

## Rainfall probability analysis and crop planning for Chambal region of Madhya Pradesh

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Received : 24.08.2012; Accepted : 31.01.2013

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■ **ABSTRACT :** Daily rainfall data of 29 years (1981-2009) recorded at RVSKVV, Zonal Agricultural Research Station Morena, Madhya Pradesh was examined for long term averages of annual, seasonal, monthly, and weekly rainfall and its temporal variability. Co-efficient of variation of 27.1 per cent indicated that the annual rainfall was more or less stable over the years. The season-wise per cent contribution of annual rainfall was 3.7, 7.9 and 88.4 per cent of summer, *Rabi* and *Kharif* seasons, respectively. With in the rainy season, August was the highest rainfall contributing month (33.4%) followed by July (28.9%) mean weakly, precipitation amount and its assurance reaches the peak (>50mm/week) during 26<sup>th</sup> SMW (Standard Meteorological Week) to 38<sup>th</sup> SMW and again declined thereafter. The earliest onset of rainy season occurred in 24<sup>th</sup> SMW. The normal onset of rainy season was observed as 26<sup>th</sup> SMW with CV of 5.8 per cent. There is an ample scope for rain water harvesting from July to September which can be utilized as crop saving irrigation as well as pre-sowing irrigation for succeeding *Rabi* crops which are generally sown on residual soil moisture.

■ **KEY WORDS :** Rainfall pattern, Probability analysis, Crop planning

■ **HOW TO CITE THIS PAPER :** Bhadoria, H.S., Singh, H. and Singh, A. (2013). Rainfall probability analysis and crop planning for Chambal region of Madhya Pradesh . *Internat. J. Agric. Engg.*, 6(1) : 236-239.

Agriculture being mainly rain fed, the Gird Agro climatic zone of Madhya Pradesh state, India locally known as 'Kandi' (Alluvial) is characterized by undulating to escapement topography, uneven and erratic distribution of rainfall, deep ground water table, severe soil erosion, inherent poor soil fertility and frequent crop failures. Since rainfall is the only source of moisture, the spatiotemporal distribution of rains holds the key in determining the fate of entire crop productivity in the region. Knowledge of average monthly, seasonal and annual rainfall is helpful in understanding the general picture of the particular region but the weekly rainfall data analysis gives more useful and precise information's for the rainfall based crop planning (Tiwari *et al.*, 1992). Rainfall probability (wet and dry spells) could made use of in selection of different cropping system (Jadhav *et al.*, 1999). The coincidence of wet spells with the sensitive phenophases sometimes may be more detrimental to the crop development. On the other hand, the occurrence of dry spell at the time of ripening would become beneficial. Therefore, the probability of wet and dry spells can serve as a basic input for establishing precise crop-weather relationships to take some useful decision for crop management practices, contingent crop planning and

related farm operations for sustaining crop production in the area. Such an analysis has also been reported from other parts of the country to follow a profitable crop planning system under rainfed conditions (Sarnia *et al.* 1996 and Dingre and Habib, 2006). Hence, an attempt has been made to analyze the daily rainfall data of ZARS, Morena for evolving rainfall based cropping system.

### ■ METHODOLOGY

The daily rainfall data for 29 years (1981-2009) recorded at Agro-meteorological Observatory (31°6'5"N, 76°27'26"E and 152-529 m above mean sea level), RVSKVV, Zonal Agricultural Research Station for Chambal Command Area (ZARS) of RVSKVV Gwalior, Madhya Pradesh was examined for analyzing rainfall distribution pattern of the area, probability of wet and dry spells and its implications for crop planning. An attempt has been made to use a standard week in drought analysis using Markov Chain Model and planning crops accordingly. A week receiving less than 21 mm rainfall is taken as dry spell week and week receiving 21 mm or more rainfall as a wet week (Subramaniam and Raju, 1988). From the daily rainfall data, annual, seasonal, monthly and weekly total rainfall was worked