

**CONTRIBUTION OF SOIL EROSION ON ARABLE LAND
TO INPUT OF SOLIDS INTO THE WATERCOURSE SYSTEM
OF A SMALL CATCHMENT AREA**

**BEITRAG DER BODENEROSION AUF ACKERFLÄCHEN
ZUM FESTSTOFFEINTRAG IN FLIESSGEWÄSSERSYSTEME
KLEINER EINZUGSGEBIETE**

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SUMMARY

Recent soil erosion on agricultural areas and the associated discharge of soil particles into the watercourse system show a close causal relationship to contamination of surface waters through diffuse inputs of nutrients and solids. It is imperative to reduce these inputs in view of the objectives of the European Water Framework Directive. Such action requires accurate knowledge of the extent of sediment discharge from arable land and its contribution to sediment deposition in watercourses.

To date, there is not a sufficient number of empirical surveys depicting the extent of this sediment discharge into watercourses in central European low mountain regions through agriculture. Appropriate methods for quantifying this process are lacking throughout the existing studies. As of now, catchment based studies rely mainly on event-based physical models or SDR-studies (Sediment Delivery ratio) which often do not differentiate between sediment delivery from arable plots and watercourses/alluvial sediments. The goal of this study is to empirically quantify recent sediment discharge from agricultural areas for forecasting purposes. This will involve reconstructing the erosion and sedimentation patterns of selected agricultural sites in the Theel-III catchment basin (Saarland, Germany) that have been intensively farmed since the mid-20th century by determining the age of colluvial sediments at the foot of slopes.

The results indicate that for a majority of the areas investigated, between 1960 and 2015 between 60 % and 85 % of soil material on arable land mobilised through erosion has been transported into the watercourse system. Within the study area, this affects approximately 11 % of the entire agricultural acreage. The quantity of soil material input is closely correlated with the slope loss rate modelled according to the Universal Soil Loss Equation (USLE – German version) starting from a threshold of $5 \text{ t ha}^{-1} \text{ year}^{-1}$ and serves as a basis for a forecasting model to identify arable plots with dominant sediment delivery.