Application of a commercial type soil moisture sensor in irrigation strategy to prevent leaching. An evaluation

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Prior to this project

- Daily dynamic irrigation (crop demand)
- Irrigation management by sensors
- Zero leaching

Requirements Growers

- Wireless / **no obstacles for crop/soil handlings - activities**
- Single device multiple sensors
- Compatible with process computer
- Technically Robust
- Reliable moisture content
- Additional EC and temperature
- (reasonable pricing)

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Objectives

- Evaluation SM sensor types matching growers requirements
- Improve management moisture rootzone
- Insight in leaching (water – NO_3)

Derived objectives :

- Reliable measurement at several depths
- Can leaching be predicted with SM sensors

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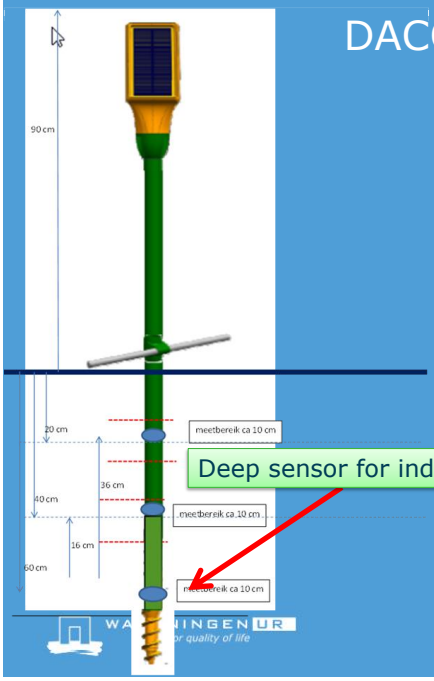
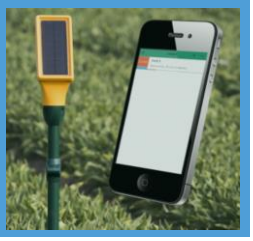
DACOM "Sensetion"

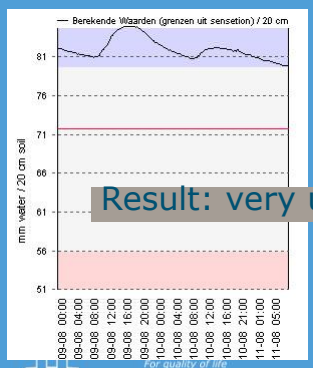


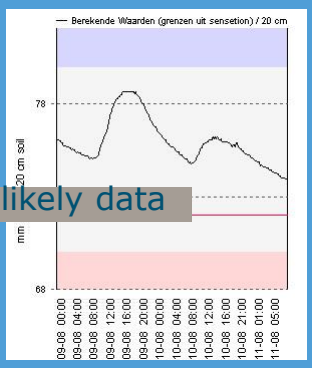
- Integrated multi level sensor
- Three sensors: 20, 40, 60 cm
- Powered by solar panel
- GSM communication (SIM-card)
- Data to DACOM Server
- Readings by smartphone

Deep sensor for indication of leaching



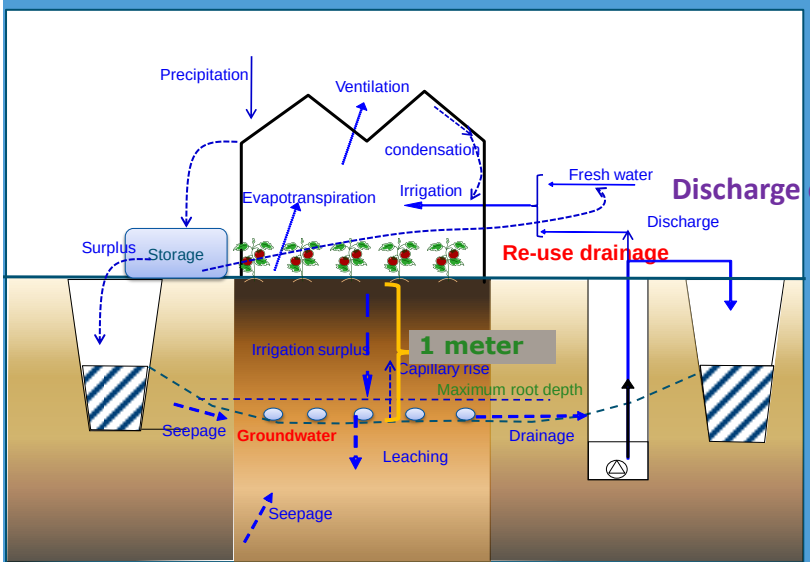
Major problem
not soil moisture content
but 'saturation .. refill'





Result: very unlikely data

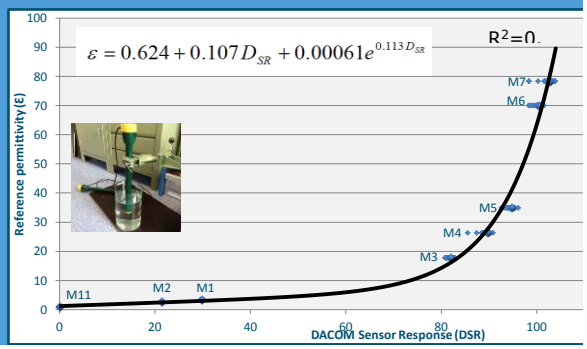
Dutch greenhouse situation
Drainage systems (high groundwater)



