JWARP> Vol.2 No.3, March 2010

OPEN ACCESS

Simulation of Runoff and Sediment Yield for a Himalayan Watershed Using SWAT Model

PDF (Size:7012KB) PP. 267-281 DOI: 10.4236/jwarp.2010.23031

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ABSTRACT

Watershed is considered to be the ideal unit for management of the natural resources. Extraction of watershed parameters using Remote Sensing and Geographical Information System (GIS) and use of mathematical models is the current trend for hydrologic evaluation of watersheds. The Soil and Water Assessment Tool (SWAT) having an interface with ArcView GIS software (AVSWAT2000/X) was selected for the estimation of runoff and sediment yield from an area of Suni to Kasol, an intermediate watershed of Satluj river, located in Western Himalayan region. The model was calibrated for the years 1993 & 1994 and validated with the observed runoff and sediment yield for the years 1995, 1996 and 1997. The performance of the model was evaluated using statistical and graphical methods to assess the capability of the model in simulating the run-off and sediment yield from the study area. The coefficient of determination (R2) for the daily and monthly runoff was obtained as 0.53 and 0.90 respectively for the calibration period and 0.33 and 0.62 respectively for the validation period. The R2 value in estimating the daily and monthly sediment yield during calibration was computed as 0.33 and 0.38 respectively. The R2 for daily and monthly sediment yield values for 1995 to 1997 was observed to be 0.26 and 0.47.

KEYWORDS

AVSWATX, Calibration, Validation, Image Processing, Remote Sensing, GIS, Runoff, Sediment Yield

Cite this paper

S. Jain, J. Tyagi and V. Singh, "Simulation of Runoff and Sediment Yield for a Himalayan Watershed Using SWAT Model," *Journal of Water Resource and Protection*, Vol. 2 No. 3, 2010, pp. 267-281. doi: 10.4236/jwarp.2010.23031.

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