Advance tool for watershed planning

Avanish Yadav
Research Scholar, Department of Soil and Water conservation Engineering,
SHUATS, Prayagraj (U.P),
Corresponding author:- **avanishyadavswc@gmail.com**
ARTICLE ID: 031

In the earlier days, implementations of conventional methods of hydrologic modeling were hampered by the lack of detailed information about the spatial variability of the physical and hydrological parameters of the catchment. With the evolution of the remote sensing technology, satellite based remote sensing methods are now being widely used to capture the spatial variation in the hydro-meteorological and catchment characteristics, resulting in significant improvement in the hydrologic modeling. Major focus of remote sensing applications in hydrology include the estimation of hydro-meteorological states (such as land surface temperature, near surface soil moisture, snow cover, water quality, surface roughness, land use cover), fluxes such as evapo-transpiration and physiographic variables that can influence hydrologic processes.

Watersheds known as basins or catchments are physically delineated by the area upstream from a specified outlet point. Watersheds can be delineated both manually on paper maps and digitally in a GIS environment. Watershed has emerged as the basic planning unit of all hydrologic analyses and designs. Watersheds are natural hydrological entities that cover a specific aerial expanse of land surface from which the rainfall runoff flows to a defined drain, channel, stream or river at any particular point.

Watershed delineation is a human interpreted, or GIS derived vertical boundary delineation that extends above earth's surface dividing the land into horizontal surface water drainage areas that route excess surface water to the outlet of a surface water system. Using digital watershed delineations as containers on the landscape allows for the modelling and illustration of landscape connectivity within a hydrologic system. With the development of computer and information technology, distributed hydrologic models become research focus, in which watershed delineation based on DEM (Digital Elevation Model) is the key step and priority. DEMs are used in water resources projects to identify drainage features such as ridges, valley bottoms, channel networks, surface drainage patterns, and to quantify sub

catchment and channel properties such as size, length, and slope. The accuracy of this topographic information is a function both of the quality and resolution of the DEM, and of the DEM processing algorithms used to extract this information. Watershed delineation is one of the most commonly performed activities in hydrologic analysis. Although watershed area is easy to conceptualize and delineate on a paper map, GIS delineations are less labor intensive, more reproducible, and less dependent on subjective judgment. The GIS delineation process starts with a grid representation of topography called a digital elevation model. From the DEM a series of additional grids are produced that represent various hydrologic characteristics of the landscape. From these "hydrologic grids", a GIS can delineate watershed boundaries by identifying all locations within a DEM that are uphill of an outlet.