

## **ANALYSIS OF TRENDS IN STREAMFLOW AND ITS LINKAGE WITH RAINFALL IN *KELANI* RIVER USING INNOVATIVE TREND ANALYSIS APPROACH**

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Assessment of hydro-climatic trends is useful in resource planning especially in river basin scale under climate variability and change. This study investigated the trends of streamflow in the *Kelani* river and its association with rainfall over 30 years period. Streamflow and rainfall were assessed at six and eight stations respectively using Innovative Trend Analysis (ITA) and Mann Kendall test (MK) with Sen's slope estimator. The relationship between streamflow and average catchment rainfall was tested using Spearman's rho correlation coefficient ( $\rho$ ). Both ITA and MK tests confirmed the decreasing annual and seasonal streamflow trend from mid-stream to downstream of *Kelani* river basin. A decreasing trend of rainfall was recorded in 75% and 63% stations during South West Monsoon (SWM) and Second Inter-Monsoon (SIM) respectively. However, annual, North East Monsoon (NEM) and First Inter-Monsoon rainfall showed an increasing trend in 63%, 88%, and 100% stations respectively. Moreover, there was a positive correlation between the streamflow and catchment rainfall at all time scale tested. The maximum  $\rho$  was observed for annual streamflow at *Kithulgala* gauging station ( $\rho=0.61$ ) and the minimum  $\rho$  was recorded at *Holombuwa* station ( $\rho=0.17$ ) with respective catchment rainfall. There was a significant association between streamflow and catchment rainfall ( $p<0.05$ ) for the tested time period for 70% of stations suggesting that the variation of streamflow is mainly attributed to the variation of catchment rainfall. The decreasing trend of streamflow and rainfall during SWM and SIM towards the downstream area with the increasing temperature trend indicate a drying tendency of *Kelani* river basin over the study period. The results of this study are useful in formulating a sustainable plan in the usage of water in *Kelani* river basin.

**Keywords:** Innovative trend analysis, *Kelani* river basin, Mann - Kendall test, Rainfall, Streamflow