Item 8
Global Soil Doctors Programme

SILVIA PIOLI (FAO/GSP)

28, 29 and 30 March 2022 | Virtual meeting
What is it?

- Farmer-to-farmer training programme

Aim

- Building the capacity of farmers on soils and sustainable soil management;

Perspectives

- To support a self-sufficient system that will promote good practices on sustainable soil management and optimize available national resources
**Roadmap**

1. The Global Soil Partnership and the Promoter agree on the implementation plan.
2. The Global Soil Partnership trains the Promoter.
3. The Promoter identifies farmer groups and selects potential Soil Doctors.
4. Training of the Soil Doctor by the Promoter.
5. Training of the Farmers by the Soil Doctor.

**Actors**

- GSP
- Promoter
- Soil Doctor
- Farmers

*Global Soil Doctors Programme*

**ITPS**

INTERGOVERNMENTAL TECHNICAL PANEL ON SOILS
First step: find the promoting institution

- **Terms of reference**

  List of criteria for the promoter selection, roles and benefits

- **Registration form**

  Formalization of the voluntary collaboration between GSP and the promoter
Posters’ overview

What is the Global Soil Doctors programme?
How to become a Soil Doctor?
Why are your crops not growing well?
What is soil?
How to take a soil sample
How to best manage your soil
What are the physical soil properties?
What are the biological and chemical soil properties?
What is soil compaction?
How to prevent and remediate soil compaction?
What is soil erosion?
How to minimize soil erosion by water?
How to minimize soil erosion by wind?
What is soil organic matter?
How to enhance soil organic matter content?
What are soil nutrients?
How to manage soil nutrients?
What is soil pH?
What is soil acidification?
How to minimize soil acidification?
What are saline and sodic soils?
How to prevent soil salinization and sodification?
How to manage salt-affected soil?
What is soil pollution?
How to prevent soil pollution on agricultural fields?
What is soil biodiversity?
How to enhance soil biodiversity?
Soil educational kit

<table>
<thead>
<tr>
<th>Soil Kit - Standard version (qualitative assessment)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
</tr>
<tr>
<td>Physical properties</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Chemical properties</td>
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<tr>
<td>Biological properties</td>
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</tbody>
</table>
Soil educational kits
# Field exercises

## Physical soil properties – Exercise P04

### SOIL AGGREGATE STABILITY: SLAKE TEST

**RELEVANCE**

Soil stability is a key property that is related to soil chemical, physical and biological dynamics. The slake test is a simple method to evaluate soil structure in the field. It is based on the observation that clumps of soils with poor structure fall apart when placed into water. If soil structure is stable, water can move into the soil pores and displace the air without causing the aggregate to break. It is advisable to compare different soils for a more reliable evaluation.

### MATERIALS

- Workbench
- Trowel
- Siever
- Stopwatch

- *Water is needed*

### PROCEDURE

1. Place the wired mesh into the beaker filled with water.
2. Collect a clump of soil with the trowel.
3. Place the soil aggregate sample onto the mesh so that the whole sample is submerged.
4. Use the stopwatch to time how quickly the sample breaks down.

<table>
<thead>
<tr>
<th>ADVANTAGES OF THE METHOD</th>
<th>SOILS WITH DIFFERENT TEXTURE AND/OR DIFFERENT MANAGEMENT CAN BE COMPARED. QUICK TO ESTIMATE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIMITATIONS OF THE METHOD</td>
<td>FOR A MORE ACCURATE ASSESSMENT, SOIL SHOULD BE AIR DRIED BEFORE THE TEST.</td>
</tr>
<tr>
<td>QUESTIONS TO BE ADDRESSED</td>
<td>HOW LONG DOES IT TAKE FOR THE SOIL TO FALL APART IN THE WATER? AFTER 5 MINUTES, WHAT PERCENT OF THE SOIL CLUMP REMAINS? DID YOU COME TO DIFFERENT SOIL TYPES? WHAT CONCLUSION CAN YOU DRAW? WHAT CAN BE THE CAUSE OF FASTER DISSOLUTION?</td>
</tr>
</tbody>
</table>

