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A TRIPARTITE COOPERATION GAME BASED STUDY FOR WATER RESOURCE MANAGEMENT AGENCIES AND CLIENTS

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Abstract

This paper employs cooperative game theory to explore effective coordination mechanisms for water resources management agencies and upstream-downstream users confronted with scarcity. By utilizing a characteristic function to capture cost-benefit interdependencies and alliance stabilities, and employing Shapley values to ensure equitable payoff distribution, the study delves into the intricate dynamics of cooperation. Drawing upon China's challenging context as a case study, the modeling results yield fresh perspectives on the potential of cooperative partnerships grounded in game-theoretic principles. These insights shed light on the possibility of striking a balance between efficiency, equity, and system sustainability in water resource management. The findings underscore the role of cooperation in informing pricing strategies and infrastructure decisions, thereby facilitating conflict resolution and enhancing social welfare. Despite acknowledged limitations relating to uncertainties and implementation feasibility, the holistic governance approach showcased in this research holds promising implications for fostering cooperative policymaking among competitive water stakeholders.

Key words: cooperative game, policymaking, Shapley's value, water allocation

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