

AN INVESTIGATION ON THE SOCIO-ECONOMIC BENEFITS AND CHALLENGES FACED BY FISHERS AROUND RIVER DONGA TARABA STATE, NIGERIA

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ABSTRACT.

The study was conducted from March 2018 to August 2019 to investigate the socio-economic and challenges faced by fishers around River Donga. Structured questionnaires were administered to 242 fishers and data was analyzed using SPSS Version 23. Fishers' age group showed middle-aged had the highest value (66.12%) while old age was lowest (2.48%). Sex showed males had the highest (96.69%) while females were lowest (3.31%). Marital status showed married had highest (83.47%) while divorced were lowest (0.83%). Educational level revealed primary school leaver had highest (51.24%) while those with tertiary education were lowest (5.79%). Alternative livelihood highest was the animal and plant farming (62.81%) and trading was lowest (3.31%). Fishing experience highest was 21-30years (38.8%) while lowest ≥ 51 (1.65%). The most effective of fishing regulations was the ban on the use of poison (3.95) mean score while the lowest was restricted season and area (1.68). Profitability regression analysis was significant for age, marital status, educational background, market distribution, and gear depreciation ($P < 0.05$). Gender, experience, and craft depreciation not significant ($P > 0.05$). Challenges faced by fishers' highest was gear and fish theft (31.34%) while seasonal/climate change was least (1.14%). There is a decline in performance, from the negligence of fishing communities with benefits accrue to them by the Government. Fishers show support in abiding by fishing regulations if properly implemented.

Keywords: Profitability, Fishing activities, Educational level, Gear, Fishing regulation.

INTRODUCTION

Traditionally, the fish in our water bodies are used for food and local sales by the communities around such water bodies. However, some activities bring in more money than fishing activities. These activities can pollute and otherwise damage natural environments, including fish habitats, and bring significant change to the life of residents. Some conservation groups are reacting to increasing environmental damage, and often ask for restriction to be placed on some or all of the activities that affect these inland waters. These restrictions can benefit fisheries, limit fishing and, impact fishing communities negatively. Meanwhile, about 90 million people in the world depend on fish for their daily source of protein and as a source of income (FAO, 2005). An understanding of the social and economic aspects of fish production and the interaction between both variables is a prerequisite to the future development and sustainability of the sector (Townsend, 1991; Akpoko, 2003).

Nigeria is endowed with abundant natural resources in marine, estuarine and freshwater environments. Chukwuemeka *et al.* (2017); Anko and Eyo, (2006) reported that Nigeria has vast potentials for fisheries development, being endowed with a marine area of 36,300km² an exclusive economic zone (EEZ) area of 210,900km², and inland waters of 12.5million hectares. Amazingly, despite the huge endowment, the current production level of 750,000 metric tonnes is at a 50% deficit to

meet Nigeria's fish need per annum of at least a 1.5million metric tons. In many parts of Nigeria, the demand for fish and fishery products has continuously outweighed the supply. In Nigeria, the annual consumption of fish and fish products is about 1.3 million metric tonnes in contrast to the total domestic production of 450,000metric tonnes per annum (Tsadu *et al.*, 2006).

Analysis of global fisheries data has shown a decrease in the mean size of individual fish species and the value of the catches (FAO, 2014). Hence, the fishing sector progressively is adopting economic technologies and approaches to environmentally acceptable fishing. The technology of fish exploitation in the Nigeria inland fisheries is mainly characterized by the use of simple fishing gear and techniques. Fishing plays an important role in supporting livelihood worldwide and forms an important source of diet for over a billion people. Fisheries-related activities provide important sources of livelihood for millions of people in Nigeria. Taraba State is blessed with vast wetland resources. Among the people of Taraba State, fish constitute a major percentage of their protein intake.

This study despite the importance of the research there is no documented work on it to bridge the gap and facilitate management decisions. Hence, the objectives were to investigate the fisheries, socio-economic benefits, and challenges faced by fishers in River Donga, Taraba State, Nigeria.

