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## Characterization and constraints of artisanal fishery in the upper benue river basin, Nigeria

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### Abstract

The study assessed the socioeconomic variables and constraints of artisanal fishery of the Upper Benue River Basin, Nigeria between January and April 2019. The study aimed at updating knowledge on the socio-economic status and constraints of the fisher-folks in the study area. Frame and catch assessment survey was used to collect data. The data was subjected to Descriptive statistical analysis. The results revealed that fishing in the study area is male dominated (89%) and 36% of the fisher-folk are aged 31 – 40 years; 32% had primary education while 38% of the fisher-folks make a profit of N31,000 and above per month from fishing activities. Difficulty in accessing credit; transporting fresh catch and lack of storage facilities are the major constraints of the artisanal fishery in the study area. Therefore the study recommends that fisheries extension services is needed to encourage improved fishing practices with reduced losses.

**Keywords:** Characterization, artisanal, fishery, upper benue basin

### 1. Introduction

Fisheries play a very significant role in the National Economy <sup>[1]</sup>. In Nigeria, the fisheries sub-sector contribute about 3.5% to the country's annual Gross Domestic Product (GDP), which translate to 10% of agricultural sector's GDP, fisheries sub-sector employ about 4.3% of the population which translate to more than one million direct and secondary employment to Nigerians and importantly contribute to the nutritional requirements of people <sup>[2]</sup>. According to Adekoya <sup>[3]</sup>, Fish represents about 55% of the protein source intake of Nigerians. The fishing industry remains a veritable tool to creation of jobs, income to fishery households, promoting growth and development of rural fishing settlements, and enhances conservation and sustainability of water resources <sup>[4]</sup>.

The Nigerian fishery sub-sector consists of three broad units: the artisanal or small scale fisheries; the industrial (or large scale fisheries) and the aquaculture. Of these three units, the artisanal fisheries constitute the most significant unit in terms of number of the people employed and contribution to total fish output in the country <sup>[5]</sup>. The artisanal unit covers the operations of small-scale canoes, fisheries operating in the coastal areas, creeks, lagoons, inshore water and the inland rivers <sup>[5]</sup>. The artisanal fishery is characterized by low capital outlay, low operational costs, low technology application and it is labor intensive <sup>[6, 7]</sup>. Available records from the Federal Department of Fisheries, FDF and Food and Agriculture Organization, FAO reveals that the total fish production from the artisanal unit in Nigeria for 25 years period (1981-2005) averaged about 408,000 tons per annum and artisanal fisheries' contribution to total fish output in the country averaged about 90% <sup>[8, 9]</sup>.

It is estimated that about 10 million people particularly youths are engaged in artisanal fishing in Nigeria <sup>[10]</sup>. The youths largely depend on it for their livelihoods. Furthermore, Artisanal fishing is a main source of livelihood for those residing in riverine communities. Artisanal fisheries can be subsistence or commercial fisheries, providing for local consumption or export <sup>[11]</sup>. Previous studies <sup>[12, 13, 14]</sup>, revealed that fishing is an economic activity which requires capital investment which is characterized by the use of dug-out, wooden canoes that are often not motorized, operated by individual or small groups using labour intensive gears of relatively low level of productivity. In general, artisanal capture fisheries, which are low capital, low operational costs and limited gear coverage, characterize fishing activities in Nigeria <sup>[12]</sup>. Fishing inputs commonly used include canoe, paddles, hooks, gill nets, cast nets, beach seining and drift nets.

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The fish community inhabiting the Upper Benue River Basin consists: *Mormyrus spp*, *Petrocephalus bane*, *Marcusenius spp*, *Synodontis gambiensis*, *Synodontis clarias*, *Synodontis nigrita*, *Schilbe spp*, *Auchenoglanis spp*, *Clarotes laticeps*, *Chrysichthys spp*, *Labeo senegalensis*, *Bagrus bayad*, *Bagrus docmac*, *Clarias gariepinus*, *Heterobranchus bidorsalis*, *Alestes spp*, *Hydrynus forskalii*, *Tilapia zilli*, *Oreochromis niloticus*, *Distichodontus rostratus*, *Citharinus citharus*, *Malapterurus electricus*, *Heterotis niloticus*, *Protopterus annectens*, *Lates niloticus*, *Gymnarchus niloticus* [15].

