The scale was graduated as follows;

Strongly disagree=1, Disagree= 2, Indifferent=3, Agree=4, Strongly agree=5

Individual scores were computed for each respondent, and the scores were converted to mean scores by dividing the total scores of each respondent by the number of statement (10) such that the lowest and highest possible mean scores were one (1) and five (5) respectively. For the purpose of the study, a benchmark of a mean score of 3 was adopted to connote agreement with theLikert statements. Chi-square analysis was used to identify the socio-economic factors affecting farmers' attitude to value addition. Chi- square (X^2) statistic is used for testing relationships between categorical variables whether distributions of the categorical variables differ from one another. The Chi- Square statistic compares the counts of categorical responses between two (or more) independent groups. Chi-Square statistic is calculated by using the formula below;

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e}$$

where f_o = the observed frequency and f_e = the expected frequency (Chawla and Sondhi, 2011). Unlike most statistics, the Chi-square (χ^2) can provide information not only on the significance of any observed differences but also provides detailed information on exactly which categories account for any differences found.

Measurement of Variables

Age- Measured in years

Gender-Measured as a dummy variable 1 for male and 0 for female

Marital status-Measured as a dummy variable 1 if married, 0 otherwise

Primary occupation-Measured as a dummy variable 1 if fish farming, 0 otherwise

Fish farming experience-Measured in years

Access to credit- Measured as a dummy variable 1 if yes, 0 otherwise

Farm size-Measured as number of fish in stock

Level of education-Measured as a dummy variable 1 if above primary level, 0 otherwise

Access to training- Measured as a dummy variable 1 if yes, 0 otherwise

Frequency of extension visit-Measured as the number of extension visits in the immediate past 6 months period.

3. Results and Discussion

Socio-economic Characteristics of the Respondents

This section of the results and discussion presents the description of the socio-economic features of the interviewees. The results are summarized in Table 1.

Table 1. Socio-economic Characteristics of Respondents

Socio-economic Characteristics	Frequency	Percentages	Mea ns
Age			
20-29	28	21.88	
30-39	47	36.71	
40-49	32	25.00	
50-59	17	12.28	37.55
>59	4	3.13	
Total	**128**	**100.00**	
Gender			
Male	93	72.66	
Female	35	27.34	
Total	**128**	**100.00**	
Marital Status			
Single	29	22.66	
Married	99	77.34	
Total	**128**	**100.00**	
Educational Status			
No formal Education	2	1.56	
Primary	5	3.91	
Secondary	28	21.88	
Tertiary	93	72.65	
Total	**128**	**100.00**	
Household Size			
1-5	56	43.75	
6-10	48	37.50	
11-16	15	11.72	
>15	9	7.03	7.00
Total	**128**	**100.00**	
Primary Occupation			
Fish Farming	51	39.84	
Civil Servant	35	27.34	
Other Businesses	42	32.82	
Total	**128**	**100.00**	
Years of Experience in Fish Farming			
1-5	59	46.10	
6-10	40	31.25	
11-15	17	13.28	
16-20	10	7.81	6.90
>20	2	1.56	
Total	**128**	**100.00**	

Source: Field Survey, 2016

The table shows that more than half of the respondents (58.59%) were below 40 years of age. Also, the mean age of the respondents was 37.55. These two statistics reveals active participation of the youth in fish farming in the study area and this finding has positive implications for the future of fish farming in the study area. This conclusion is drawn from the established reports that the youthful years are characterized by physical strength as well as the willingness to try out innovation (Bahaman et. al., 2010; Abdullah and Sulaiman, 2013). The distribution of the respondents by gender projects the low level of participation of females in fish farming in the study area as less than a third of the respondents (27.66%) were female. This is particularly of

interest giving that about half (49.1%) of Nigeria's population are women (NPC, 2006). The majority of the catfish farmers were married (77.34%). Also, a high level of literacy was recorded among catfish farmers in the study area as less than 2 percent of the respondents had no formal education while as high as 72.65 percent had tertiary education. Less than 40 percent of the respondents were primarily fish farmers as others had other primary occupations and merely engaged in aquaculture as an alternative or additional source of income. This may have implications for their level of commitment and dedication to fish farming due to the competition for their time by their other occupations. The majority of the farmers had not more than ten years of experience (77.35%) in fish farming.

Processing Equipment Used by Catfish Farmers in Kwara State

The processing technologies in use among catfish farmers in the study area are analyzed and discussed in this section. The results are summarized in Table 2.

Table 2. Distribution of Respondents According to Processing Equipment in use

Technology	*Frequency	*Percentages
Galvanized Oven	67	40.12
Extended Drum Oven	5	2.99
Brick Kiln Oven	36	21.56
Gas Cooker	29	17.37
Charcoal Stove	4	2.39
Refrigerator	15	8.98
Smoke House	7	4.19
Clay Oven	1	0.60
Bowl Cutter	3	1.80
Total	**167**	**100.00**

Source: Fields Survey, 2016

**Multiple Responses*

From the table 2, it is seen that many of the respondents used processing equipment in combinations. The use of galvanized iron was the most popular technology among the farmers in the study area as it had the highest percentage of users (40.12%). The brick kiln oven and gas cookers were also in moderate use by 21.56 and 17.37 percent respectively. This finding is in agreement with that of George *et al.*, (2014) in a similar study carried out in Ibeju-Leki, Lagos, Nigeria in which smoking was identified as the most used fish processing technology among farmers. Other technologies such as the clay oven, bowl cutter, charcoal stove, extended drum oven and smoke house were in very poor use. This may be attributed to the drudgery associated with their use. The poor use of refrigerators may also be attributed to the epileptic supply of electricity in the country.