STUDY AREA

River Donga is located on latitude 8° 19'00" N and longitude 9° 58'00" E of the equator (<https://geographic.org>). The River rises from the Mambilla Plateau in Northeast Nigeria; it forms a part of the international border between Nigeria and Cameroon and flows northwest to eventually merge with the Benue River as an attribute in Nigeria. The River Donga watershed is 20,000 square kilometres (7,700sq mi) in the area. The River Benue is said to deliver up to 1,800 cubic meters (64,000cu ft) of

water per second. The River is often brownish during the wet season and clears during the dry season. The communities around use the water for several purposes which include drinking, irrigation, fishing, laundry, bathing, and transportation, etc. Its elevation is about 113 meters above sea level. River Donga is also known as Donga, Dukari and it is in Taraba State, Nigeria, there are three forest reserves, Baissa, Amboi, and Bissaula River in the River Donga Basin.

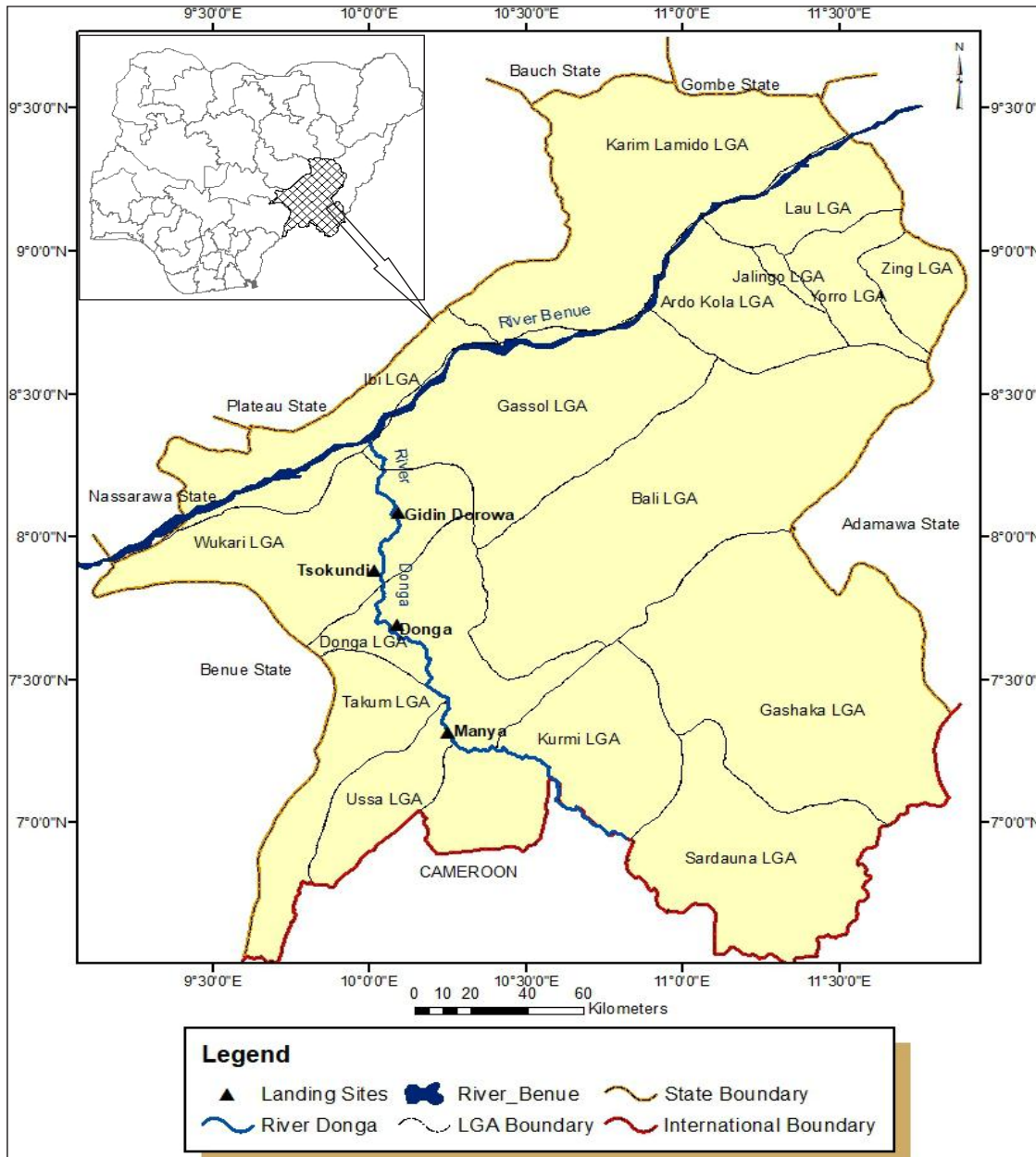


Fig. 1: Map of river donga showing the study areas

Source: Digitalized from Google Earth and Taraba State Political Map of Diva GIS

MATERIALS AND METHODS

The Fishers were selected at random through stratified sampling technique and 272 structured questionnaires were administered to the

respondents at four different locations and 242 were recovered. Planning was made for field visits combined with resource and elderly persons, the purpose and objectives of the study were made clear

to them. Further enquiries and observations were made during subsequent visits to the river. Various field exercises were conducted to gather information like population dependency on the river, fish species found, fish species lost, types of fishing gear used, regulations guiding fishing, processing, marketing, and distribution, the profitability of fishing activities, challenges faced by the fisher folks, etc. Data collected were recorded and analyzed.

RESULTS

The results for the socio-economic characteristics of fishers around River Donga are shown in (Table 1). The results revealed that the middle age group was the highest with 66.12% while the young age was the lowest with 16.53%. The sex ratio reveals that males were the highest with 96.69% while females were the lowest with 3.31%. Marital status shows that married was the highest with 83.47% while divorced was the lowest with 