



## **Impact of future climate change on streamflow in the White Volta river basin, West Africa**

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The Soil and Water Assessment Tool (SWAT) model was applied in the White Volta river basin, West Africa, to simulate the streamflow and to estimate the impact of future climate change on the streamflow. The White Volta river basin is one of the three major sub-basins of the Volta river basin, and drains an area of about 106,000 km<sup>2</sup> mainly shared by the riparian countries, Burkina Faso and Ghana. The model was calibrated and validated using daily measured streamflow data from the stream gage at Nawuni, for the period 1980-2000. Impact of future climate change on streamflow was estimated by simulating streamflow of two time slices, the present (1990-2000) and future (2030-2039), using the calibrated SWAT model and stochastically generated daily climate series and comparing their mean annual values. The generated future climate series reflected monthly changes in precipitation and temperature forecasted by the meso-scale climate model MM5, which was downscaled from ECHAM4 scenario IS92a.

The results show that SWAT is able to accurately reproduce the streamflow in the White Volta Basin. The coefficient of determination and Nash-Sutcliffe model efficiency were found to be, respectively, higher than 0.8 and 0.7, for both the calibration and validation periods. Compared to the present, the future mean annual streamflow and the annual coefficient of variation of the streamflow in the basin are expected to increase by 33% and 52%, respectively, as a result of future climate change.