

ABSTRACT

Name of the Student: **Rabab Siddiqui**

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Name of the Department: Civil Engineering

Name of the Topic: **Analysis of Geomorphometric Characteristics of Two Climatically Distinct Watersheds using Remote Sensing Data.**

Keywords: GIS and remote sensing, Morphometric analysis, Prioritization, PCA, AHP, SCS-CN and ArcSWAT

Morphometric analysis at watershed level and its prioritization for vulnerability assessment forms an essential for implementation of natural resource conservation programs. The accurate prediction of surface runoff for data scarce regions is time taking by traditional methods. The morphometric analysis of Kosi and Nagmati River watersheds has been quantified by evaluating 6 linear, 19 aerial and 4 relief morphometric parameters. The results revealed uniqueness in the estimated values of morphometric parameters for the two distinct watersheds.

Hypsometric integral, evaluated as 0.48 for Nagmati watershed and 0.45 for Kosi watershed. The hypsometric curve for Nagmati River watershed revealed complete '*S shape*' specifying less soil erosion. Prioritization of two watersheds was performed at sub-watershed level by employing four

approach morphometric, PCA, I-PCWS and AHP, to identify the most erosion prone regions.

An average annual runoff generated for each year since 2006 to 2017 by SCS-CN method amounted to 21.33% for Kosi River watershed and 29.47% for Nagmati River watershed. Likewise, an average of annual runoff generated for the same duration by ArcSWAT amounted to 21.44% for Kosi and 24% for Nagmati River watershed. Therefore, both models revealed evidence of greater runoff generation from Nagmati River watershed as compared to Kosi River watershed.