

Water, Energy, and Food Nexus: Preserving Local Resources through Inter-Basin Trade

Albert Wicaksono*, Gimoon Jeong**, Doosun Kang***

.....

Abstract

Water-Energy-Food (WEF) nexus is a new holistic resources management concept that considers the interconnections among resources for sustainable resources planning and management. The current challenge is to fulfill the required demand in the lack of available resources. A traditional way to provide more available resource is by increase in production, but it caused increment of indirect demand of other interlinked resources. Importing resources from other area (where local supply is redundant) is another option to secure local resources with additional economic expenditure. The WEF nexus-trading model adapts the previously developed nationwide nexus simulation model with additional input parameters and functions to simulate trading scenarios. In general, the analysis starts with the quantification of local resources deficit (potential importing amount) and redundancy (potential exporting amount) of each area. Then, a trade module is initiated by determining possible donor area and importation amount. Finally, the nexus simulation for all area is re-run to determine final resources supply-demand results including the trading amount. The trade option provides an opportunity to meet local demands without draining local resources. However, the production capability of donor area may limit the importation amount. The newly developed trade option allows more alternatives for stakeholders to determine resources management plans.

Keywords : Inter-basin trade, Resources management, WEF nexus simulation

Acknowledgement

This study is supported by a Korea Agency for Infrastructure Technology Advancement (KAIA) grant funded by the Ministry of Land, Infrastructure, and Transport (Grant 18AWMP-B083066-05).

* Ph.D. Candidate, Dept. of Civil Engineering, Kyung Hee University.

** Ph.D. Candidate, Dept. of Civil Engineering, Kyung Hee University.

*** Professor, Corresponding Author, Dept. of Civil Engineering, Kyung Hee University · E-mail : doosunkang@khu.ac.kr