

**ASCERTAINING THE DISTINCTIVE ROLE OF CLIMATE  
CHANGE AND LAND USE CHANGE IN HYDROLOGICAL  
BEHAVIOR OF HARO RIVER BASIN**



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## ABSTRACT

Climate changes and anthropogenic activities e.g. land use changes are two key factors that may influence the hydrological process of a basin. Hence, assessment of relative contribution of these factors in runoff variation is essential for basin development and mitigative activities. The current study focusses on the estimation of runoff variation induced by climate change and land use change using Man-Kendall test, Pettit test and Budyko Framework. The trend analysis results showed 0.83% decrease in depth of annual precipitation and 0.11% increase in annual potential-evapotranspiration. Pettit test indicated a change point at 1998 and based on change point, the study period was divided into pre-change period (1988-1997) and post-change period (1998-2018). Furthermore, Budyko Framework analysis depicted the significant decrease in runoff from pre-change period to post-change period with 77% and 30% relative contribution of climate change and land use change respectively. The cross assessment of supervised land use classification of satellite images also seconded the major land use variations during the post change period. This study also concludes that aforementioned methods performed well in quantifying the relative contribution of land use change and climate change to runoff change.