The economic importance of these fish species to the community include source of food, provision of employment, source of foreign exchange/income, tool to rural development and source of raw materials to manufacturers [16, 17]. However, Tietze *et al.* [18] noted that the use of poor quality fishing materials can limit fish catch levels and that efforts should generally focus on the quest for improved fishing techniques and gears to replace the low yielding traditional fishing methods.

Available literature highlights the constraints to artisanal fishery to include high costs of fishing gears, use of dangerous chemicals in natural waters to kill fish, manpower shortages in the key areas, capacity under-utilization and faulty planning with attendant short-lived policies by government, lack of finance, lack of storage facilities, and marketing problems [19].

Oladimeji *et al.*, [4] and Akinwumi *et al.*, [20] observed that artisanal fishery has contributed significantly to the socio-economic conditions of the fishing populace due to multiple economic influx of people in search of fish and fish products from the adjoining towns. To this end, the study seeks an understanding of the social and economic aspects of the artisanal fishery and the interaction between both variables to the future development and sustainability of the artisanal fishery sub-sector. Furthermore, an understanding of the constraints limiting the growth and development of the artisanal fishery sub-sector with emphasis to Upper Benue Basin is vital for the successful development of policies or programmes aimed at improving the performance of the sub-sector.

## 2. Materials and Methods

### Description of study area

The study was carried out at the Upper Benue River Basin in Lau, LGA of Taraba State. The study area is located between latitude 8°56' to 9°40' N and longitude 11°5' to 11°4' E.

The study was carried out between January and April 2019 and the study area was selected based on the population of fishing families, catch volume and species diversities of the fish catches in the area. The fishing activities are usually carried out by artisanal fishing methods such as canoes with paddlers, gill nets, cast nets, liftnets, long lines, Malian traps. The main fish species found in the study area are: *Citharinus citharus*, *Malapterurus electricus*, *Heterotis niloticus*, *Protopterus annectens*, *Lates niloticus*, *Gymnarchus niloticus*, *Synodontis gambiensis*, *Synodontis clarias*, *Synodontis nigrita*, *Schilbe spp*, *Auchenoglanis spp*, *Clarotes laticeps*, *Chrysichthys spp*, *Labeo senegalensis*, *Bagrus bayad*, *Clarias gariepinus*, *Tilapia zilli* etc.

### Method of data collection

Frame and Catch Assessment Survey was used to collect data. Subsequent identification and classification into various types were done according to the classification models of

Binyotubo [21]. Fifty three (53) Fisher-folks were selected from the study area. Information related to sex, age, marital status, household size, educational background, years of experience, method of fishing, gears type in use, preferred fishing period, size of fishing fleet and the daily income range was obtained through the structured questionnaire.

### Statistical analysis

The data obtained were analyzed using descriptive/inferential statistics and charts of explanatory variable.

## 3. Results and Discussion

### Age

Age group of the fisher-folks plays a prominent role in the analysis of the social status of an area. The study revealed that the age group of the fisher-folks varied between 10 – 50 years (Fig. 1). The highest age group of 36% is recorded between the ages 31 – 40 years. While 21%, 19%, 17% and 7% are between the age group of 21 – 30 years, 41 – 50 years, 10 – 20 years and  $\geq 51$  years respectively. The implication of this findings is that, middle aged population takes part actively in fishing activities than other age categories in the study area. The study agrees with the findings of Dambatta *et al.*, [22] conducted among the fisher-folks of Kano State, Nigeria revealed that the most active age group is between the ages of 25 – 40 years. It's so because at these aged range, people are more energetic and healthier. The study further agrees with the study of Malgwi [23] conducted in Maiduguri Metropolitan Area of Borno State, Nigeria revealed that most of the fisher-folks are in their middle aged.

