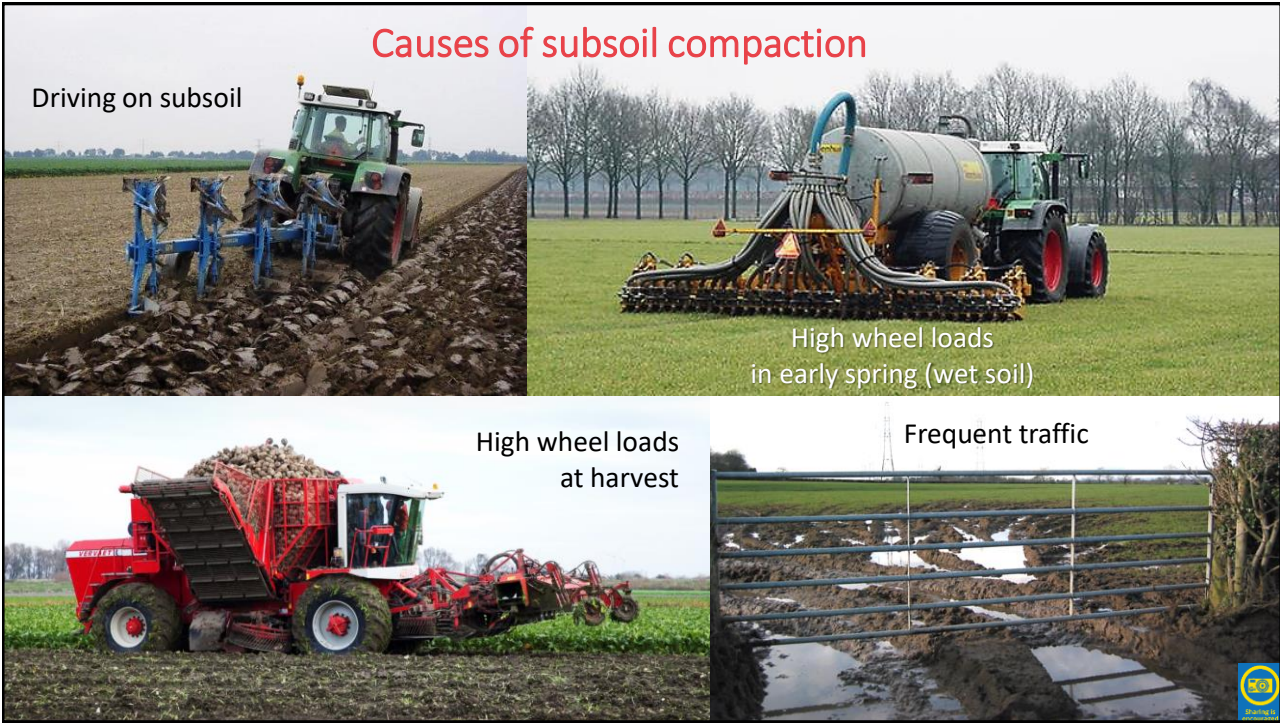




1



2

High risk for subsoil compaction in the Netherlands.

Susceptibility to soil compaction

- < high level of risk
- ≥ high level of risk

EU Soil Observatory,
<https://esdac.jrc.ec.europa.eu/esdacviewer/euso-dashboard/>

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3

Detrimental consequences of subsoil compactions

Nat Nederland

- Reduced water infiltration and retention
- Increased emissions to surface water
- Reduced rooting and nutrient efficiency
- Yield reduction

Farmers dig trenches for extra drainage.

En boer in Beneden-Leeuwen graaft maandag geulen om het water af te voeren. De grond waarop hij staat is al verloren gegaan.

Foto Marcel van den Bergh / de Volkskrant

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4

Awareness is essential for changes in soil management

Impediments to changes:

- Farmers are often unaware of the compaction in their fields.
- Gradual build-up of compaction over the years.
- Flooding after rainfall and reduced crop development are *non*-specific indicators.

