

IMPACT OF LAND MANAGEMENT PRACTICES ON HYDROLOGY AND WATER QUALITY OF THE BASENTO RIVER (SOUTHERN ITALY)

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ABSTRACT

Over the last twenty years, due to the enactment of the Merli law (1976) and recently due to the d.lgs. 152/99, in Italy the construction of more and better wastewater treatment plants has resulted in a significant reduction of point source emissions. However, the organic river matter and nutrient loads still exceed the threshold values fixed by the legislation. Meanwhile the contribution of diffuse sources has increased, despite several decades of research on agricultural management practices to minimize water pollution. The main purpose of this research is to analyse the effect of management practices on water quality (sediment moving, nutrient cycling, organic matter) and impact of input spatial aggregation of the sub-basins and the hydrologic response units (HRUs, lumped land areas within the sub-basin that are comprised of unique land cover, soil, and management combinations) on the river basin hydrological response. In this study the physically based, continuous agricultural nonpoint pollution model SWAT (J. Arnold, USDA Agricultural Research Service), with ArcView (ESRI) interface, has been applied to the Basento river (Southern Italy). The Basento watershed has been selected for his high environmental sensitivity due to the stream regime and the multiple uses of waters. The water quality data used in the study have been collected in a monitoring campaign, for three years, with a total amount of about 3000 data. SWAT was run with several watershed delineation, each with a different number of subwatershed, and with different land management practices. In such way, with the evaluation of hydrologic cycle, erosion and contaminants, it has been possible to assess the fate of pollutants generated by rural activities, to examine the accuracy of the model, dependence on the catchments subdivision, and to verifying the impact of actual and expected land management practices on water quantity and quality, in order to achieve sustainable land use model development.

KEYWORDS: SWAT, Management practices, GIS, nonpoint pollution.