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Climate Change Impact on Water Yield and Water Security in the Semi-arid Region of Rajasthan, India

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The Soil and Water Assessment Tool (SWAT) model is a watershed-based hydrologic model for simulating water balance at the basin scale. The SWAT model delineates the watersheds and create the Hydrological Response Units (HRUs) in the different watersheds of the basin using Digital Elevation Model (DEM), Land use, Soil and slope, and gives the water balance of the River basin. In this study, the ensemble CORDEX-SA driving GCM experiment are used to predict the water balance of the basin in the historical and future periods under the RCP4.5 and RCP8.5 scenarios. The Banas River Basin is located into the semi-arid region of Rajasthan, covered 13 districts and 5 Agro-climate zones. The basin is divided into the four zones on the basis of Agro-climatic to predict the water yield and understand water security using per capita water availability and metrological variables. It is projected that the per capita water availability will decrease, and drought frequency will increase in the future period under different scenarios. Considering the par capita water availability and meteorological variation, all the four zones are ranked, and it is found that zone 3 is more water-secure compared to other zones in the present and future periods. This study may help to understand the water scarcity status in the basin under different climate change scenarios and need more focus to improve the water management issues at the basin level.