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HISTORICAL TRENDS OF RAINFALL, TEMPERATURE AND RUNOFF IN SRI LANKA

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Abstract:

Being a small island and substantially influenced by the confining Great Indian Ocean and the nearby continents, Sri Lanka is potentially vulnerable to the climate changes. The impacts of climate change include changes in rainfall, temperature, and runoff in terms of both the averages and the extremes with an associated increase in severity of floods and drought. In addition the sustainability of water is affected by alterations in natural hydrologic cycle. This research investigates the historical trends in averages and extremes, based on the baseline rainfall and temperature and runoff records available from Meteorological and Irrigation departments of Sri Lanka. Analyzing such historical trends show to advantage as a vital precursor in assessing future projections on climate change. The statistical trend detection in this study was performed using parametric & non-parametric regressions. In particular, the statistical significance of the slope parameter of fitted linear models was tested using standard regression techniques and the non-parametric methods such as Mann-Kendall and Sen-Theil tests. Baseline data shows an increasing trend in temperature over the decades and the vulnerability in terms of drought & flood becomes more significant with time in many districts of Sri Lanka. Especially dry zones were expected to receive low rainfall with increased air temperature. In addition, the observed changes in runoff pattern have been attributed to the climate variability and changes in land use. The results provide a basic foundation for understanding the potential changes in temperature, rainfall and runoff patterns in future, based on climate models.

Keywords: Climate change, Extreme values, Historical trend, Rainfall, Runoff, Temperature