

SOPHIE: Harmonisation, Innovation, and Standardisation of soil hydro-physics properties through international collaboration.



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Hydro-physics properties are THE properties that determine the soil-water interactions

And with water flow the transport of dissolved compounds (Nitrogen, Phosphates, Pesticides, Antibiotics, Organics, etc)

Soil Hydro-Physics properties are essential in a variety of societal issues → Outcomes strongly depend on Soil-Water-condition

Photograph: Nile region Achmim, Egypt (mid east)

Objective of SOPHIE

SOPHIE supports the

Realisation of qualified soil hydro-physics data

- **highly needed for EU policy making**
- **determined with EU-wide agreed methods:**
 - **Harmonised (preferred methods)**
 - **Innovated (cost-effective)**
 - **Standardised (procedures)**
- **for laboratory- and field methods**

through international collaboration.

SHP-Properties – some examples

- soil water retention & (un)saturated conductivity
- shrinkage and swelling
- organic matter
- texture (particle distribution)
- structure (soil aggregation/pore structure)
- density
- capillary rise
- and alike



SHP properties in societal issues

Outcomes strongly depend on Soil-Water-condition

- Food security & Agricultural development (drought, water damage, precision drainage, irrigation, water logging, compaction, erosion)
- Salinity and Sodicity (leaching, evaporation, capillary rise)
- Soil greenhouse gas emissions (N_2O/CO_2)
- Water quality (percolation of nutrients, contaminants, antibiotics)
- Nature conservation (wet and dry lands: climate change)
- Sustainable land use (Healthy Soils, Function location)
- Flooding (dike stability, infiltration, soil water repellency)
- Damage to buildings & roads (soil shrinkage)

SOPHIE Ambition (HIS)

“Without data,
you're just another
person with an
opinion.”
~W. Edwards Deming



Internationally collaborate on modernising SHP-properties use, determination, and distribution

by

- **Harmonisation** (method and threshold comparison)

International agreed use of golden, silver and bronze standards; inter-comparison via reference samples; use of comparable threshold values

- **Innovation** (efficient equipment, models, dBases)

Stimulate modernisation into efficient field-, and laboratory equipment and model development, e.g. combine proximal sensing (PS), remote sensing (RS), field and lab techniques to increase output and reduce costs.

- **Standardisation** (used methods: golden, silver, bronze)

How should the parameters be determined (e.g. ISO); How to store them in dBase; standardise to general acceptable level

To give direction: OGSM

Objectives, Goals, Strategies, Measures

To mention a few for the coming 3 years:

- Jointly design of Basic Development Agenda,
- Active international contributors: meeting circulation
- Involve policy
- Generate financial means, e.g. place SOPHIE on the EJP-agenda, and design Business/Organisational Model
- Equality & involvement
- Workshops
- Inter-lab & Single-lab Reference samples for Sandbox & Pressure plate tested in 2020: reported/paper

OGSM (coming 3 years) worked out in the Basic Development Agenda

- Meetings in Brussels (Dec 2017) and Gembloux (Jan 2019) have attributed to a set of focus areas for the coming 3 years:
 - Focus parameters for Harmonisation, Innovation, Standardisation (HIS) considerations: soil texture (especially finer particle fractions), density (sampling of scale and macro-porosity), structure (methodologies), and infiltration capacity (scale).
 - Development of Reference samples for inter- and single-lab comparison of water retention determination. A first round of reference samples is prepared by Ghent University and WEPAL, and tested by interested laboratories.
- With SOPHIE members we will further set-up priorities and long term Basic Development Agenda that considers all aspects of HIS.

Basic Development Agenda

- Harmonisation -

1. Make an inventory of the Standards used and known within the group members.

2. Set the Baseline situation:

- b) Make an overview of the desired output parameters
- c) Without adjusting its contents, select from the inventory a Golden, Silver and Bronze standard per desired parameter for **lab use** and **field use**
- d) Determine bottlenecks, and possible improvements

3. Improve the Baseline situation:

- a) Determine bottlenecks
- b) Possible improvements

4. Put the outcome of 2-3 on the SOPHIE website, and in a review paper, with version number, date, signatures of representatives that underline the choices, bottle necks, and improvement proposals.



*Dike breakthrough Wilnis Netherlands,
2003*

Basic Development Agenda

- Innovation -

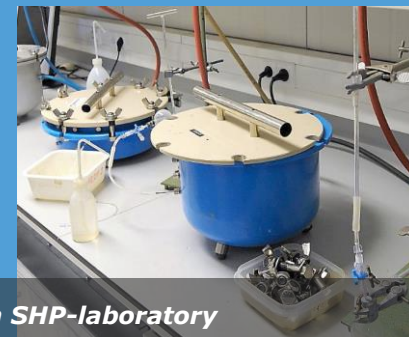
Use the inventories of Harmonisation and Standardisation to derive the

most urgent Innovation subjects:

1. Create a database with project ideas for Innovation for engineers, students, PhD's, and others. Proposals need to be collaborative and should serve SOPHIE's objective. Idea's should be as concrete as possible.
2. How to set SOPHIE-priorities of project proposals



Regulator panel for pressure plate setup, Wageningen SHP-laboratory

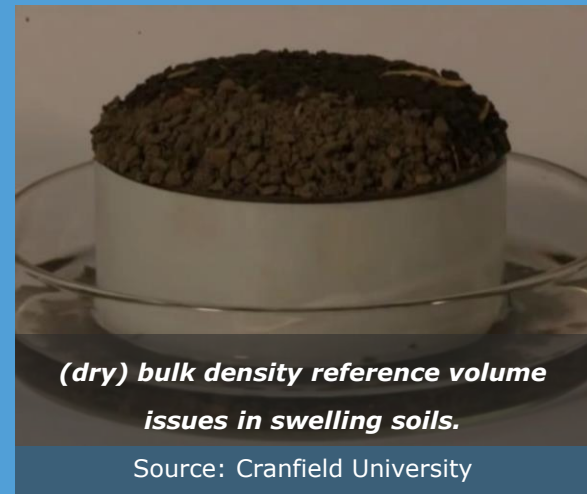


Basic Development Agenda

- Standardisation -

Use the inventory of Harmonisation to standardise the procedures:

1. Assign in general agreement the time needed per standard (no costs)
2. Put the standard contents on the SOPHIE website (or only specialties with respect to ISO or other copyrighted standards)
3. Discuss the bottlenecks of Harmonisation and improve the contents per Standard
4. Discuss these with Harmonisation



Thank you

If interested, you can register at the SOPHIE webpage:



<https://www.wur.nl/en/article/Soil-Program-on-Hydro-Physics-via-International-Engagement-SOPHIE.htm>