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Indigenous Fishing Method in Otuokpoti, Bayelsa State, Niger Delta

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A B S T R A C T

Study was conducted to investigate the indigenous fishing method in Otuokpoti between November 2023- July 2024 through oral interactions, and participatory observation. Samples randomly collected from Fishers landing were identified to species level. Diversity index estimate diversity of fish landings each month. There were no fishing activities between August and October due to the heavy rains and increased water level. Most fishing activities took place from November to March when the water level was low. Fishers age range was between 18-50 years, fishing in groups of 4-8 persons per group, using encircling gear of 20mm mesh size and hand picking method to harvest the fish. Fishers' knowledge guided fish harvesting. Catfish was the most abundant fish and diversity was estimated between 1.754 -1.811 indicating a stable system. Though a stable environment, it is pertinent to educate the Fishers on the effect of the fishing method practiced.

INTRODUCTION

Fishing involves the taking of aquatic organisms from any water body with specific equipment known as fishing gear. Fishing methods employed in a particular geographical area depends generally on the behavioural characteristics and habitat type of the various fish species available in that area. Any act of fishing involves both fishing gear and fishing vessels. The method of how the gear is used is the fishing method. A fishing gear is any equipment, tool, implement, or mechanical device used to harvest fish while fishing vessels are crafts used to carry the Fishers and gears to designated fishing ground. Fishing crafts used in Bayelsa State are vessels that are either motorized or non – motorized (Ngodigha, Alagoa, Daworiye, & Eremasi, 2015). The gear types are both passive and active that includes gill net, traps, hook and line, long line spears, baskets Ogamba, Abowei & Onugu (2013); Ngodigha, Moroyei & Gbarabe (2023) and bag net (Ngodigha, et.al 2015).

Different types of materials are used to make these fishing gears which includes netting, twine, plastic structural and fasteners, clips and swivels, ropes, steel wire ropes, combination wire ropes, purse rings, polyester, polyethylene, nylon, cotton, polypropylene, mixed fibers, floats and sinkers, bamboo, wood (Hameed, & Boophendranath, 2000). According to Moyon & Chara (2021) fishing gear can also include harvesting aquatic organisms without any type of gear but by hand picking A particular fishing gear can be used in different ways by different fishers. Classification of fishing gears and methods is based on the gear construction or gear materials used and largely of how the fishes are captured (Nedelec & Prado 1990). Methods of fishing have continuously been improved with time because Fishers are inventive and trying new ideas always. Innovation opportunities have improved in recent decades with advances in fibre technology, mechanization of gear handling, improved performances of vessels (motorization), computer processing for gear design, navigation aids, and fish detection to mention technologies (Moore & Jennings 2000).

Physiography of the water body, seasonal changes, species of fish available, efficiency of the gear, type of materials used for making of the gear are the important factors that determine the selectivity of the gear. Changes in species diversity in a particular water body and abundance have given ways to different gears and invention of different fishing gear annually to capture fish Tagago & Ahmed (2011); Bankole, Raji, Adikwu & Okwundu (2003).

Technological advancement in development of fishing gear and methods in the past was aimed at increasing production. Present situation with many overfished stock, limits possibilities of expanding fishing of underexploited fishery resources because there are more concerns about the impact of fishing operation on the aquatic ecosystem. There is now much focus on gear development on selective fishing and less environmental impact.

Comprehension of the indigenous fishing method is very crucial in assessing the level of fish exploitation. Fishing methods have been documented in other parts of the Niger Delta but no published work on the indigenous fishing methods in Otuokpoti. This research is hence aim at understanding the fishing

method, identification of fishing gear with a view of determining sustainability of the fisheries resources in the area.

LITERATURE REVIEW

Fishing involves application of different methods indigenous to the people inhabiting the area. According to Ngodigha et al (2015) the Shrimp Fishers in the Lower River Nun Estuary employ the use of the Bag-net also known as stow net to harvest Palaemon shrimps. Fishing was during the day in the estuary and coast and positioned against the oncoming currents. In 2022 Yenagoa floodwater, Ngodigha et al (2023) reported the use of Traps, Hook and Line and Gill nets in the Creek and environs. Traps were used during receding of the floodwaters while the other two gears were employed during the flood. Kingdom % Kwan (2009) also reported specific gears and methods used by Fishers in the Lower Taylor Creek area of Bayelsa State, Nigeria.

