THREATS TO FISH BIODIVERSITY CONSERVATION IN ECHARA RIVER, EBONYI- NIGERIA

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ABSTRACT

A study on threats to fish species conservation in Echara River, Nigeria was carried out from September 2009 to February 2011 to generate inferential data for Fisheries policy formulations to assess the potential of the Fishery to alleviate malnutrition among the poor in the rural communities, and use of the living resources for teaching and research. A total number of 709 fishes comprising of Fin-fishes and shell-fishes belonging to 13 families, 19 genera and 40 species were caught in 216 fishing efforts , at 10 days interval using hooks and lines (size 13), cast nets, gill nets and traps of mesh sizes of 50mm, 75mm and 100mm respectively. Fish identification was done using taxonomic keys. Evaluation of fishing methods of the Artisans within the basin was by visual survey and the use of structured questionnaires. It was observed that during the dry season, 55% of artisanal Fishers used obnoxious methods to catch fish, ranging from chemical toxicants (14%), unselective Fishing gears (35%) and direct draining (6%). It was concluded that there is an urgent need for monitoring the impacts of human activities on freshwater systems and to evolve appropriate implementable management strategies, backed up by political will to check anthropogenic impacts that have deleterious effects on the fishery.

INTRODUCTION

Freshwater ecosystems support at least 100,000 known species (Leveque *et al.*, 2005). About 25,000 fish species are known world-wide, including at least 10,000 freshwater species and approximately 500 which are species that migrate between salt and freshwater (Berra, 2001; Leveque *et al.*, 2005). Fish diversity is much higher in tropical freshwaters than in temperate regions, and many species undoubtedly have yet to be described. At the continental scale, Africa contains at least 3,000 species, South America 3,500 to over 5,000, and tropical Asia 3,000-3,500 (Leveque *et al.*, 2005). Ude and Nwani (2010) identified 39 fish species belonging to 20 genera and 14 families in Ebonyi River, Nigeria. Approximately 300 new fish species are described annually (Stiassny, 1999).

Hot spots of endemicity of freshwater are currently the least investigated areas with the most threatened biota (Leveque *et al*, 2005). While the high fish species endemicity in lakes has promoted a considerable interest among biologists, the endemicity in river systems is less known. Due to a general lack of data, it is difficult to access the status of the inland water biodiversity. Indeed monitoring the status and trends of freshwater biodiversity is essential to quantify impacts of human activities on freshwater systems and to improve freshwater biodiversity conservation. Allan and Castillo (2007) outlined some of the threat to include habit alteration, contamination, overexploitation, climate change and invasive species. Estimating global trends for freshwater biodiversity will be a critical asset for management strategies considering that studies on climate change and water resources and data management systems are currently being developed at a global scale.

MATERIALS AND METHODS

Fish species samples (fin-fish and shell-fish) were obtained three times monthly at 10 days interval from September 2009 to February 20011, using traps, hooks and lines of size 13, cast nets, gill nets of mesh sizes 50mm, 75mm and 100mm respectively. Fishing efforts were recorded. The collected species were taken to the laboratory, sorted and identified to families, genera and species, using the identification keys of Reed *et al.* (1967) and Olaosebikan and Raji (1998). The species collected were weighed to the nearest 0.1g using digital scale; total and standard lengths were determined to the nearest 1mm using meter rule on a measuring board. The pooled data of catches by all gear types in each sampling station was used in

assessing abundance by calculating the index of preponderance (IP), which is expressed as percentages of the total weight and number of the fish caught (Moses, 1987).

$$IP = \frac{\%N\ \%W}{\sum (\%N\ \%W)} \times 100$$

Where N= number of species caught, W= weight of the species caught

Fishes with IP values less than (<) 0.50 were regarded as being of relatively insignificant contribution while those with IP values greater than (>) 0.50 were regarded as being significant contribution (Moses 1987). Evaluation of fishing methods of the Artisans within the basin was by visual survey and the use of structured questionnaires. Means of the data were also calculated.

RESULTS AND DISCUSSION

A total number of 709 fishes (comprising Fin-fish and shell-fish) with a total weight of 274,016.86 g belonging to 13 families, 19 genera and 40 species were caught in 216 fishing efforts. The fish families and their index of preponderance are presented in Fig. 1. Claridae had the highest IP (6.2) value followed by Cichlidae(1.7), Characidae(1.4), Mormyridae (1.1), Cyprinidae(0.6) and Hepsetidae(0.5) respectively. The IP values of each of the remaining families (Bagridae, Distichodontidae, Malapteruridae, Mochokidae, Osteoglossidae, Palinuridae and Schilbeidae) were less than 0.4, hence of insignificant contribution to the fishery. The fishes with high IP values in this river are also of high economic value. This implies that improvement of the fishery will result in significant enhancement of the socioeconomic status of the artisans within the river. The rich assemblage of the fish families is also an indication that the resource may be of invaluable use for research purposes.

The various fishing methods employed by artisans in the river during months of the dry season are presented in Fig. 2. These include the use of chemical toxicants such as Gammalin 20, Chlorinated lime and Cypermethrin (14%), unselective Fishing gears (35%) and direct draining (6%). The broad classification of the fishing methods is presented in Fig. 3. A greater proportion (55%) of fishers used obnoxious methods, which depletes the resources in fishing. This agrees with the observations of Allan and Castillo (2007). It was only 45% of the fishers that were engaged in selective fishing methods that would promote healthy stock and species perpetuation. It was observed that there has never been public enlightenment in the area regarding the implications of obnoxious fishing methods on the non-sustainability of the fishery and the populace. This agrees with Leveque *et al*, 2005 who reported that the endemicity of freshwaters are currently the least investigated areas with the most threatened biota. There were also few instances that oil film was observed on the water surface flowing from upstream (Plate 1). The implication is that oil prevents air-water contact thereby reducing dissolved oxygen availability for fish respiration. Oil in water can prevent hatching of fish eggs and also clog the gills of fish and suffocate them. The deleterious effects of oil spill on aquatic biota cannot be overemphasized.

