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Scenario study of the effect of different land use to a sub-basin in Yeongsan River basin using SWAT model

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ABSTRACT

Land use and cover is one of the important factors that influence water flow within a watershed. Alteration of land use through time affects hydrological processes as well as the water budget in the watershed. In analyzing these processes that occur within basins and watershed, Soil and Water Assessment Tool (SWAT) is considered an indispensable tool. In this study, scenario analysis was done through the SWAT model by simulating stream discharge in a sub-basin in Yeongsan River Basin for the years 1990 (scenario 1) and 2000 (scenario 2). Input data in two scenarios were all the same except for the land use data. Land use data shows a decrease in forest and agricultural land area and increase in urban area from year 1990 to 2000. Developed models were evaluated to have acceptable performance since statistical parameters Nash-Sutcliffe efficiency (NSE) and ratio of mean squared error to the standard deviation of the measured data (RSR) in the validation for both scenarios are within the satisfactory rating limits. Water budget analysis showed an increase in annual average surface runoff and decrease in annual average evapotranspiration and lateral flow which is attributed decrease in forest and agricultural area and increase in urban area.

Keywords: Land use and cover; watershed; SWAT

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