Though Fishers are faced with numerous challenges Ngodigha et al (2018) they still fish because of the vast indigenous fishing knowledge gained with time. The knowledge enables the Fishers to know when to fish Ngodigha, & Gbarabe, (2015) and how to fish (Ngodigha et al.,2015). Where to harvest a particular fish species as well as when to get any fish species with less fishing activity (Ngodigha et al., 2015) and management of the fishery Ngodigha, Gbarabe, & Austin, (2018)

METHODOLOGY

This study was carried out along Otuokpoti creek in Otuokpoti, a small community in Ogbia Local Government area of Bayelsa State, Niger Delta. As in other areas in the Niger Delta, there are two seasons, the rainy season which is from April to October and the dry season, from November to March Ngodigha, & Gbarabe (2015); Ngodigha, Alagoa, & Abowei (2018). The major occupation of the people are farming, fishing and hunting.

Data was collected between November 2023 and July 2024 through oral interview of Fishers, Researchers participation and observation of fishing method. Fish samples were randomly collected from Fishers and identified using keys by Idodo-Umeh, (2003) and Olaosebikan & Raji (2013).

Diversity of monthly fish landings was estimated from Shannon-Wiener's diversity, Shannon & Weiner (1963).

RESEARCH RESULT

Fishing was embarked upon between November and July. The age range of the Otuokpoti Fishers was between 18- 50 years and they were all males. Fishing operation was done in groups of 4-5 and comprising of 4-8 persons per group using a non-motorized dugout boat. Fishers stop at any point along the creek once they recognize the sound of fish movements in the water. The area was encircled with an encircling gill net of 20mm mesh size (Plate 1). Grasses were cleared (Plate 2) and Fishers engage in manual fishing. Clearing of the encircled area takes between 2- 18 hours (1-3 days) depending on the thickness. All the trapped fishes were then manually harvested into bags by hand picking.

Gravids were harvested more between late January and first week of February. Fishers fish at least 3 times a week during the dry season and between 1-2 times a week during the raining season with an average landing of 170kg of fish.

Fish species identified and their local names are shown in table 1. The most landed fish was the catfish *Clarias gariepinus*. *Gymnarchus niloticus* harvested were mostly gravid females, fry and fingerlings. The fish was observed to spawn in February, as most of *Gymnarchus niloticus* landed were gravid.

Plate 1: Fishing area

Plate 2: Cleared fishing area

Table 1: Composition of fish species landings in Otuokpoti, Bayelsa State

Fish species	Common name	Ijaw(Ogbia) name	Abundance (%)
Clarias gariepinus	Catfish	Emulu	xxx
Citharinus citharus	Freshwater moon fish	Ofo	xxx
Heterotis niloticus	African bony tongue	Ogbolokaga	x
Oreochromis niloticus	Tilapia	Ikpe	x
Gymnarchus niloticus	African knife fish, aba	Aba	x
Parachanna obscura	Mud catfish	Obolo	xx

