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Evaluation of the reduction effect of NPS under SSP climate change scenarios using SWAT in Doam dam

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ABSTRACT

The Doam dam is a pivotal source of water in PyeongChang, Kangwon-do. But climate change and human activities are causing nutrient pollutants, such as nitrate and phosphate, to be deposited into the water through waterways, posing several challenges for those living in the Doam dam watershed. Since they have no complex and uniform consequences along the Doam dam. Consequently, the Soil and Water Assessment Tool (SWAT) model is used to identify the spatial distribution of NPS and highly polluted regions to manipulate watershed management. Therefore, this study aimed to assess the influence of climate change on seasonal and yearly water availability in the Doam dam. In this context, the results reveal that the annual average temperature would rise by 1.3°C (2.1°C) to the mid-century period under scenarios SSP1-2.6 and SSP5-8.5, and annual precipitation would climb by 31 mm (61 mm) between the baseline and end-of-century periods. The projected hydrological components of evapotranspiration, streamflow, and soil moisture showed variations of +3.2+17.2 %, -9.1+8.1 %, and 0.1-0.7 %, respectively, in the 2040s and 2080s. Future stream water quality, T-N, (SS), and T-P loads all increased by -4.5+2.3 %, -5.8+29.0 %, and +3.7+17.4 %, respectively. Because of the increasing temperature and precipitation in winter, the monthly average stream water quality, T-N, and SS loads declined. The results demonstrated that the T-P under climate change circumstances based on adaption methods needs urgent management approaches, even in a mitigation scenario. Furthermore, the partial implications of land-use changes were examined under scenarios, including partial change of forest to urban, grassland, and farmland. The result of runoff changes reveals

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that the upland crop scenario has the largest rate of rising, 59.3 percent in May. The findings assist watershed managers in implementing long-term sustainability of future water resources and nutrient management programs at Doam dam during specified periods to control NPSP along the watershed.
Keywords: SWAT; Climate Change; Water Resources; Nonpoint-Source Pollution; Highland Agriculture; and Watershed Modeling.