Morphometric analysis of mansi-wakal river basin of western India, using remote sensing and GIS techniques


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Abstract: The study area of wakal river basin covers 1914.32 km² and divided into 7 sub-basins range from 203.46 to 360.22 km² for the analysis. The drainage network of 7 sub-basins were delineated using remote sensing data (LISS III) on 1:50,000 scale and SOI toposheets were used as reference. The morphometric parameters were computed using ArcInfo and ArcView softwares. The drainage pattern of the study area is dendritic to sub-dendritic with stream orders of sub-basins ranging from VI to VII orders and lower stream order mostly dominated in the basin. The stream length ratios are changing haphazardly at sub-basin indicating differences in slope and topographic conditions. The values of mean bifurcation ratio ranging from 3.12 to 4.56 indicate that all the sub-basins fall under normal basin category. Drainage density varies between 3.08 to 4.20 km/km² has a mountainous relief and fine drainage texture. The values of form factor and circulatory ratio of sub-basins indicate that they are sub-circular and elongated in shape. Elongation ratio indicates that the sub-basins in a region of strong relief and steep ground slopes. The values of length of overland flow of the basin indicate that the areas associated with more run-off and less infiltration. The ruggedness number of the basins indicates that the area is extremely rugged with high relief and high stream density. Hence, it is concluded that remote sensing and GIS techniques proved a competent tool in morphometric analysis.

Key words: Morphometric analysis, Mansi-wakal river basin, Remote sensing, GIS techniques