

## **Water Scarcity in the World Economy: Improving the Hydro-Economic Interface**

Topic: Modelling global water issues

Author: Faye Duchin

Co-Authors: Carlos A Lopez-Morales

With growing demand for water, uncertain supplies, and competition among end uses, there is increasing concern about impending water scarcity especially in arid and semi-arid regions, where about a third of the world population lives. Since the vast majority of freshwater withdrawals are for agricultural purposes, attention is focused on better management of water for the production of food.

The paper reviews the emerging literature, focusing on four key concepts. First are the definition, measurement, and representation of a region's supply of water and the constraints it may impose on economic activities. Second is the representation of the uses and availabilities of "blue" water, from stocks like lakes or aquifers, and "green" water, as soil moisture from precipitation. Third, the import of "virtual" water, the total amount of water embodied in a product, mainly food, is considered a viable substitute for water-stressed regions. However, such a strategy needs to be evaluated in the broader context of comparative advantage in a world economy reliant on multiple factors and changing factor costs. Finally, the choice of the geographic unit for analysis needs to reconcile information on water availability and ecosystem integrity at the watershed level and the larger political boundaries useful for representing economic systems. We describe an approach for maintaining vital spatial detail about the water-related attributes mentioned earlier into models of the world economy operating mainly at the country level. This involves the introduction of what we call the rectangular choice-of-technology model.