

## EVALUATION OF THE EFFICIENCY OF TRADITIONAL AND MODIFIED MALIAN TRAPS IN TAGWAI DAM OF NIGER STATE

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### ABSTRACT

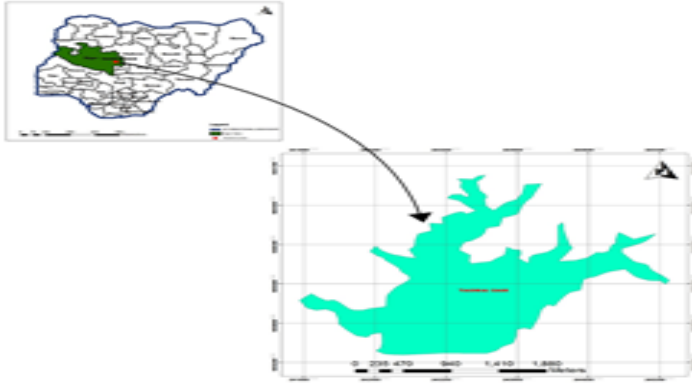
The evaluation to comparatively determine the efficiency of a traditional and modified Malian traps in capture fishery was conducted in Tagwai Dam, Niger State to ascertain the productivity of the dam and also find out the possibility of adapting the Modified Malian trap by fisherfolk as one of the conservation tools in fishery management. The outcome of the catches revealed that traditional Malian trap caught 131 fishes, comprising of *Sarotherodon galileus*, *Tilapia zillii*, *Clarias gariepinus*, *Oreochromis niloticus* and *Synodontis membraneceous*. While modified semi-circular trap caught 58 fishes of same species and modified rectangular Malian traps also caught similar species excluding *Hydrocynus forskalii*. The species diversity index calculated for the traditional and modified Malian traps were 0.47 0.41 and 0.39 respectively. Based on the results, it was concluded that the traditional traps had higher catches than modified traps due to the smaller mesh size of the net used with no significant difference ( $P>0.05$ ) between their biomass. Hence in terms of catch efficiency, the modified trap, proofed to have the potential in competing for species selectivity and biomass with its traditional counterpart and also efficient in trapping mostly large bodied size fish and allowed the escape of juvenile fishes. Modified Malian trap of this nature is recommended as one of the potential fishing gears in conserving aquatic resources.

**Key words:** Traditional Malian Trap, Tagwai Dam, Modified Semi-circular Malian Trap, Modified Rectangular Malian trap, Mesh size.

### Introduction

Fishing gear can be defined as any type of equipment used in capturing, harvesting or cropping fish from any water body Nuhu and Yaro (2005). According to Moses (1992) Fishing gears have generally passed through many improvement and modifications in line with advances in modern technology. Although, the fundamental principle of hooking, trapping, wounding, encircling, filtering and scooping can still be found in existence. (Abiodun and Niworu 2004). There have been several efforts in recent years to modify fishing gears and practices in order to target particular sizes and species of fish and other marine life more efficiently, and to also reduce impact on both surface and bottom habitats of the aquatic system. Furthermore, the development of gear and techniques is still very much in its infancy from the perspective of reducing capture of small size fish and benthic disturbances. The capture process of fishing gear in various environments is the key element in developing modifications and practices that can reduce ecosystem impacts (John and Petri 2000) Malian trap is one of the most widely used gear in combination with other traditional and modern fishing gears. Agbelege and Ipinjolu (2001).

## METHODOLOGY



**Figure1: Map of Nigeria and Niger State inset Tagwai Dam.**

Tagwai Dam is located in Minna, Niger State. Within Latitude 6°33' E and Longitude 9°33' N, covering a land area of 88km<sup>2</sup>.

### **Traps Construction Process, Setting, Monitoring and Data Collection of Trapped Fish**

The traps were designed and constructed with the following wooden frame dimensions: - the traditional trap which was cone shaped, had a diameter of 130cm, 100 cm and 70cm while that of the modified semicircular Malian trap had 100cm length, and 50cm width. Also modified rectangular-shaped, Malian trap had a base length of 100cm, width of 50cm and height of 40cm. The Traditional Malian traps was enclosed in 3.75cm mesh size while the modified Malian trap were both enclosed in a netting material of 5cm mesh size. The traps were set alternately according to their shape with 30m distance apart. Sticks pegged closed to them for easy identification during monitoring visits. Collection of catch was done twice weekly for a period of six months (July to December). The catches were brought into the laboratory for analysis.

