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More crop per drop? Exploring root uptake under high frequency irrigation using electrical resistivity tomography

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In water-scarce countries, irrigation of agricultural crops is imperative. In many countries, precision irrigation has been adopted, since it provides water exactly in the root zone of the plant. However, the frequency of irrigation is not always well adapted to the dynamic water needs of the plant over the day and over the growing season. This is because it is difficult to assess the soil moisture status with both high spatial and temporal resolution. In this study, we investigated how high frequency irrigation of bell peppers (*Capsicum annuum* L.) changes the soil moisture dynamics and more specifically, the root water uptake dynamics in space and time. We did this by combining a non-invasive imaging technique with classical sensors and plant parameters. The results of this study can give direct guidelines for precision farming, but can also be used to gain a better understanding in the mechanisms of root water uptake under high evapotranspiration demand and irrigation.

The results are ongoing research. However, they show already that (i) there are important differences in soil moisture depletion between the low- and high-frequency irrigation and (ii) 3-D ERT gives interesting, additional information on the spatial distribution of water infiltration and root water uptake. Further data analysis will allow us to check the water balance, compare the results of the different methods and show in more detail how different irrigation practices affect water use efficiency.