



Dynamic water accounting in heavily committed river basins

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Many river basins throughout the world are increasingly under pressure as water demands keep rising due to population growth, industrialization, urbanization and rising living standards. In the past, the typical answer to meet those demands focused on the supply-side and involved the construction of hydraulic infrastructures to capture more water from surface water bodies and from aquifers. As river basins were being more and more developed, downstream water users and ecosystems have become increasingly dependant on the management actions taken by upstream users. The increased interconnectedness between water users, aquatic ecosystems and the built environment is further compounded by climate change and its impact on the water cycle. Those pressures mean that it has become increasingly important to measure and account for changes in water fluxes and their corresponding economic value as they progress throughout the river system. Such basin water accounting should provide policy makers with important information regarding the relative contribution of each water user, infrastructure and management decision to the overall economic value of the river basin. This paper presents a dynamic water accounting approach whereby the entire river basin is considered as a value chain with multiple services including production and storage. Water users and reservoirs operators are considered as economic agents who can exchange water with their hydraulic neighbors at a price corresponding to the marginal value of water. Effective water accounting is made possible by keeping track of all water fluxes and their corresponding transactions using the results of a hydro-economic model. The proposed approach is illustrated with the Eastern Nile River basin in Africa.