# Soil erosion and sediment yield prediction on catchment and regional scale using a process based simulation model

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The prevention of erosion is one of the main issues in the EU-Water Framework Directive (WFD) and the European Agricultural Fund for Rural Development (EAFRD).

Planning and dimensioning of soil conservation measures require reliable and detailed information on the temporal and spatial distribution of soil detachment, soil transport and deposition. Soil erosion models are increasingly used, in order to simulate the physical processes involved and to predict the effects of soil erosion control measures. In this study the EROSION 3D simulation model is used for surveying soil erosion and deposition on the catchment scale covering the entire state of Saxony/Germany (18.500 km$^2$).

EROSION 3D is a distributed, extensively validated GIS based soil loss and deposition model including sediment delivery to surface water bodies. However, the application of the model for an entire state is a new challenge, because of the enormous data requirements and complex data processing operations prior to simulation. In this context the study includes the compilation, validation and generalisation of existing land use and soil data in order to generate a consistent EROSION 3D input dataset for the entire state of Saxony.

As a part of this process the interface software DPROC allows to transfer the original soil and land use data into model specific data.

The project aims to extend the interface software DPROC by an interactive GIS-component which enables the user to select arbitrary hydrological watersheds including the related soil and land use data. Based on these data DPROC automatically creates the according EROSION 3D input files using a relational database of primary data and model specific data.

DPROC uses parameter transfer tables in order to specify the relationship between primary soil and land use data and model specific data.

This combined methodology provides different risk assessment maps for certain demands on the regional scale of a Federal State. Besides soil loss and sediment transport sediment pass over points into surface water bodies and particle enrichment can be simulated using the EROSION 3D model. Thus the estimation of particle bound nutrient and pollutant inputs into surface water bodies according to the WFD demands is possible.

The study ended up in a user-friendly, timesaving and improved software package for the simulation of soil loss and deposition on a regional scale providing essential information for the planning of soil and water conservation measures particularly under consideration of expected land use and climate changes.