

ABSTRACT

In man-made lakes (=reservoirs) of most tropical Asian countries, introduced African cichlid species have brought about a spectacular increase of fish yields. The reservoir fishery management studies are often resource-oriented, and the social component has not been recognized fully in most parts of Asia.

In the present study, the fishery of two Sri Lankan reservoirs, namely Kaudulla and Minneriya, have been studied from April 1986 to April 1989 with a view to developing suitable management strategies, based on the interconnection of both biological and sociological approaches.

The stratification of catch and effort data according to fishing methods was found to improve the estimates of total fish production. This is possibly due to the differences in the efficiencies of various fishing methods. The estimates of annual fish yields in Kaudulla and Minneriya during 1986 -1989 were 192 kg/ha and 130 kg/ha respectively.

On the basis of a multiple regression analysis, it is concluded that gillnetting would not have adverse effect on the stocks at least over the range of fishing effort represented by the data and that in Minneriya, beach seining seems to lead to diminished returns by depleting stocks.

Length frequency data of Oreochromis mossambicus and O. niloticus, the dominant species in the fishery of two reservoirs, were analyzed using the "Compleat ELEFAN" software package to determine the von Bertalanffy

growth parameters and mortality rates. Length-structured Virtual Population Analysis indicates that fishing mortality rates are approximately constant throughout the recruited stocks, suggesting that the effects of gillnet selectivity on the catch samples are small. Further the methodologies applicable to stocks with probability of capture of unity in the exploited phase are appropriate for the stock assessment of the two cichlid species.

Yield-per-recruit (Y'/R) analyses were performed incorporating probabilities of capture. They indicated that in Minneriya, both O. mossambicus and O. niloticus are over-exploited, further confirming that fish stocks are over-exploited due to the employment of beach seines in Minneriya. In Kaudulla, O. mossambicus is under-exploited whereas O. niloticus is exploited close to the optimum level. Y'/R analyses also indicate that by increasing size of first capture (L_t), higher O. niloticus yields in both reservoirs and higher O. mossambicus yield in Minneriya could be obtained at the present level of exploitation rate (E).

From the sociological point of view, withdrawal of fishing crafts from the fishery of Minneriya, in order to reduce E , is impracticable. The acceptable landing sizes of two cichlid species to the consumer are higher than the biologically optimum L_c .

As a compromise, the desirable mean landing sizes of two cichlid species were therefore determined to be 24 cm and 23 cm in Kaudulla and Minneriya respectively. Forbidding the use of beach seines and increasing the minimum permissible mesh size upto about 10 cm would optimize fish yields in the two reservoirs. Socioeconomic studies have revealed that an

integrated approach which considers the resource component and the social component which makes use of the resource is important for the management of the fishery.