0.83%. Household size result shows that 6-10 members of a family were the highest with 47.93% and 16 and above were the lowest with 0.83%. The educational level result shows that those that attended primary school were the highest with 51.24%, while the tertiary institution was the lowest with 5.79%. Alternative livelihood result shows that animal and plant farmers were the highest with 62.81% and trading was the lowest with 3.31%. Fishing experience result shows that those group of 21 to 30 were the highest with 38.8% and the lowest were 51 and above with 1.65%.

The profitability of the fishing activities in respect to depreciation around River Donga is shown in the coefficient (Table 2). The result reveals profit versus age, fishing experience, gear depreciation, craft depreciation. The Box-Cox transformation of the response with rounded lambda = 0.5. The 95% CI for lambda is (0.424030, 0.607030). The regression model is significant in, age, marital status, educational background, market distribution, and gear depreciation. Other independent variables (gender, fishing experience, and craft depreciation) in the model were not significant based on the data collected.

The result for profitability in fishing activities around River Donga is shown in (Table 3). The result reveals that when the age of respondent increases by 1 unit, profit increases by 0.12 unit, when the respondent is divorced, profit increases by 6.33 units when the respondent has a non-formal education, profit decreases by 1.41 unit when the respondent has other education, profit increases by 5.91 unit and when respondent's gear depreciates by one unit, profit increases by 0.00081 unit.

The result for the challenges faced by fishers around River Donga is shown in (Table 4). The result shows gears and fish theft with 31.34% as the highest while the lowest was a seasonal climatic change with 1.14%.

The result for fishing regulations around River Donga is shown in (Table 5). The result showed that the effectiveness of fishing regulation's highest value was the ban on the use of poison with a mean score of 3.95 which revealed the effectiveness of the regulations. The lowest of the regulations was on the restricted season and area with a mean score of 1.68 which means that it is ineffective regulations as in the 4-Likert scale rating which indicates values of < 2.50 as ineffective and > 2.50 as effective.

