Prediction of Onset of Monsoon at local scale using Fuzzy Logic Approach for Sabarmati Basin,India

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In arid and semi-arid regions the crop yield is highly dependents on arrival and departure of monsoon in addition to rainfall amount and length of dry spells. Hence, it is necessary to predict the onset of monsoon season at local scale considering a new approach. In this paper, a new approach of monsoon arrival based on fuzzy logic has been proposed considering three constraints namely, total amount of rainfall, number of rainy days and percentage of stations receiving rainfall. A monsoon arrival model based on fuzzy logic approach in FOXPRO has been developed for parts of Sabarmati basin having a geographical area of 21565sq. km in Western India.The first two definition constraints are attached to a fuzzy membership function using triangular fuzzy numbers while the third constraint considers the threshold limit.The basin has been classified into three regions based on terrain, amount of rainfall received and cluster of stations. The model results showed monsoon onset for region-1 on 14th June, region-2 on 17th June, and region-3 on 21th June. The model parameters for targeted and independent region have been found to be 0.40 and 0.35 respectively. The model captures periodic variability in monsoon onset for various years. The model output was verified with Indian Meteorological Department's dates for monsoon arrival which shows good coherence.