

INFLUENCE OF CATCHMENT CHARACTERISTICS ON FISH YIELDS IN RESERVOIRS OF SRI LANKA

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The United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 identified a comprehensive and far-reaching programme for sustainable development which is known as "Agenda 21" which suggests that all states, according to their capacity and available resources, could implement amongst others, development and sustainable management of inland fisheries as part of national water resources planning. Towards this need, in the present study an attempt was made to develop empirical models for predicting fish yields in Sri Lankan reservoirs.

Data on catch and effort statistics in 11 reservoirs were collected at least 20 days a month by employing field assistants in individual reservoirs. Fish yields in reservoirs are multiply correlated with fishing intensity (FI in boat-days month⁻¹) and ratio of catchment area (CA in km²) to reservoir area (RA in km²) or reservoir capacity (RC in km³). Land-use patterns in catchment areas of 7 Sri Lankan reservoirs were analysed using "ArcInfo" Geographical Information Systems (GIS) software package, based on the 1:50,000 land-use maps. Thirteen major land-uses were recognised in the catchment areas. Of these land-uses, extents of forest cover (FC in km²) and shrubs (Sh in km²) in the catchment area have positive influences on fish yields (Y in kg ha⁻¹ month⁻¹). The relationships are described by the following equations,

$$Y = 1.5719 (FC/RA) + 3.8718 \quad (r=0.90; p < 0.01)$$

$$Y = 0.0037 (FC/RC) + 5.8036 \quad (r=0.92; p < 0.01)$$

$$Y = 0.5856 (Sh/RA) + 6.6277 \quad (r=0.87; p < 0.01)$$

$$Y = 0.0015 (Sh/RC) + 5.9479 \quad (r=0.94; p < 0.01)$$

When FI is also used as a predictor variable the following relationships were obtained.

$$Y = -5.903 + 1.1089 (FC/RA) + 17.581 FI \quad (r=0.98; p < 0.001)$$

$$Y = -2.580 + 0.0027 (FC/RC) + 14.580 FI \quad (r=0.97; p < 0.01)$$

$$Y = -2.870 + 0.3860 (Sh/RA) + 16.300 FI \quad (r=0.93; p < 0.01)$$

$$Y = -1.810 + 0.0011 (Sh/RC) + 13.400 FI \quad (r=0.98; p < 0.001)$$

As such, GIS methodologies can be effectively used for the management of reservoir fisheries in Sri Lanka. Furthermore, the present study highlights the importance of management of land-uses in catchment areas of reservoirs for their fisheries management.

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