Evaluation of the physical and virtual water transfers for Beijing city in China

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Abstract

Freshwater resources are unevenly and geographically distributed in China. In Beijing city, located in the North China Plain with per capita water availability under 150m^3/y, the Water Stress Index (WSI) has been over 100% under extreme water stresses. Water supply gap threatens to sink Beijing's ambitious develop goal as one of the center of political, economic and cultural in the world. Therefore, China has started to construct the world's largest physical water transfer project — the South-North Water Transfer Project (SNWTP) since 2010. Of which, 13 Gm^3 water is transferred from the Yangtze River Basin to Huang-Huai-Hai River Basin annually through the Middle Route project to Beijing and Tianjin in the Northern. Besides physical water transfer project, virtual water strategy is another solution to remedy regional water scarcity. Virtual water defined as the water required for the production of goods and services along their supply chains, is transferred along the domestic and international economic trade. Based on virtual water transfer, water scarce region, such as Beijing, imports water-intensive products instead of producing them locally in order to save local water resources. In this paper, a model linking the interregional trade data in China and in the world was built and applied to account the virtual water flow throughout the entire supply chain from the domestic provinces to the world. Based on this, we accounted the physical and virtual water transfer for the social economic system in Beijing city and evaluated the impact on the regional water stress in China.

Keywords: *Water transfer; virtual water; Beijing city; multiregional input-output analysis*