Catfish Farmers' Attitude towards Value Addition

The result of an investigation into the attitude of catfish farmers towards value addition is discussed in this section. Table 3 presents the responses to the various Likert items used to assess their attitude while Figure one provides the distribution of the responses based on their attitude.

Table 3. Chi Square Analysis Showing the Relationship between Socio-economic Characteristics of the Respondents and their Attitude towards Value Addition

Socio-economic Characteristics	χ^2	Df	P. value	Decision
Age	86.067	35	.000	S
Gender	20.807	1	.000	S
Marital Status	108.578	2	.000	S
Primary Occupation	51.874	3	.000	S
Fish Farming Experience	113.533	15	.000	S
Access to Credit	0.600	1	.439	NS
Farm Size (No of stock)	145.514	1	.000	S
Educational Status	274.296	4	.000	S
Access to Training	103.910	1	.000	S
Membership of Social Other Groups	131.030	1	.000	S
Frequency of Extension Contact	85.836	5	.000	S

Source: Field Survey, 2016 S=Significant, NS= Not Significant

Table 3 shows the extent to which the respondents agreed or disagreed with statements in favour of fish value addition. Out of a total obtainable mean score of five, the responses on al the ten statements recorded a minimum of 3.22 anc a maximum of 4.12. The implication of this result is that for most of the statements, the respondents agreed to a large extent that the statements were true. This is indicative of a strong positive attitude towards fish value addition among the respondents. For instance, the item with the lowest mean score of 3.22 (Fish processing increases profit) had 82.03 percent of the respondents in agreement with the statement while 80.47 percent of the respondents agreed that a considerable number of consumers would rather purchase catfish in the processed form.As expected from the results presented in Table 3, Figure 1 shows that the respondents had a high positive attitude towards value addition to fish.

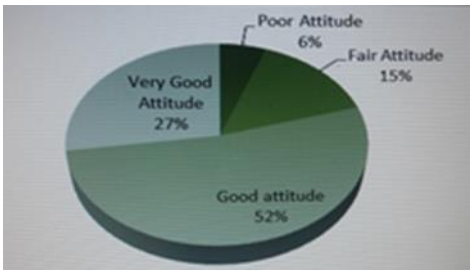

Figure 1. Fish farmer's attitude towards value addition

A total of 27 respondents (with means scores greater than 4) had very high positive attitude towards value addition. With scores between 4.0
250 .49, 52 percent had high positive attitude the attitude of the remaining 15 percent was

Factors associated with Catfish Farmers' Attitude to Value Addition

The relationship between farmers' selected socio-economic characteristics and mean scores on attitude to value addition is discussed in this section. Table 4 summarizes the results.

The chi-square (χ^2) analysis result shows that at ($P < 0.05$) there was a significant relationship between some socio-economic characteristics of the fish farmers and their attitude towards value addition. The result indicated that age (χ^2=86.067, p = 0.000), gender (χ^2 = 20.807, p =0.000), marital status (χ^2 = 108.578, p = 0.000), primary occupation (χ^2 = 51.874, p =0.000), fish farming experience (χ^2 = 113.533, p 0.000), Farm size (χ^2 = 145.514, p = 0.000), educational status (χ^2 = 274.296, p = 0.000), access to training (χ^2 =103.91, p = 0.000), member of association (χ^2 = 131.030, p = 0.000), and the Number of extension contact (χ^2 =85.836, p = 0.000) were significantly related to attitude towards value addition. The positive coefficients connote a direct relationship between the variables and attitude. Therefore, an increase in age, years of farming experience, farm size, educational status, the number of extension contacts, etc. significantly

increased positive attitude among the farmers. Kowsalya *et al.*, (2017) also confirmed that extension contact, educational level, and access to training were directly related to the possession of positive attitude towards value addition among women farmers in India. Also, positive attitude towards value addition was higher among males, married farmers and farmers who belonged to social groups. However, there was no significant relationship between access to credit and the farmers' attitude towards value addition (χ^2 = 0.600, p = 0.439), at P > 0.05. This could be because only very few of the respondents had access to credit facilities. Issa *et al.*, 2014 also reported poor access of catfish farmers to credit facilities

4. Conclusions

This study examined the socio-economic characteristics of catfish farmers, the processing technologies in use by the farmers, their attitude to value addition and finally the factors affecting their attitudes. The study concluded that the galvanized oven, brick kiln oven and gas cookers were the common technologies in use among the respondents. Also, the respondents had a high positive attitude towards fish value addition. At $p<0.05$, 10 of the 11 socio-economic characteristics investigated for a relationship with attitude (age, marital status, primary occupation, fish farming experience, Farm size, educational status, access to training, membership of associations, and the number of extension contact) had a significant direct relationship with attitude. Therefore, factors other than poor attitude of farmers to value addition-are responsible for the low rate of value addition to fish in Kwara State, Nigeria.

Based on these findings, the following recommendations are put forward;

1. Association of Catfish Farmers in the study area should organize continuous training of its members on various value addition technologies as well as its importance.
2. The group contact extension method is recommended to enhance the frequency of extension contact among the farmers.
3. Farmers should be educated about the advantages that membership of social groups confers on their farming activities while existing groups should be strengthened through training on social networking and group dynamics.
4. The reason for the poor level of involvement of women in catfish farming should be addressed to ensure their optimum contribution to aquaculture in the study area.

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