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Sedimentation and Its Impacts/Effects on River System and Reservoir Water Quality: case Study of Mazowe Catchment, Zimbabwe

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Abstract. Sediment delivery into water sources and bodies results in the reduction of water quantity and quality, increasing costs of water purification whilst reducing the available water for various other uses. The paper gives an analysis of sedimentation in one of Zimbabwe's seven rivers, the Mazowe Catchment, and its impact on water quality. The Revised Universal Soil Loss Equation (RUSLE) model was used to compute soil lost from the catchment as a result of soil erosion. The model was used in conjunction with GIS remotely sensed data and limited ground observations. The estimated annual soil loss in the catchment indicates soil loss ranging from 0 to 65 t ha yr⁻¹. Bathymetric survey at Chimhanda Dam showed that the capacity of the dam had reduced by 39% as a result of sedimentation and the annual sediment deposition into Chimhanda Dam was estimated to be 330 t with a specific yield of 226 t km⁻² yr⁻¹. Relationship between selected water quality parameters, TSS, DO, NO₃, pH, TDS, turbidity and sediment yield for selected water sampling points and Chimhanda Dam was analyzed. It was established that there is a strong positive relationship between the sediment yield and the water quality parameters. Sediment yield showed high positive correlation with turbidity (0.63) and TDS (0.64). Water quality data from Chimhanda treatment plant water works revealed that the quality of water is deteriorating as a result of increase in sediment accumulation in the dam. The study concluded that sedimentation can affect the water quality of water sources.

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