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PROBABILITY ANALYSIS OF CRITICAL DRY SPELLS OF MARATHWADA REGION OF MAHARASHTRA STATE FOR PLANNING CLIMATE RESILIENT CROPPING PATTERNS

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Abstract

A period of dry weather can serve as an indication of situations where moisture stress is present, and it can help in reducing economic losses. Having prior knowledge about the start and duration of dry spells is crucial for rain-fed agriculture, as it aids in deciding the appropriate crop type or variety, planning irrigation, and making climate-related decisions.

This study analyzed the daily data of rainfall and evaporation from 1981 to 2015 to determine the average dates of the onset of the effective monsoon (OEM), its withdrawal, critical dry spells (CDS), and their duration in eight districts located in the Marathwada region of Maharashtra, India. Additionally, the duration of CDS at 20, 40, 60, and 80 percent probability levels was determined using Gumbel's extreme value distribution. The study revealed that the earliest OEM (18th June) was observed at the Hingoli and Parbhani stations, indicating that the rainy season in these areas is longer compared to others. The longest CDS duration (28 days) was recorded at the Osmanabad station, suggesting a shorter monsoon season. Furthermore, the Jalna station experienced the highest number of CDS (86), making it the most susceptible to crop failures.

The study also conducted a probability analysis of CDS duration at different levels. The methodology employed in this study could potentially be applied in other regions with similar agro-climatic conditions.

Keywords: critical dry spell (CDS), dry spells, Gumbel's extreme value distribution, onset of effective monsoon (OEM), withdrawal of effective monsoon

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