

Spatial and Temporal Profiles of the Occurrence of Droughts in Sri Lanka

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Drought indicates dry situation caused by lack of water, which occurs when rainfall is less than normal for several weeks, months or years. Droughts occur in Sri Lanka is either due to lesser annual rainfall, and/or late onset or early withdrawal of monsoon, or long dry spells. Generally, once in 3-4 years a drought is likely to occur in Sri Lanka. The country experienced severe droughts in 1974, 1976, 1980, 1983, 1988 and 2001. These frequent as well as severe droughts have emphasized for more research. Major objectives in this study are: to study the temporal as well as spatial variations in the occurrence of droughts and its intensity.

To study the drought conditions, Standardized Precipitation Index (SPI) and Aridity Index (Ia) have been applied together. Long-term monthly rainfall data (1881-2001) for 28 stations and monthly temperature data for the same period for 16 principal meteorological stations in Sri Lanka and other required data have been collected from the Department of Meteorology and other sources. Temporal drought profile described based on the decadal SPI results. To study the spatial drought conditions, firstly monthly water budget was calculated by using the WATBUG computer algorithm programme (Willmott, 1985). Then, the aridity index is projected according to Thornthwaite formula. To demarcate the drought regions, the hierarchical cluster technique has been is adopted. For this, the water deficiency and the aridity factors are considered as key variables.

A significant temporal and spatial variation has been found on the occurrences of droughts. The decadal frequencies of drought in various parts of Sri Lanka indicate that the periods of 1991-2000, 1981-90, 1971 -80 and 1901-10 recorded the highest number of droughts. The decade of 1981-90 was the worst drought period, while minimum frequency was reported during 1921-30 and 1931 -40. Based on the dendrogram 9 heterogeneous drought regions were recognized. Cluster region-1 demonstrates the severe moisture stress situations. Simultaneously, region-9 explicitly depicts the less moisture stress. The regions from 1-7 falls under dry zone; concurrently regions 7-9 belongs to wet zone. Besides, once in 3 years a drought is possible over the regions 1 and 2 and once in 5 years in the remaining regions.

Key Words: Rainfall; Dry spells; Temporal and spatial variations; Hierarchical cluster technique

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