



Application of a hydrologic model (SWAT) for the simulation of the water and nutrient balance in a water stressed / data scarce catchment (Merguellil- Tunisia)

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The Merguellil basin is located in the central part of Tunisia and is characterized by a semiarid climate. This study regards a catchment of about 1200 km² upstream of the El Haouareb dam built in 1989.

The water stress situation in the Merguellil catchment can be summarized as a limited resource facing an increasing water demand. The water resource is limited by the semi-arid climate (and its spatial and temporal variability), which means an uneven distribution in the landscape. The natural state is modified by the large El Haouareb dam, that increases the surface storage and evaporations losses, and by many smaller dams and other works for conservation of soil and water that lead to a significant decrease in the surface runoff, in input to the large dam and in infiltration to aquifers.

To reduce human impacts on quantity and quality of the water resources it is important to outline management strategies and to this aim the use of hydrological models is advised.

The main objective in our study is to improve the availability of high quality water at catchment scale by assessing different schemes of land use pattern and management.

First goal is to prioritize Hydrological Response Units to be targeted by selected conservation practices in order to limit sediment detachment and transport, and to limit the importance of flash floods to avoid water quality deterioration in the reservoir,

Secondly, to identify and simulate the positive impact of possible Best Management Practices in containing diffuse sources pollution to improve the quality of water in downstream reservoir.

The SWAT hydrological model has been used which is a process-based continuous daily time-step model, which evaluates land management decisions in large ungauged rural watersheds.

During the process of setting up the environmental database to be used in the model runs, it became evident that data availability and data quality were rather poor. This is a rather common feature of semi-arid catchments primarily because of the scarce consideration that those catchments raise in policy makers; also some physical characteristics of such areas (i.e. the great variability in space and time of rainfall and flow regime) play a role in making it difficult to adequately monitor some parameters.

Then a considerable effort has been devoted to the development of the required database accessing global or regional data coverage's or using proxy for some unavailable data.

In such a situation sensitivity analysis is an important step in selecting variables that require higher attention.

The approach adopted in dealing with data shortage in this case is described and preliminary modeling results are shown. A first selection of possible BMPs to be modeled is also developed.