Application of Hydro-Economic Optimal Water Allocation Model: Case Study on Namhan River Basin in South Korea

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(a) Purpose of study or research hypothesis

This study examines the applicability of the hydro-economic optimal water allocation model for secured water supply under future climate change scenarios. Application study is conducted on Namhan river basin of South Korea.

(b) Key issue(s) or problem(s) addressed

Water scarcity is a global issue and will be worsen due to rapidly growing population, urbanization and climate related changes. To optimally distribute the limited water resources, various water allocation models have been developed and applied as engineering tools in decision making process. Here, a hydro-economic water allocation model, called WAMM(water allocation and management model) is introduced and demonstrated.

(c) Methodology or approach used

The WAMM is equipped with optimization modules for optimal water allocation. The water allocation objective can be chosen by users either to maximize the water supply reliability or to maximize the economic benefits. Various plausible climate scenarios are developed in Namhan river basin and the WAMM applies to suggest the optimal water allocation decisions for individual scenarios.

(d) Results or conclusions derived from the project

In drought years, there exists water conflicts among users and the WAMM possibly suggests the best spatio-temporal water supply decisions enhancing water supply reliability and economic benefits. The scenario analyses using the proposed model will be beneficial for decision makers to manage preparedness plans hedging against future uncertainties in water availability.

(e) Implications of the project relevant to congress themes

This study simulates the water availability and allocation changes under climate change scenarios using a hydro-economic optimal water allocation model. The model is expected to be used as a decision support tool when establishing water supply plans by predicting risks and presenting reasonable water allocation decisions.

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Keywords : Climate change, Decision support tool, Hydro-economic model, Optimal water allocation