

Validation of Astro-meteorological Rainfall Forecast for Gujarat

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Abstract

Gujarat state in India receives annual rainfall of 828 mm in 35 rainy days with coefficient of variation (CV) of 50%. There is large spatial and temporal variation in rainfall of the state. The low rainfall areas receiving less than 500 mm rainfall are Kutch district, western parts of Banaskantha and Patan districts, and parts of Jamnagar, Rajkot, and Surendranagar districts. Anand Agricultural University (AAU), Anand, Gujarat had prepared almanac predicting district-wise daily rainfall during monsoon 2008 for the farming community as well as planners. The mean rainy days during June, July, August, and September in the state were 28, 14, 22, and 19 days respectively. The seasonal total rainy events for the state as a whole was 83 days, whereas, actually it was for 75 days (rain amount greater than 1 mm per day). During four months of monsoon the intensity of no rain, low, medium, heavy, and very heavy rainfall was predicted for 35, 38, 37, 7, and 0 days respectively for the state as a whole. But actual data showed 66, 34, 13, 4, and 2 days respectively for different rainfall intensities. The observed and predicted rainfall was then analyzed for its validity. Comparatively, the accuracy of forecast was good in July. The skill scores averaged for four months (June to September) were 36.0%, 34.6%, 41.2%, and 35.3% for four regions, viz., Middle Gujarat, North Gujarat, South Gujarat, and Saurashtra respectively. Along with AAU's Monsoon Research Almanac – 2008, rainfall predictions made by other astro-meteorologists for Gujarat were also validated. The average Yes/No skill scores were 38.6%, 42%, 45.1%, 46.8%, 51.6%, and 59.9% for Patel Jasratbhai Surani, Dhansukh Shah, Girdharbhai Devjibhai, Pravinbhai Vora, Ratanbhai Mathuria, and Dheeraj Thumar respectively for June to September 2008. These workers predicted rainfall region-wise and/or state as a whole, while AAU's almanac made predictions district-wise on daily basis. The rainfall projection by AAU for the state as a whole was quite good with +6.3% departure from actual rainfall which was less than 10%. AAU's projection for the state as a whole was 19.8% higher than the normal rainfall, which gave correct trend of above normal prediction in Monsoon 2008.