Therefore, it is important to measure subsoil compaction, but is not easy to quantify.



Profile pit assessment



Penetrometer



Kopeccky rings

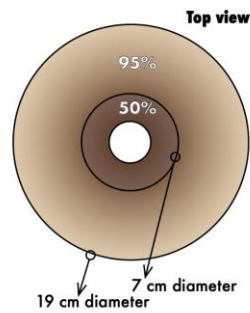
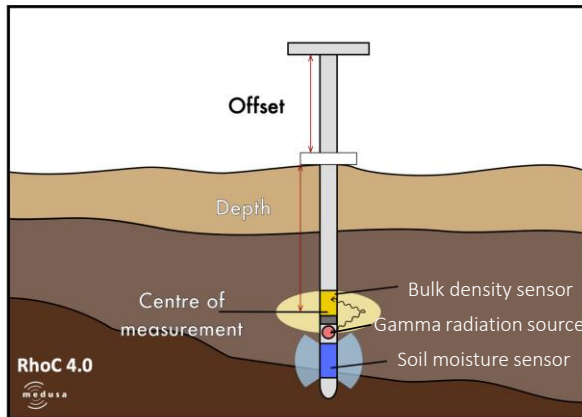


Conventional methods for diagnosing subsoil compaction

- Profile pit assessment:
 - Visual estimate
 - Qualitative, subjective
- Penetrometer:
 - Penetration resistance
 - Highly moisture dependent
- Kopeccky rings:
 - Dry bulk density
 - Labour intensive, lab facility, time consuming (5 h per profile)

RhoC-sensor for *in situ* dry bulk density measurements

- Dry bulk density profile 0-100 cm deep in less than 10 minutes

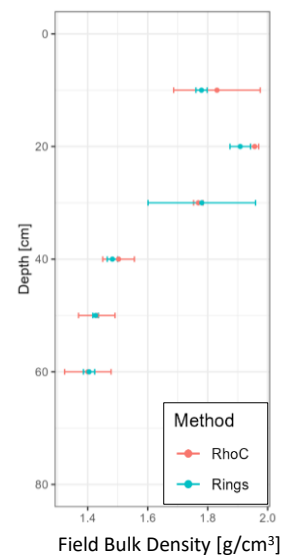
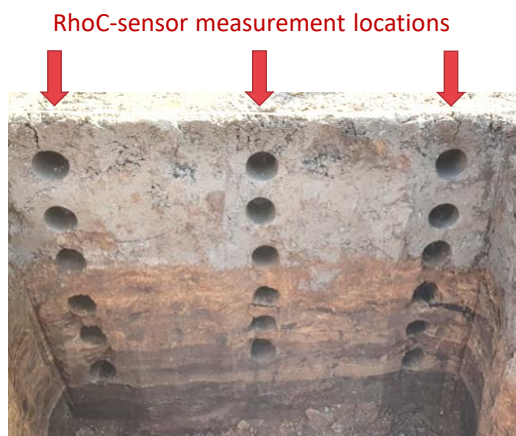


- Validation in two soil types: loam and sand

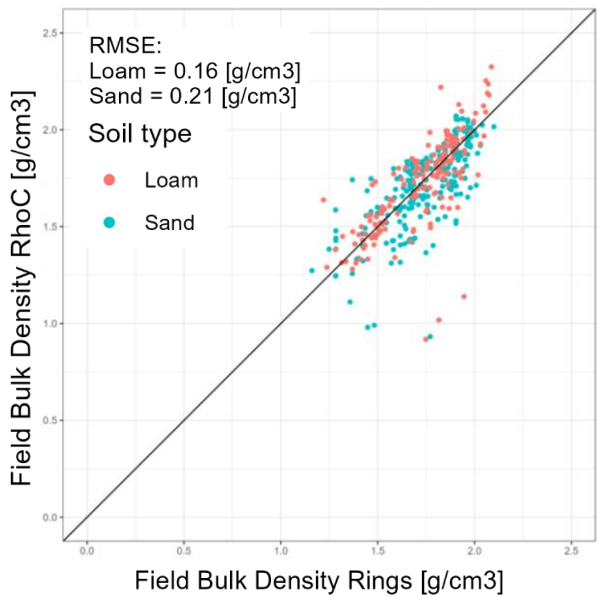
RhoC-sensor for *in situ* dry bulk density measurements

