

Technology development for optimal operation of groundwater using existing wells to cope with drought

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(a) Purpose of study or research hypothesis

The present research aims to develop a method for efficient groundwater use using existing wells in order to prepare for an eventual drought.

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

In the recent decades, droughts are not only intensifying, but they are also spreading into territories where droughts used to be less intense and relatively infrequent. With the increasing disaster, efficient groundwater use is urgently needed not only to prevent the problem of groundwater depletion but also drought risk reduction. Therefore, the research addressed the problem of efficient aquifer use as source of water during drought and emergencies.

(c) Methodology or approach used

The research focused on well network system applied to Yanggok-ri in Korea using simulation models in visual MODFLOW and visual AEM. The approach consists to variate groundwater pumping rate in the most important wells used for irrigation across the study area and evaluate the pumping effect on water level fluctuation. From the evaluation, the pumping period, appropriate pumping rate of each well and the most vulnerable wells are determined for a better groundwater management.

(d) Results or conclusions derived from the project

The project results divide the study area into two different regions (A and B), where the wells in the region A (western part of the region) show a crucial drop in water level from May to early July and in August as consequence of water pumping. While wells in region B are also showing a drawdown in groundwater level but relatively less compare to region A. the project suggests a pipeline connection from region B wells to irrigate region A in the period of groundwater level drop and a shot down of well A in the same period to avoid potential depletion due to overexploitation. Beside pipeline connection, further research is required for underground taming of flood for irrigation system to promote managed groundwater recharge and subsurface water storage as a preparedness against climate risks and water scarcity.

(e) Implications of the project relevant to congress themes

Well Network System in relevant project, by pumping in another well where water is more abundant and keep the fixed storage in region A, is a measure to improve preparedness to reduce eventual disaster risk. The improving preparedness measure from the project, indicates its implication to congress themes.

Keywords : Well Network System, efficient groundwater use, fixed storage, drought risk reduction, improve preparedness