Soil moisture sensors in three urban allotments

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Background

Allotment holders want to water less without harming their crops. Low-cost capacitive soil moisture sensors are cheap, but their accuracy in mixed urban soils is not known. This report compares such sensors with the standard gravimetric method, where a soil sample is weighed before and after drying.

Method

We placed 12 sensors in three allotments (four per site) and took a soil core next to each sensor once a week for ten weeks, giving 120 paired readings.

Synthetic example for the course Introduction to agentic AI. Not a real report.

Results

On average, the sensors read 4.1 percentage points higher than the gravimetric reference. The error was small in dry soil and grew above about 35% volumetric water content. One sensor failed after six weeks and was replaced.

Conclusions

The low-cost sensors are good enough to tell gardeners when the soil is dry, but they should not be used to measure how wet a soil is after heavy rain without a site-specific calibration.

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