

**DRAINAGE NETWORK QUANTIFICATION IN A MOUNTAINOUS WATERSHED:  
A GIS-BASED APPROACH IN BADULU OYA BASIN, SRI LANKA**

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Quantification of drainage network elucidates many characteristics of a drainage area. GIS is a widely applied tool to derive drainage networks from spatial data. The present study aimed to assess the drainage network parameters of Badulu Oya Catchment (BOC) in Uva province of Sri Lanka in terms of linear, areal and relief characteristics. The contour-based Digital Elevation Model (DEM) was used to derive the drainage lines and watershed with the aid of hydrology tools in ArcGIS 10.4.1 platform. Results of the drainage network analysis revealed that the Badulu Oya is a sixth order stream channel, extending for 39.7 km along the elongated drainage basin which encompasses an area of 404.7 km<sup>2</sup> illustrating a dendritic drainage pattern. Bifurcation ratio of less than 5 (1.84) indicates that the drainage basin is underlain by uniform materials, and the constituent streams are usually branched systematically with large number of first, second and third order tributaries implying low influence of geologic structures on channel controls. Highly branched stream network indicates lower influence on flooding. Low values of elongation ratio (0.57), foam factor (0.26) and circulatory ratios (0.3) further confirm basin shape and low risk of floods. High drainage texture (21.25) implies the sparse vegetation of dry climate condition in the basin. Drainage density (2.95) and stream frequency (6.82) indicate prevalence of good level of percolation and infiltration processes in the basin. The relief parameters such as basin relief (1,900 m) and ruggedness number revealed that the basin is characterized by high relief and steep gradient. Similar pattern has been observed in a study of Kelani River basin. As per the current knowledge this study is the first morphometric analysis of the BOC, hence comparison with the previous findings is lacking. An analysis of published drainage network in a topographic map further confirms the validity of the derived stream network.

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