



Analysis of Socio-economic Factors Affecting Artisanal Fishermen around Lake Alau, Jere Local Government Area of Borno State, Nigeria

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ABSTRACT

The study analyzed the socio-economic factors affecting artisanal fisheries around Lake Alau, Jere Local Government area of Borno State, Nigeria. The study used random sampling technique to select 41 respondents in the study area. Data were collected by the aid of structured questionnaires administered to the respondents. The data collected were analyzed using descriptive statistics and linear regression. The result revealed that majority (85.3 %) of the fishermen fall between the age range of 21 and 40 years and 82 % had the family size of 1-8 members. The results of the regression analysis showed R-square of 0.93, implying 93 % of the variation in the dependent variable was explained by the independent variables included in the model. All the independent variables were significant and positively related to the dependent variable. The study recommended that efforts should be made to educate fishermen adopt environmentally friendly fishing techniques and be provided with fishing materials and infrastructure for the improvement of quantity of fish catch.

Key words: Socio-economic, Artisanal fisheries, Lake Alau, Borno State

INTRODUCTION

Fish contains high quality protein, vitamins, minerals and other nutrients important for human health and growth. A combination of fish and low quality protein meets the proven requirement of an adequate diet. According to Ovie and Raji (2006), fish is crucial to the Nigerian economy, contributing 5.4% of the gross domestic product (GDP). Fish are significant to the nation's economy in terms of food security, income, employment, poverty alleviation, foreign exchange earnings and provision of raw materials for animal feed industries. Fish is the commonest and cheapest source of protein for the teeming Nigeria's poor, estimated to be between 65-70% of the total population.

Artisanal fishing is the term used to describe small scale, less technology, commercial or subsistence fishing practice. It is also described as capturing fish from the natural water using traditional fishing gears such as rod and tackles, arrows and harpoons, cast and drag nets, traps, barrier and traditional fishing canoes and boats (Wikipedia, 2012). Artisanal fishing usually occur around the world particularly in

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developing nations and are vital to livelihoods and food security of the local community. They supply income, employment and also supply the local people with protein at reasonable prices.

Although Nigeria is blessed with many water bodies (dams, lakes, rivers and streams) where fish are sourced, yet the country fails to provide the required amount or quantity of fish required by the rapid growing population. According to Raufu *et al.* (2009), the current annual production of aquaculture is around 500,000 metric tonnes. This quantity is grossly inadequate for domestic consumption, thus Nigeria imports 700,000 metric tonnes of fish annually to cushion the supply- demand gap (Essien and Effiong, 2010). This study was thus conducted to identify the socio-economic characteristics of artisanal fishermen, the factors affecting the quantity of fish catch and the constraints of artisanal fishermen in the study area.

MATERIALS AND METHODS

Study area

This study was conducted in Lake Alau, Jere Local Government area of Borno State. Jere Local Government Area (LGA) is located in the northern part of Borno State between Latitude 13°05'E and 14°45'E and longitude 11°57'N and 13°45'N and (Isah *et al.*, 2010). The Local Government covers an area of 868km² with its headquarters in Khaddamari (Wikipedia, 2012). Jere has an estimated population of 1,119,381 (NPC, 2006). The local government shares boundaries with Maiduguri Metropolitan Council (MMC) to the southeast, Magumeri LGA to the west and Mafa LGA to the northeast (Samuel, 2008). The local government has an annual rainfall of 450mm-750mm with a temperature of 28°C - 40°C during the hot season and 24°C - 28°C during the cold harmattan season (Samuel, 2008). Borno State possess a great potential of fish production both in terms of inland fishing and aquaculture. Socio-economic and environmental production factors are suitable for fish production (Omoyemi and Yisa, 2005).

Sampling procedure

Both purposive and random sampling procedures were employed for this study. Two landing stations known for high concentration of fishermen was purposively selected out of three stations. Random sampling was used to select the respondents from a list of members of each station provided by their respective union. This gave an equal opportunity to each member selected. Forty one (41) respondents were chosen in the landing site proportionately since the membership of the sites varied. Twenty five percent of the populations of the chosen stations were selected.

Data collection

Primary data were used for this study. The primary data were obtained by the use of structured questionnaires. The questionnaires were administered to the respondents by well trained enumerators who interpreted to them. The designed questionnaire was used to collect information on the level of education in years, household size, age, quantity of fish caught and factors affecting the quantity of fish catch through artisanal fisheries as well as the constraints to artisanal fisheries.

