

## Rainfall Characteristics and Incidence of Meteorological Droughts in Sirohi District of Rajasthan

A.S. Rao<sup>1</sup>, Surendra Poonia\* and D.V. Singh

ICAR-Central Arid Zone Research Institute, Jodhpur 342 003, India

Received: August 2013

**Abstract:** The rainfall characteristics and meteorological drought conditions in Sirohi District of Rajasthan were studied by analyzing the rainfall data (1901-2012) of three tehsils namely Reodar, Sirohi and Sheoganj. Three tehsils experience 520 to 621 mm of average annual rainfall in 24 to 27 days, out of which 482 to 580 mm occurs during June to September. The lowest annual rainfall in Sirohi was 140 mm in 1901 and highest of 1578 mm in 1973, whereas at Sheoganj, it varied from 157 mm in 1918 to 1689 mm in 1973 mm and at Reodar from 54 mm in 1987 to 1495 mm in 1973. The 1-day rainfall for return periods of 5, 10, 25, 50 and 100 years was 139.1, 168.8, 205.8, 233.4 and 261.6 mm at Sheoganj, 156.1, 192.7, 238.3, 272.3 and 307.0 mm at Reodar and 169.7, 209.5, 259.0, 296.0 and 333.7 mm at Sirohi. The long-term annual rainfall trends showed that there was an increase at a rate 0.62 mm year<sup>-1</sup> at Sirohi, 0.24 mm year<sup>-1</sup> at Sheoganj and 0.85 mm year<sup>-1</sup> at Reodar. The severe meteorological droughts occurred in 11-12% years at Sirohi and Sheoganj and in 19% years at Reodar, whereas, mild drought in 23-29% and moderate drought in 19% years at all the locations.

**Key words:** Rainfall characteristics, meteorological drought, Sirohi District.

There is a large variation in rainfall distribution observed from time to time and year to year on same place and place to place in India (Dhar *et al.*, 1979). In India nearly 75% of the annual rainfall is received during monsoon season (June to September). Kharif crops depend upon the rainfall during the monsoon season.

Rainfall characteristics of arid Rajasthan are not only influenced by monsoon circulations, but also from projected global climate changes by the Inter-governmental Panel on Climate Change (IPCC, 2007). Rainfall and its variability continues to govern crop production from the fragile eco-regions like Indian hot arid zone, which has a high human and livestock density and people largely depend on climate sensitive sectors like agriculture and animal husbandry (Rao and Roy, 2012). There are many methods available which can be applied for analysis of meteorological drought using rainfall data (Erol Keskin *et al.*, 2011; Asati, 2012; Lala *et al.*, 2012). Very recently Rajpoot and Kumar (2013)

studied meteorological drought using rainfall data in Satna District of Madhya Pradesh.

The arid part of Sirohi District of Rajasthan is one of the most disadvantageous districts so far identified by the Planning Commission. Out of its total 5136 km<sup>2</sup> area nearly 40% is arid. Of this nearly 43% area is occupied by barren hills, rock outcrops and rocky/gravelly pediment and nearly 5% by settlement and water bodies. Thus only 52% area is available for agriculture, out of this 26.6% area has irrigation facility aggregating drought impact on crop production in the district (Anon., 2007). The average annual potential evapotranspiration of the area is 1449 mm compared to average rainfall of 579 mm, thus leaving a larger water deficit in the area. Bajra, guar, castor and mung are most dominant rainfed crops, and mustard, wheat, groundnut and cotton are important irrigated crops (Anon., 2008). Out of the gross cropped area during 2007-08 kharif cropped area constituted 59%, rabi 35% and summer 6%. Castor, mustard, wheat, guar and bajra are dominant crops of the region constituting 16.9%, 12.7%, 14.7%, 10.6% and 8.9% of the total cropped area (Anon., 2008). An attempt is made in this paper, to analyze the rainfall characteristics for identifying the meteorological droughts.

\*E-mail: poonia.surendra@gmail.com

<sup>1</sup>Present Address: ICAR-Central Research Institute for Dryland Agriculture, Santoshnagar, Hyderabad 500 059, India