



## **Experimental design to monitor the influence of crop residue management on the dynamics of soil water content**

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Choices related to crop residue management affecting soil structure determine spatio-temporal dynamics of water content and eventually crop yields. In this contribution, we will discuss the experimental design we adopted to study the influence of agricultural management strategies (tillage and residue management) on the soil water dynamics under maize in a Cutanic Siltic Luvisol in Gembloux, Belgium. Three different treatments will be studied: a conventional ploughing realized either in December 2014 or just before sowing in April 2015, and a strip tillage in April 2015. A bare soil under conventional ploughing will also be monitored in order to better understand the influence of the plant over the growing season. In order to limit soil disturbance, we opted for the use of electrical resistivity tomography (ERT) and we use the bulk electrical conductivity as a proxy for soil moisture content. ERT will be collected every week on a surface of two square meters corresponding to three rows of seven maize plants through surface stainless steel electrodes. Five additional sticks with stainless steel electrodes will be vertically inserted into the soil up to 1.50 m to get more detailed information near to the central maize row. In each of the monitoring plots, two time-domain reflectometry (TDR) probes will be installed for data validation. In order to calibrate the relationship between electrical resistivity and soil water content under highly variable field conditions (changes in soil structure, variable weather conditions, plant growth, fertilization), a trench will be dug, in which a set of four electrodes, one TDR probe and one temperature sensor will be placed at four different depths. In addition, two suction cups will be installed in each of the plots to quantify changes in ion composition and electrical conductivity of the soil solution at two different depths. Within the framework of the multidisciplinary research platform AgricultureIsLife, regular assessment of pore structure will be conducted using X-ray images. Combining this wide range of data, we will be able to investigate and quantify the effect of simultaneously changing pore water conductivity, soil porosity, soil temperature and soil moisture on the effectiveness of time-lapse ER measurements as a proxy for soil moisture changes.