



## **Towards efficient and robust reservoir management in the Senegal River basin**

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The Senegal River basin is under a major and rapid evolution. Serving as a catalyser for regional development, new planned reservoirs will dam the major tributaries, increasing the water controllability, expanding energy supply and demand, changing the complex environmental equilibriums improving food security, and increasing the water demand for energy, the environment, and irrigation. A marked interannual hydrological variability still makes the system fragile to extremes. All these conditions imply possible conflicts among different stakeholders and a need for a more efficient water use, as recognized by the OMVS (Organisation pour la Mise en Valeur du fleuve Sénégal).

Presently, Manantali is the only operating reservoir on the upper part of the Senegal River. Manantali operational rules, designed using a simulation approach, suggest the trade-offs among energy, the environment, flood recession agriculture and irrigation agriculture.

In this study we explore a cost-benefit analysis approach for reservoir management, which maximizes the efficiency in water use. A first step in this direction is producing electricity when more valuable, considering a variable value of energy along the year. We employ a stochastic dynamic optimal method to solve the cost-benefit problem under hydrological uncertainty. We also evaluate the consequences for other uses and the robustness to extreme events.