Collaboration between GLOSOLAN and INSII: addressing data quality in map production

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Goals

- Continuously developing actionable soil information, purely country-driven global assessments, products and systems (in accordance with international standards) that support decision making for sustainable soil management, which is instrumental for the implementation of the GSPAction Framework.
- Make soil information and data accessible, interoperable and harmonised at national, regional and global level to facilitate environmental assessments.
- Provide a robust data-driven framework for monitoring GSP Action Framework indicators and targets.
GSPs Contribution to Data Driven Policy Making

Soil Information Systems
National, Regional & Global Soil Information Systems

Country Driven Global Data Products
Of the countries, by the countries, for the countries

Data Driven Policy Making
Of the countries, by the countries, for the countries

Capacity Development Programme – SiD
Bridging the digital divide in data science

Harmonisation
Harmonisation of Data, Information & Methods

Capacity Development – GLOSOLAN
Analytical Methods – wet/dry Chemistry

6th Meeting of the Global Soil Laboratory Network (GLOSOLAN) | 22-24 November 2022
Global Soil Nutrient and Nutrient Budget Maps | GSNmap

PHASE I

Mapping the current state of...

…macronutrients (N, P, K),
…micronutrients, and
…associated soil properties (CEC, pH, SOC, texture, BD)

• Resolution: 250 x 250 m
• Depth layers: 0 -30 cm, optional: 30 -60 & 60-100 cm

PHASE II

Mapping soil nutrient budgets
• of macronutrients (N, P, K)
• PHASE I maps are linked with data on biological fixation, fertiliser and manure input, crop removal, …
## Target nutrients and soil properties

<table>
<thead>
<tr>
<th>Soil property</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Nitrogen</td>
<td>%</td>
</tr>
<tr>
<td>Available Phosphorus</td>
<td>ppm</td>
</tr>
<tr>
<td>Available Potassium</td>
<td>ppm</td>
</tr>
<tr>
<td>Cation exchange capacity</td>
<td>cmol$_e$/kg</td>
</tr>
<tr>
<td>Soil pH</td>
<td>-</td>
</tr>
<tr>
<td>Clay, sand, and silt</td>
<td>g/100g</td>
</tr>
<tr>
<td>Soil organic carbon</td>
<td>%</td>
</tr>
<tr>
<td>Bulk density</td>
<td>g/cm$^3$</td>
</tr>
<tr>
<td><strong>Optional:</strong> Ca, S, Mg, Fe, B, Cl, Mn, Zn, Cu, Mo, Ni, Si</td>
<td>ppm</td>
</tr>
</tbody>
</table>
Potential for collaboration between INSII and GLOSOLAN
1. Data sharing

- Maximise soil data availability on national level to increase quality of national maps, i.e. nutrient data for the GSNmap
- **GSP soil data policy** as instrument to manage data sharing and data protection
  - Raw data is not shared with the GSP (only the final map)
  - Laboratories decide on degree of data protection
Potential of data sharing

- Soil data on specific properties (particularly nutrients) is often limited and outdated
- often assessed in laboratories (mostly without precise coordinates)

**Benefits of data sharing for laboratories:**

- make good **use of unexplored soil data** resources
- foster **inter-institutional collaboration** on national level
- GSP Secretariat can provide
  - technical **support in data management**
  - **capacity building** opportunities
  - improve the **technological capacity** of laboratories through projects *(ongoing)*

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2. Definition of SOP conversion factors

- Soil data composed by different measurement methods
- Harmonisation of methods has the potential to increase map quality
- Conversion factors between SOPs are needed

New SOPs needed for:

K, Cu, S, Mg, Fe, Cl, Zn, Ca, Mo, Ni, Si, B, Mn

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3. Development of pedo-transfer functions

- Pedo-transfer functions (PTF) are a key element of digital soil mapping (DSM) as they enable mappers to fill gaps in data.
- Geographically more representative PTF are needed to be incorporated in the mapping process.

Support in generating an overview of existing PTFs for different environmental settings from GLOSOLAN.
Collaboration: INSII - GLOSOLAN

1. Promote **exchange of data** on national level between INSII institution and NASOLAN to produce GSP data products
2. Develop SOPs and **conversion factors**
3. Advise GSP in **use of PTF for mapping** and develop new PTF
Thank you for your attention!