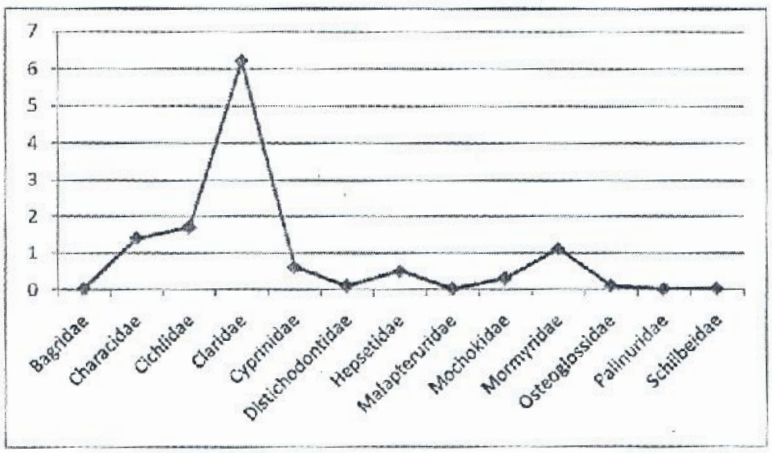

Figure 1: Fish families of Echara River and their index of Preponderance

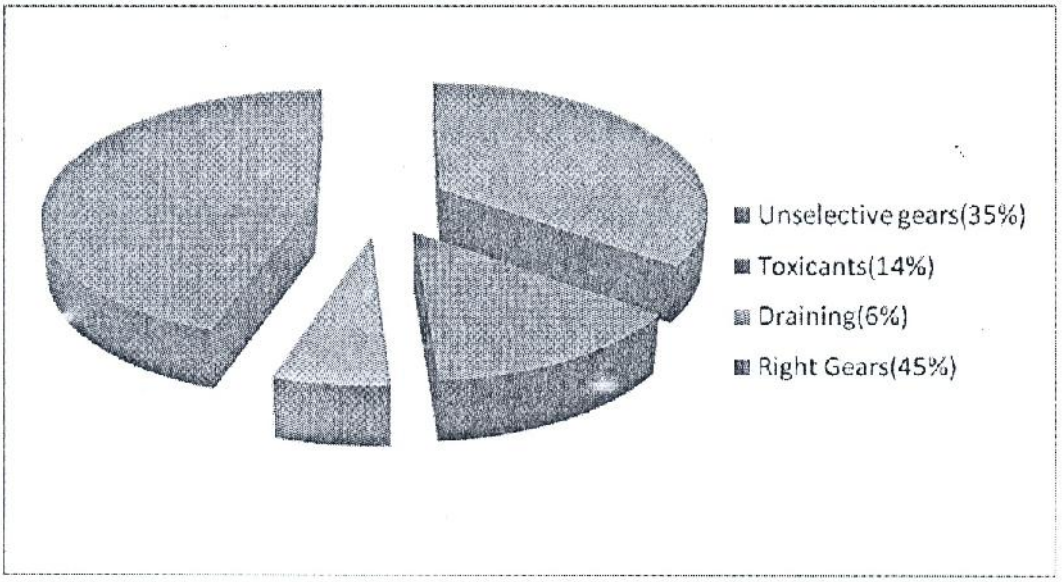

Figure 2: Various fishing methods used by Artisanal fishers during dry seasons in Echara River

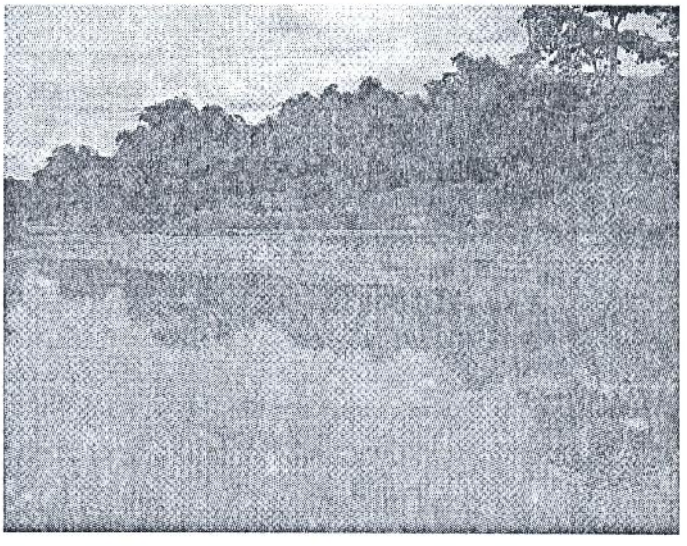

Plate 1: Section of Echara River showing oil pollution on water surface

CONCLUSION

Monitoring the status and trends of freshwater biodiversity is essential to quantify impacts of human activities on freshwater systems. It is only then that appropriate management strategies could be evolved to check anthropogenic impacts that have deleterious effects on the fishery. This will be a right step to improving freshwater biodiversity conservation, with a resultant effect of improved livelihoods of the rural populace who depend on the resources for survival. It is recommended that Government and other stakeholders enlighten the users of the inland rivers on the need for sustainable use of the resources. Agencies responsible for monitoring the environment should implement existing laws that protect biodiversity in inland freshwater systems.

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