E-24

# STATISTICAL ANALYSIS OF RAINFALL DATA

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An investigation is undertaken to study the variation such as seasonal, cyclic and randon variations using rainfall data collected over the last 69 years in Jaffna district. The attention was focussed on fitting a Markovian model such as follows to this data.

$$P = \begin{array}{c} \\ \text{DRY} \\ \text{WET} \end{array} \begin{array}{c} \begin{array}{cc} \text{DRY} & \text{WET} \end{array} \\ \begin{bmatrix} 1-\alpha & \alpha \\ \beta & 1-\beta \end{bmatrix} \end{array} \begin{array}{ll} i & 0 \leq \alpha \leq 1 \\ i & 0 \leq \beta < 1 \end{array}$$

under the assumption.

(i) The data follow two-state Markov chain.

It appears that this model fits very well and this data exhibits two different grouping namely Dry and Wet cells. It was observed as the results of the analysis that the maximum rainfall for the wet spells (1931-1932), (1943, 1944), (1957, 1958), (1963, 1964), (1969, 1970), as 166.23 mm, 149.27 mm, 258.69 mm, 141.94 mm, 183.43 mm respectively. This also agrees with the history on the rainfall in Sri Lanka in the past.

The same data is further analysed by a different approach such as time series analysis :

$Y$ = TCSI ($Y$—Rainfall obtained T—Trend, C—Cyclical variation, S—Seasonal variation, I—Irregular variations.)

## SECTION E

As a result of this analysis the seasonal indices were computed for monthly rainfall in the area concerned. De–seasonalized data is further considered to study other variations : cyclical and irregular variations were together considered as random effect and the methods of " Turning points " and " Phase lengths " are employed to test the randomness. It is observed that both methods independently prove the existence of randomness in the data.

A seasonal pattern is observed which will help to predict the further behaviour of the rainfall in the areas considered.