

Recent trends in the rainfall patterns of Mannar, Sri Lanka

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Evaluation of the variations in rainfall patterns that reflect the trends in climate, is of essence for effective and sustainable management of the available water resources within a country. Sri Lanka being a tropical country that significantly depend upon agriculture for economic viability, has to pay much attention to the variations in rainfall patterns (especially in seasonality and severity of the rainfall and frequency of wet and dry events) for effective planning and management of water resources ensuring their sustainability. Therefore, Standardized Precipitation Index (SPI) and Seasonality Index (SI) were employed to assess the degree of climate change on rainfall patterns (with respect to the temporal variations of wet and dry events and rainfall seasonality) of Mannar District Secretariat Division (DSD) that lie within DL₃ and DL₄ agro-ecological regions of the dry zone. Daily rainfall data for fifty three years (1961 - 2013) obtained from the Mannar rain gauging station were utilized in this study, under two major periodic intervals of years (1961-1985 and 1986-2013). Monthly accumulated rainfall for each month of the considered periods of years were calculated and used as the input for SPI modeled in Mat Lab R2007b (version 7.5). Variations in rainfall seasonality were assessed based on the SI values that were calculated for each year in the two periods of years (1961-1985 and 1986-2011) using the standard procedures. Subsequently, the calculated SI values were arranged into 5 groups on a ten year (decade) basis and mean SI values of each 10 year time period were calculated and were analyzed to recognize long term variations in rainfall seasonality. A significant decrease in wetness [$X^2_{cal} = 15.04 > X^2_{tab(4, 0.05)}$] with an apparent increase in dryness [$X^2_{cal} = 2.326 < X^2_{tab(4, 0.05)}$] in terms of severity and frequency of occurrence could be predicted for Mannar. No significant variations in rainfall seasonality were predicted for Mannar in accordance with the SI, except for apparent variations that were not significant.

Keywords: climate change, SPI, SI, seasonality, wetness, dryness