Table 1: Socio-Economic Characteristics of Fishers

Parameters	Frequency	Percentage
Age		
11 to 30 (young)	40	16.53
31 to 50(middle)	160	66.12
≥51 (old)	42	17.36
Sex		
Male	234	96.69
Female	8	3.31
Marital Status		
Single	30	12.4
Married	202	83.47
Divorced	2	0.83
Widow/Widower	8	3.31
Household Size		
1 to 5	88	36.36
6 to 10	116	47.93
11 to 15	36	14.88
16 and above	2	0.83
Educational level		
No Formal	56	23.14
Primary School	124	51.24
Secondary School	48	19.83
Tertiary	14	5.79
Alternative livelihood		
Animal and/ or Plant farming	152	62.81
Motorcycle riding	24	9.92
Others	8	3.31
None	58	23.97
Fishing Experience		
1 to 10	20	8.26
11 to 20	76	31.4
21 to 30	82	38.8
31 to 40	44	18.18
41 to 50	16	6.61
51 and above	4	1.65

Table 2: Coefficients Table for Profitability of Fishing Activities

Term	Coefficient	SE Coefficient	T	P
Constant	5.02819	1.98247	2.53632	0.012*
Age	0.12303	0.04912	2.50469	0.013*
Gender				
Female	0.41495	0.72677	0.57059	0.569
Marital Status				
Divorce	6.32529	2.32103	2.72521	0.007*
Married	1.74678	0.89323	1.95557	0.052
Single	0.88590	1.01001	0.87712	0.381
Education				
Non-Formal	-1.41621	0.55760	-2.53983	0.012*
Others	5.91399	1.23786	4.77761	0.000*
Primary	-0.69042	0.58876	-1.17268	0.242
Secondary	-0.46821	0.50910	-0.91967	0.359
Experience	-0.04628	0.05671	-0.99073	0.323
Market				
Other	-0.93377	1.53147	-0.60972	0.543
Retail	-2.37528	1.83882	-1.29175	0.198
Gear Depreciation	0.00081	0.00037	2.16959	0.031*
Craft Depreciation	0.00028	0.00019	1.42527	0.155

*Significant at 0.05 level of significance

Table 3: Regression Analysis for Profitability of Fishing Activities around River Donga

Source	DF	SS	Adj SS	Adj MS	F	P
Regression	14	1427.96	1427.96	101.997	8.1660	0.000000*
Age	1	80.75	78.36	78.359	6.2735	0.012959*
Gender	1	3.02	4.07	4.072	0.3260	0.568589
Marital Status	3	738.75	772.59	257.529	20.6179	0.000000*
Education	4	390.18	346.26	86.565	6.9304	0.000028*
Experience	1	26.83	12.26	12.260	0.9815	0.322875
Market	2	106.36	117.32	58.659	4.6962	0.010035*
Gear Depreciation	1	56.70	58.79	58.794	4.7071	0.031076*
Craft Depreciation	1	25.37	25.37	25.373	2.0314	0.155453
Error	227	2835.35	2835.35	12.491		
Lack-of-fit	207	2835.35	2835.35	13.697		
Pure Error	20	0.00	0.00	0.000		
Total	241	4263.32				

*Significant at 0.05 level of significance

DF = Degree of Freedom, SS = Sum of Square, Adj SS = Adjusted Sum of Square

Adj MS = Adjusted Mean Square, F = Test significance of each Variable

Table 4: Challenges Faced by Fishers

Challenges	Respondents	Percentage (%)
Gears and Fish theft	110	31.34
Inadequate of fishing and storage facilities	35	9.97
Transportation/ access road	29	8.26
High cost and unavailability of fishing facilities	27	7.69
Hippopotamus	24	6.84
Marketing/ low price by buyers	19	5.41
Low catches	27	7.69
Removing fish from gear (net)	9	2.56
High revenue	16	4.56
No fishing regulations	15	4.27
Seasonal/ Climatic changes	4	1.14
Social amenities (Health, School, good water, etc.)	36	10.26
Total	351	99.99

