

The Damage Cost Estimation of Agricultural Drought using Reservoir Drought Index

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(a) Purpose of study or research hypothesis

The economic damage by agricultural drought was tried to estimate using a damage cost formula representing with damage factors of area, rate, crop yield, and price. For the droughts in Geum river basin (9,900 km²), the field records were collected and the Reservoir Drought Index (RDI) representing severity, duration, and magnitude of the drought was applied.

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

Since 2012 in South Korea, the meteorological drought have been occurred in every year at some places. Our agricultural reservoirs was designed to endure 10-year return period of drought. Thus, the recently shortened return period, deepened severity, and the carried over from the previous year drought causes the agricultural drought more vulnerable and increase economic damage on crop productivity. The risk drought management such as the agricultural reservoir storage information is necessary to predict the economic damage of drought impact areas.

(c) Methodology or approach used

For Geum river area, the damage cost data by 2001, 2009, 2014, and 2015 were collected from the Agricultural Drought Management System (ADMS), Ministry of Land, Infrastructure and Transport (MOLIT), Ministry of the Interior and Safety (MOIS) and Korea Meteorological Administration (KMA). The MCT damage cost formula [damage area (DA) × damage rate (DR) × average crop yield (CY) × damage price (DP)] was used. Using the reservoir characteristic data and the monthly observed reservoir storage rate data of Korea Rural Corporation Community (KRC), the damage rate (DR) was estimated using Reservoir Drought Index (RDI) representing severity, duration, and magnitude of the drought. For the damage area (DA), the benefitted irrigation area of reservoir was used. In the MCT damage cost formula, a coefficient considering the ratio of reservoir watershed area to benefitted irrigation area will be introduced.

(d) Results or conclusions derived from the project

The drought damage cost will be estimated by the Reservoir Drought Index (RDI). The results of this study can be used to estimate the future agricultural drought damage cost by monitoring the reservoir water storage data.

(e) Implications of the project relevant to congress themes

The estimation of agricultural drought damage cost using RDI can be a useful tool for policy- and decision-making for effective drought risk management. This study is to extent the drought analysis scope to socio-economic area.

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