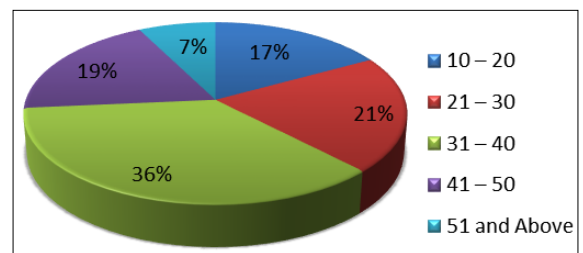


Fig 1: Age group (years) of the fisher-folks

### Marital status

Marital status described individuals as married, single, divorced and widowed [24]. The study revealed the marital status of the respondents with 58% as married, 34% being single, 4% being widow(er) while 2% are divorced or separated respectively (Fig. 2). The high percentage of the fisher-folks being married may be due to socio-cultural and religious factors in the study area. The result agrees with Shahadul *et al.*, [25] in a similar study conducted in Chapai Nawabganj district, Bangladesh showed that 85% of the fisher-folks are married.

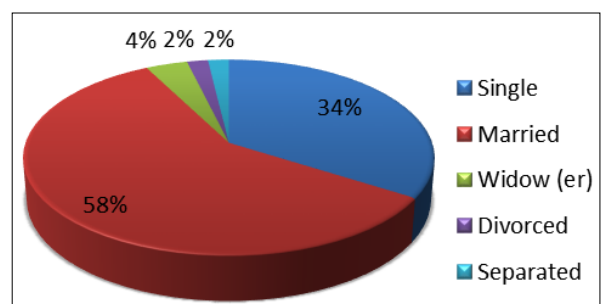


Fig 2: Marital status of the fisher-folks

**Gender**

The study revealed that both male and females were involved in all activities of fishing such as Fishing, processing, marketing and consumption with male having the majority (89%), while female constitute (11%) of the respondents (Fig. 3). According to Williams [26], women mostly use traps and nets to catch fish in most fishing communities in Nigeria, and are also actively involved in fish processing and marketing. However, a number of socio-cultural factors, such as, restricted access to water resources, low technical know-how and lack of credit facilities limit women full participation in the small-scale fisheries sector [20].

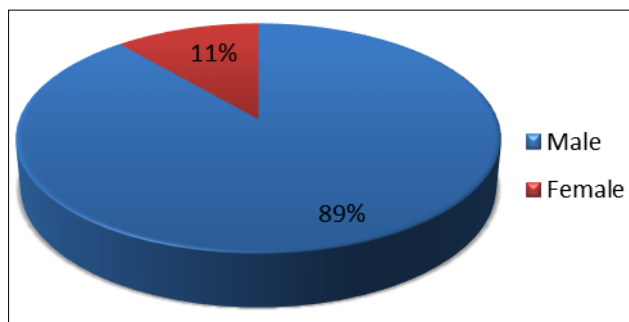


Fig 3: Gender of the fisher-folks

**Educational attainment**

Education is very important in every aspect of life and plays vital role in fishery sub-sector development; in enhancing easy assimilation, awareness and receptivity to innovation so as to improve fish production [22]. The study categorize the educational attainment of the fisher-folks into 5 groups i.e. (i) No formal (ii) Adult/Quaranic Education (iii) Primary (iv) Secondary (v) Tertiary education. The data as shown in Fig. 4 showed that the educational attainment of fisher-folks was high in the area. 32% had Primary Education while 30%, 8% and 4% had the Adult Education, Secondary and Tertiary Education respectively. 26% of the fisher-folks had no formal education. In a similar study by Adeparusi *et al.* [27] in their study of artisanal fishers of Ilaje, Ondo State, Nigeria also reported that 67.5% were literate having primary, secondary or higher education while 32.5% were illiterate. The relative high level of education of fisher folks could give such households the capacity to successfully implement income diversification strategies to cope with income fluctuations, income failure and poverty. The relative significant percentage of about 26% of illiterate fisher-folks in the study area might be due to impoverished condition and lack of awareness about education.

