



發展經濟學研究所

學術論文

題目：A novel multi-dimensional water transfer analysis framework

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論文摘要：

Study Region

This study encompasses mainland China, specifically analyzing 31 provincial-level administrative regions. The research focuses on evaluating the stark spatial imbalance in Water Resources (WRU) between the water-abundant south and the water-scarce north.

Study Focus

Propose the Multi-Dimensional Water Transfer (MDWT) Analysis Framework to examine inter-provincial water transfer mechanisms. This framework integrates Multi-Regional Input-Output (MRIO) modeling, Hypothetical Extraction Method (HEM), Structural Path Analysis (SPA), and Moran's Index. It classifies water into three governance elements, Inelastic Water (INW), Improvement Water (IMW), and Sustainable Water (SW), to develop differentiated spatial WRU management strategies.

New Hydrological Insights for the Region

The analysis reveals: (1) Western regions (Xinjiang, Tibet, Inner Mongolia) exhibit high water-use intensity driven by agricultural/industrial dependence and ecological vulnerability; (2) Northern/northwestern provinces (Xinjiang, Heilongjiang) are net water transfer outflows, supplying coastal net inflow regions (Jiangsu, Guangdong) through key transmission paths; (3) Significant positive spatial auto-correlation exists for INW, with high-high clusters in the east and low-low clusters in the central and western. The MDWT framework quantifies water linkage, transfer, and agglomeration, supporting cross-basin coordination, water rights trading, and industrial restructuring policies to optimize spatial allocation. This provides multidimensional metrics for China's inter-regional WRU dynamics.

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