



Artisanal fishing gears used in two riverine wetlands of the upper Benue river basin, Nigeria

Bonjoru R^{1*}, Ndeham VR², Amadu SO³

^{1,3} Department of Biology, College of Education, P.M.B 1021, Zing, Taraba State, Nigeria

² Department of Fisheries, Federal Polytechnic, Mubi, Adamawa State, Nigeria

Abstract

The study was carried out to look at the Artisanal Fishing Gears used in two Riverine Wetlands of the Upper Benue River Basin, Nigeria. The study was carried out for a period of six (6) months (July, 2017 - December, 2017). Frame and catch assessment survey was used to collect data. Descriptive statistics and charts of explanatory variable were used for data analysis. A total of six (6) artisanal fishing gear types were identified and classified in the study areas. Of these gears, six (6) are commonly used in Mayo Ranewo while five (5) were used in Lau wetlands. Thirty two (32) fish species from sixteen (16) families were caught by the six artisanal fishing gears in both Mayo Ranewo and Lau wetlands. The study therefore recommends that a concise and comprehensive guideline to the usage of fishing gears to enable optimum yield without affecting the future of the fisheries resource of the wetlands. Also a there's need of government to legislate and pass laws banning the use of harmful gears.

Keywords: Artisanal, fishing gears, Catch composition, Mayo Ranewo, Lau, Riverine Wetlands

1. Introduction

Wetlands are swamps related to river channels and are usually a dysfunctional branch or tributary that is not actively involved in discharging channel flow. This means that the water reserve is not easily depleted through outflow. These wetlands are usually replenished by variable mechanisms of water exchange between the active channel and the dysfunctional branch ^[1]. Riverine wetlands of the Upper Benue River Basin constitute one of the most lucrative sources of artisanal fisheries along the River Benue Trough and fishing activities are high and most of the fishing activities are done in subsistence or artisanal means ^[2].

It is observed that a fairly large number of types and forms of fishing gears and craft are being operated in the floodplains/wetlands to exploit wild fishes since time immemorial ^[3]. Artisanal fisher-folks in the Upper Benue River Basin primarily use gears in catching fishery resources. Fishing gears are tools used in gathering or capturing fishery resources, which can be categorized into active gears (presence of gear movement, and/or pursuit of target species) and passive gears (absence of gear movement, and/or pursuit of target species) ^[4]. These gears are used to catch target species which are of high commercial value, however, by-catch species are nowadays retained for consumption (i.e. human and animal) ^[5].

The intensity of use of any form of gear in wetlands/floodplains is dependent on the intensity of target fish population presumed to be available in that wetlands ^[3]. It is further observed that increasing fishing effort and limited fishery resources has opted fishermen to modify their gears including employing fishing accessories to increase the capture efficiency of their gears ^[5]. Hence the study presents a preliminary analysis of the fishing gears

used by fisher-folks in the study area.

2. Materials and methods

Description of Study Area: The study was carried out at two locations in the Upper Benue River Basin. The wetlands of Mayo Ranewo is located between latitude 8°47' to 8°53' N and longitude 10°50' to 10°55' E while that of Lau lies between latitude 8°56' to 9°40' N and longitude 11°5' to 11°4' E. Both wetlands empties into the Upper Benue River Basin.

Method of Data Collection: Frame and Catch Assessment Survey was used to collect data. The study areas were visited twice monthly for a period of six months (July, 2017 - December, 2017) for data collection. The different fishing gears used by fishermen were photographed using a digital camera for documentation. Subsequent identification and classification of the fishing gears into various types were done according to the classification models of Binyotubo ^[6]. Identification of the fish species was according to Olaosebikan and Raji ^[7].

Statistical Analysis: The data obtained were analyzed using descriptive statistics and charts of explanatory variable.

3. Results

A total of Six (6) artisanal fishing gear types were identified and classified in the study areas. Of these gears, six (6) are commonly used in Mayo Ranewo while five (5) were used in Lau (Fig. I – V, Table 1). Of these gears, two (2) are active while four are passive gears (Fig 1) all targeting Bagrids, Schilbeids, Clariids, Mochokids, Characids, Citharinids and Heterotids.

Thirty two (32) fish species from sixteen (16) families were caught by the six artisanal fishing gears in both Mayo Ranewo and Lau wetlands (Table 2).



