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Assessing the value and quality of German soils under agricultural use

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Halting and reversing soil degradation as well as protection and sustainable use of soil as a resource are part of the United Nations Sustainable Development Goals. Despite the vital significance and essential functions of soil, massive amounts of fertile soil worldwide are lost due to improper land use. In Germany, approximately 66 ha of soil are damaged partly or completely in their soil functions daily. The main issues are soil erosion, land area claims for housing estate and transportation, and pollution. Until now, precise spatial location and assessment of the loss of valuable soil in terms of fertility and productivity has not been quantifiable and therefore not controllable.

In the SOIL-DE project, indicators to evaluate the functionality, potential, intensity of use, and vulnerability of soils are developed in order to be able to assess the quality and value of soils, both in retrospective and under current agricultural use. The aim of this survey is (i) to detect the loss of land over the past ten years in high spatial accuracy, (ii) to determine the fertility of the soil and (iii) to identify risk areas, i.e. regions with particularly high soil loss rates and high soil profitability. The threat to soil, the fertility and impairment of soil functions by changes in land use, are to be recorded nationwide and statewide. Therefore, the evaluation of time series from satellite images is used in combination with official soil information at different spatial resolution, as well as digital elevation models and climatic data. In this study, different rating systems are investigated including e.g. the Muencheberg Soil Quality Rating (ZALF), biotic potential yield, resistance to erosion, filter, buffer and transformation function, and runoff regulation. First results will be presented.