Table 5: Effectiveness of Fishing Regulations in River Donga

Fish Regulations	Very Effective	Effective	Ineffective	Very Ineffective	Mean Score
Ban the use of poison	224(3.87)	5(0.06)	0(0.02)	0(0)	3.95
Prohibition on fence	81(1.34)	74(0.92)	85(0.70)	2(0.01)	2.97
Gear control	13(0.21)	98(1.21)	98(0.81)	33(0.14)	2.37
Fishing frequency	0(0)	26(0.32)	192(1.59)	24(0.06)	1.97
Payment of revenue	0(0)	44(0.55)	128(1.06)	70(0.29)	1.9
Restricted season and area	2(0.03)	33(0.41)	93(0.77)	114(0.47)	1.68

4-Likert Scale Rating Value < 2.50 is ineffective and > 2.50 as effective (*)

DISCUSSION

The socio-economic characteristics of fishers were categorized into three subgroups by age as young, middle, and old. The middle-aged were more in the fishing job, this could be that the middle-aged people are more energetic, healthier, and may have a better entrepreneurial drive in the society. Salim *et al.* (2017) reported that Fishing continued to be the most preferred activity of fisherfolks in the middle-aged group which constituted 62% of the respondents in their study area. This implies that the fishers were in their productive and economically active age. The gender revealed that most of the fishers were male with few females. This shows that males were the breadwinner of the family as per the workforce is concerned, to provide for the needs of the family. Sule and Raji, (2006) reported that the fishing business is an exclusive job for males which disagrees with the present report. Marital status is one of the important parameters of the socio-economic of fisher folks as most of the fishers in the study area were married. This implies that the majority had household obligations to meet which agrees with Nasir *et al.*, (2016). This agrees with Gaurab *et al.*, (2015) who reported that 90.22% of the fishers sampled were married. Most of the fisher's household sizes were 6-10 people and this could add greater responsibilities for sourcing income to cater to the family needs. Ibrama *et al.*, (2014) reported that; the family size in his study was high and implied that artisanal fisherfolks have large households which constitute an important labor source for them and this agrees with the present report. Educational level is an important parameter, which reveals that most of the fishers attended primary school. This by implication shows that educational qualification deeply influences individual preferences and behavioral patterns which in turn may influence performance, skill, and capabilities. This disagrees with Islam *et al.*, (2013) who reported that the majority of the fishers in his survey were illiterate which constituted 48% of the total fishers sampled. The alternative livelihood shows most of them were into plant and or animal farming, though few were absolutely fishers. This could be, that the income in fishing was not meeting up with family demands or they need more income for savings. These findings contrast Sule and Raji, (2006) who reported that all the fishers responded fully to be engaged in alternative livelihood. The

fishing experience reveals that most of the fishers were having fishing experience. It could be that they were born into the family of fisher's community and started the fishing business at a tender age or by inheritance as some also reveal that their major occupation is fishing, the "Jukun Nwano" of Taraba state who predominantly were fishers. These findings agree with Adeogun *et al.*, (2011) who reported that there was a significant difference in the experience of the fishers.

The Economic benefits of fishers studied reveals the descriptive analysis of the profitability of fishing activities that they were more males than females involved in catching fish with the use of various gears, and the active age of fisherfolks was 31-50 years. The implication is that the respondents were within the productive and economically active age which yielded energy force in the business. The regression model is significant in age, marital status, educational background, market distribution, and gear depression. This shows that there was profit in the fishing activity which is revealed as significantly different at values 0.05 of the level of significance when the age of divorce and others, gear depression of respondents is increased by 1 unit, profit increased by 0.12 units, 6.33, 5.91 and 0.00081 units respectively. Concerning the general regression analysis of profit versus age, experience, Gender, Graft depreciation comparison between the accrued benefits and expended fund, the benefit-cost obtained Shows that the fishing business is not viable since its value is greater than the unity. This agrees with Amos and Bolorunduro, (2000) who reported that the benefit-cost ratio of 1:26 obtained Showed that the project is viable since its value is greater than unity. The findings further revealed that most of the fishers were experienced with many years of fishing practice. This implies that they need little training in the modern way of fishing to enhance their profit in the business. This agrees with Ibemere *et al.* (2014) and (Nwachukwu and Onuegbu, 2007) who reported that year of experience enhanced farmers of new skills and innovations.

