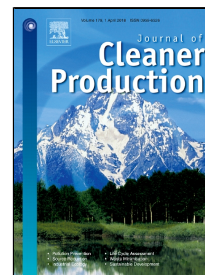


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Study of Impact Factors of Willingness to Pay regarding Water Reserve of South-to-North Water Diversion Project in Beijing Based on Bayesian Network Model

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Abstract: The contingent valuation method is used to study the service value regarding the water resources reservation of the South-to-North Water Diversion Project in Beijing. The analysis results illustrate that the mean willingness to pay (WTP) is 42.15 CNY per permanent resident of Beijing. We propose a WTP analysis model based on the Bayesian network for its obvious advantages compared to previous models. The results demonstrate certain factors crucial to WTP, including “public support for the project expenditure of financial, material, and human resources to reserve water resources”, “willingness to participate in public benefit activities”, “public cognition of water scarcity in Beijing”, “monthly family income”, and “knowledge of the project”. This study concentrates on the variables that are of most concern to the government, including “education background”, “occupation”, “public cognition of water scarcity in Beijing”, and “public awareness of the SNWDP”. The future of China's environmental strategy will gradually be market-oriented, and this study also provides a basis for the government to gain insight into public payment behaviour impact factors and set policies.

Keywords: Bayesian Network; Contingent Valuation Method; Impact Factor; Willingness to Pay; Water Reserve; Sensitivity Analysis.

1 Introduction

Beijing is located in the Haihe River basin, which lacks water resources, with the annual water resources per capita having been less than 200 m³ in recent years. Specifically, the per capita water resources in Beijing were 94 m³ in 2014, according to the Beijing Water Authority (Beijing Water Resources Bulletin 2014), which is less than 1/10th of the internationally recognised minimum standard (Bellie Sivakumar 2011). In Beijing, the supply–demand disequilibrium of water resources is very serious (Huang et al., 2015; Zhai et al., 2014; Chen et al., 2014). In the past, water resources were one of the restrictive factors affecting the economic development and environmental health of Beijing. Before water from the South-to-North Water Diversion Project (SNWDP) was diverted to Beijing, the city had to rely on excessive exploitation of underground water (Ma et al., 2015) and water reserves from the Miyun and Guanting reservoirs in order to maintain its water supply; consequently, the water reserves of these reservoirs and underground water diminished drastically. The underground water level of plain areas decreased rapidly, at 1.2 m per year, and the emergency water resource areas at 3–4 m per year. The security reserves of water resources were almost depleted, seriously threatening water supply security.

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