## Results

**Table 1: Number and Weight of the fish Caught with Traditional and Modified Malian Traps**

Months	TMT	MSCT	MRT	TMT (g)	MSCMT (g)	MRMT (g)
July	29	27	25	232.25 ± 73.13	413.68 ± 137.5	478.61±160.5
August	33	7	5	351.62 ± 115.5	58.3 ± 8.66	69.05 ± 18.92
September	19	6	2	179.32 ± 54.2	23.9 ± 8.42	40.37 ± 6.2
October	12	3	4	86.15 ± 20.3	26.75 ± 8.43	27.9 ± 8.3
November	20	7	4	181.2 ± 54.93	25.72 ± 8.46	41.6 ± 5.77
December	18	9	7	177.33 ± 53.54	144.03 ± 41.58	44.12 ± 4.62
TOTAL	131	58	47			

Where: ± SDM= standard deviation of the mean; TMT= traditional malian trap; MSCMT= modified semi-circular malian trap; MRMT= modified rectangular malian trap

## Discussions

There was variation in the rate, weight and species of fish caught. This gave efficient information on the traps employed throughout the study and the productivity of fish in the Dam as well.

A total of 236 fish weighing 15, 611.18g of different size, species occupying different feeding niches were caught in this study. Ayanwale *et al.* (2013) reported that variation in mesh size of gears influenced number of catch and that low catches are mostly recorded during the raining season and daytime. This conform partly with the result of this study in which there was a variation in mesh size used for Traditional and Modified Malian traps and the study was also conducted from July to December. The result of the catch also agreed with Ogunfowora *et al.* (2011) who discovered in their finding that seasonal variation influence catch efficiency with a catch of 1,373 recorded during dry season as compare with 1,198 recorded during the wet season.

The result of this study does not correspond with the report of Ayanwale *et al.* (2013) who study the fish fauna of Tagwai Dam in relation to gear selectivity from July to September, 2010 using cast and gill net and discovered a total of 1,669 specimens. The reason for the variation could be as a result of the differences in year the two study were conducted as fish productivity of the Dam declined with time due to over exploitation.

The finding on dominant species in this study, is in line with Ayanwale *et al.* (2013) who reported *Cichlidae* as the most abundant fish family in the Dam. The species diversity index computed for the traps were close in value. They include TMT 0.47 followed by MSCMT with 0.41 and 0.39 for MRMT. The reason for low species diversity index of the traps employed could also be linked to low productivity of fish in the Dam, season, overexploitation, type of the gear used and migration of certain species which were hitherto known from the Dam. Ago *et al.* (2012) reported species density index of 0.93 recorded for the Polyiniyl chloride (PVC) pot as against 0.79 for the Malian trap. Ipinjolu *et al.* (2004) also reported different species diversity index of 0.86 for 6-V, 0.80 for 8-V and 0.60 for 4-V Lege traps respectively.

## Conclusions

This study revealed that modified malian traps can compete favourably with its traditional counterpart in terms of trapping different species of fish available in Tagwai Dam. The study further unfolds the present unproductive nature of fish in the Dam due to overexploitation, lack of regulation, and effective monitoring. The species of fish caught with the traps shows an extinction of few valuable species such as *Mormyrus* species *Alestes* which were hitherto reported to be one of the dominant species in the Dam (Ayanwale *et al.*, 2013). Also, the low value of species diversity index computed further corroborated the low productivity of fish in the Dam.

## Recommendations

Base on the finding of this study, Niger State Government, should as matter of urgency regulate the activities of indiscriminate fishing in Tagwai Dam and also restock some valuable species in the Dam which were hitherto reported to be present in the Dam. Also, based on the efficiency of Modified Malian traps, the traps are recommended to the government and fisherfolk as one of the conservation tools in effective fisheries management.

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