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Agricultural management change effects on river nutrient yields in a catchment of Central Greece

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Modelling efforts are strongly recommended nowadays by European legislation for investigating non-structural mitigation measures against water pollution on catchment scale. Agricultural diffuse pollution is considered to be the main responsible human activity for the Eutrophication of inland waters with nitrogen (N) and phosphorus (P). The physically-based water quality model SWAT is implemented in an agricultural medium-size agricultural catchment of Central Greece with the purpose to simulate the baseline situation and subsequently to predict the effects that realistic non-structural interventions, applied on the agricultural land, have on water quality and crop yields. SWAT was successfully calibrated according to measured flows and water quality data and subsequently scenarios were developed by changing chemical fertilizer application rates and timing on corn, cotton and wheat cultivations. All scenarios resulted in a decrease of nutrient emissions to surface waters but with a simultaneous small decrease in crop yields. The model predicted explicitly the consequences of non-structural mitigation measures against water pollution sustaining that the understanding of land management changes in relation to its driving factors provides essential information for sustainable management of the agricultural sector in an agricultural country like Greece.