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The use of RS and GIS techniques integrating with RUSLE makes soil erosion estimation and its spatial distribution feasible with reasonable costs and better accuracy in larger areas. Such methods provide significantly better results than using traditional methods of measuring and calculating erosion-related biophysical data in the field. Human activities such as urbanization and industrialization and the respective land use change within a basin are important contributing factors that cause deterioration of river water quality through increasing soil erosion. Sediments in the form of suspended solids in the river water body transport to downstream and result in poor water quality. Hence, the aim of this study was to determine potential soil loss using both the Revised Universal Soil Loss Equation (RUSLE) model and Geographical Information Systems (GIS) techniques within selected catchments of the Awash River Basin. RUSLE was used to estimate potential soil losses by utilizing information on rainfall erosivity (R), interpolation of rainfall data, soil erodibility (K) using soil maps, vegetation cover (C) using satellite images, topography (LS) using DEM and conservation practices (P) using data collected by GPS for the conservation actions made in the area. The results indicated that the rate of potential soil loss in the Yeka Ankorucha catchment, Ethiopia ranged from very low to severe. About 51% of the study area had low to moderate levels of soil loss, while 49% of the study area has moderate to high soil loss.