



Food and Agriculture
Organization of the
United Nations

GLOBAL SOIL PARTNERSHIP

12th Plenary Assembly

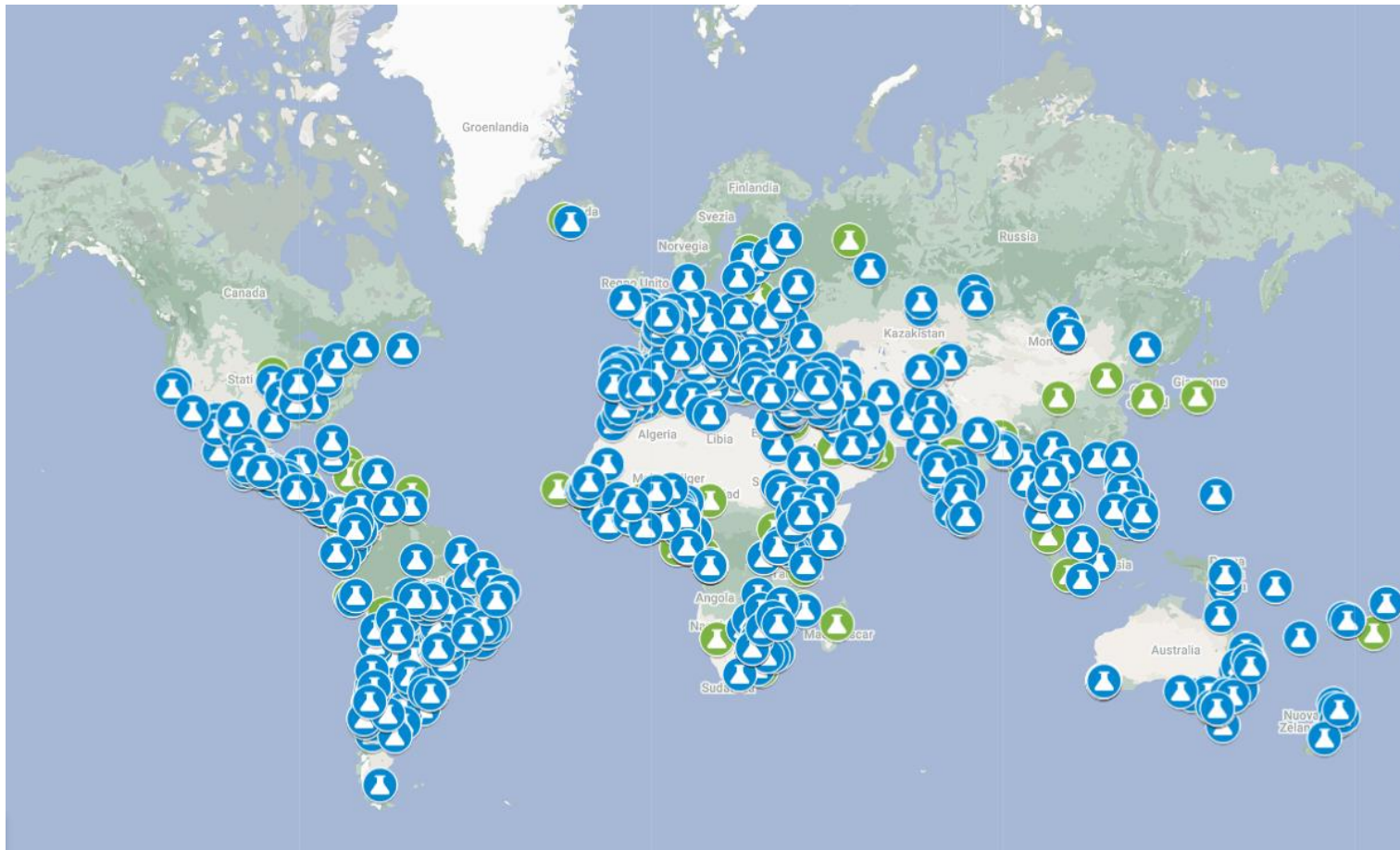
03-05 June 2024

GLOBAL SOIL LABORATORY NETWORK (GLOSOLAN) AND ITS INITIATIVE ON SOIL SPECTROSCOPY (GLOSOLAN-SPEC)

