



## **Development of Hydrological Response Units of Brahmani River Basin for Assessing Hydrological Responses Under Climate Change**

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### **Abstract:**

Spatial variability in the basin characteristics in most distributed models is often captured by partitioning of watershed/basin into smaller homogeneous units in terms of a certain combination of soils, land use, elevation, slope, and aspect. These units are called as Hydrological Response Units (HRUs). To assess the hydrological response of a river basin, a study was carried out for delineation of Brahmani river basin (39313.50km<sup>2</sup>) into different HRUs. The basin comprises of seventeen districts of states of Jharkhand, Chhattishgarh and Orissa with geographical extent of 83° 52' 55" E - 87° 00' 38" E longitude and 20° 30' 10" N - 23° 36' 42" N latitude. GIS and image processing technique have been used to develop Digital Elevation Model (DEM), aspect map, slope map, soil map, landuse map, delineation of sub-watersheds and Hydrological Response Units (HRUs). Elevation varied between 1m to 1158m, general aspect direction was towards east-east-south and slope varied between nearly level (0%-1%) to very steep (>30%). Thematic map of soil had six classes namely sandy loam, loamy sand, loam, silt loam, clay loam and clay; landuse map has four classes as cultivated land, forest, water bodies and settlement. The basin has been subdivided into four sub-watersheds (Tilga, Jaraikela, Gomlai and Jenapur) using stream flow gauging stations as seed points. The sliced elevation map, landuse map and soil map have been used to develop

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HRU layers for the entire basin and for each sub-watershed. Nineteen HRUs classes with different combinations of elevation range, soil types and landuse types were generated with total 69 polygons for the basin. In Jenapur Gamlai Jaraikela and Tilga sub-watershed sixty-six, forty, forty-eight and twenty-six polygons were generated respectively using PCI Geomatica V9.1 and TNT Mips V7.1 software.