Hydrological balance of the Boura dam (Burkina Faso)

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Main message
In developing countries, where many basins are ungauged or poorly gauged, small reservoirs could be used as hydrometric stations for estimating runoff of small watersheds upstream of the dams. Thus, hydrological monitoring of dam is essential in water resources management by predicting where there may be shortages or surplus water.

Purpose
• Monitoring of hydrological balance of Boura dam;
• Estimate the components of water balance of Boura reservoir in the context of the scarcity data;
• Contribute to hydrological modeling at local scale of watersheds which reside in headwater areas of major river basins;

Method
Based on the principle of mass conservation, often referred to as the continuity. Inflows – Outflows = Storage change

Conclusions (lessons and Recommendations for defined stakeholder)
Knowledge of water reservoir changes is a central task to support water management authorities and stakeholders in operational irrigation and water supply strategies. So, the local folks must be better organized for maximum valorizing the water potential available in the reservoirs.

Findings
Over the monitoring period of one year, from April 2012 to March 2013, the water budget of reservoir was composed as follow:
• Amount of rainfall falling directly in the reservoir was 1.64 Mm³ in 67 rainy days;
• Amount of evaporative water loss was 2.76 Mm³;
• 85% of annual inflow (11.14 Mm³) into the reservoir coming from the surface runoff;
• Uncontrolled water releases through the spillway represented 56% of total output (From August to mid-October);
• Less than 10% of annual inflow was withdrawn for various uses (20% of reservoir storage capacity);
• More than 2 m of water are lost from the end of spillway discharge until the dam reaches its minimum storage.

Schematic drawing of the Boura reservoir
Some components were measured by using simple valid approaches while others were considered as residuals terms of the water balance equation.

Histogram of different water fluxes at Boura reservoir in monthly time step: Inputs (positive part) and outputs (negative part)