

Linking a multiregional input-output and a Hydro-Economic models to analyze the Ebro River basin

Topic: IO modeling: Conjoined Modeling Approaches

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In a previous work, we developed a multiregional input-output table for the Ebro river basin, with a high level of disaggregation in agriculture, which is really interesting when assessing the socioeconomic and environmental impacts of several water scenarios. However, water is a flowing resource, so, its availability depends on time, space and upstream uses. For this reason, we have developed a hydro-economic model, which allows us to take those factors into account.

One of the bases of hydro-economic models is the principles of the water mass balance and the continuity of the river flow, which, among other factors, determine the volume of water availability in the different river stretches. To maintain these principles, we mark nodes that account available water along the river and we formulate equations showing the link between the different nodes. That is, the hydrological component identifies the water available for use in each zone and also the destination of the water returns. The water extractions of each agent are associated with a specific node, so the water available for each agent is determined by the use of agents located upstream and by hydrology.

The other basis of hydro-economic models is the agent behaviour, characterized by some equations, which will be linked to the input-output table, where the productive structure appears and the intersectoral and interregional dependencies can be seen. To facilitate the integration of both methodologies, we have assumed a hydrological scheme in which we take into account the 5 regions composing our input-output table.

This combination of methodologies will allow us to simulate decreases in available water, in line with climate change, or increases in the environmental flows of the Ebro delta, and to evaluate the direct and indirect impacts in socioeconomic terms of those changes.