GLOSOLAN

GLOBAL SOIL LABORATORY NETWORK

2nd Plenary Meeting on Soil Spectroscopy

Decision document GLO/II/2021: *Review the objectives of the GLOSOLAN Initiative on Soil Spectroscopy. To be discussed on 3 November 2021.*

Background

The first plenary meeting on soil spectroscopy of the Global Soil Laboratory Network (GLOSOLAN) was virtually organized by the Global Soil Partnership (GSP) on 23-25 September 2020 on the online platform Zoom (report available at https://www.fao.org/3/cb2220en/cb2220en.pdf). During the meeting, GLOSOLAN members agreed on the 2020-2021 work plan of the Soil Spectroscopy Initiative (GLOSOLAN-Spec) and the objectives of the initiative:

1. Build a globally representative, soil spectral calibration library (database) based on mid infrared (MIR) spectra and the accompanying soil property reference data recorded in one gold-standard reference laboratory;
2. Provide a freely available and easy-to-use soil property estimation service based on this evolving library;
3. Support countries in their contributions to the GLOSOLAN soil spectral library (named the Global Soil Spectral Calibration Library) and their use of the soil property estimation service;
4. Harmonize soil spectroscopy methods (including soil sample preparation, spectral measurement, and quality assurance of data analysis) by developing standards and protocols; and
5. Help countries build the capacity for estimating soil properties using soil spectrometry.

However, during the implementation of activities in 2021, the following concerns were expressed by the soil spectroscopy community to the GLOSOLAN Coordinators:

- GLOSOLAN-Spec should adopt a broader definition of soil spectroscopy. Thus, to include other spectral ranges (e.g. visible and near infrared) and the use of different spectrometer technologies (e.g. benchtop research grade instruments, portable, handheld or miniaturized spectrometers). In this regard, (1) different spectral ranges and different technologies have unique advantages and disadvantages for soil analysis, and (2) countries and institutions have different capacities and needs resulting in a variety of soil spectroscopy's adoption and development modalities.
- National capacity development was not sufficiently included in the work plan of GLOSOLAN-Spec. More attention should be paid to train soil spectral laboratories, support the development of national/regional soil spectral libraries via the estimation service, and to the provision of advisory services on suitable instrumentation.

Based on this, GLOSOLAN found appropriate to propose its members to review the objectives of the GLOSOLAN-Spec initiative and the work plan on the establishment of global spectral estimation services.

Proposal

Participants to the second plenary meeting on soil spectroscopy are kindly asked to review the revised objectives of the GLOSOLAN-Spec, below:

- To support the development of all types of soil spectroscopy at national, regional, and global levels. To achieve this objective, this initiative will be supervised by a group of experienced scientists to ensure that all activities are science based.
- To support countries in establishing their own soil spectral laboratories and national soil spectral libraries with standardized methods and decentralized estimation services. To achieve this objective, GLOSOLAN will be using a country-driven approach and invest in capacity building activities at the national or regional level.
- To continuously support the development of the global spectral estimation services by encouraging countries to share part of existing national soil spectral libraries on a voluntary basis.
- Support the development of standards and protocols for soil spectroscopy, including but not limited to soil sample preparation, measurement protocols, quality assurance, and data analysis and modelling.

The establishment of global spectral free estimation services

The priority of GLOSOLAN-Spec is to support countries to establish their own soil spectral laboratories, their national soil spectral libraries with an estimation service. Once national soil spectral libraries are established, GLOSOLAN will connect them for the purpose of establishing global spectral free estimation services for the different spectral techniques. The development of such global spectral free estimation services will be voluntary:

- With the support of its partners, GLOSOLAN will first start to establish a global spectral estimation service based on current available open data resources and existing estimation platform.
- A country can decide whether they are willing to join the development of global spectral estimation services or not, if not, GLOSOLAN will continue to support countries for further development of their capacities as described above. Countries can also decide to join the

development of global spectral estimation service at any time and without a particular contribution.

- A country can decide how much data to share for the establishment of global spectral estimation service.
- A country can decide whether the shared data will be an open resource or only use for the global estimation service. The condition of using such dataset for research and other purposes should be discussed and documented.
- The shared soil spectral library from countries will be hosted by GLOSOLAN only for providing estimation service purposes. GLOSOLAN only hosts such dataset under the framework of GSP data policy, and the country should have a full data license.

Decision to make at the 2nd Plenary Meeting on Soil Spectroscopy

GLOSOLAN is kindly asking participants to the 2nd Plenary Meeting on Soil Spectroscopy to endorse the revised objectives of GLOSOLAN-Spec and proposed country driven approach for the establishment of a global spectral estimation service.