Analytic Hierarchy Process and Multi-Criteria Decision-Making Approach for Selecting the Most Effective Soil Erosion Zone in Gomati River Basin

Authors : Rajesh Chakraborty, Dibyendu Das, Rabindra Nath Barman, Uttam Kumar Mandal

Abstract : In the present study, the objective is to find out the most effective zone causing soil erosion in the Gumati river basin located in the state of Tripura, a north eastern state of India using analytical hierarchy process (AHP) and multi-objective optimization on the basis of ratio analysis (MOORA).The watershed is segmented into 20 zones based on Area. The watershed is considered by pointing the maximum elevation from sea lever from Google earth. The soil erosion is determined using the universal soil loss equation. The different independent variables of soil loss equation bear different weightage for different soil zones. And therefore, to find the weightage factor for all the variables of soil loss equation like rainfall runoff erosivity index, soil erodibility factor etc, analytical hierarchy process (AHP) is used. And thereafter, multi-objective optimization on the basis of ratio analysis (MOORA) approach is used to select the most effective zone causing soil erosion. The MCDM technique concludes that the maximum soil erosion is occurring in the zone 14.

Keywords : soil erosion, analytic hierarchy process (AHP), multi criteria decision making (MCDM), universal soil loss equation (USLE), multi-objective optimization on the basis of ratio analysis (MOORA)
Conference Title : ICWRCOE 2016 : International Conference on Water Resources, Coastal and Ocean Engineering
Conference Location : Kuala Lumpur, Malaysia
Conference Dates : February 11-12, 2016