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Trade-off, vulnerability and power asymmetry in the Senegal River basin

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The development of Senegal River basin involves trading-off competing objectives in an uncertain environment. Through a stochastic analysis, the trade-off discovery can be enriched to identify vulnerabilities; that is, the sensitivity of those losses with respect to changing natural and anthropogenic factors. In the Senegal River basin, the availability of water at a particular point in space and time is directly linked to both the hydrologic processes and the level of development of the water resources system. Our analysis of the trade-off relationships reveals the existence of two coalitions of objectives: traditional food production (agriculture and floodplain fisheries) versus hydropower-navigation. In terms of vulnerability, the examination of probabilistic trade-offs also shows that of the two main coalitions of objectives, the one dealing with traditional food production is much more vulnerable to changes in both hydro-climatic conditions and allocation policies. Of interest is the fact that the first coalition mostly concerns downstream riparian countries while hydropower, and to a less extent, navigation concern upstream countries. The result is a reinforced power asymmetry where vulnerable downstream riverine communities compete for water with politically and/or economically more powerful upstream water users like power companies.