



## **Land use patterns in Likangala River Catchment and its implications for management of small watersheds in developing countries**

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This study analysed land cover and land use changes in Likangala and Domasi river catchments, the two major rivers of Lake Chilwa, and examined the effects of land use related physio-chemical and hydrological parameters on the migratory and reproductive behavior of *Barbus* species. Land use analysis results indicated increasing deforestation, soil erosion, and conversion of agriculture land to homestead development in the Lake Chilwa Catchment. High soil losses of up to over 50t.ha<sup>-1</sup>.yr<sup>-1</sup> were estimated in steep sandy areas of the upper catchment. Poor vegetation cover and high kinetic energy were major determinants of soil loss. A high sedimentation yield of 374t.km<sup>2</sup>.yr<sup>-1</sup> was observed to occur in poorly vegetated catchment of Likangala River while 315t.km<sup>2</sup>.yr<sup>-1</sup> was observed for Domasi River catchment with a generally better vegetation cover. A situation analysis for the Likangala River catchment further showed high reduction in soil loss of up to 50% is achievable when a combined 20% increase of maize yield, tree canopy and contour ridging is assumed. Multiple regression results indicate that sediment yield; river flow rate, electrical conductivity and total suspended solids are significant predictors of migratory dynamics and reproductive status of *Barbus* sp. These results suggest that the most critical soil loss factor, the land cover should form an integral part of a soil conservation strategy in Likangala catchment. Appropriate management actions that reduce fishing pressure on breeding *Barbus* females in the influent rivers should also be formulated to ensure success of spawning migrations of breeding females into the influent rivers. The study further demonstrates how a combination of land cover and land use modeling, community outreach, river water quality and fish dynamics could be used to identify factors for managing and monitoring catchments of small tropical lakes.