### EVALUATION EXAMPLES

<table>
<thead>
<tr>
<th>POOR</th>
<th>MODERATE</th>
<th>GOOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>The clump of soil disintegrates and falls apart in less than 1 minute.</td>
<td>The clump of soil disintegrates and falls apart in 1-5 minutes. Some portion of the clump remains intact.</td>
<td>The clump of soil disintegrates and falls apart in &gt;5 minutes. A large portion of the clump remains intact.</td>
</tr>
</tbody>
</table>

**Source:**

https://www.roadside.org/Soil_Equipment/Dissolution_Tests/Soil_Slaking_Test/  
Evaluation of soil conditions and recommendations

Interpretation

Physical Soil Properties
The physical condition of a soil determines its holding capacity, ease of root penetration, air circulation, water storage capacity, drainage and nutrient retention, among other factors. In case of physical constraint, we must look for sustainable management practices for the mitigation or prevention of possible problems, e.g., compaction.

Chemical Soil Properties
The chemical condition of a soil regulates the availability of plant nutrients, plant growth and resistance to parasites, as well as soil biological activity. In case of chemical constraint, attention should be paid to soil use and management through amendments or organic matter management to improve the desired soil properties.

Biological Soil Properties
The biological condition of a soil determines the rate of organic matter decomposition and nutrient release. Moreover, earthworms and other arthropods improve soil porosity, structure, stability and drainage. If our soil shows biological limitations, we should focus on possible toxic effects which limit the efficiency of soil management for agricultural production.

General Evaluation
The evaluation of soil condition after each exercise may be combined to assess the general soil physical, chemical and biological properties. If you have scored poor or moderate soil properties, please refer to the following table to get to know which are the best practices to halt soil degradation and promote sustainable soil management. If you are not currently facing any issues related to soil health, you may be interested in a general overview of sustainable soil management practices to prevent the loss of soil functions in the future (e.g., poster n. 6).

Recommended Management Practices
For more details on how to improve soil properties, refer to posters’ contents given in the table.

<table>
<thead>
<tr>
<th>Improve physical properties</th>
<th>Improve chemical properties</th>
<th>Improve biological properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid heavy machinery when not necessary (to avoid compaction)</td>
<td>P6</td>
<td>P6</td>
</tr>
<tr>
<td>Reduce sludge</td>
<td>P6, P5b</td>
<td></td>
</tr>
<tr>
<td>Optimize irrigation (water quality and water-use efficiency)</td>
<td>P6, P10b</td>
<td></td>
</tr>
<tr>
<td>Choose crop rotation</td>
<td>P6, P10b, P5c</td>
<td>P6, P10b</td>
</tr>
<tr>
<td>Choose mixed cropping (possibly with annuals)</td>
<td>P6, P10b, P5c</td>
<td>P6, P10b</td>
</tr>
<tr>
<td>Use mulch, crop residue or cover crops</td>
<td>P6, P10b, P5b, P5c</td>
<td>P6, P10b</td>
</tr>
<tr>
<td>Avoid overgrazing (reduce the grazing, and reduce the number of animals per unit area)</td>
<td>P10b</td>
<td>P10b</td>
</tr>
<tr>
<td>Prefer organic fertilizers</td>
<td>P10b</td>
<td>P10b</td>
</tr>
<tr>
<td>Make a sustainable use and management of plant nutrients (light time, source, place and rate)</td>
<td>P6, P10b</td>
<td>P6, P10b</td>
</tr>
</tbody>
</table>
## Modules

<table>
<thead>
<tr>
<th>Topic</th>
<th>Specific soil topic (e.g. general soil properties, nutrients, salinity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posters</td>
<td>4 posters to be chosen among those available</td>
</tr>
<tr>
<td>Field exercises</td>
<td>3-4 field exercises related to the topic including physical, chemical, biological observations</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Final evaluation of soil condition and recommendations</td>
</tr>
</tbody>
</table>