Ms Hanane Aroui Boukbida
GLOSOLAN vice-Chair



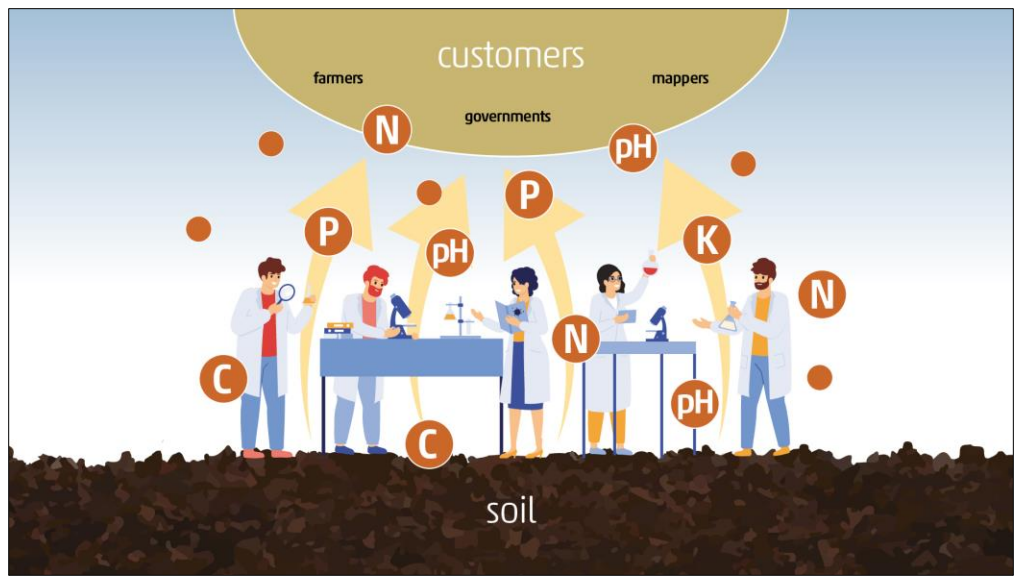
GLOSOLAN: bringing soil laboratories to the forefront worldwide since 2017



Currently grouping together over 1 000 soil testing institutions from 163 countries



We operate at all levels...



GLOBAL



REGIONAL



NATIONAL



Main areas of work:



- Harmonization of Standard Operation Procedures (SOPs)
- Training on the implementation of GLOSOLAN SOPs
- Training on safety and health

- Execution of external quality control (proficiency testing)
- Training on the execution of internal quality control

- Training on equipment use, maintenance and purchasing
- Establishment of a donation/bartering system
- Soil spectroscopy

Measurement

Quality control

Equipment

***Laboratory
management***

***Data management
(LIMS)***

Soil data comparability is possible only if the same procedures are adopted or via **transfer functions**

