

**TOWARDS THE DEVELOPMENT OF A GIS-BASED DIAGNOSIS TOOL  
FOR THE SPATIALLY-EXPLICIT ASSESSMENT OF RUNOFF AND  
EROSION RISKS ON AGRICULTURAL FIELDS**

**ENTWICKLUNG EINES GIS-BASIERTEN DIAGNOSE-WERKZEUGS ZUR  
RÄUMLICH-EXPLIZITEN BEWERTUNG VON RUNOFF- UND  
EROSIONSRISENEN AUF ACKERSCHLÄGEN**

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**SUMMARY**

Inappropriate agricultural production bears severe risks for both, the productivity of soils due to different types of soil degradation (on-site damage), and the damage of neighboring ecosystems such as aquatic habitats by diffuse inputs of production residues (off-site damage). Apart from water erosion as the dominating type of soil degradation in most parts of Europe, surface runoff is increasingly recognized as an important pathway of diffuse water pollution. Even though erosion processes are not to be diagnosed, runoff leads to severe contaminations of surface waters by dissolved pollutants. Against this background we present a GIS-based modeling framework, which enables a spatially explicit estimation of both, water erosion and runoff risks at sub-field scales. The integration of statistical (bottom up) and dynamical (top down) approaches within a raster-based modular organized modeling scheme supports a dynamical simulation of water balance components, surface runoff, discharge pathways and erosion rates at spatial high resolution, taking into account major controlling state factors and forcing meteorological variables. Embedded in a comprehensive Web-GIS environment, the model frame-work is intended to offer best practice recommendations for advisors and farmers to reduce soil erosion and runoff risks as well as diffuse inputs of plant protection products in surface waters to a considerable extent.

**Keywords:** Hydrological Modeling, Runoff, Water Erosion, Degradation Risk, Plant Protection Products, Diffuse Entries, Agricultural Counselling, Best Management Practices