Hydro-economic equilibrium with climatic variability in a subregional input-output framework: the case of Tuscany

Topic: Energy policies
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An interregional IO model of a regional economy (Tuscany, IT) extended to water resources is used to provide an economic assessment of water resources overexploitation. A comprehensive representation of the interdependencies between hydrological and productive systems, allows to define a set of endogenous thresholds of water scarcity and the conditions for the hydro-economic equilibrium of the regional economy. Despite only 24% of the annual supply of freshwater is used for production, on average about 172 Mm3 of water are used in condition of scarcity, due to a spatial mismatch between supply and demand. The opportunity cost to reach the absence of overexploitation in all sub-regional areas would be 129 Euro for each m3 of water used in condition of scarcity. Hydro-economic equilibrium would require a decrease of about 10% of the regional output, a value that would be increased to 14% in a climate change scenario.