Analytical techniques

The analytical techniques used for the study were descriptive and inferential statistics. The descriptive statistics used includes percentages and frequencies. The inferential statistics used was linear regression. This was used to analyse the quantity of fish caught by the fishermen in the study area. The linear regression analysis used was explicitly expressed as: $Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + u$. Where: Y= quantity of fish caught (kg), X₁= age of the respondents (years), X₂= family size, X₃= educational status (years), X₄= years of fishing experience, X₅= availability of fishing materials, X₆= years in membership of each union, a= constant, b₁-b₆= estimated parameters, u = error term.

RESULTS AND DISCUSSION

Socio-economic characteristics

Table 1 shows the socio-economic characteristics of the respondents. This included the age distribution, sex, marital status of fishermen, household size, educational status, years of experience, fishing goal and membership in the fishermen union. The socio-economic characteristics assessment helps to know how the fishermen were affected in artisanal fisheries.

Analysis of the result in Table 1 shows that 51.2% of the respondents were between the ages of 21-30 years constituting the highest percentage of the fishermen in the study area. Thirty one percent (34.1%) were in the age groups of 31 - 40 years, 9.8% were in the age group of 41 years and above, while only 4.9% of the respondents were in the age group of 20 years and below. This indicated that most of the fishermen were in their youthful age due to the fact that fishing activities require much energy in which children and elderly people may not be able to participate fully.

Analysis of the gender of the respondents indicated that all (100%) the fishermen were male which shows that women do not participate in the fishing activities in the study area. This implies that male dominated the fishing activities in the study area, while the female might mostly be involved in marketing and processing of the caught fish. The result is almost consistent with the findings of Inoni and Oyaide (2007), who reported male as the dominant (72.3%) fishermen in the Delta.

Marital status of the artisanal fishermen in the study area indicated that majority (80.5%) of the fishermen were married while 19.5% were single. This implies that married and responsible men dominated the fishing activities in the study area. The higher percentage of married respondents in this study may be due to the fact that people get married earlier and as such had to find for means of livelihood to sustain the family. The result is in agreement with the findings of Raufu *et al.* (2009) who observed 81.3% of the fishermen were married while only 10% were single, the remaining were divorced or widowed.

Majority of the fishermen (43.9%) observed in this study had 1-3 persons as members of their household, 39% had 4-8, and 9.8% had 9-12 persons while only 7.3% had 13 persons and above. This shows that most of the fishermen in the study area had a family size of less than 12, indicating that most of them are youth.

Analysis of the educational status of the fishermen around Lake Alau indicated that most of the fishermen (41.5%) had Qur'anic education, 26.8% had primary education, 7.3% had secondary education, 7.3% had adult education while 17.1% did not attend any formal school and none of them had tertiary education. These results indicated that the fishermen and the Alau communities are left behind in terms of formal education which may be due to the absence of schools in the study area. The implication is that as education brings about technological changes, the respondents cannot be able to adopt new fishing technology easily to change from what they know. This confirmed the findings of Dogondaji *et al.* (2009) who reported that majority of the fishermen (54%) had Islamic education, while only 6% had tertiary education.

The years of experience in fishing postulated that most of the respondents (53.7%) had more than 13 years fishing experience, 24.4% had 9-12 years of fishing experience, and 12.2% had 4-8 years of fishing experience while only 4.9% had 1-3 years of experience.

This result of years of experience recorded in this study that the fishermen are much familiar with the terrain of fishing in Lake Alau and are having some earnings or income. The result of this study is close to the findings of Dogondaji *et al.* (2009) who documented that 56% of the respondents had more than 16 years of fishing experience in Toidi Lake of Binji Local Government area, Sokoto State, Nigeria.

Analysis of the fishing goal of the respondents showed that 63.4% (majority) were not fishing for commercial purposes, 31.7% of the fishermen were for both commercial and consumption purposes, while only 4.9% were fishing for consumption only. The result shows that most of the fishermen earn their living from the artisanal fisheries.

Table 1: Socio-Economic Characteristics of fishermen (n=41)

Variable	Frequency	Percentage (%)
Age of the respondents (years)		
Less than 20	2	4.9
21-30	21	51.2
31-40	14	34.1
41 and above	4	9.8
Gender		
Male	41	100
Female	—	—
Marital status		
Single	8	19.5
Married	33	80.5
Widow	0	0
Divorced	0	0
Household size		
1-3	18	43.9
4-8	16	39
9-12	4	9.8
13 and above	3	7.3
Educational status		
Non formal	7	17.1
Islamic	17	41.5
Adult	3	7.3
Primary	11	26.8
Secondary	3	7.3
Years of fishing experience		
1-3	2	4.9
4-8	5	12.3
9-12	10	24.4
13 and above	22	53.7
Fishing goal		
Consumption	2	4.9
Commercial	26	63.4
Consumption and commercial	13	31.7
Membership in organization		
Member	35	85.4
None member	6	14.6

