World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:18, No:06, 2024

Effect of Climate Change on Aridity Index in South Bihar

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Abstract : Aridity impacts on agriculture, as well as ecological, human health, and economic activities. In the present study, the effect of climate change on aridity index has been analysed in South Bihar for the past 30 year period by five types of aridity indices as Lang AI, De-Martonne AI, Erinc AI, Pinna combinative AI and UNEP AI. For the study of aridity index, the analysis of rainfall and temperature is significant. Rainfall was analysed for 30 year period from data of 23 gridded stations in for the period 1991-2020. The results show that rainfall pattern was decreasing with respect to previous decades for majority of stations. Trend of maximum, minimum and mean annual temperature has been observed, which shows increasing trend. Structural breakpoint was observed for mean annual temperature data series in year 2004. In period 1991-2004 mean annual temperature was 25.25 ºC, and in period 2005-2020, mean annual temperature was 25.7 ºC. Average aridity index has been calculated by all the above mentioned methods for whole 30 period. Lang AI shows that eastern part of study area is Humid type, and rest all is semi arid. De-Martonne AI also reveals that east part is humid, but rest of the study area is moist sub humid. According to Erinc AI and Pinna, combinative AI shows that whole south Bihar is dry sub humid and semi dry, respectively. UNEP AI shows most of the part as sub humid, and very small part in west is semi arid, while small part of east is humid. Temporal distribution of all the aridity indices shows a decreasing trend. This indicates a decrease in the humid areas in south Bihar for the selected time period.

Keywords : drought, aridity index, climate change, rainfall, temperature
Conference Title : ICSWRM 2024 : International Conference on Sustainable Water Resources Management
Conference Location : Riga, Latvia
Conference Dates : June 20-21, 2024