The challenges faced by the fishers reveal that they were constrained by many factors that affect their productivity and profitability. Like other fishing communities, the study Shows fishing and storage facilities and social amenities like school, hospital, good road access to the landing site which

portrayed long years of neglect and absence of development in the research area. Other challenges were natural occurrence by climatic changes which could likewise affect their performance. All challenges mentioned have a greater influence on the output of the fishers. This agrees with Ikeobasi and Opara (2017) who reported that constraints encountered by women fish farmers can be affected by current economic issues in the country have affected aquaculture production adversely as a result of the increase in the price of fish feed in the major market of the site. Gear and fish theft were the major challenges faced by fisherfolks. It could reduce their income if not properly handled. Inadequate storage and fishing facilities were also challenging because the method employed for fishing was mostly traditional and with little result for most of the couple with the fact that, high cost and unavailability of fishing facilities were a big challenge. The hippopotamus was also a threat to the fishing activities, as it could destroy their fishing facilities and attack or even kill the fishers living them vulnerable. Amos and Ja'afaru (2016) also reported that the Hippopotamus caused a threat to the fishers by attacking and had killed a number of them in Kiri Dam. Poor marketing and catches were part of the problem of fishers as some of them complained of low pricing of the stock by the buyer, more so removal of fishes from the gear were time-consuming according to the fishers. This by implication could affect their income, however, the modern method could have been the best way out. Also, fishing regulations could be declared to curtail fishers that combine the use of all gear mesh that could be hazardous to fishing. Though fishing is profitable, ecosystem management was a prominent issue. Social amenities were threats to the fishing activities as the government seems to be far from them. Amenities like school for their children, good health Centre, good drinking water, and access road were far from them, resulting in poor performance by the fisher's community in the knowledge of technical know-how. Adeyemo, (2011) and (FAO, 2000) observed that the role of management institutions is to collect information, ensure participation of stakeholders, provide training and capacity building, ensure the coherence of local management plans with national policy objectives, monitor, control, and put in place surveillance to encourage compliance with the regulations.

Effectiveness of fishing regulations result shows that ban on the use of poison was effective with a mean score of 3.95. This signifies that most of the fishers were abiding by the regulations guiding fishing. Though the causes of endangered fish species indicated that the use of poison had the highest percentage, which contradicts their response to the effectiveness of fishing regulations, it could be that some were secretly involved in the use of poisonous substances for fishing. Amos and

Ja'afaru, (2016) also observed that the ban on poison was effective regulation among fisherfolks in Kiri Reservoir which agreed with this research work. Other regulations were geared control, fishing frequency, or overfishing; which could be exploitation of the ecosystem, payment of revenue, and restricted season and area were ineffective regulations. This disagrees with Amos and Ja'afaru, (2016) who reported that payment of revenue was effective in Kiri Reservoir. The ineffectiveness of the fishing regulations could be due to negligence on the side of the government to enforce and monitor fishing practice in the River Donga.

CONCLUSION

The fishers were with a lot of challenges, which decline their performance, from the negligence of the fishing communities with benefits accrue to them like social amenities, others were storage and fishing facilities, access road and support by the Government. The fishers show support in abiding by the fishing regulations if properly implemented or the government is involved in the monitoring of the fisheries sector. The socio-economic condition of the fishers was averagely okay as it meets up with their demands. Though some of them leave in town, the few that were by the river bank had more challenges of social amenities.

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