

Confidence limits of expected monthly and weekly rainfall of Jaffna

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Abstract

Precise confidence limits of expected monthly and weekly rainfall must be regarded as fundamental to the specification of the climate regions of an agricultural region. The science of weather forecasting is necessarily based on extensive statistics of experience. However, the means and standard deviations calculated from such statistics are not accurate enough and may be mislead unless skewness is not accounted.

In the study, 105 years monthly rainfall data from 1887 to 1990 of Jaffna meteorological stations and 52 standard week rainfall of a year from 1964 to 1994 (30 year) were used to predict weekly and monthly expected rainfall. The frequency distributions of monthly and weekly rainfall were demonstratable skewed. Then the data were suitably transformed by logarithmic transformation using Manning's method (1950). On the transformation, manipulated C values were 102.17 and 15.41 for monthly and weekly rainfall respectively. High correlation values were obtained between mean rainfalls to standard deviation of rainfall of transformed data in straight - line formula. The derived R^2 values were 0.9896 and 0.9460 for weekly and monthly respectively. Hence, a logarithmic transformation of skew rainfall data is suitable since the ratio of mean to standard deviation is constant and it could be used to derive confidence limits of expected rainfall.

Practical applications of these confidence limits include the more accurate representation of rainfall patterns, valuable guide to agricultural operations, planning and designing of irrigation schemes and better estimates of the range of mean monthly and weekly rainfall. The true break of the season during 40th to 41st weeks for *Maha* and 12th standard week for *Yala* were observed by sharp upward trend of lower and upper confidence limit curve respectively. The possibility of getting torrential rainfall is revealed during 31st week. Hence, the 1:1 rainfall confidence limits of monthly and weekly – expected rainfall or within which this expected rainfall will occur, could be effectively used to obtain valuable guide in agriculture rather than on mean monthly or weekly amount for long period.

Key words: Rainfall, Confidence limit, Logarithmic transformation, Jaffna

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