Source: Field Survey, 2012

In the study of organizational group, 85.4% indicated that they were members of fishermen association while 14.6% of the respondents do not belong to any association, indicating that the association was just introduced of recent and others complain that they do not feel the impact of the organizational group in the study area

Socio-economic factors affecting quantity of fish catch

Table 2 presents the result of the linear regression analysis which determines the socio-economic factors that affects the quantity of fish catch among the fishermen in the around Lake Alau.

Table 2: Socio-economic factors affecting quantity of fish Catch among the Respondents

Variable	Coefficient	p-value
Constant	1.365	0.000***
Family size	0.312	0.001***
Educational status	0.942	0.010*
Fishing experience	0.304	0.000***
Availability of fishing materials	0.243	0.002***
Membership of association	0.974	0.005**
R ²	0.93	
F-Value	131.66	

Source: Field Survey, 2012, ***significant at 1%, **Significant at 5%, *Significant at 10%

The results revealed that the linear functional form was the best model that fit this study, based on the values of the coefficient of determination (R-square), level of significant variables and their sign. The value of R square (0.93) indicated that 93 % of the variation in the dependent variable was explained by the variables included in the linear regression model. The results also revealed that age of the respondents was significant at 5% level of significance and positively related to the quantity of fish catch with a coefficient of 0.009.

Family size was significant at 1% with positive coefficients of 0.312. This implies that an increase in family size will lead to 0.312kg increase in fishing output. That is, family size plays an important role on the quantity of fish catch among the respondents in the study area.

Educational status was found to be significant at 10 % and positively related to the amount of fish catch in the study area by the respondents with coefficients of 0.942. This implies that level of education among the respondents has an influence on the fishing output by changing to new technique.

Availability of fishing materials was found to be highly significant and positively related to the quantity of fish obtained from the lake. The results revealed that the availability of fishing material was significant at 1.00% level of significance and had the coefficient of 1.254. This implies that 1 % increase in the availability of fishing materials led to increase in the quantity of fish catch. That indicates that fishing materials of different sizes helped in catching more fish while fishing.

The results also indicated that membership of association played a significant role in the quantity of fish obtained at 5 % level of significance with a coefficient of 0.974. This may be due to the fact that through unionism the fishermen acquired more fishing materials to carry out their artisanal fishery.

Constraints faced by the fishermen in the around Lake Alau

This aspect of the study analysed the constraints faced by the fishermen in the study area which included breeze (wind), theft, unavailability of fishing equipment, unavailability of fish in the lake, insufficient fund, lack of formal education and infrastructure. Table 3 presents the distribution of constraints faced by the respondents in the study area.

Table 3: Distribution of constraints in artisanal fishermen

Constraints	Frequency	Percentage (%)	Rank
Breeze (wind)	25	24	1
Unavailability of fish	15	14	2
Theft	20	19	3
Unavailability of fishing equipment	21	20	4
Lack of formal education and infrastructure	16	15	5
Insufficient fund	19	18	6
Total	106*	100	

Source: Field Survey, 2012.

Multiple response exist, the total number of respondents is greater than the actual number of respondent (41). The results in the table revealed that 24% of the respondents were constrained by breeze (wind) which was ranked first. The reason for the higher percentage for breeze may be due to the fact that when the breeze was passed over the lake especially during harmattan the fishes go down in the water and make it difficult to catch and also fishermen find it difficult to go into the water, because the breeze results to boat staggering on the water.

The results also revealed that 14% of the fishermen indicated unavailability of fish during fishing as the constraint they faced in the study area. It was ranked second most important constraint by the respondents. This may due to the fact that fishes can easily run away from their prey as the lake is so wide and lack modern equipment. The respondents also complained of thief which constituted 19 % and ranked third. The implication is that thieves make the fishermen helpless and render their efforts worthless, hence a lost.

The other constraints faced by the fishermen in the study area were unavailability of fishing equipment (20%), lack of formal education (15%) and insufficient fund (18%) ranked fourth, fifth and sixth respectively. In conclusion Socio-economic variables played a significant role in the quantity of fish caught in the study area and the respondents faced different constraints in artisanal fishing in the study area and it can be recommended that Provision of micro loan facilities to the fishermen which help them to acquire fishing materials and the fishermen should be educated on modern fishing so that quantum of fish caught increases.

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