



Impact of Crop Rotations on Water Retention in Agricultural Areas

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Improved water retention of rural landscapes can be an important factor in non-structural flood risk management. It is a preventive measure to reduce the amount of fast runoff components. This aim can be targeted by raising water uptake by plants or reduce water loss by direct discharge. In river basins the effect of land use on runoff is a mixed signal and the impact of a single crop or crop rotation is not visible at the gage. So we decided to measure the impact of land use on the rainfall runoff ratio on field scale. For this purpose two drainage lines on an experimental farming estate of Kiel University have been rerouted through a measuring station in 1998. Since then discharge and nutrient load have been measured in a daily time step. During this monitoring period, the estate has been converted to organic farming. Gras clover leys, winter wheat with undersown clover and peas combined with green rye now affect the definition of crop rotations. Fallow land during winter and monocropping are no longer practiced. Our measurements indicate that long-standing multiplex crop rotations with a high proportion of deep rooting crops, like most legumes are, seem to be capable of reducing the drainage rate. This is presumable caused by a high water demand of the plant (lupine, bean e.g.), and on the other hand by permanent covering of the soil surface. Furthermore, perennial crops like grass clover leys and undersown crops can increase the LAI of the crop and thus the interception rate.