Discharge of Drainage

Sensor Calibration

- Big differences between sensors (6%) (technical issue).
- EC influence (± 10 %)
  - Adjustable if EC known
- Temperature effect :
  - Adjustable if temp. measured
- Soil texture



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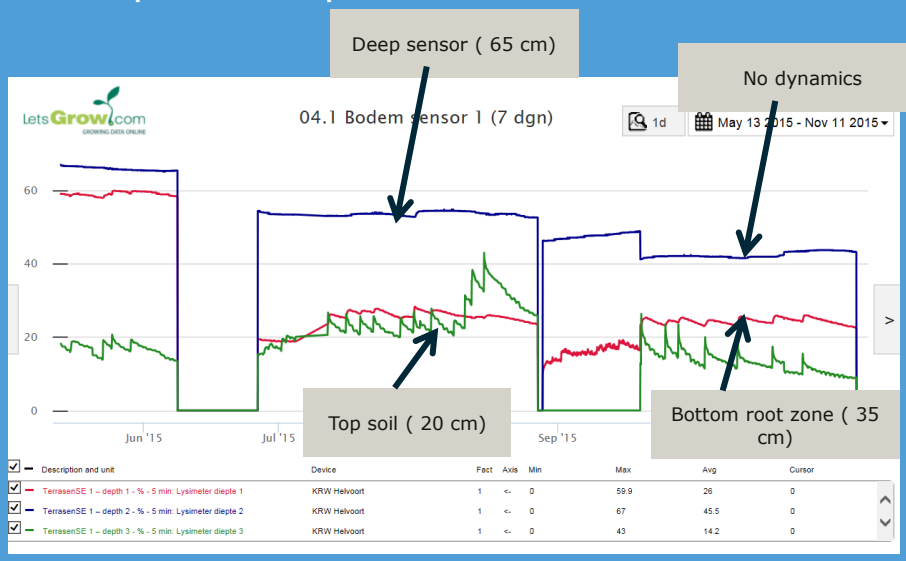
Example of output data



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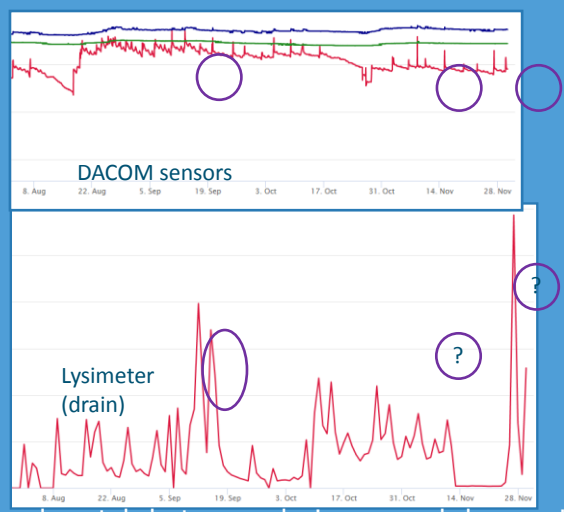
Monitoring results with lysimeter



No good match between drainage and deep soil sensor

Data: Jos Ammerlaan

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To summarize

- DACOM sensor calibration developed for open field, based on 'refill'
- For fertigation (intensive crops (greenhouse) realistic moisture content needed
- DACOM sensor: technical issues to be solved.
  Power problem / Robustness of the rod (PVC).
- "One-fits-all" sensorcalibration acceptable (for trends).
- Improvements by soil specific calibration
- Deep sensor of limited value limited dymamics and low resolution (noise)
- Prediction of leaching requires high sensitve sensors. Though can only be used if combined with a calibrated water transport model.

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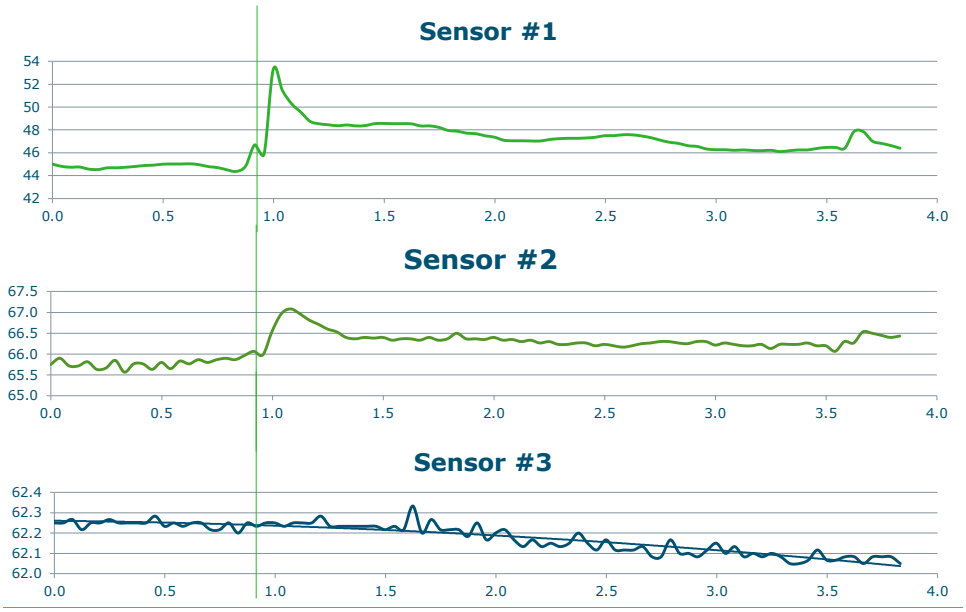
Impulsresponsies



questions

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