**Assessment of Spatio temporal variation of Raifall over Semi-Arid, Sabarmati River Basin, Western India, Using GIS and MATLAB**

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***ABSTRACT***

Current and future projections of climatic variables provide critical information about ongoing climate change, which is essential for water resource management and food security especially in semi-arid/arid environments. Climate change has severely affected multidimensional regime of precipitation over various regions. The present study has been conducted over Sabarmati River Basin, water scarce but highly industrialized region. Encompassing the semi-arid region over western India, the basin has lowest surface water availability per capita, so the assessment of decadal rainfall trend analysis over the basin is very important for water resource manager for development and planning. This study was done with the aim to determine the spatial and temporal variation over the basin as well for other rainfall characteristics (extreme rain-fall events, number wet and dry days, and prolonged spells of rainfall) in recent years. Gridded data of precipitation with a resolution of 0.25×0.25o from India Meteorological Department for the years between 1980 and 2020 were used for the study. The analysis was carried out using MATLAB and GIS. For rainfall trend analysis at annual, seasonal, and monthly scales, non–parametric test Mann–Kendall test, Sen-Slope estimator, and linear regression analysis were used. It was observed that both monsoon and annual rainfall has increased over the basin while it is showing a declining trend for the rest of the seasons. The present study also suggested unimodal distribution of rainfall and it also indicates a shift in rainfall towards later months of monsoon (August and September). It is also inferred that days with moderate rainfall have decreased over the basin while there is an increase in low and extreme rainfall events. This study also suggests an increase in extreme rainfall events in all the seasons with a rate of change 0.68, 0.08, 0.52, and 0.59 mm/year, respectively. Understanding the precipitation regime over a river basin scale will be very helpful to carry out water resource management in this water scarce region.

**Keywords:** Water Scare, Rainfall variability, Mann-Kendall test, MATLAB, Westen India