Fig 1



Fig 2

Fishing gears (nets) used in Mayo Ranewo and Lau Wetlands:

Gill net (Fig I), Cast net (Fig II)



Fig 3



Fig 4

Table 2: Common catch of the different fishing gears used in the study areas

Family/Specie	Gear					
	Gill net	Cast net	Liftnet	Longline	Malian Trap	Spear
Mormyridae						
<i>Momyrus spp</i>	+	+	+	-	+	-
<i>Petrocephalus bane</i>	+	+	+	-	+	-
<i>Marcusenius spp</i>	+	+	+	-	+	-
Mochokidae						
<i>Synodontis gambiensis</i>	+	+	+	-	+	-
<i>Synodontis clarias</i>	+	+	+	-	+	-
<i>Synodontis filamentous</i>	+	+	+	-	+	-
<i>Synodontis gabroni</i>	+	+	+	-	+	-
<i>Synodontis nigrita</i>	+	+	+	-	+	-
Schilbeidae						
<i>Schilbe spp</i>	+	+	+	-	-	-
Claroteidae						
<i>Auchenoglanis occidentali</i>	+	+	+	+	+	-
<i>Clarotes laticeps</i>	+	+	+	+	+	-

Fishing gears used in Mayo Ranewo and Lau Wetlands: Lift net (Fig III), Longline (Fig IV)



Fig 5

Fishing gears used in Mayo Ranewo and Lau Wetlands: Malian trap (Fig V)

Table 1: Classification of Artisanal Fishing Gears used by fishermen in the study areas

Gear	Local name	Gear classification	Location	
			Mayo Ranewo	Lau
Gill net	Taru	Passive	+	+
Cast net	Birgi	Active	+	+
Lift net	Akauji	Passive	+	-
Longline	Rincha	Passive	+	+
Malian Trap	Gura/Malia	Passive	+	+
Spear	Mashi	Active	+	+

Note: (+) means “presence” of such gear; (-) sign means “absence” of such fishing gear

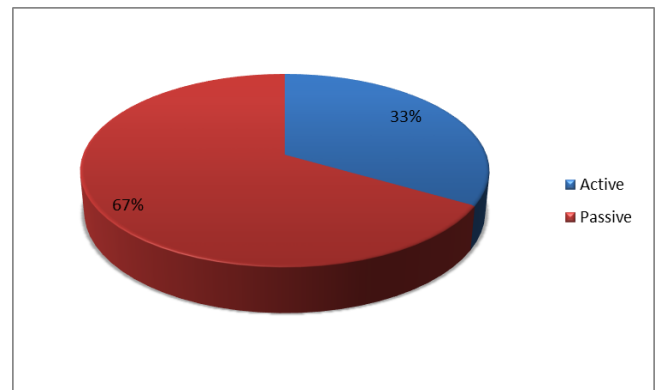


Fig 6: Frequency of active and passive artisanal gears used by fishermen in the study area

<i>Chrysichthys spp</i>	+	+	+	+	+	-
Cyprinidae						
<i>Labeo senegalensis</i>	+	+	+	+	+	-
<i>Labeo coubie</i>	+	+	+	+	+	-
Bagridae						
<i>Bagrus bayad</i>	+	+	+	+	+	+
<i>Bagrus docmac</i>	+	+	+	+	+	+
Clariidae						
<i>Clarias gariepinus</i>	+	+	+	+	+	+
<i>Clarias anguillaris</i>	+	+	+	+	+	+
<i>Heterobranchus bidorsalis</i>	+	+	+	+	+	+
Alestidae						
<i>Alestes spp</i>	+	+	+	+	+	-
<i>Hydrocynus forskalii</i>	+	+	+	+	+	-
Cichlidae						
<i>Tilapia zilli</i>	+	+	+	+	+	
<i>Tilapia dageti</i>	+	+	+	+	+	-
<i>Tilapia Galileo</i>	+	+	+	+	+	-
<i>Tilapia membranaceus</i>	+	+	+	+	+	-
<i>Oreochromis niloticus</i>	+	+	+	+	+	-
Distichodontidae						
<i>Distichodontus rostratus</i>	+	+	+	+	+	-
Citharinidae						
<i>Citharinus citharus</i>	+	+	+	+	+	-
Malapteruridae						
<i>Malapterurus electricus</i>	+	+	+	+	-	-
Arapaimidae						
<i>Heterotis niloticus</i>	+	+	+	+	+	+
Protopteridae						
<i>Protopterus annectens</i>	+	+	+	+	-	-
Centropomidae						
<i>Lates niloticus</i>	+	+	+	+	+	+
Gymnarchidae						
<i>Gymnarchus niloticus</i>	+	+	+	+	+	+

4. Discussion

Artisanal fishery activities in the Upper Benue River Basin of Nigeria are majorly noted with diversified species and multiple gears activities [2]. Fishermen that are involved in artisanal fisheries in Nigeria make use of gears made from both natural and synthetic materials [8]. Fishing gears can be categorized as active and passive gears [6, 5]. Active gears are characterized with movement which aims to pursue or capture the target species and used with combination of other fishing methods. On the other hand, passive gears are characterized by absence of movements (stationary) and the target species move towards the gear through different methods such as attracting and setting, among others [4]. The most commonly used artisanal fishing gears in the Upper Benue River Basin were gillnet, cast net, liftnets, longline, Malian trap and spear (Table 1 and Fig 1-5). This result agrees with the findings of Ibrahim & Ogueji [8] reported the use of gillnet, cast net, hook and line, malian/gura, clap net and giwa net in Northern Nigeria. Also Ibrahim *et al.* [9] reported the use of gillnet, cast net, hook and line and Malian trap as the common fishing gears in Kontagora Reservoir. Furthermore, in a study conducted by Bonjoru [2] in River Benue at Mayo Ranewo, Bankole *et al.*, [10] in Lake Alau; Adeyemi, Bankole & Adikwu [11], in Gbedikere Lake, Bassa, Kogi State and Neiland, *et al.*, [12] in Lake Chad Basin all reported the use of gillnets, castnets, liftnets, longline and Malian trap as the commonest used gears in the areas. The dominance of these gears widely used in artisanal fisheries in developing countries are as results of their efficiency, relatively inexpensive and capable of catching higher amount of economically valuable fish [13].