x = less abundant, xx= abundant, xxx= most abundant

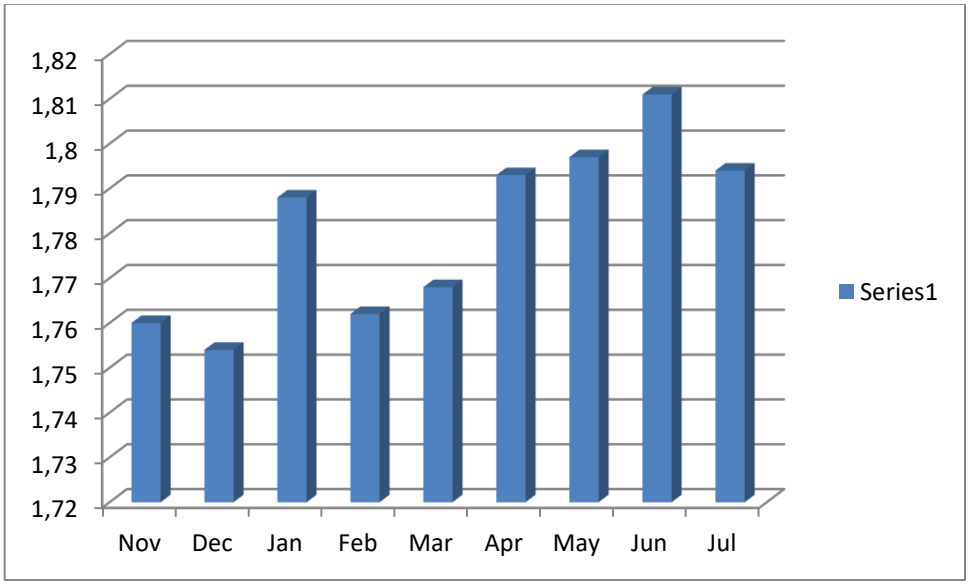

Fig1: Species diversity of fish landings in Otuokpoti

Diversity ranged between 1.754 and 1.811. The highest was estimated in June while the lowest was in November. Fishers sell most of their landings in Otuokpoti fresh, while the ones left are either consumed fresh or dried and consumed or sold.

DISCUSSION

Knowledge of the indigenous fishing method of an area can provide the level of sustainability practiced by fishers. Fishing was begun after the rainy season where fishes migrate with the floodwater into the creeks. Fishers knowledge of fish migration encourages fishing which stops in July due to the heavy rains that results in steady increase in the water level. This is a major constraint faced by Fishers in the Niger Delta as reported by Ngodigha, et.al (2018) that agrees with this study.

Adults of between 18 and 50 years of age of the Fishers, dominated by the male gender operating in not less than 4 groups could be attributed to the very strenuous nature of the fishing method that involves encircling the net in the water body full of different species of aquatic macrophytes. The ability of fishers to identify areas of fishing through the sound of the fishes indicates application of local knowledge that could be used for scientific studies Ngodigha, Abowei, & Ogamba, (2015) applied to manage aquatic resources where there are limited funds to carry out scientific research (Ngodigha, & Gbarabe 2015). Small mesh size of 20mm used by the Fishers indicates poor management of the fishery resources because the gear was not fish harvesting friendly. A minimum of 40mm mesh size should be used so to allow for escape of juveniles and fingerlings as observed in floodwaters of Epie creek in Bayelsa State (Ngodigha, et. al 2023).

Hand picking method of harvesting the fish involves collecting all fishes within the encircled area without bias which could affect the fishery negatively with time. Gravid females, juveniles, fingerlings were all harvested. Fishers do not consider the implications of indiscriminate harvesting. They just harvest all the fishes within the enclosed gill net. The implication of harvesting gravids and juveniles can lead to depletion of the fishery resources and eventual extinction of some species.

The record of catfish *Clarias gariepinus* as the most abundant could be due to the hardy nature of the fish. *Clarias gariepinus* live in ponds with varying water depths in lakes, streams, rivers, swamps and floodplains subjected to seasonal drying. The most common of these habitats are floodplain swamps and pools where they survive during the dry season due to their accessory air breathing organs. *Clarias gariepinus* undertakes lateral migrations from the larger water bodies, in which they feed and mature at about the age of 12 months, to temporarily flood marginal areas in order to breed. This could account for the abundance of the fish in the landings of the Fishers.

Fishing of gravid fishes affects spawning because the fishes are caught before they have the chance to spawn. In addition, fishing of juveniles can result in recruitment over fishing that can lead to over exploitation and depletion of the fishery resources. *Citharinus citharus* landed were mostly juveniles. Harvest of juveniles affects a fishery negatively because the fish species are not allowed to grow which can lead to depletion of the stock.

Diversity estimated was 1.754 -1.811. This finding agrees with the range of 1.734 to 1.974 recorded by Ngodigha (2023) in the study of fish diversity in extreme flood in Epie creek also in Bayelsa State. The values estimated in this study suggest a system that is stable because diversity value of $1< H \geq 3$ indicates moderate diversity and stable ecosystem Odum, (1993) which might be due to migration of fish species with the flood in and out of the creek.

CONCLUSIONS AND RECOMMENDATIONS

The study conducted showed that fishing method practiced by Fishers in Otuokpoti involves identification and encircling of an area of fishes and harvesting of all fishes irrespective of age, size and fecundity. Encircling gill net gear used had mesh size of 20mm that can lead to over exploitation of the fishery. Though the ecosystem is stable, there is the need to educate the Fishers on the

implications of the fishing method practiced as it can lead to depletion of the fishery and extinction of species with time. Hence, to manage the Fishery, there should be introduction of management measures such as using mesh size of at least 40mm and closed season in February, which is the period where gravid females were more in abundance.

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