Supporting water management in the Volta river basin with Water Accounting Plus (WA+)

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1. Background/Objectives

Reliable water resources assessment ⇒ Better planning & management

Study area: Volta River basin (VRB) (Fig.1)
- Area = 410,000 km²
- semi-arid - sub-humid climate
- South-North gradient of increasing aridity
- 6 riparian countries
- Different national priorities for water use

Current and Future state of water accounts?

Objective: Provide information on water accounts to support the development and implementation of sustainable water use policies and management strategies.

2. Method/Materials

WA+: Independent estimates and summary of complex hydrological processes (flows, fluxes, stocks, storage changes and consumptive use) in river basins [1].

Water uses:
- Hydroelectricity
- Irrigation
- Aquaculture
- Domestic use

Key challenges [2]:
- Water quantity & seasonal flows
- Ecosystems degradation
- Water quality
- Climate change & Governance

3. First Results

WA+ Land use map [3]:
- PLU: wetlands, national parks, RAMSAR sites, etc.
- ULU: natural pastures, savannas and deserts, woodlands, lakes, etc.
- MLU: built-up areas, rainfall.
- MWU: irrigation, urban water supply, industrial extractions, dams, etc.

Evapotranspiration Sheet: understanding how, where and when water is consumed, and relate water consumption to intended purposes (beneficial vs. non-beneficial ET)

Budyko Curve [3, 4]: describes partitioning of P into ET and Q (γ-axis), and deviation in climatic conditions (x-axis). Used to check the accuracy of the LULC classes and for Green and Blue water assessment.

Resource Base Sheet: overview on over-exploitation, unmanageable, manageable, exploitable, reserved, utilized and utilisable flows at river basin scale.

4. Summary/Discussion

- Key bio-physical levers driving water productivity?
- How do we increase beneficial and managed fractions of ET?
- Is "non-beneficial" ET a loss?
- Sensitivity of WA+ to input data?
- Contribution of WA+ to the UN SDGs (Goal 6)?

5. Next steps

Linking hydrological modelling & WA+ for future projections

References:
[1] www.wateraccounting.org
[3] Data sources: GlobCover 2009, GFSDD Crop Mask 2010; World Database on Protected Areas; Evapotranspiration products (GLEAMv3); Rainfall products (RFEv2).

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Note: All results are for 2008