Using the same SOPs

=

Speaking the same language

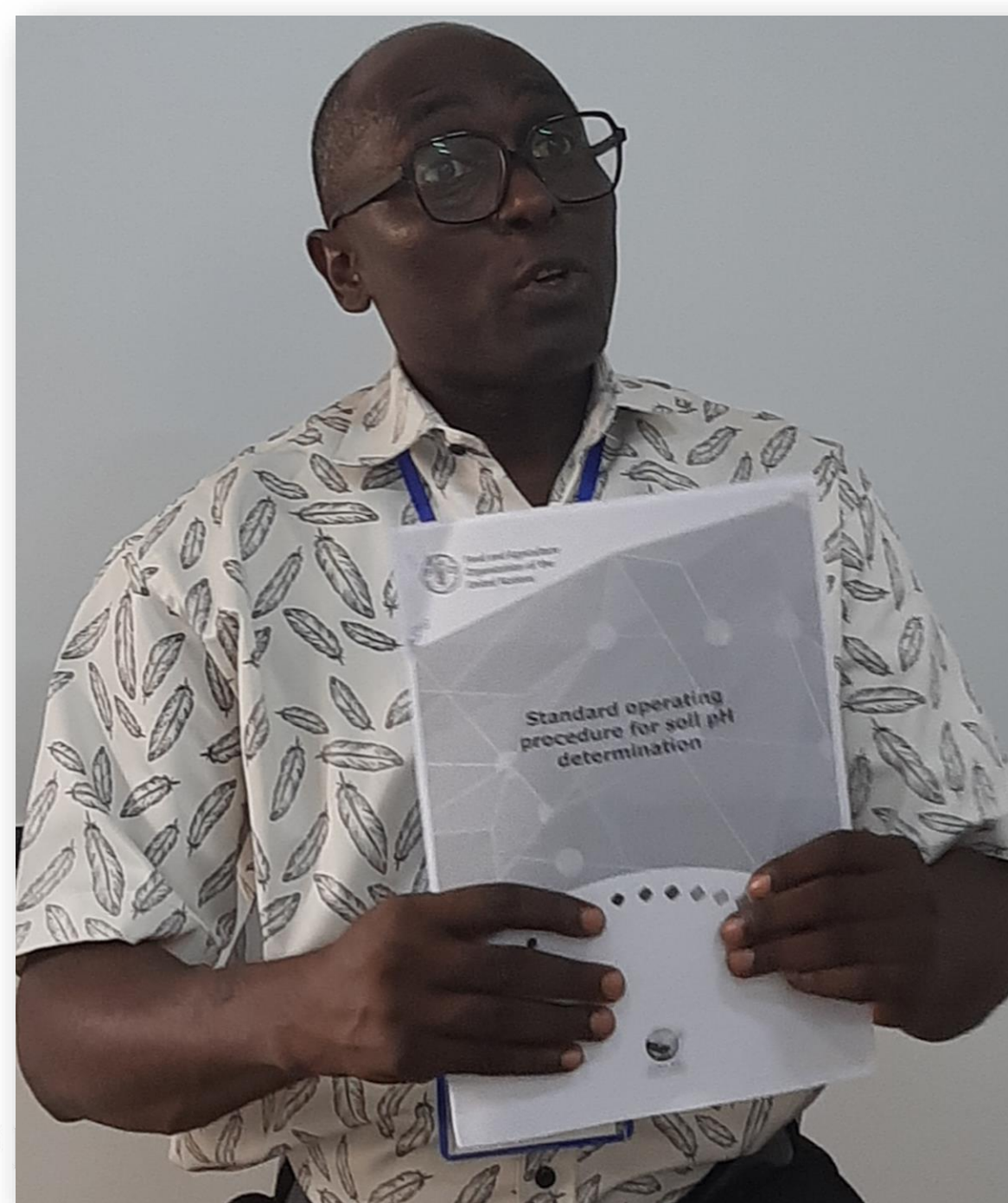
Different methods and procedures used by different laboratories can lead to **inconsistent** and **unreliable results**, which can make it difficult to compare and interpret data

Walkley-Black · 1.3 = Tyurin · 1.15 = Dry Combustion ($P = 0.95$).

Modify by	Revision	Approval date	Validated date
GLOSOLAN SOP Tech. W.G. Leader: Elena Shamrikova, Russian Federation	By the Review Panel	13 January 2021	13 January 2021

Global Soil Laboratory Network GLOSOLAN	GLOSOLAN-SOP-16		
SOIL ORGANIC CARBON Tyurin spectrophotometric method	Version number : 01	Page 16 of 18	
	Effective date : 13 January 2021		

Partnership



GLOSOLAN SOPs developed so far

Already published:

- 1 on sample pre-treatment
- 18 on soil chemical parameters (5 more ongoing)
- 2 on soil physical parameter (4 more ongoing)
- 3 on soil biological parameter (3 more ongoing)

