



1 Temporal drought analysis for North-Eastern dry zone of Karnataka, India

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The identification, monitoring and characterization of drought is of great importance in water resources planning and management. To investigate the temporal and spatial drought occurrence, Standardized Precipitation Index (SPI) was calculated from the probability distribution of precipitation, using a two-parameter gamma function. Percentage departure (-92% to +192%) of annual rainfall from normal was calculated using India Meteorological Department (IMD) method. The methodologies were applied for daily rainfall data for the period of 1976-2003 for 56 rain gauge stations in northeastern dry zone of Karnataka, India. Drought severity (ranging from SPI values of -7.6 to +2.3) was more during the year 2002 where almost all the rain gauge stations did not receive rainfall except in the month of May and June. The area of 520 km² under Raichur, Raichur RARS, Yadgir and Gurumitkal rain gauge stations were more frequently affected by dry spells during *khari*f season. An attempt was also made to predict the spatial variability in the degree of dryness/wetness for all the rain gauge stations using daily maximum SPI values for 5, 10, 20, 30, 40, 50, 80 and 100 years by employing Gumbel's extreme value distribution. Drought mitigation measures based on the severity of dry spells in the different sectors earmarked by this study were also prescribed for different regions of the study area like: *in situ* moisture conservation through bunds, small dams and percolation tanks, rubble checks on shallow, medium and deep black soils, gravel sand mulch for soils having lesser infiltration capacity, supplemental irrigation, broad based terrace system with appropriate waste weirs in clay soils to improve antecedent moisture conditions, contingent crop plan with photo-insensitive millets with timely supply of inputs, grains-for-wages scheme to generate

employment during drought periods and groundnut water recharging during wet periods.