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Drought Severity Index-a new method devised for categorizing drought severity in Andhra Pradesh, India

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Severity of drought proneness of each mandal (county) in the state of Andhra Pradesh, the fifth largest state in terms of geographical area and third most drought prone state in India, has been assessed using drought severity index. The term drought severity index was coined for the first time and so also was its formula. The drought severity index (D.S.I) can be written as:

D.S.I=(0*NDF+0.25*MIDF+0.50*MODF+0.75*SDF)*100/Total Number of years

Where NDF, MIDF, MODF and SDF are frequencies of no drought, mild drought, moderate drought and severe drought, respectively. These frequencies were worked out by calculating moisture adequacy index i.e., the ratio of actual and potential evapo-transpiration during the cropping season of each mandal (county) or district (province) for 20-30 years. The year(s) with average crop season MAI$>$0.75 were classified as no drought years, with MAI $<$0.75 and $>$0.50 as mild drought years, with MAI$<$0.50 and $>$0.25 as moderate drought years and with MAI $<$0.25 as severe drought years. The parameters AET and PET required for obtaining MAI were obtained as out puts of water balance model run for each mandal for all the 20-30 years.

Based on drought severity index, all the 1099 mandals (counties) were classified into 4 categories viz., safe, less vulnerable, moderately vulnerable and highly vulnerable. This categorization was made using the mean (M) and standard deviation (σ) of drought severity indices over all the mandals of the state. The methodology for categorization of mandals according to the limits of DSI is: safe-DSI<=M- σ; Less vulnerable-DSI>(M- σ) and <=M; Moderately vulnerable-DSI>M and <(M+ σ) and Highly vulnerable-DSI>(M+ σ). Mandals or districts with different drought severity classes can be depicted pictorially using GIS.This methodology can be tested and used for classification of drought prone regions in other states of the country and in other drought prone countries of the world.