	2019	2020	2021	2022
Chemical	OC Walkley and Black, TC Dumas, Calcium carbonate eq. (titrimetric and volumetric calcimeter methods)	Phosphorus (Bray I, Bray II, Olsen, Mehlich I), pH, electrical conductivity (in water and in saturated paste), nitrogen (Dumas, Kjeldah), carbon (Tyurin)	Particulate organic carbon (physical fractionation), Quasi-total elements (digestion using aqua regia and EPA), Exchangeable bases and CEC (ammonium acetate), available micronutrients (extraction using DTPA), Boron (hot water extraction), Mehlich III for macro and micronutrients (including S and B)	Organic matter (loss of ignition), Available phosphorus (KCl), Exchangeable acidity + Exchangeable Al (KCl), Soil buffer capacity (KOH), Fe and Al oxides (ammonium oxalate)
Physical			Particle size-distribution (hydrometer, pipette), bulk density, moisture content (gravimetric method)	Water retention (pF) curve, Particle density (pycnometer)
Biological			Microbial biomass C and N by chloroform fumigation-extraction, soil respiration	Soil Enzyme Activities (beta-glucosidase, arylsulfatase, beta-glucosaminidase, phosphatases and dehydrogenase), N Mineralization (incubation method), Nematodes trophic groups (wet extraction), QBSar (mesofauna), ISO-TSBF (megafauna)

Harmonization of Standard Operating Procedures (SOPs)



Globally harmonized protocols, with a bottom-up, collaborative and inclusive approach.

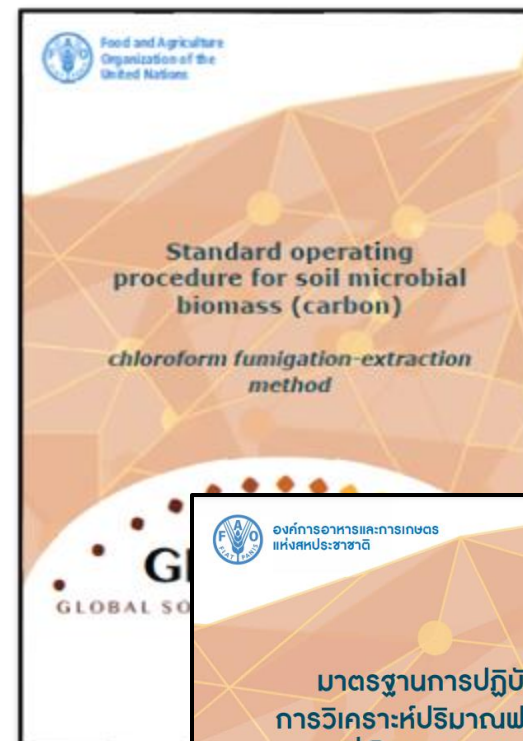
- Include step-by-step instructions, sections on health and safety, quality assurance and control (QA/QC),
- Contribute to the replicability of an analysis and to the quality and reliability of the data,
- **Accessible** online, for free and in several languages.

In 2024, GLOSOLAN is focusing on:

- **Translation** of SOPs
- **Finalization** of the pending SOPs from previous years
- **Review** the SOPs already published

Ongoing:

- Particle size distribution
- Water retention curve (pF)
- Soil organic matter by loss of ignition
- Mesofauna by QBS-ar
- Nematodes



Joint products

- GLOSOLAN SOPs are living documents and are revised regularly and/or as needed
- Experts from other GSP Technical Networks support the harmonization process according to the parameter:
 - NETSOB: active members of the working groups for all SOPs dealing with soil biological parameters.
Examples: enzymes, nematodes, DNA extraction
 - INSAS: review the SOPs related to soil salinity and sodicity
Examples: pH, electrical conductivity, Sodium Adsorption Ratio (SAR), Exchangeable Sodium Percentage (ESP), SOC in saline soils
 - INSOP: review the SOPs related to pollutants and toxic elements
Examples: microplastics, explosive residues, disposal of reagents





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Over 10 000 views in two years!



