



## Decadal-scale assessment of blue and green water resources in the Brahmani river basin, Odisha

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Inherent knowledge of the river basin-scale water balance components is essential for long-term management of water resources planning and food security at a regional scale. This study explains a combined approach using the Soil and Water Assessment Tool (SWAT) followed by the Sequential Uncertainty Fitting program (SUFI2) concept to calibrate and validate the hydrologic models of the Brahmani basin based on observed streamflow at a monthly time-step. The water balance components in terms of blue water flow (surface runoff, return flow, and lateral flow), green water flow (actual evapotranspiration), and green water storage (soil moisture storage) of the study area are assessed at a decadal scale (1979-88, 1989-98, and 1999-2008). The first 7 years of each decade are considered as calibration period (1979-85, 1989-95, and 1999-05) and the remaining years are the validation period (1986-88, 1996-98, and 2006-08). The results of the initial decade (1979-88) showed that there is a balance between blue water flow, green water flow, and green water storage components. There is an increasing trend in blue water flow and green water flow components in the mid-decade (1989-98). However, there is a fluctuation in green water storage. It is decreasing in mid-decade and increasing towards the end decade (1999-2008). The warm and humid climate of the study area is expected to affect the variation of the above components. The vulnerability of water balance components is crucial for maintaining regional-scale water demand and food security. However, the alarming impacts of climate change could adversely affect the above situation. Water availability component analysis at a decadal scale has not been explored widely in the present study area. This study can help the policy-makers to maintain a balance between water demand from different sectors and availability to avoid water scarcity of a river basin in the future. Further, the developed approach for the analysis of blue and green water can be applied in other arid and semi-arid regions.