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The impact of the south-to-north water diversion project on the usage of water-saving irrigation machinery

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Abstract

Agricultural water-saving irrigation represents an important component of environmental protection with the potential to improve economic development and environmental protection of water-receiving areas, but little is known about the relationship between South-to-North Water Diversion Project and the usage of water-saving irrigation machinery. This paper exploits the 2013–2014 China South-to-North Water Diversion Project reforms which significantly alleviated the water shortage problem in north China. By linking administrative claims data to water-saving irrigation machinery numbers for water-receiving provinces and the control provinces, this paper finds that water-receiving provinces experienced a 19.6 percent post-reform decline in water-saving irrigation machinery usage, and a 7.3 percent drop in water-saving irrigation area relative to other provinces.

1. Introduction

As a critical grain-producing area in China, the North China Plain has a large population and a great demand for water. However, the problem of insufficient annual precipitation makes it one of the most water-scarce areas in China, which seriously restricts agricultural and economic development. To alleviate water scarcity, China has implemented a South-to-North Water Diversion Project (SNWDP).

China's South-to-North Water Diversion Project is a mega-engineering scheme with construction and maintenance spanning over six decades (Zhu et al., 2008). The project transfers water from humid Yangtze River basin to dry northern plains of the Yellow, Huai and Hai River basins to improve agriculture and to mitigate drought (Wei et al., 2016). It transfers water through three routes: Eastern Route (ER) is through the Grand Canal, Middle Route (MR) from Danjiangkou reservoir to Beijing, and the Western Route (WR) planned on the Tibet Plateau. Three provinces namely Jiangsu, Shandong and Hebei are located in the eastern route. Four provinces and municipalities namely Beijing, Tianjin, Hebei and Henan are located in the middle route, for which Tianjin and Hebei provinces suffer severe water shortage. Six provinces namely Qinghai, Gansu, Ningxia, Inner Mongolia, Shaanxi and Shanxi are located in the western route. The first phase of the ER was opened to water on November 15, 2013 and the MR was on December 12, 2014. The WR has not yet started.

The completed water transfer line will be over 1152 km long, equipped with 23 pumping stations with a power capacity of 454 megawatt. Due to the natural topography of the Yangtze and North China Plains, pumping stations will raise water from the Yangtze to Yellow River crossing further north, and water will flow downhill through an aqueduct. The amount of water to be diverted in the first, second and third stages are 9.07 billion cubic meters, 10.6 billion cubic meters and 14.8 billion cubic meters, respectively (Wei et al., 2016).

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