Capacity building: regional perspective



Senegal, October 2023

In-person training sessions

- **AFRILAB:** Dakar, October 2023
(targeting lab technicians)
Over 70 soil laboratories technicians from 40 sub-Saharan countries
- **LATSOLAN:** Santiago de Chile – Chillán, April 2024
Over 60 soil laboratories from 23 countries from the Caribbean, Central and South America
- **SEALNET:** the Philippines, July 2024
Expected: around 20 National Reference Laboratories (under preparation)



Chile, April 2024





- Webinars
- Video training
- Guidelines

Several topics covered:

- SOPs implementation
- Quality control and good practices
- Health and safety
- Equipment
- Soil spectroscopy

Food and Agriculture Organization of the United Nations

Taller
Lavado de materiales de laboratorio utilizados en el análisis de suelo

Miriam Ostinelli GLOSOLAN

Miriam Ostinelli, GLOSOLAN/ INTA – Instituto de Suelos, Argentina
Daniel Carreira, LATSOLAN / INTA – Instituto de Suelos, Argentina

LATSOLAN

7 de agosto de 2023 - Virtual

GLOSOLAN
GLOBAL SOIL LABORATORY NETWORK

GLOSOLAN workshop on cleaning and washing soil laboratory glassware and equipmen | 7 August 2023

Webinar on lab glassware washing, in Spanish, August 2023

Food and Agriculture Organization of the United Nations

Determination of the clay content of soils

25 June 2024

AGENDA

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Have you checked out the latest standard operating procedures (SOPs) harmonized by GLOSOLAN?
 Visit the dedicated webpage on the GLOSOLAN website to access all SOPs, which are also available in multiple languages.

[MORE HERE](#)

MARCH 2024

SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

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GLOSOLAN inter-laboratory comparison (ring test/proficiency test – PT)

REGIONAL

- Eurasia 2023
 - 21 labs from 6 countries
 - Led by the Russian Soil Laboratory Networks
 - Focus on soil organic carbon (various methods)
- Africa + NENA 2024
 - 83 laboratories from 57 countries
 - Thanks to the support of IRD and BGS
 - Focus on C, N, P
- Asia 2024
 - Expected: 150 laboratories from 20 countries
 - Led by the Philippines
 - Focus on C, N, P, K, texture, pH

GLOBAL

- To be launched in the last quarter of 2024
- Thanks to the support of IRD and BGS
- Focus on C, N, P, pH, EC, texture, heavy metals
- Thanks to the support of IRD and BGS



Exchange of soil samples for scientific purposes remains a major issues in many countries

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Plan for 2024: develop a certification system

- Following the discussion held in the XII GSP Plenary Assembly side event, GLOSOLAN will work on a proposal to be brought to the XIII GSP Plenary Assembly for discussion and (hopefully) approval
- Establishment of a certification system to be carried out alongside the inter-laboratory comparisons, for the good performing laboratories
- Need to find the needed financial resources
- Internal assessment will be done to comply with the FAO regulations

GLOSOLAN-Spec

Main outcomes:

- Two English **webinars** and one Spanish webinar were conducted
- Spectroscopy **technical manual** French version was published (Spanish ongoing)

Scope:

The GLOSOLAN-Spec proposes to extend its focus from laboratory to proximal and remote platform with the aim of facilitating the acquisition of diverse soil data from various sources and platforms.

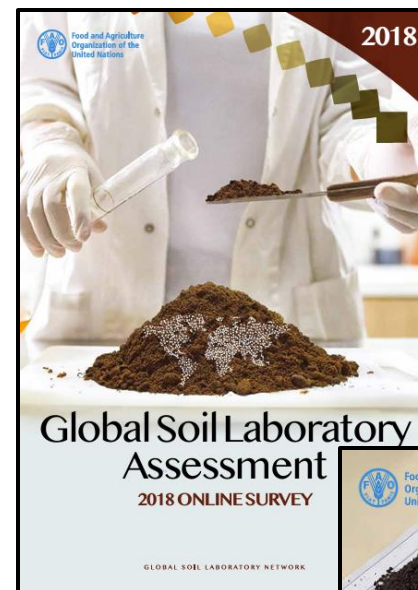


GLOSOLAN work plan is developed according to its members' needs

Continuous monitoring is essential:

- In-person workshops
- Laboratory visits and individual training
- Questionnaires

