

Estimation of Soil Erosion Severity using RUSLE Model in the Kangsabati River Basin of West Bengal, India applying RS and GIS

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Abstract : *Soil erosion is the most serious problem especially in areas of agricultural activity where soil erosion not only leads to decrease in agricultural productivity but also reduces water availability. Remote sensing and GIS techniques have become valuable tools specially when assessing erosion to larger scales due to amount of data needed and the greater areal coverage. In the present study of the Kangshabati river basin, an attempt was made to assess the annual soil loss using Revised Universal Soil Loss Equation (RUSLE) in GIS framework. The soil erosion rate was determined as a function of land topography, soil texture, land use/land cover, rainfall erosivity, and crop management and practice in the basin using RUSLE (for Indian conditions), remote sensing imagery, and GIS techniques. In the RUSLE approach rainfall erosivity factor (R), slope length and steepness factor (LS), soil erodibility factor (K), cover management factor (C) and conservation practice factor (P) were studied in detail and finally by integrating all these factors a soil erosion severity map of the Kangsabati river basin was made on GIS platform. The annual soil loss estimated in the river basin using RUSLE is 41.62 ton/h/yr.*

Key Words: *Remote sensing and GIS, revised universal soil loss equation (RUSLE), soil erosion severity, Kangshabati river basin*

Coastal Erosion and Saltwater Intrusion in Botkhali Area of Sagar Island, West Bengal

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Abstract : *Sagar Island is an erosion-prone island. Historically the island experienced erosion, mostly in the southern section. In recent times, increasing salt content in surface and groundwater is also becoming a serious concern in the coastal area of Botkhali, located at the southeastern part of the island. This paper analyses the causes of saltwater intrusion and discusses how it is affecting the physical and socio-economic conditions in the area. The erosional trend of the area was identified with the help of multi-dated satellite images. The amount of surface salinity was measured from soil samples collected from eight locations of Botkhali, while groundwater salinity was measured by collecting water samples from five deep tube wells. A questionnaire survey was also carried out to find out the problems related to saline water intrusion. The main causes for saltwater intrusion were found to be coastal erosion and breaching of the embankments. Based on the studies some management options have been suggested, including changes in land use and livelihood practices, as well as rehabilitation of critically affected inhabitants.*

Key Words: *coastal erosion, saltwater intrusion, surface salinity, groundwater salinity, management.*

A Geomorphic Appraisal of Bank Erosion of River Mahananda in the Foothills of Darjeeling Himalaya

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Abstract : *In this paper, a stretch of the river Mahananda (8km) 200m upstream of Gulma Railway Bridge to the confluence of the river Mahismari, at Champasari area, has been taken into consideration for detailed analysis for causes and mechanism of riverbank erosion in the foothills of the Himalayas, where severe problem of bank erosion exists. The study shows that the mechanism of bank erosion in this region is mainly by undercutting since the attainment of bankfull stage rarely occurs. The riverbank is mainly composed of sand, pebble, gravel and a very little amount of silt and clay which on one hand is unable to hold the bank materials and on the other hand, it helps to create huge subsurface flow along the exposed bank. High rainfall, coupled with sudden fall of channel gradient and formation of number of bars within the channel, triggers adjustment of plan form a through lateral erosion. Deforestation along the bank line area, bed material extraction activities, rapid change of land usage, human occupancies near the exposed bank, etc. increases the chances of bank erosion in the study area. Every year a huge amount of money is being invested in bank restoration and protection work in this area. Understanding the causes and mechanism of erosion will help to monitor the issue and lead to better management.*

Key Words: *bank erosion, longitudinal bars, ground seepage, non-cohesive bank, undercutting.*

Rainfall-runoff Modeling using Remotely Sensed Data and Hydrologic Modeling System (HEC-HMS)- Case Study of the Konar River Catchment, Jharkhand

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Abstract : *Accurate estimation of runoff depth and its influence on surface hydrology of the Konar Catchment (945.87 km²) is vital for the management and utilization of water resource in the catchment. In this study, the HEC-HMS4.2 hydrological model was used to simulate the rainfall-runoff process. SCS Curve number loss method was applied to estimate the excess rainfall and surface runoff. Rainfall-runoff simulation was carried out using rainfall data for two years from two hydrological stations, namely, Nagwan and Deoria. A small difference is found between the observed and the simulated flows. Subsequently model calibration with optimization method showed a good correlation coefficient ($r=0.92$ for Nagwan and $r=0.91$ for Deoria) between the observed and the simulated flows in the catchment. The results can be useful for the water and land management practices in the catchment. The model can also be used in regions with similar environmental parameters and limited gauge data.*

Key Words: *HEC-HMS, HEC-GeoHMS, SCS-CN, konar catchment, calibration, validation*

Trend and Pattern of Urbanization in Uttar Pradesh with Special Reference to Bundelkhand Region

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Abstract : *Rapid growth of population, continuous upgradation of technology and infrastructure, increasing economic inter-dependency between urban and rural areas lead towards urbanization. Developing countries experience it severely and it is like a challenge as well as an opportunity for them. This paper is an attempt to analyse temporal and spatial distribution of urban centres and their population in Uttar Pradesh at regional level and district-wise in Bundelkhand region. This study is based on secondary data sources mainly provided by Census of India. Its major findings are related to demographic nature of urbanization in the region. The region has mainly politico-administrative urban centres. The districts like Jhansi and Jalaun has higher level of urbanization than districts situated on rugged land like Chitrakoot, Banda and Lalitpur. Jhansi is the primate city of the Bundelkhand region of Uttar Pradesh. Above 65 percent of the urban inhabitants are living in the cities and large towns. Population growth rate in cities and large towns is higher than medium and small towns but it shows decreasing trend from 2001 to 2011 census.*

Key Words: *urbanization, urban centres, trend and pattern, regional, Bundelkhand.*

Decline in Population Density with Increasing Distance from City Centre :

A Case Study of Greater Mumbai

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Abstract : *Urbanization is the most important phenomena to study in regards to land transformation. It influences the socio economic and political condition of the residential population as well as the impact is seen on the ecological aspects. The need for the gradient analysis is felt for understanding the spatial pattern of dispersion of population and the reasons behind it. In the present research paper, the population density of Mumbai is studied over a period of five decades (1971 to 2011). The changing pattern of population density, particularly the shift of population from the city core (South Mumbai) to the peripheral area (North Mumbai) has been observed due to development of the transportation and communication facility as well as the de-urbanization that has taken place in South Mumbai.*

Key Words: *gradient pattern, urbanization, decadal changes, population density.*