

Impact of Climate Change on Krishna Western Delta Using Swat Hydrological Model

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ABSTRACT

Quantitative analysis of expected changes in water availability and crop yields under changing climate scenarios has been carried-out in Krishna Western Delta. The area located geographically between 16.45 $^{\circ}$ -15.56 $^{\circ}$ N latitude and 79.85 $^{\circ}$ - 80.83 $^{\circ}$ E longitude and has a command area of 5275.21 km². The Soil and Water Assessment Tool (SWAT) model is applied for the resources in the study area and calibrated. The water balance studies in KWD indicated that 59.43 % of total water resources goes as water yield, 38.13 % as evapotranspiration, 2.3 % as change in aquifer storage and 0.14 % as soil moisture storage change. In the model study, the hydrological responses to variations of temperature (0 $^{\circ}$ C, +1 $^{\circ}$ C and +2 $^{\circ}$ C), and precipitation (0%, -10 %, and -20 %) have been considered based on Intergovernmental Panel on Climate Change (IPCC) projections. It is observed that the water availability in the system reduces in all changing climate scenarios. Both water yield and soil moisture storage decreases by 19 % in decrease of 20 % rainfall and increase of 2 $^{\circ}$ C temperature scenario. Average agriculture productivity in the study area decreases from 723 to 637 t ha⁻¹ in different climate scenarios. From the simulation results, rice will be the most affected crop in the changing climate conditions. Rice crop yield decreases by 39 % followed by grams 19 %, sunflower 10 %, maize 7 % and cotton 4 %.

Key words : Climate change impact, Krishna Western Delta, SWAT (Soil and Water assessment Tool).