

A multi-region input-output analysis of global virtual water flows

Topic:

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Virtual water flow is recognised as an important indicator for redistribution of water from water-rich countries to water-poor countries. Recently, most of studies on global virtual water flows are based on the process analysis (PA) and exclusively focused on agricultural commodities. Environmental input-output analysis (EIOA) has become a popular tool for assessing the virtual water flows along the global supply chain, which provides detailed information on sectoral interaction within a country and among different countries. In this study, we apply a 113 world regions' multi-regional input-output model (MRIO) to assess global virtual water flows at sector level. The MRIO model allows us to track both direct and indirect water requirement of 57 commodities (14 agricultural products, 32 industrial products and 11 services) in international trade. We distinguish green, blue and grey water: green water refers to the total rainwater evapotranspiration from fields and plantations, which has high comparative advantage but low opportunity cost; blue water is fresh surface and groundwater which generally has higher opportunity cost compared to the green water; grey water is the water required to dilute pollutants to such an extent that the quality of the water remains above agreed water quality standards. The results can be used to demonstrate how usefulness of the international trade for rebalancing the world water resources. In additions, the results can be used to informing national and international environmental strategies in terms of integrated water resource management from both supply and demand sides.