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Supporting water management in the Volta river basin with Water Accounting Plus

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Competition for scarce water resources in the transboundary Volta river basin (VRB) of West Africa will increase in the near future due to the combined effects of urbanization, economic development, rapid population growth, and climate change. Residents are dependent on subsistence agriculture, mainly rainfed, which is sensitive to changes and variation in the climate. As in many basins in semi-arid environments, most of the rainfall in the VRB returns to the atmosphere, and the region is vulnerable to floods and droughts that damage properties and take lives. Information on current and future water resources and their uses is thus fundamental for water actors.

This research aims to provide quantified information on the current and projected state of the VRB water resources, incorporating available remote sensing products through a relatively new water accounting tool, namely the Water Accounting Plus (WA+) framework. The WA+ framework provides estimates of manageable and unmanageable water flows, stocks, consumption among users, and interactions with land use. 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 modelling can be associated for projections on the future water accounts.

The adopted methodology for this study consists of using hydrological modelling, downscaled climate scenarios, satellite measurements and public domain data. Key indicators are calculated to give an insight on the parts of water that are available, utilized, utilizable, managed, manageable and beneficial or not for the consumptive use. 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. In a transboundary context, the WA+ allows an independent and unbiased assessment of the spatiotemporal availability of water resources, and serve as a central database on water-land-ecosystems that can be used by decision makers.