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Prediction of annual maximum weekly rainfall using frequency analysis for tarai region of Uttarakhand

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ABSTRACT: Frequency analysis is the statistical tool to estimate the probability of recurrence of an event of given magnitude. In the present study, an effort has been made to find out the goodness of fit of the observed annual maximum weekly rainfall with the predicted values of rainfall computed by using four probability distributions namely, Gumbel's, Log Pearson Type III, Log Normal and Van Te Chow distributions for the selected return periods for Tarai region of Uttarakhand. The daily rainfall data of 36 years (1970-2005) were collected from Crop Research Centre, Pantnagar, located at 29°N latitude and 79.3°E longitude with an altitude of 349.84 m above mean sea level. The best theoretical distribution was adjudged by using three criteria viz. Chi-Square test, Per cent Absolute Deviation (PAD) and Integral Square Error (ISE). The average values of sum of Chi-Square, Per cent Absolute Deviation (PAD) and Integral Square Error (ISE) for Gumbel's, Log Pearson Type III, Log Normal and Van Te Chow distributions were found to be 2.307, 2.543, 2.217, 1.440; 9.849, 8.248, 7.489, 6.159 and 0.0280, 0.0272, 0.0270, 0.0219, respectively. The Van Te Chow distribution was observed to be the best fit for the prediction of annual maximum weekly rainfall values based on the above criteria for Tarai region of Uttarakhand.

Key Words: Chi-square test, integral square error, percentage absolute deviation, probability distribution.