Measurement / sampling:

- 2 fields: loam and sand
- 10 soil pits per field
- Per 10 cm soil layer:
 - 3 x RhoC-sensor
 - 3 x Kopecky rings



Field bulk density correlation



- Outliers are mainly measurements of 0-10 cm depth.
- This is probably due to very loosely packed soil.
- These data are excluded in the correlation analyses.

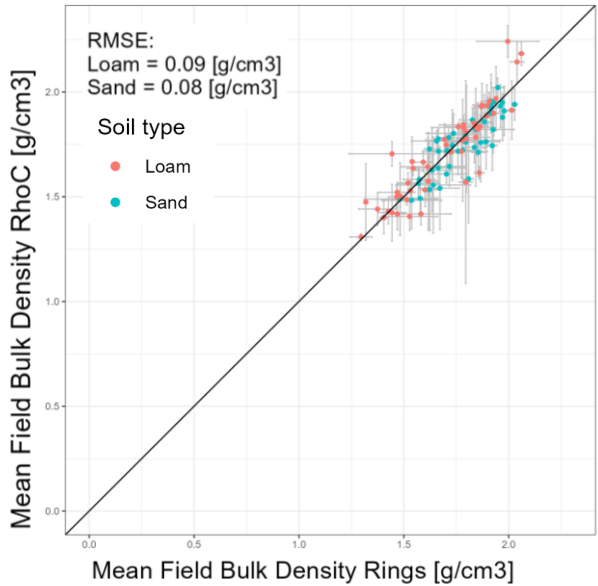
© Karin Pepers, k.pepers@aeres.nl



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Mean field bulk density correlation



- Strong correlation for both soil types.

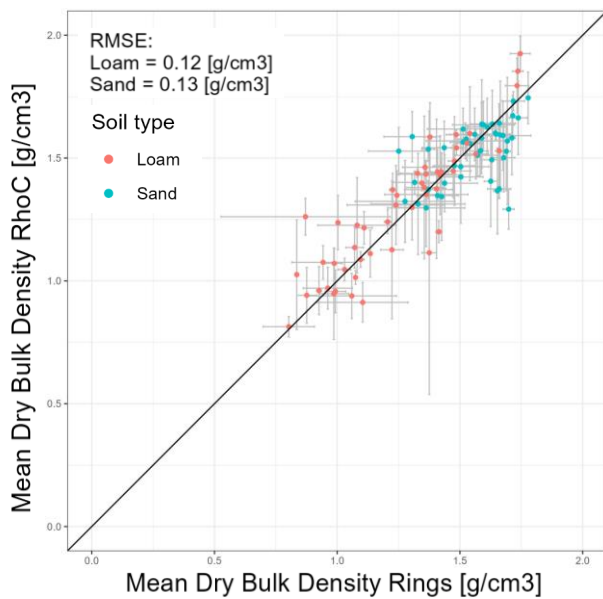
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Mean *dry* bulk density correlation



- After correction for water content still strong correlation.


Conclusions

- Validation results show good correlation between RhoC sensor and the reference ring method.
- The RhoC soil bulk density sensor can provide an accurate and useable profile measure of soil bulk density *in situ*, in less than 10 minutes time.


Invitation:

Demonstration of RhoC sensor
Wageningen Soil Conference,
Thursday August 31th






de bodem beter in beeld




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Regieorgaan




Many thanks to:




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