Optimization of multi-water resources in economical and sustainable way satisfying different water requirements for the water security of an area

Kapil Gnawali*, KukHeon Han, KangMin Koo***,**
KyungTaek Yum**, Kyung Soo Jun*****

Abstract

Water security issues, stimulated by increasing population and changing climate, are growing and pausing major challenges for water resources managers around the world. Proper utilization, management and distribution of all available water resources is key to sustainable development for achieving water security To alleviate the water shortage, most of the current research on multi-sources combined water supplies depends on an overall generalization of regional water supply systems, which are seldom broken down into the detail required to address specific research objectives. This paper proposes the concept of optimization framework on multi water sources selection. A multi-objective water allocation model with four objective functions is introduced in this paper. Harmony search algorithm is employed to solve the applied model. The objective functions addresses the economic, environmental, and social factors that must be considered for achieving a sustainable water allocation to solve the issue of water security.

Keywords: Multi- water sources, Water security, Optimization framework, Harmony search algorithm

Acknowledgement

This research project is supported by “Demand Responsive Water Supply Service Project”, Ministry of Environment, Korea.

* PhD candidate, Graduate School of Water Resources, Sungkyunkwan University · E-mail: kapil@g.skku.edu
** PhD, National Smart Water Grid Research Group,Sungkyunkwan University · E-mail: kuk0904@daum.net
*** PhD candidate, Graduate School of Water Resources, Sungkyunkwan University · E-mail: koo00v@skku.edu
**** Director, National Smart Water Grid Research Group,Sungkyunkwan University · E-mail: kwfyum@gmail.com
***** Professor, Graduate School of Water Resources,Sungkyunkwan University, Republic of Korea · E-mail: ksjun@skku.edu