### Example: Module 1

<table>
<thead>
<tr>
<th>Topic</th>
<th>What is soil?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posters</td>
<td><img src="image" alt="Posters" /></td>
</tr>
<tr>
<td>Field exercises</td>
<td><img src="image" alt="Field exercises" /></td>
</tr>
<tr>
<td>Evaluation</td>
<td><img src="image" alt="Evaluation" /></td>
</tr>
</tbody>
</table>
Visual identity
## Implementation activities: Overview

<table>
<thead>
<tr>
<th>Country</th>
<th>Promoter</th>
<th>Topic</th>
<th>Trainers</th>
<th>Farmers</th>
<th>Soil Doctors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>SRDI - DAE</td>
<td>Soils4nutrition</td>
<td>10</td>
<td>450</td>
<td>15</td>
</tr>
<tr>
<td>Bolivia</td>
<td>AOPEB - ELSEIBO</td>
<td>Fertilization</td>
<td>26</td>
<td>TBD</td>
<td>50</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>TBD</td>
<td>Soils4nutrition</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>Chile</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Colombia</td>
<td>AGROSAVIA</td>
<td>General</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Gambia</td>
<td>FAO Gambia – SOIL SOL</td>
<td>General</td>
<td>15</td>
<td>TBD</td>
<td>150</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>Farmers association</td>
<td>Salinity</td>
<td>10</td>
<td>200 to 300</td>
<td>50</td>
</tr>
<tr>
<td>Malawi</td>
<td>TBD</td>
<td>Soils4nutrition</td>
<td>TBD</td>
<td>500 to 800</td>
<td>TBD</td>
</tr>
<tr>
<td>Mexico</td>
<td>PUEIS</td>
<td>General</td>
<td>32</td>
<td>400 to 600</td>
<td>TBD</td>
</tr>
<tr>
<td>Morocco</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>Thailand (Lancang-Mekong)</td>
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<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>The Philippines</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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</tbody>
</table>
Communication and visibility

- New website to be released
Communication and visibility

- Highlights published

Positioning the Soil Doctors Programme as a mechanism that matters

As the Soil Doctors Programme enters its second year, it has successfully scaled-up farmer-to-farmer training initiatives in Bangladesh, Malawi and Mexico. The Programme will continue to strike up robust partnerships for the benefit of smallholders, empowering them to scale-up cost-effective, sustainable soil management (SSM) practices.

27/01/2022 Empowering farmers to safeguard sustainable soils

The Global Soil Doctors Programme is a farmer-to-farmer training initiative. The Global Programme principles support the local context. These pilot schemes have illustrated the importance of each: the national promoter and the "champion" farmer - also key other farmers in the local community.

Promoters are an essential component of the Programme country so that they can offer solutions from knowledge, to resources to extend them to their local communities. From agencies, national extension services, soil science societies, organisations (NGOs) or farmers' associations.

Thailand's testing kits empower farmers to monitor the state of their soils

Getting the balance right: regulating soil pH values to improve agricultural production

23/02/2022 The Global Soil Partnership’s (GSP) Soil Doctors Programme is upgrading the soil testing kits that are part of the Programme’s educational materials thanks to a donation from the government of Thailand.

Earlier this month, Thailand donated 1,000 soil pH testing kits to the GSP to be distributed to farmers who are participating in the Programme, which currently spans Bangladesh, Bolivia, Burkina Faso, Colombia, Ethiopia, and Mexico.

Other countries will be selected to engage over the course of 2022 so that the Programme can enhance its capacities and extend the reach of sustainable soil management (SSM) to different regions around the world.

The Soil Doctors Programme started in Thailand in 1995 and is now being extended globally through the GSP. The Thai government has supported a number of the GSP’s initiatives over the past ten years and is committed to soil health and SSM.

FAO of the UN

Media gallery updated regularly

Global Soil Partnership

Regional Panel on Soils (ITPS)

2022 | Virtual meeting
Expected collaboration

- Poster revision and development
- Field exercises revision and development
Pictures from the training

Botswana

Malawi

Mexico

Bangladesh

https://www.flickr.com/photos/faooftheun/albums/with/72177720296280200
Thank you!

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