



Integrated water resources management : A case study in the Hehei river basin, China

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The lack of water resources experienced in different parts of the world has now been recognized and analyzed by different international organizations such as WHO, the World Bank, etc. Add to this the growing urbanization and the fast socio-economic development, the water supply of many urban areas is already or will be severely threatened. Recently published documents from the UN Environmental Program confirms that severe water shortage affects 400 million people today and will affect 4 billion people by 2050. Water nowadays is getting scarce, and access to clean drinking water and water for agricultural usage is unequally distributed. The biggest opportunity and challenge for future water management is how to achieve water sustainability to reduce water consumption. Integrated Water Resources Management (IWRM) is a process which promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

We take the Heibe river basin where agriculture water there accounted for 90% of total water consumption as an example to study the impacts of IWRM on regional water resources. We calculated the elasticity of substitution values between labor and land, water by each irrigation areas to find the variable elastic value among irrigation areas, and the water-use efficiency based on NPP estimation with the C-fix model and WUE estimation with NPP and ET. The empirical analysis indicated that the moderate scale of farmland is 0.27-0.53hm² under the condition of technical efficiency of irrigation water and production. Agricultural water use accounted for 94% of the social and economic water consumption in 2012, but water efficiency and water productivity were both at a low stage.

In conclusion, land use forms at present in Heihe river basin have a detrimental impact on the availability of ecological water use. promoting water management from water demand management to water consumption management is an important direction for scientific and sustainable development of the Heihe river basin, it is also an endeavor to enhance the policy relevance of land use governance and industrial transformation. The comprehensive exploration on the water-ecosystem-economy is critical in integrated water resource management.