

# **High resolution land surface distributed hydrological modeling in Nepal Himalaya**

**Maheswor Shrestha<sup>1</sup>**

<sup>1</sup> Water and Energy Commission Secretariat, Kathmandu, Nepal.

Assessment of accurate spatial distribution of precipitation is the big challenge in the mountainous and Himalayan River basins and is critical in hydrologic modeling of such basins. In this study, high resolution (1 km spatial resolution) distributed hydrologic modeling is carried out in Narayani River basin (31700 sq. km.) of Nepal Himalaya having the regions with the highest and the lowest precipitation in Nepal. The model used is Water and energy budget based distributed hydrological model (WEB-DHM-S) with an energy budget-based multilayer scheme for clean glaciers, a single-layer scheme for debris-covered glaciers and multilayer scheme for seasonal snow over glacier and other land uses (soil/forest). Spatial distribution of precipitation is generated by correcting the basin scale precipitation taking into account the orographic effect. Simulation results show that discharge variability (high and low flow) were well reproduced in 2002-2004. Model simulated snow cover were comparable to the Moderate Resolution Imaging Spectroradiometer (MODIS) 8-day snow product. Although the basin hydrology is highly modulated by monsoon precipitation induced runoff, snow and glacier melt runoff contribution were found remarkably high at the head reaches. It is necessary to enhance our understanding on precipitation variability in these regions through observational and modeling experiments.