

B-27: Identification of hydrological drought in Upper Mahaweli Catchment

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In the wet zone and most of the intermediate zone of Sri Lanka, rainfed agriculture is practiced. Hence, drought can adversely affect the crop production. In these areas, due to slopy terrains and small sizes of land holdings, supply of water by irrigation is difficult. Therefore, information for hydrological drought identification through mapping is very useful in these areas. Thus, the main objective of this study was to develop hydrological drought maps through rainfall analysis. It was expected to provide information from these maps on the length of drought for each month for different return periods.

Daily rainfall data was obtained for 54 stations located in Upper Mahaweli Catchment Area (UMCA) or at a close proximity to UMCA for a period of 30 years (1964 -1993). The maximum number of consecutive non-rainy days and the total number of non-rainy days in a month in each time series of each

station were counted. Extreme Value Type I (Gumbel EVI) distribution was fit to the counted data series. The observed drought length and the estimated values were plotted against the reduced variate to observe the goodness of fit of the distribution. Correlation coefficients were also calculated and compared using regression analysis and parameter values were calculated for different return periods and subsequently, maps were developed.

The spatial distribution of rain gauging locations is very poor and hence, linear interpolation technique could lead to erroneous conclusions. A realistic interpolation should include some accountability of the orographic effects. When maximum number of consecutive non-rainy days were considered the highest numbers were found in January and February months at Peradeniya and Nawalapitiya gauging stations for all the return periods. In contrast, annual rainfall figures of these two stations were much higher than those of most of the other stations. Lowest maximum number of non-rainy days were observed in November and April at Lower Spring Valley and Kenilworth. This is accompanied with the onset of monsoons. In June, a high number of consecutive non-rainy days and the highest variation between the lowest and highest values for all the return periods were observed. Except during the monsoon periods, drought extends for the entire month when 60 year return period was considered.