

Assessing the Impacts of Riparian Land Use on Gully Development and Sediment Load: A Case Study of Nzhelele River Valley, Limpopo Province, South Africa

Authors : B. Mavhuru, N. S. Nethengwe

Abstract : Human activities on land degradation have triggered several environmental problems especially in rural areas that are underdeveloped. The main aim of this study is to analyze the contribution of different land uses to gully development and sediment load on the Nzhelele River Valley in the Limpopo Province. Data was collected using different methods such as observation, field data techniques and experiments. Satellite digital images, topographic maps, aerial photographs and the sediment load static model also assisted in determining how land use affects gully development and sediment load. For data analysis, the researcher used the following methods: Analysis of Variance (ANOVA), descriptive statistics, Pearson correlation coefficient and statistical correlation methods. The results of the research illustrate that high land use activities create negative changes especially in areas that are highly fragile and vulnerable. Distinct impact on land use change was observed within settlement area (9.6 %) within a period of 5 years. High correlation between soil organic matter and soil moisture ($R=0.96$) was observed. Furthermore, a significant variation ($p \leq 0.6$) between the soil organic matter and soil moisture was also observed. A very significant variation ($p \leq 0.003$) was observed in bulk density and extreme significant variations ($p \leq 0.0001$) were observed in organic matter and soil particle size. The sand mining and agricultural activities has contributed significantly to the amount of sediment load in the Nzhelele River. A high significant amount of total suspended sediment (55.3 %) and bed load (53.8 %) was observed within the agricultural area. The connection which associates the development of gullies to various land use activities determines the amount of sediment load. These results are consistent with other previous research and suggest that land use activities are likely to exacerbate the development of gullies and sediment load in the Nzhelele River Valley.

Keywords : drainage basin, geomorphological processes, gully development, land degradation, riparian land use and sediment load

Conference Title : ICLDSSM 2016 : International Conference on Land Degradation and Sustainable Soil Management

Conference Location : Istanbul, Türkiye

Conference Dates : April 19-20, 2016