Thirty two (32) fish species from sixteen (16) families were caught by the six artisanal fishing gears in both Mayo Ranewo and Lau wetlands (Table 2). Majority of the species caught in the study areas are of high commercial value while only a few were of low value. The target fishes caught by the gears are primarily: Bagrids, Schilbeids, Clariids, Mochokids, Characids, Citharinids, Heterotids and host of others.

5. Conclusion

The fishing gears (Gill net, cast net, lift nets, longline, Malian trap, spears) employed and operated in the Riverine wetlands of the Upper Benue River Basin, are used to capture fish species in the study areas. Most of the fishing gears have significant variations and modifications aimed solely to capture targeted species. To this end, the study recommends a concise and comprehensive guideline to the usage of fishing gears to enable optimum yield without affecting the future of the fisheries resource of the wetlands. Also a there's need of government to legislate and pass laws banning the use of harmful gears.

6. References

- Gao J, Li X, Gary B, Alan C, Yang Y. Geomorphic-centered Classification of Wetlands on the Qinghai-Tibet Figau, Western China. *J. Mt. Sci.* 2013; 10(4):632–642.
- Bonjoru R. Comparison of Capture Efficiency of Artisanal Fishing Techniques employed in River Benue at Mayo Ranewo, Ardokola Local Government Area, Taraba State. M.Sc Thesis submitted to the Department

- of Zoology, Modibbo Adama University of Technology, Yola, Adamawa State, Nigeria, 2017, 123.
3. Rahman S, Mazid MA, Kamal M, Hossain MA, Hossain MS. Study on fishing gears, species selectivity toward gears and catch composition of BSKB beel, Khulna, Bangladesh. *Bangladesh J. Fish. Res.* 1999; 3(1):25-32.
 4. Bjordal A. The use of technical measures in responsible fisheries: regulation of fishing gear. In: Cochrane KL. *A fishery manager's guidebook – management measures and their application.* Fisheries Technical Paper No. 424, 2002. <http://www.fao.org/docrep/005/y3427e/y3427e04.htm#bm04.2>
 5. Rodulf ATB, Cristine JDT & Angeli CMV. Fishing gears and their common catch in two coastal areas of Palawan, Philippines: Implications to fisheries management. *International Journal of Fisheries and Aquatic Studies* 2019; 7(2):216-222
 6. Binyotubo TE. *A Guide to Fishing Gear Technology.* National Institute of Freshwater Fisheries Research, New-Bussa, Niger State, Nigeria, 2011, 245.
 7. Olaosebika BD, Raji A. *Field Guide to Nigerian Freshwater Fishes.* Revised Edition, 2013.
 8. Ibrahim BU, Ogueji EO. Atlas of Fisheries, Fish Craft and Fishing Gears of Some Selected Water Bodies in Northern Nigeria. *FUNAI Journal of Science and Technology.* 2017; 3(1):1-11.
 9. Ibrahim BU, Auta J, Balogun JK. A Survey of the Artisanal Fisheries of Kontagora Reservoir, Niger State, Nigeria. *Bayero Journal of Pure and Applied Sciences.* 2009; 2(1):4751.
 10. Bankole NO, Raji IA, Adikwu OA, Okwundu EC. Fishing gear survey of Lake Alau, In: A.A. Eyo and E.A. Ajao (Eds), *Proceedings of the 16th Annual Conference of the Fisheries Society of Nigeria (FISON).* Maiduguri, 4th-9th November, 2001, 99-103.
 11. Adeyemi SO, Bankole NO, Adikwu IA. Fish Gear Survey of Gbedikere Lake, Bassa, Kogi State, Nigeria. *Int. J. Lakes Rivers.* 2009; 2(1):53-56.
 12. Neiland AE, Jaffry S, Ladu BMB, Sarch M.T, Madakan SP. Inland Fisheries of North East Nigeria including the Upper River Benue, Lake Chad and the Nguru-gashua Wetlands. I. Characterization and analysis of planning suppositions. 2000; DOI: 10.1016/S0165-7836(00)00180-6. pp 229-243.
 13. Kingdom T, Kwen K. Survey of Fishing Gear and Methods in the Lower Taylor Creek Area, Bayelsa State, Nigeria. *World Journal of Fish and marine Sciences.* 2009; 1(4):313-319.