Evaluating the impacts of extreme agricultural droughts under climate change in Hung-up watershed, South Korea

Sayed Shajahan Sadiqi*, Eun-Mi Hong**, Wan-Ho Nam***

Abstract

Climate change indicators, mainly frequent drought which has happened since the drought of 1994, 1995, and 2012 causing the devastating effect to the agricultural sector, and could be more disruptive given the context of climate change indicators by increasing the temperature and more variable and extreme precipitation. Changes in frequency, duration, and severity of droughts will have enormous impacts on agriculture production and water management. Since both the possibility of drought manifestation and substantial yield losses, we are propositioning an integrated method for evaluating past and future agriculture drought hazards that depend on models' simulations in the Hung-up watershed. to discuss the question of how climate change might influence the impact of extreme agriculture drought by assessing the potential changes in temporal trends of agriculture drought. we will calculate the temporal trends of future drought through drought indices Standardized Precipitation Evapotranspiration Index, Standardized Precipitation Index, and Palmer drought severity index by using observed data of (1991-2020) from Wonju meteorological station and projected climate change scenarios (2021-2100) of the Representative Concentration Pathways models (RCPs). expected results confirmed the frequency of extreme agricultural drought in the future projected to increase under all studied RCPs. at present 100 years drought is anticipated to happen since the result showing under RCP2.6 will occur every 24 years, RCP4.5 every 17 years, and RCPs8.5 every 7 years, and it would be double in the largest warming scenarios. On another side, the result shows unsupportable water management, could cause devastating consequences in both food production and water supply in extreme events. Because significant increases in the drought magnitude and severity like to be initiate at different time scales for each drought indicator. Based on the expected result that the evaluating the impacts of extreme agricultural droughts and recession could be used for the development of proactive drought risk management, policies for future water balance, prioritize sustainable strengthening and mitigation strategies.

Keywords : Climate change; Drought characteristics; Drought indices; Global climate models; South Korea

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*Ph.D. student · Department of Environment Science, Kangwon National University E-mail : sayedshajahansadiqi@gamil.com
**Assistant Professor, Department of Environment Science, Kangwon National University E-mail : eunmi.hong@kangwon.ac.kr
***Assistant Professor, Department of Bioresources and Rural Systems Engineering, E-mail : wonho.nam@hknu.ac.kr