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Evaluation of the trends in seasonal variation of rainfall in Mannar, Sri Lanka

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As a country with an agriculture based economy, Sri Lanka has to pay more attention to the climate extremes and variations in rainfall patterns. Evaluation of the regional variations in rainfall patterns (especially in rainfall seasonality, severity and frequency of wet and dry events) that reflect the trends in climate, is of essence for effective and sustainable management of the available water resources. Therefore, the variations in rainfall seasonality of Mannar District Secretariat Division (DSD), that lies within DL₃ and DL₄ agro ecological zones of the dry zone was evaluated by devising the Gumbel approach. Daily rainfall data for fifty three years (1961 to 2013) from the Mannar rain gauging station were collected from the Department of Meteorology. Monthly cumulative rainfall values were calculated and were subjected to a frequency analysis employing the Gumbel approach under two major periods of calendar years as 1961 - 1985 (past years) and 1986 - 2013 (recent years), while considering the four rainfall seasons identified in Sri Lanka. The first inter monsoon rainfalls indicated a reduction of the magnitude of low intense rainfall events along with an increment in the return period of the intense rainfall events. Meanwhile, the rainfall patterns in the second inter monsoon indicated an increasing trend of return periods of high intense rainfall events in recent years than in past years. A declining trend in the maximum average monthly cumulative rainfall and frequency of occurrence of intense events of rainfall could be recognized in the Southwest monsoon and Northeast monsoon periods in recent years (1986-2011) compared to the past (1961 to 1985). Thus, frequent occurrence of severe and extreme dry events that could significantly affect both availability and available quantity of water could be expected in Mannar, resulting in potential impacts on environmental, economic and social sectors. Especially as a locality that often experiences severe droughts, any further increment in the frequency of occurrence of dry events (as predicted by the study) could significantly affect the economic, social and environmental aspects. Therefore, timely planning and management of water resources in Mannar, based on the observed present and expected future trends (increasing dryness) in climate patterns (especially in rainfall patterns) could be recommended to compensate for the possible extreme variations in rainfall.

Keywords: Climate Change, dry zone, Gumbel approach, Mannar, rainfall seasonality