Evaluation of Future Climate and Potential Impact on Streamflow in the Upper Oti River Basin of Northern Togo

Batablinlè LAMBONI

Department of Physics and Chemistry, Ecole Normale Supérieure of Atakpamé,

Togo

Agidé LAWIN

*University of Abomey Calavi*

*Cotonou, Benin*

Water resources in Northern Togo have been less explored with regard to the impact on hydrology that the future climate would have. For this study, fine-resolution multi model climate projections over upper Oti River basin are developed based on eight (8) Regional Climate Models (RCMs) and two emissions scenarios (RCP4.5 and RCP8.5) from Africa-CORDEX program by means of bias correction, spatial disaggregation and validation. The GR4J model was used to simulate daily flows of the Oti watershed. This study compared baseline (1981–2010) climate and streamflow values with future time scales during 2011–2040, and 2041–2070. Projection of future temperature levels indicates that higher increases will be during 2041–2070, and in general, the increases in the minimum temperature will be higher than those in the maximum temperature under RCP8.5. With regard to the seasons, a decrease is found for the precipitations at all horizons considered and under both scenarios.

Average of RCM combinations shows that decreases will be in ranges of −8.5 to −42.9% for annual flows, −21 to −49% for dry season flows, increases in rainy season flows will be between 11 and 44%. The results of this study will be useful for river basin planners and government agencies to develop sustainable water management strategies and adaptation options to offset negative impacts of future changes in climate. In addition, the results will also be valuable for agriculturists and hydropower planners.