

RARE

**FISH STOCK ASSESSMENT AND STRATEGIES FOR
CO-MANAGEMENT IN THE FISHERIES OF TWO
RESERVOIRS OF SRI LANKA**

BY**D. A. ATHUKORALA (B.Sc.)**

**INLAND AQUATIC RESOURCES AND AQUACULTURE DIVISION
NATIONAL AQUATIC RESOURCES AGENCY
CROW ISLAND
COLOMBO 15
SRI LANKA**

ප්‍රවේශ අංකය	317
වර්ග අංකය	

**THE THESIS SUBMITTED TO THE UNIVERSITY OF KELANIYA, SRI LANKA,
IN FULFILMENT OF THE REQUIRMENTS FOR THE DEGREE OF MASTER OF
PHILOSOPHY**

JUNE 2003

ABSTRACT

In the reservoirs of Sri Lanka, optimal fish yields are not realized due to lack of proper management strategies. Ineffectiveness of past management strategies for reservoir fisheries in Sri Lanka is mainly attributed to the fact that active resource user participation is lacking in decision making process.

The basic objective of this study was to investigate the possibilities of introduction of community participated management procedures for the fisheries of two reservoirs of Sri Lanka by determining the present status of fishery and identify the constraints to adopt such management procedures. The fisheries of two perennial reservoirs in the dry zone of Sri Lanka namely Chandrika Wewa and Udawalawe reservoir were investigated towards this goal. The fishery of Muthukandiya reservoir which has effective community involvement in the management of the fishery was also studied and compared with the fisheries of Chandrika Wewa and Udawalawe reservoir.

Seasonal variations in fish yields in the two reservoirs were also investigated in relation to water level fluctuation and rainfall. There was a significant influence of rainfall only on *Labeo dussumieri* yield in Udawalawe reservoir. Although there were no significant influences of rainfall on yields of other fish species in Udawalawe reservoir and Chandrika Wewa, seasonal variations in fish yields have significant influence on the average income of fishing families.

According to relative yield-per-recruit (Y'/R) analysis it was evident that in Udawalawe reservoir, any attempt to optimize Y'/R of one species would have detrimental effects on other dominant species. In Chandrika Wewa, on the other hand size at first capture can be further reduced to optimize Y'/R , possibly due to the reason that the cichlid species in Chandrika Wewa exhibit r-life strategies. In Muthukandiya reservoir there is effective community involvement in fisheries management, both the cichlid species are optimally exploited. Due to the r-selected life strategies of cichlids in Chandrika Wewa, fish yields ($69.9 \text{ kg ha}^{-1} \text{ yr}^{-1}$) are lower than in Udawalawe reservoir ($137.6 \text{ kg ha}^{-1} \text{ yr}^{-1}$). Differences in fish species composition in the landings of the two reservoirs might be another reason for the differences in their fish yields. In Udawalawe reservoir *O. mossambicus*, *O. niloticus* and *L. dussumieri* equally contribute to the fishery. *L. dussumieri* yield is influenced by rainfall. Even during the months of low cichlid yields in Udawalawe reservoir, total catch remains high due to high *L. dussumieri* yield during rainy season. This indicates that biological productivity of fish stocks influences living standard of fishing communities whose income is derived from fisheries.

Due to the low income derived from the fishery in Chandrika Wewa, fishers are willing to comply with the rules and regulations imposed by the cooperative society with a view to obtaining high fish yield for better income. In order to compensate for low income, it is necessary to rebuild the fishery of Chandrika Wewa through fish stock enhancement methods such as stocking of fish fingerlings (i.e., Indian and Chinese major carps). On the other hand in Udawalawe reservoir, where fish vendors are involved in decision making for

the management of the fishery, management decisions cannot be implemented effectively for rational exploitation of fish resources. Therefore this reservoir needs more involvement of government in the management of the fishery. Muthukandiya reservoir sets a good example for effective participation of community in the management of the fishery.

Based on the results of the present study, appropriate co-management strategies for Udawalawe reservoir and Chandrika Wewa were formulated. For the fishery of Udawalawe reservoir, more involvement of government institutions is needed for the sustainable management of the fishery than in the fishery of Chandrika Wewa.