



An Integrated Environmental and Water Accounting and Analytical Framework for Accountable water Governance: a Case Study for Haihe Basin

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Abstract: Water is a critical issue in China for a variety of reasons. This is especially urgent in Haihe basin with poor water availability of 305 m³ per capita basis. With the rapid economic development and associated increases in water demand, the river basin has been enduring increasing water stress. Water for the ecosystem use has been compromised and the environment has been deteriorating. Water shortage and environmental degradation have become a bottleneck to the further development of the economy and society.

On one side, previous water resource managers have emphasized the amount of water withdrawn but rarely take water quality into consideration. On the other side, environmental managers have usually ignored the importance of pollutant assimilating capacity of water flows for the wastewater control. It is especially important to measure the impacts of both water withdrawn and wastewater discharge on the hydro-ecosystem. Thus, water consumption should not only account for the amount of water inputs but also the amount of water contaminated in the hydro-ecosystem by the discharged wastewater. Water quantity and quality of return flows should also become the important components of such an environmental and water account. Because return flow from upstream sites represents an externality to downstream uses, which can be positive as an additional source and negative as a pollutant source.

In this paper we present an integrated environmental and water accounting and analytical approach based on a distributed hydrological model WEP-L (Water and Energy transfer Process in Large river basins) combined with a simple water quality model. Our environmental and water accounting framework and analysis tool allows tracking water consumption on the input side, water pollution from the human system and water flows passing the hydrological system thus enabling us to deal with water resources of different qualities.

Keywords: Environmental accounting; Water accounting; Water quantity/quality; Accountable water governance.