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An analysis of eco-environmental impacts of the south-to-north water transfer project on the receiving areas

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Abstract: The receiving areas of the Phase I projects of the eastern and central routes of the South-to-North Water Transfer Project cover 41 administrative regions at and above the prefecture level in the provincial level administrative regions of Beijing, Tianjin, Hebei, Shandong and Henan, and have a carrying capacity of water resources most unadaptive to the needs by the economic and social development. Those areas have densely distributed population, farmland and agricultural and industrial activities and are experiencing rapid urbanization, but suffer from high scarcity of water resources, with all the cities in the areas seeing water shortage to a varying extent. Most of the cities are relying on abstracting deep groundwater and occupying agricultural water for urban water supply.

In December 2002, the State Council officially approved the General Plan on the South-to-North Water Transfer Project, which provides multiple measures to reduce groundwater over-abstraction and improve and gradually restore the eco-environment in the receiving areas by using transferred water to replace the agricultural water occupied by urban water supply and the eco-environmental water occupied by cities and agriculture. What changes have occurred to the eco-environment and urban water use in the receiving areas in recent years ? How much water can be returned from the cities to agriculture and ecology after the objectives of water supply are met? What can be achieved in the control of groundwater abstraction? What level of guarantee can the water transfer provide for agricultural water use in a dry year? All of those issues have been at the focus of public attention.

In this paper, statistical analysis is made on the eco-environmental status and urban water use of 72 cities in the receiving areas of the Phase I projects since year 2000 and a conclusion is drawn that the renewal capacity of the eco-environment and groundwater in the receiving areas is deteriorating. Then the water balancing method is used to quantitatively analyze the roles of the Phase I projects in improving the eco-environment in the receiving areas from the angles of alleviation of drought severity, replacement of local source water supply, reduction of groundwater abstraction, replacement of agricultural water occupied by urban water supply, increase of agricultural and ecological water use by water transfer, etc. The results show that the Phase I projects have produced significant impacts on the improvement of urban water supply and agricultural eco-environment in the receiving areas, but cannot fundamentally solve the groundwater over-abstraction problem, and water saving, water transfer and pollution control need to be implemented simultaneously in order to fully tap the benefits of the Phase I projects.