

Study of agroclimatic conditions of nagarjuna sagar reservoir to reduce vulnerability using sustainable management practices

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Climate change is the biggest environmental and developmental challenge facing humanity. Projected climate change is likely to impact all natural resources, agriculture, and food security systems in the coming decades. There is realization at the global and national levels on the need for mitigation and adaptation to address the impending climate change. The effects of climate change reflect change in global to local markets that may amplify the importance of sustainable management practices. Vulnerability refers to the potential of a system to be harmed by an external stress. The impacts of climate change on the key sector of "agriculture" is represented by the change in indicators such as relative variability of rainfall, water availability, crop water demand (evapotranspiration) and precipitation pattern. These indicators have been derived from the impact assessment model named "AquaCrop". AquaCrop is a crop water productivity model developed to simulate yield response to water of herbaceous crops, and is particularly suited to address conditions where water is key limiting factor in crop production. To reduce the vulnerability, biomass is a key factor in agriculture and carbon benefits (C-benefits) such as carbon stock enhancement in most natural resources and agriculture could be considered as an additional factor. Enhancement of carbon stock could contribute to improve the soil fertility and thereby increased crop yields. Similarly, enhancement in C-benefits could contribute to reduce the vulnerability through enhanced and stabilized crop yields as well as diversification of income sources. Vulnerability study has been carried out for a case study of Nagajuna Sagar command area (N16°15' to 17°15' and E79°10' to 80°20') located in Nalagonda district, Andhra Pradesh, India. For the case study area, AquaCrop model assessed the actual biomass as 11.355 tonnes/hectare compared to the potential of 11.8236 tonnes/hectare for the given soil fertility with 92% efficiency and adjusted harvested index of 52.6%. Biomass can be achieved up to 18.983 tonnes/hectare under controlled/ managed crop management practice. Most carbon enhancement interventions are likely to have positive socio-economic and environmental implication. These indicators are utilized to assess the future vulnerability to climate change. It is concluded from the results that majority of the command area under Nagarjuna Sagar reservoir are subjected to climate induced vulnerability currently and also in the near future.

Biography

Satyendra Tripathi is Research Fellow at Department of Civil Engineering, Birla Institute of Technology & Science, Pilani- Hyderabad campus. He has been actively involved in research and teaching for the past 2 years. He was Research Associate with Prof. N.H. Ravindranath at Divecha Center for Climate Change, Indian Institute of Science, Bangalore. He has authored several popular science articles and gives talks at national level. He is life member of Indian Mathematical Society and member of International Geo-spatial Society, Canada. His research interests are in Climate Change modeling, Forest Hydrology and adaptation & mitigation in Water Resources & Agriculture Sector.

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