

Assessment of land-use change on streamflow using GIS, remote sensing and a physically-based model, SWAT

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Abstract This study aims to assess the impact of the land-use changes between the periods 1967–1974 and 1997–2008 on the streamflow of Tapacurá catchment (northeastern Brazil) using the Soil and Water Assessment Tool (SWAT) model. The results show that the most sensitive parameters were the baseflow, Manning factor, time of concentration and soil evaporation compensation factor, which affect the catchment hydrology. The model calibration and validation were performed on a monthly basis, and the streamflow simulation showed a good level of accuracy for both periods. The obtained R^2 and Nash-Sutcliffe Efficiency values for each period were respectively 0.82 and 0.81 for 1967–1974, and 0.93 and 0.92 for the period 1997–2008. The evaluation of the SWAT model response to the land cover has shown that the mean monthly flow, during the rainy seasons for 1967–1974, decreased when compared to 1997–2008.

Key words surface runoff; impacts of landscape; Tapacurá catchment, Brazil