

# A Fuzzy Logic based Modified Drought Hazard Index for Comprehensive Assessment of Drought Hazard

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Drought is one of most the costliest natural hazard and occurs mostly in all part of worlds. Multivariate phenomena such as drought need a comprehensive assessment of hazard to reflect the various characteristics of drought. This study presents a modified drought hazard index (MDHI) based on fuzzy logic theory to overcome limitations of currently available hazard assessment indices. Ensemble-averaged projected precipitation and temperature data for RCP 8.5 from 7 RCM models namely, CCCma-CanESM2, CERFACS-CNRM-CM5, GFDL-ESM2M, MOHC-HadGEM2, MIROC-MIROC5, MPI-ESM-LR, and MPI-ESM-MR has been used to calculate standardized precipitation evapotranspiration index (SPEI) at 12-month scale to characterize the droughts. A comprehensive analysis of droughts for India has been performed using MDHI to map various high drought hazard regions over four different time periods i.e. 2021-2040, 2041-2060, 2061-2080 and 2081-2100 for the 21<sup>st</sup> century. Results of this study suggest an overall increase in the drought hazard over India with the progression of time. Odisha, Jharkhand, Parts of Bihar, West Bengal, Telangana, and Maharashtra are expected to have severe droughts hazard in Period 3 (2061-2080). All Himalayan states in India including Northeastern states are expected to have severe drought hazard in Period 4 (2081-2100).

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