IAHS2017-166-2
IAHS Scientific Assembly 2017

GIS based estimation of soil erosion potential and its implications to water resources of city of Kinshasa, D.R. Congo

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Soil erosion is one of the major causes of loss of soil and water resources. The sustainability of agriculture productivity and water resources are affected by soil and siltation activities. This study estimated the spatial soil erosion hazard potential and amount of soil lost in and around Greater Kinshasa. The study also quantified the amount of soil lost within different buffer zones from the main rivers within the study area and provided the appropriates measures that can be used by the policy makers for environment and water resources protection. The Water Observation and Information System (WOIS) 3.0 software was used to solve the Wischmeier and Smith (1960; 1978) universal soil loss equation (USLE) which is used land use, soil, slope, and rainfall products as mains inputs in the estimation of soil loss and erosion hazard. It was found that most of the south part of the urban area were prone to erosion. From the total area of Kinshasa (996 500 ha), 25 013ha (2.3%) is of very high (> 15tonnes/ha/year) risk of soil erosion. The Urban area consists of 4.3% of the area with very high (>15tonnes/ha/year) risk of soil erosion compared to a very high risk of 2.3% (>15tonnes/ha/year) in the rural area. The municipalities of Mont Ngafula, Ngaliema, Kisenso, Selembao are the most affected by risk to erosion. The rivers beds were also affected as the area under 1000 m from the Rivers (437046ha) the area with very high risk was of 12395 ha (2.8 %) (>15tonnes/ha/year). The most affected were the buffer region of 100 m with of 4.2% of very high risk (>15tonnes/ha/year). The study shows that the soil loss was mostly driven by the slope, elevation, and informal settlements, this because of the high percentage of soil losses where there were the high slope and high percentage of soil losses where the informal settlements are located at the high elevated area in both the rural and urban areas. The study realised that the highest discharges of soil in rivers may affect the river beds, river streams, and aquatic biodiversity. The study provided the appropriate measures for environmental and water resources protections.