



## Estimation of runoff of Western Himalayan watershed using Remote Sensing and Geographical Information System

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### ABSTRACT

Water is continuing one of the most critical resources for development. Surface runoff is the major input for soil erosion as well as surface water bodies like tanks and reservoir. Since most of Indian watershed are ungauged but estimation of depth and rate of runoff are the key parameters for management of watershed programme. Estimation of runoff is not help for designing the engineering structures within the watershed but also help in prioritization of sub watersheds within the watershed. In present study, Soil Conservation Service Curve Number (SCS-CN) method has been applied to asses the runoff of Badri Gad watershed of Uttarakhand India. The SCS curve number is widely accepted for estimation of runoff for ungauged watershed. Geographical Information System (GIS) and Remote Sensing (RS) used in the study area to create the database required for the preparation of most of the input data used in SCS-CN method. Annual runoff was calculated for 24 years period (1985 to 2008). It was observed that runoff varied from 2.03 to 27.30 per cent of the annual rainfall for the years 2001 and 1998, respectively. The average annual runoff was found to be 187.60 mm

**Key words:** Watershed, Ungauged, RS, GIS, Curve Number and runoff

### INTRODUCTION

Himalayan region characterized by young fragile ecosystem, diminishing bio diversity, marginalized and resources poor inhabitants with inadequate - infrastructural facilities. Most of the Indian hilly watersheds are ungauged hence could not get much attention of the researchers due lack of quality data. Moreover collection of data in such locations is tedious and difficult. Nowadays, watershed management is becoming a blue print for agricultural development in most parts of the country. Watershed management implies the proper use of all land and water resources for optimum production with minimum hazard to natural resources. The success of planning for developmental activities depends on the quality and quantity of information available on both natural and socio-economic resources. Remote Sensing and GIS are commonly used to get the reliable data base generation for devising the ways for optimal planning and management of watersheds.

Integrated use of remote sensing and GIS techniques can be used in runoff estimation, soil erosion assessment and watershed prioritization (Deshmukh et al. (2004). The input parameters, required for soil erosion modelling, can be generated by remote sensing. Geographical Information System helps in creating a database for the watershed, which is very much useful for carrying out spatial analysis thereby helping the decision makers in framing appropriate measures for critically affected area. Assessment of surface runoff is pre requisite for designing the different soil and water conservation measures within the watershed The Soil Conservation Service (now Natural Resources Conservation Service) Curve Number (SCS-CN) method (SCS, 1956) is one of the most popular method for computing depth of runoff for a given rainfall event from small agricultural, forest and urban watershed. This method is widely used foe estimating runoff of un gauged watershed Kavita et al. (2004), Amutha et al. (2009). The curve number method requires

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