

Assessing the effect of climate change on the hydrology of the Wainganga River basin using VIC model

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Climate change is one of the most important global environmental challenges, which affects the entire earth system in terms of negative impacts on food production, water supply, health, livelihood, energy, etc. The study aims to assess the long-term impact of on the streamflows in the Wainganga basin at Ashti station for period 1951-2014. The Wainganga basin is the biggest sub-basin of the Godavari and accounts for nearly 1.56% of the total geographic area of India and 16.45% of the total area of the Godavari basin. Wainganga is an agricultural basin with around 51% under cultivation land. Changing climate can have huge impact on the livelihood of the people. Precipitation has decreased by 7.95% in the basin during the study period while temperature have increased by 0.48°C. Variable Infiltration Capacity (VIC) model was used for simulating streamflows. 20 years' durations were selected as calibration (1970-1989) and validation (1990-2009) periods. Daily NSE, COD and RE of 0.85, 0.92 and 2.6% and, 0.84, 0.92, and 1.45% were obtained during calibration and validation of the model respectively. Analysis demonstrates a significant decreasing trend in the basin showing 15.02% decrease in mean annual flows. The decrease is due to decrease in precipitation and increase in losses due to increased temperature. The study contributes to the knowledge and understanding of the climate change impact on the local catchment level.

Keywords: Climate change, hydrological modelling, VIC model, streamflow

