

# How to quantify the benefits of managing new dams cooperatively



A new framework for assessing the benefits of cooperative management of new dams in water resource systems that do not have formal sharing agreements, applied to the Pwalugu Multipurpose Dam (PMD) in Ghana.



"The study confirms that cooperative management achieves higher overall benefits than seeking benefits of individual dams or countries."

Benefits are estimated by comparing **historical reservoir operations with new cooperative rules** that achieve the better results for riparian countries — as evaluated by a water resources simulator and its performance metrics.

## Stage 1

Identify historical operating rules of existing dams using observed water management operations (observed flows and storages).

## Stage 2

Derive optimised operating rules for new dams under cooperative and non-cooperative scenarios given a range of performance measures. A basin-wide water management institution is assumed in the cooperative scenario, to share information across the basin and coordinate management actions.

## Stage 3

Evaluate the dam management strategies identified in stages 1 and 2 over an ensemble of plausible future flow scenarios.

The PMD could impact downstream ecosystems and infrastructure in Ghana and could itself be impacted by how the upstream Bagre Dam is managed in Burkina Faso.

Through cooperation both countries could increase energy production, although some ecosystem service losses would need to be mitigated.

Future  
DAMS

Gonzalez JM, Matrosov ES, Obuobie E, Mul M, Pettinotti L, Gebrechorkos SH, Sheffield J, Bottacin-Busolin A, Dalton J, Smith DM and Harou JJ (2021) Quantifying Cooperation Benefits for New Dams in Transboundary Water Systems Without Formal Operating Rules. *Front. Environ. Sci.* 9:596612. doi: 10.3389/fenvs.2021.596612