



Potentials of land use/management strategies for climate change adaptation using SWAT

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A sustainable ecosystem is crucial for human well-being. However, climate change may affect the provision of multiple services. Land use and management strategies can be designed to mitigate climate change impact on ecosystem services. Furthermore, adaptation options are more efficient if applied in critical zones to achieve a better response. This study assesses the potentials of land use and management adaptations to improve ecosystem service indicators under climate change conditions. Moreover, suitable areas are identified to achieve higher efficiency for identifying adaptation scenario. A SWAT (Soil and Water Assessment Tool) model was set up for Broye catchment located in Western Switzerland from 1981 to 2015 and parameterized for daily streamflow and monthly nitrate load. Selected ecosystem services in this study were water quantity and quality regulation, food provision, soil loss regulation, and climate regulation. Continuous projected climate change data from 1981 to 2099 was employed for RCP2.6 and RCP8.5 scenarios and 6 model chains (three with the lowest precipitation in summer and three with the highest precipitation in winter) to assess the impact of climate change on ecosystem service indicators. Afterward, potentials of identified adaptation land use and management scenarios were evaluated with regard to improving ecosystem services under climate change. Preliminary results show that increasing permanent grasslands (e. g., pasture and meadow) can increase water quantity. Moreover, pasture land use with low intensity in grazing management shows promising improvement for improving water quantity and quality simultaneously without loss in food provision.

Keywords: Ecosystem services, model parameterization, water quantity, water quality, greenhouse gas emissions, critical zones.