Geographical Information System based Morphometric Analysis of Ghat Gad and Gheria Gad Microwatersheds of Ladhiya-Lahaghat Watershed of Sarju River in Champawat, District, Uttaranchal

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Abstract: The study area covers 74.57 sq. kms having 34.67 and 39.9 sq.kms respectively for Ghat Gad and Gheria Gad drainage basins comprising 10 micro watersheds. The drainage network of 10 microwatersheds was delineated using SOI topographical maps on 1:50,000 scale and compared with IRS-IC LISS III, 23.5 meter resolution, geocoded imagery of same scale. The resistance of topographical surface is determined by its altitude, slope, resistance to erosion of soil and landuse/landcover. Interrelationship between these factors and their distribution have played major role in the development of the present state of drainage basin topography. The morphometric analysis of 10 microwatershed has been carried out using GIS software. The drainage network shows that the terrain exhibits dendritic to sub dendritic drainage pattern. Stream order ranges from fourth to fifth order. Drainage density varies between 3.28 to 3.58 km/km^2. Texture ratios of the drainage basins are 4.91 & 6.38 and categorised as moderate to fine textured in nature. The drainage frequency of Ghat Gad and Gheria Gad is 4.93 and 5.48. In this area both drainage basins show high DF which indicate to high relief and low infiltration capacity of the bed rock. The relief ratio ranges from 0.132 to 0.136. The bifurcation ratio ranges from 2.6 to 5.15 and 2.0 to 5.61 for Ghat Gad and Gheria Gad drainage basins, respectively, and the watersheds do not fall under normal basin category. The elongation ratio is 0.57 to 0.59, showing that both drainage basins have moderately elongated pattern. Hence from the study it can be concluded that remote sensing data, coupled with GIS techniques, prove to be a competent tool in morphometric analysis.

Keywords: Morphometric analysis, Drainage basin, microwatershed, Ladhiya Lahaghat watersheds, Sarju river, Champawat district.