

Investigating the cooperative strategies between China and North Korea for the Tumen River Area Development Programme

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Abstract

Addressing the equitable management of an international boundary river, this study aims to find the optimal strategy with regard to how to build multi-purpose dams and allocate the benefits and costs thereof. The interests of the riparian countries (North Korea and China) are defined in terms of the cooperative 2-person nonzero-sum game, and the Nash product is then calculated for various alternative strategies. The results reveal that the Kangkudong Dam and the Simpo Dam should be collaboratively constructed, and that the benefits of the 2 dams should be allocated according to relative demand in order to provide North Korea and China with sufficient benefits and to equitably address their conflicting interests. Furthermore, the suggested strategy was found to be optimal or at least quasi-optimal when the North Korean economy, which is regarded as a crucial source of uncertainty in this case, moved from a low-growth scenario to a high-growth scenario.

Keywords: Boundary river management, Tumen River, Nash bargaining solution, cooperative game theory