

RESEARCH PAPER:

Assessment of occurrence and frequency of drought using rainfall data in Coimbatore, India

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SUMMARY

Rainfall data of twenty seven years (1981-2007) have been analyzed on annual, seasonal, monthly and weekly basis to assess the drought conditions and the frequency analysis has been made for predicting the expected rainfall at different probability levels. The analysis indicated that the maximum frequency of drought was observed to be in 50th to 52nd week and 1st to 13th week, February month and southwest monsoon and summer season. The observed frequency of drought was minimum in 44th week, October and November months and northeast monsoon. The analysis revealed that 2005 was the wettest year and 1995 was the driest year during 27 years study period. The expected rainfall of annual, Southeast monsoon, northeast monsoon, summer season, October and November month at one year recurrence interval was 477.33 mm, 90.2 mm, 97.2 mm, 47 mm, 30 mm and 26.1 mm, respectively. During the study period, the intensity of drought was observed to be mild/moderate and no occurrence of severe or extreme drought events were observed. The surplus water available during northeast monsoon can be effectively harvested and efficiently utilized to meet out the water demand for domestic areas and supplementary irrigation for agricultural areas during water deficit periods.

Key Words :

Rainfall,
Intensity of
drought, Weibull,
Frequency
analysis, Return
period

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Rainfall is the major source of water for agriculture and the spatial and temporal uneven distribution of rainfall leads to occurrence of flood and drought in different regions simultaneously. Drought incidences; regardless its severity, have become more common in recent years in parallel to global climate changes. Droughts have adverse socio-economic, agricultural, and environmental impacts that can be reduced by assessing and forecasting drought behaviour. Probability and frequency analysis of rainfall data enable us to determine the expected rainfall at various chances (Bhakar *et al.*, 2008). Such information can also be used to prevent floods and droughts, and applied to planning and designing of water resources related to engineering such as reservoir design, flood control work and soil and water conservation planning (Agarwal *et al.*, 1988; Dabral *et al.*, 2009). Various researchers have investigated the meteorological droughts at various places of India (Kumar and Kumar, 1989; Ray *et al.*, 1987; Shrivastava *et al.*,

2008). Meteorological droughts were studied for predicting the expected rainfall at different probability levels for planning a suitable cropping pattern (Kumar, 2009; Singh *et al.*, 2007). In this context, an attempt has been made at Tamil Nadu Agricultural University, Coimbatore (T.N.), to analysis the nature of distribution of rainfall and to assess the drought conditions, frequency and drought intensity for Coimbatore.

EXPERIMENTAL METHODOLOGY

Location of study area:

The TNAU is located at 11° N latitude and 77° E longitude with an elevation of 426.72 m above mean sea level covering an area of 323.88 ha. It is situated 3 km away from Coimbatore city in the west direction. The long term mean annual rainfall is 657 mm distributed in 47 rainy days. Heavy rains are likely to occur during North East Monsoon. The mean maximum and minimum temperature is 31.5°C