



Water Accounting Plus for sustainable water management in the Volta river basin, West Africa

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Water Accounting Plus (WA+) is a standard framework that provides estimates of manageable and unmanageable water flows, stocks, consumption among users, and interactions with land use. The water balance terms are estimated based on remotely sensed data from online open access databases. The main difference with other methods is the use of spatiotemporal data, limiting the errors due to the use of static data. So far, no studies have incorporated climate change scenarios in the WA+ framework to assess future water resources, which would be desirable for developing mitigation and adaptation policies. Moreover WA+ has been implemented using remote sensing data while hydrological models data can also be used as inputs for projections on the future water accounts.

This study aims to address the above challenges by providing quantified information on the current and projected state of the Volta basin water resources through the WA+ framework. The transboundary Volta basin in West Africa is vulnerable to floods and droughts that damage properties and take lives. Residents are dependent on subsistence agriculture, mainly rainfed, which is sensitive to changes and variation in the climate. Spatially, rainfall shows high spatiotemporal variability with a south-north gradient of increasing aridity. As in many basins in semi-arid environments, most of the rainfall in the Volta basin returns to the atmosphere. The competition for scarce water resources will increase in the near future due to the combined effects of urbanization, economic development, and rapid population growth. Moreover, upstream and downstream countries do not agree on their national priorities regarding the use of water and this brings tensions among them. Burkina Faso increasingly builds small and medium reservoirs for small-scale irrigation, while Ghana seeks to increase electricity production. Information on current and future water resources and uses is thus fundamental for water actors.

The adopted methodology for this study will consist of using hydrological models, downscaled climate scenarios, satellite measurements and public domain data. The expected outputs are an assessment of the impacts of external (climate change) and internal influences (land use change) on water resources, their implications for water availability and current and projected water accounting reports.

The WA+ framework allows computing a set of indicators that are used to summarize the overall water resources situation. They give an insight of the parts of water that are available, utilized, utilizable, managed, manageable and beneficial or not for the consumptive use. In a transboundary context, the WA+ methodology can serve as a central database on water-land-ecosystems to be used by decision makers. An independent and unbiased assessment of the spatiotemporal availability of water resources and uses could potentially alleviate tensions among the riparian countries.