

Valuation of ecosystem services for water provision, purification, and regulation in Chilean regions based on a multiregional input-output model.

Topic: Special session: From Basins to Planet: Unraveling Water-economy Interactions across Scales with MRIO Models

Author: Gino Sturla

Co-Authors: Benedetto Rocchi, Eugenio Figueroa, Leonardo Lanata

Water-related ecosystem services (ES) - including provision, purification, and regulation - are fundamental to regional sustainability but remain economically undervalued in Chile. This study addresses this gap by quantifying the economic value of these services across Chilean regions, employing for the first time an environmentally extended multiregional input-output model (MRIO-EE). The model integrates the economic structure of 15 regions (2014), sectoral water extractions and restitutions from surface and groundwater, and the additional water required for pollutant dilution and assimilation (gray water). Scarcity thresholds (ST) and the extended water exploitation index (EWEI) are calculated to evaluate regional hydroeconomic equilibrium (HEE) and its associated cost (CHEE). The analysis estimates water usage under overexploitation conditions, linking it to the opportunity cost of reallocating water to its most economically productive use - generating added value. Results indicate that the economic value of water services in overexploited regions ranges from 3 to 50 USD per cubic meter (2014). The total value of provision and purification services is 71.5 billion USD, with groundwater regulation services contributing an additional 10.7 billion USD. These findings highlight the significant regional variability and economic importance of water-related ES in Chile. This study demonstrates that the MRIO-EE model, despite certain limitations, provides a robust framework for quantifying the economic value of water-related ES. The results offer critical insights for designing policies aimed at achieving sustainable and equitable water resource management in regions facing overexploitation.