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Comprehensive evaluation of water resources utilization benefits based on catastrophe theory

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ABSTRACT

The benefits of water resource utilization include social benefits, economic benefits, and ecological environmental benefits, so it is difficult to evaluate them comprehensively by adopting the traditional cost-income analysis method. Catastrophe evaluation method, which majors in dealing with uncertain problems, evaluates system synthetically based on the internal mechanism of the system. It calculates the evaluation value of the system in the condition that the relative importance of the indexes is determined and the exact weights are unknown. In this paper, the comprehensive evaluation model of water resources utilization benefits is established based on the catastrophe evaluation method. Moreover, the method which embodies the important roles of various benefits effectively is applied to evaluate the comprehensive benefits of different water resources utilization schemes from 2000 to 2005 in Zhengzhou City of China. The results show that the method has good flexibility and provides a new idea for a comprehensive evaluation of water resources utilization benefits.

Keywords: Catastrophe theory; Water resources utilization; Benefits; Evaluation index

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