

# Impact of Climate Change on River Discharge and Rainfall Pattern: A Case Study from Marshyangdi River basin, Nepal

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## ABSTRACT

*Climate models have predicted increase in monsoon precipitation for Nepal and expected to enhance further in scenario of deforestation and global green house gas emission which induces extremes resulting risk of flood, landslide during monsoon while water shortage in dry season. In this study, the impact of climate change on water resource for glacierized Marshyangdi River is evaluated using HBV light hydrological model with available hydrological data (1988-2009) to predict the future water availability and change in rainfall pattern based on available rainfall data (1981-2009). The results for Marshyangdi basin with 4104.59km<sup>2</sup> area with average discharge of 204.03 m<sup>3</sup>/s (1988-2009) suggested decrease in rainy days while increase in frequency of intense rainfall, and the projected rainfall based on downscaling showed increase in rainfall for 2050's. The model performance is adequate and able to simulate accurate result with estimated average discharge of 224.82 m<sup>3</sup>/s (1988-2009). The simulated result provided good fit with model efficiency 0.86 for first calibration and 0.81 for second calibration, while total volume difference of 1.43% and Nash-Sutcliffe Efficiency of 0.80 between observed and simulated discharge.*

**Keywords:** *Climate Change, Marshyangdi basin, HBV Light, Nepal Himalaya*