

## **Towards a spatially explicit and seasonal accounting and modeling framework for water provision, consumption and trade-off assessment: A case study for the Niger River in Africa**

Topic: Environmental IO models 2

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The aim of this paper is to develop an environmentally extended socio-economic framework to assess the economic trade-offs of different agricultural practices (e.g. increasing irrigation areas) and waste water treatment scenarios (primary, secondary and tertiary treatment) and other important water uses such as industry, services and households and the environment in water scarce regions in Africa. Input-output tables are usually compiled at the national level and for the accounting period of 1 year. For analyzing water consumption especially in agricultural environments both are not very useful starting points. A spatially explicit sectoral model especially for water intensive agricultural products sensitive for seasonal variation such as change in precipitation, water uptake and harvests are required. In water scarce regions (and in fact more generally) it matters considerably where the water extraction takes place and national averages are less than helpful. The accounting framework and model proposed in this paper address these issues by linking seasonal city level urban input-output models to their rural hinterland and at four different locations along the Niger River in Western Africa.

City level urban IO tables are constructed by scaling down the national IO table with reference to several factors, such as population, value added and share of national agricultural area. These urban tables are interlinked with their rural hinterland in terms of provision of agricultural products but also water withdrawal of a common source along a flow gradient. To account for seasonality in water flows and consumption, we further disaggregate the regional IO table to seasonal/ IO tables. The approach will allow us to assess the water use and pollution impacts of alternative development scenarios and to quantify and compare alternative investment strategies for water infrastructure.