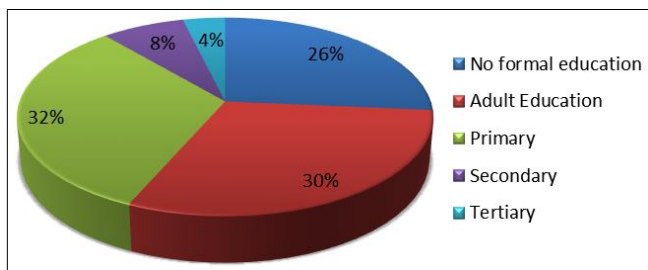


Fig 4: Educational qualification of the fisher-folks

**Household size**

A relatively small household size was found in the study area.

The result showed that 55% had a household size of 1 – 5 members followed by 36% with family size of 6 – 10 members, 5% with a household size of 11 – 15 members while 4% had a household size of 16 – 20 members (Fig. 5). Majority of the fisher-folks in the study area are having small household size because mostly the fisher-folks are more of middle aged who have less family size than the old ones. This findings are similar to the findings of Fabusoro *et al.* [28] who reported that average household size in Africa was about 9 person.

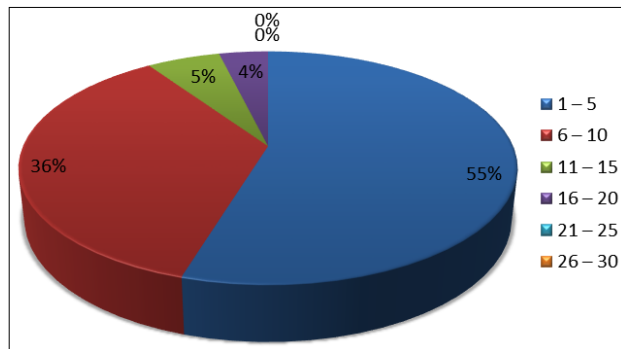


Fig 5: Household size of the fisher-folks

**Fishing experience**

Fishing experience is the number of years that the fishermen spent in fishing. The longer the experience in the fishing, the better the performances in fishing activities [22]. The result showed that most of the respondent (55%) had fishing experience of 11 – 20 years, 32% had a fishing experience of 1 – 10 years, 8% had a fishing experience of 21 – 30 years while 6% had a fishing experience of 31 – 40 years (Fig. 6). This moderate years of experience in fishing implies that the fisher-folks can manage their fishing activities and risk and make sound decision to enhance their performance.

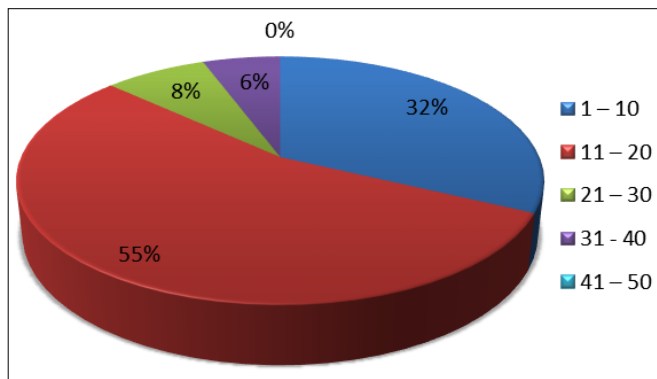


Fig 6: Fish catching experience (years) of the fisher-folks

**Subsidiary occupation**

Subsidiary occupation means the second occupation in which the fisher-folks are engaged or seek in the off period of fishing [25]. The study showed that 58% of the respondents are involved in farming during off-fishing season. 34% of the fisher-folks are involved in trading, 6% are involved in civil service while 2% are involved in other occupations (Fig. 7). In a similar study conducted by Bonjoru [15] in River Benue at Mayo Ranewo, Ardo Kola LGA, Taraba state reported that providing incentives, loans and training of the fishermen in other ventures helps reduce pressure on the water body.

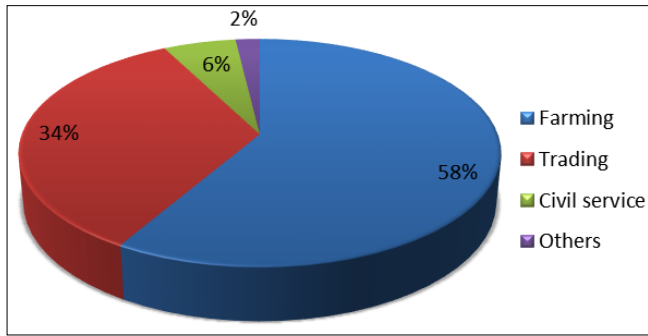


Fig 7: Subsidiary Occupation of the fisher-folks.

