

Impact of Land Use/Land Cover Change on Runoff using SWAT Modelling: A Case Study in Upper Prek Thnot Watershed in Cambodia

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Abstract

Changes in land use/land cover (LULC) may result in water shortages, flood risk and soil erosion, contributing to the degradation of living conditions. Recognition of the impacts of LULC changes on water resources is a crucial aspect of watershed management. Thus, this paper aims to determine how LULC change affects runoff and other hydrological components including: groundwater, water yield, percolation and evapotranspiration in Upper Prek Thnot watershed from 2006 to 2018 by using SWAT modelling. The result indicates that LULC of Upper Prek Thnot watershed experienced such significant changes during these 13 years. Conversion of forest area into agricultural land was the main modification in the study area, which accounts for 39%. This followed by an increase of rubber plantation, built-up area, barren land and water bodies and a decrease of the wood shrub. These changes resulted in a corresponding increase in annual average surface runoff (36%) and water yield (2%), and a decrease of groundwater (24%), percolation (8%) and evapotranspiration (1%). In particular, if the forest area is converted to agricultural land, especially if the conversion takes place in large numbers, the hydrological elements will be significantly affected. Consequently, due to a noticeable alteration of LULC in the study area, a sound strategic management plan should be applied considerably to ensure the sustainability of ecosystem services.

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