Optimization of Water Disaster Reduction Technology in Korea's Coastal Mountainous Areas Considering Surface-Ground Water Interaction

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(a) Purpose of study or research hypothesis

Due to recent climate change, water shortages caused by prolonged drought worldwide in the 2010s, and flood damage occurred due to prolonged and localized torrential rains in East Asia in 2020. In all climate change scenarios, future rainfall intensity is expected to increase, suggesting that sudden torrential rains will increase the possibility of unexpected flooding in urban and mountainous areas. Research is needed to derive optimization measures for the operation of water damage reduction technology considering surface-ground water interactions in mountainous and coastal areas that can counteract such water disasters.

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

In terms of water circulation, surface water management without considering groundwater can affect river dryness when groundwater is depleted, which can cause various damages such as concentration of pollutants and pollution of the groundwater aquifer. The application of water disaster response technology and optimization of technology in consideration of water exchange between rivers and groundwater aquifers can secure stable water sources in mountainous areas, and in coastal areas, water disaster response and prevent pollution by seawater penetration in aquifers.

(c) Methodology or approach used

1) the evaluation criteria shall be selected and data collected to represent the characteristics of water resources in each administrative district of Korea; 2) development and application of spatio-temporal water resource characteristics evaluation technology considering surface-ground water interactions and regional characteristics by using multi-criteria decision-making methods(MCDM); 3) vulnerable areas to water disaster response are selected and representative study areas are selected; 4) temporal water disaster response vulnerability assessments are conducted in representative study areas; 5) areas applied to water resource management facilities to reduce water disaster damage are prioritized and the effects of damage reduction due to the occurrence of water disasters are analyzed

(d) Results or conclusions derived from the project

The results of the study can provide a spatio-temporal water disaster response vulnerability assessment technique for mountainous and coastal areas. In addition, it can present methods to verify the effectiveness of water disaster damage reduction by optimizing the operation of water disaster damage reduction technology.

(e) Implications of the project relevant to congress themes

By providing optimal technology selection and optimization of technology operations to reduce possible damage to water disasters in the future, damage reduction measures can be proposed not only in Korea but also in areas where water disasters are expected to occur around the world.

Keywords : Surface-Groundwater Interaction, Water disaster damage reduction, Coastal and

Mountainous Areas, Optimization of water management technology