TREND ANALYSIS OF RAINFALL OVER SRI LANKA; APPLICATION OF INNOVATIVE TREND ANALYSIS METHODOLOGY

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Rainfall trend analysis provides useful information for effective planning, designing and management of water resources and gives insight to the climate change of a region. This study investigates the trends in annual and seasonal rainfall at 30 rainfall stations from 1987 to 2017 period over Sri Lanka using an Innovative Trend Analysis (ITA) and Mann Kendall test (MK) with Sen's slope estimator. The relationships between trends in ITA and MK were studied by correlation analysis. According to the MK test, annual rainfall at 19 stations showed increasing trends and only trends at Potuwil, Anuradhapura, Battcaloa and Bakamoona stations were significant. Annual rainfall at 11 locations showed decreasing trend, but none of their trends were significant ($p<0.05$). ITA results for annual rainfall showed increasing trend at 70% stations while 30% stations showed decreasing trend Furthermore, MK test results for seasonal rainfall indicated increasing trend at 77, 53 and 27% of stations during First Inter Monsoon (FIM), Second Inter Monsoon (SIM) and South West Monsoon (SWM) seasons respectively. All tested stations showed increasing rainfall trend during North East Monsoon seasons (NEM) for MK test analysis. According to ITA results for seasonal rainfall, 90% stations showed increasing trend during FIM and 77% stations showed increasing trend for both SIM and NEM seasons. ITA and MK tests exhibit similar trend results for 80% of the stations (24 stations) except Kurunagalla, Mahaillukpallama, Puttalam, Thissamaharama, Colombo and Higurakgoda. Moreover, Spearman's rho correlation coefficient between ITA and MK test trends showed significant ($p<0.05$) positive strong correlation (0.87). In general, the eastern, southern, northern and north central regions of the country showed increasing rainfall trend over the last 30 years while north western, western, sabaragamuwa regions and central hills of the country indicated a decreasing rainfall trend during the period 1987 to 2017

Keywords: Innovative trend analysis, Mann Kendall test, Rainfall, Sri Lanka