**Monthly income**

The monthly income analysis of the fisher-folks across the study area was observed to be solely dependent on catch volume, type of fish or species compositions of catch and the freshness of the fish. Table 1 showed the percentage distribution of the income status of the fisher-folks on monthly basis. The result showed that 38% of the fisher-folks make a return of between N31,000 and above per month, 36% make a monthly return of between N21,000 – N30,000 while 26% make a monthly income of between N10,000 – N20,000. The glaring decline in monthly income of the fisher-folks in the study area maybe due to decline in the Catch Per Unit Effort of the area. The results agreed with a similar study conducted in River Benue at Mayo Ranewo, Ardokola LGA of Taraba State, Nigeria by Bonjoru [15] and Akinwumi,

Akinwumi & Ogundahunsi, [20] in the Coastal Area of Ondo State, Nigeria that fisher-folks have a decline income as result of declined Catch Per Unit Effort.

Table 1: Monthly Financial returns of respondents (n = 53)

Category	Frequency	Percentage (%)
10,000 – 20,000	14	26
21,000 – 30,000	19	36
≥31,000	20	38
	53	100

**Craft and gear types identified**

The nature of the fishing grounds and the dominant population of fish species around each study location were observed to directly determine the type of gears used by the respective fishermen [20]. According to Table 2, the study showed that 53% own and use wooden canoe as the craft for accessing water bodies, 28% own and use Dugout canoes while 17% of the fisher-folks use both dugout and wooden canoes. Furthermore, the result showed that the gears used by the fisher-folks across the study area consisted mostly of a combination of any two or three gears with 40%, Gill nets with 19%, Longline with 12%, Cast nets with 11% while Malian trap and Liftnets had 9% and 2% respectively. The findings in this study are in agreement with Bonjoru [15] and Adeyemi *et al.* [29] who reported that gill nets, cast net, Malian trap, Lift nets and longlines were typical of most Nigeria’s Freshwaters.

Table 2: Identification of craft and gear type in the study area

Variable	Category	Frequency	Percentage (%)
Type of craft owned and used for fishing	Dugout Canoes	15	28
	Wooden Canoe	28	53
	Wooden and Dugout canoe	09	17
	Others	01	2
Type of Gear owned and used for fishing	Gill Nets	10	19
	Cast nets	06	11
	Liftnets	01	2
	Longline	06	12
	Malian Trap/Gura	05	9
	Hook and Line	03	6
	A combination of any of Gill nets, Cast nets, Liftnets, longline or Malian	21	40
	Others	01	2

**Constraints to artisanal fishing in the study area**

The study examined the constraints facing the fisher-folks in the study area. The results showed that 32% had difficulty

accessing credit; 26% had difficulty transporting their fresh catch while 20% lack storage facilities (Table 3).

Table 3: Constraints of artisanal fisher-folks

Constraints	Frequency	Percentage (%)
Difficulty in Accessing credit	17	32.1
Difficulty in Transporting fresh catch	14	26.4
Lack of Storage Facilities	11	20.7
Problem of weather	03	5.70
Difficulty of Accessibility to Markets	02	3.80
High cost of Fishing Equipment	01	1.90
Infestation by Water Weeds	01	1.90
Poor Gear Design	01	1.90
Poor Maintenance of Equipments	01	1.90
Problem of processing	01	1.90

**4. Conclusion**

The potentiality of the artisanal fishery sub-sector of the study area is enormous. Therefore, considerable attention should be given to reducing the high costs of fishing gears, provision of

facilities and storage facilities and access to market could greatly improve the socioeconomic condition of the fisher-folks thereby complementing governments effort towards in job creation, poverty alleviation and supply of animal protein

to the teeming Nigerian population. The study therefore recommends that fisheries extension services be intensified with adequate programmes that will encourage improved fishing practices with reduced losses.

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