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ASSESSMENT OF WATER RELATED ECOLOGICAL SECURITY UNDER CHANGING ENVIRONMENT IN CHINA

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Abstract

Over the last few decades intensive human activities and potentially the changing climate has stressed ecological systems impeding sustainable development of the social economy in many regions in China. The importance of ecological security has gained greater prominence. Sustaining or restoring natural functions of water ecosystems is also crucial for human welfare. To assess water related ecological security (WES), this paper constructed a framework based on the Pressure-State-Response (PSR) model with indicators in terms of society, economy, water resources, water environment and ecology. The Entropy Method was used to determine the weighting of each indicator. Spatial distribution and temporal trend of WES was then analyzed in China. With weighting analyses, dominant factors threatening eco-security were identified. Results show that the basin of Inland Rivers in the Northwest (IRNW) and the basin of Rivers in the Southwest (RSW) are the most ecologically threatened regions in China. In the IRNW basin, the WES is mostly affected by the factors of water consumption ratio and soil erosion area ratio, while in the RSW basin it was influenced by the natural population increase ratio and the investment percent of GDP in environmental pollution treatment. Most WES indexes (WESIs) in the ten basins show an increasing trend, except for that in the basin of Rivers in Southeast (RSE) which has a decreasing trend due to the reduced investment ratio of environmental pollution treatment. These results will provide valuable information to water resources management.

Key words: entropy weighting, Pressure-state- response (PSR), water related ecology security (WES)

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