

Spatio-Temporal Analysis of Drought in Cholistan Region, Pakistan: An Application of Standardized Precipitation Index

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Abstract : Drought is a temporary aberration in contrast to aridity, as it is a permanent feature of climate. Virtually, it takes place in all types of climatic regions that range from high to low rainfall areas. Due to the wide latitudinal extent of Pakistan, there is seasonal and annual variability in rainfall. The south-central part of the country is arid and hyper-arid. This study focuses on the spatio-temporal analysis of droughts in arid and hyperarid region of Cholistan using the standardized precipitation index (SPI) approach. This study has assessed the extent of recurrences of drought and its temporal vulnerability to drought in Cholistan region. Initially, the paper described the geographic setup of the study area along with a brief description of the drought conditions that prevail in Pakistan. The study also provides a scientific foundation for preparing literature and theoretical framework in-line with the selected parameters and indicators. Data were collected both from primary and secondary data sources. Rainfall and temperature data were obtained from Pakistan Meteorology Department. By applying geostatistical approach, a standardized precipitation index (SPI) was calculated for the study region, and the value of spatio-temporal variability of drought and its severity was explored. As a result, in-depth spatial analysis of drought conditions in Cholistan area was found. Parallel to this, drought-prone areas with seasonal variation were also identified using Kriging spatial interpolation techniques in a GIS environment. The study revealed that there is temporal variation in droughts' occurrences both in time series and SPI values. The paper is finally concluded, and strategic plan was suggested to minimize the impacts of drought.

Keywords : Cholistan desert, climate anomalies, metrological droughts, standardized precipitation index

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