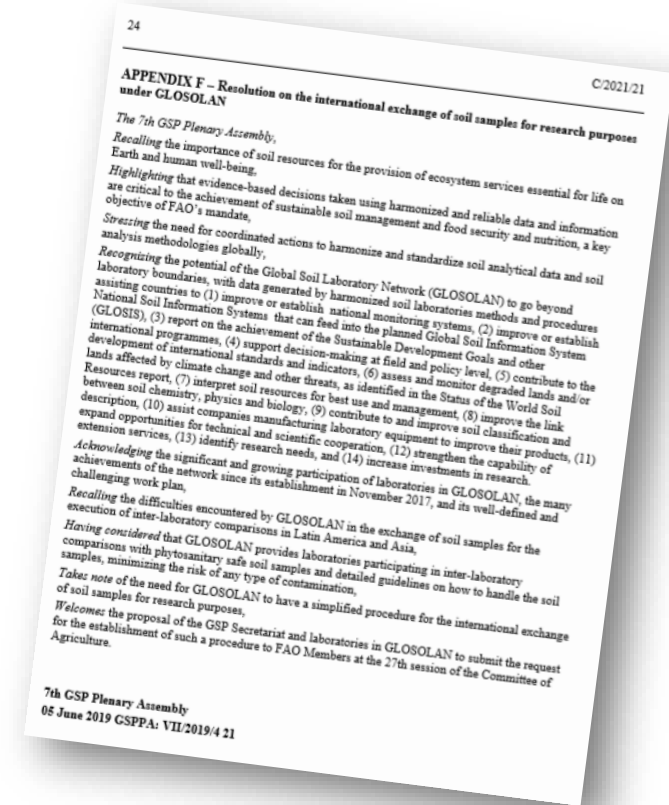
→ towards the ***Global Assessment 2024***



Suggested actions for the GSP Focal Points (1/2)

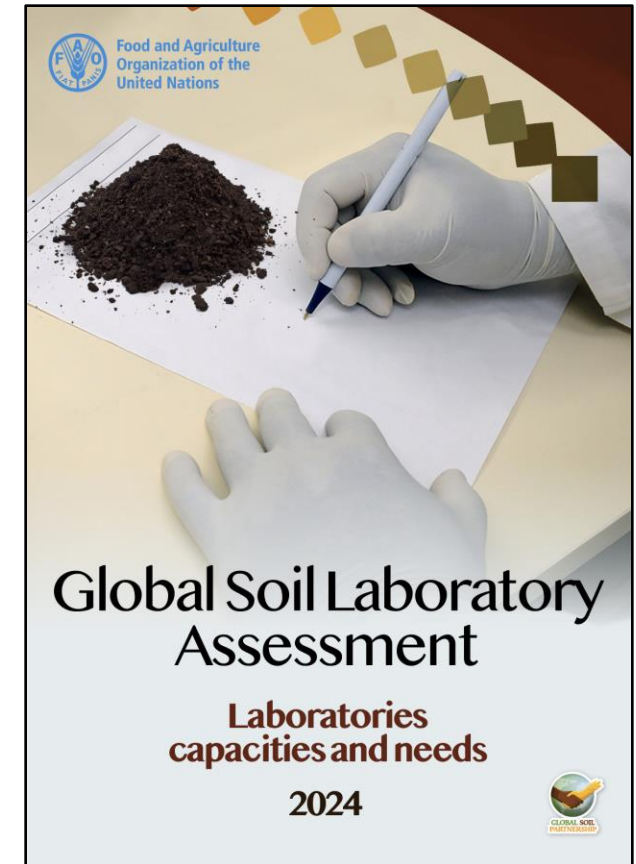


- Encourage national soil laboratories to **join the network, implement the Standard Operating Procedures** harmonized by GLOSOLAN, participate in **proficiency tests (PTs)**
- Invite resource partners to **support GLOSOLAN activities** and the National Soil Laboratory Networks (**NASOLANs**)
- Facilitate the implementation of the [Resolution on the international exchange of soil samples for research purposes](#) under GLOSOLAN, which was endorsed at the 27th Session of the FAO Committee on Agriculture (COAG), and promote the organization of national proficiency tests;
- Contribute with information on national legislations on the import/export of soil samples to further develop and update the **Soil Import Legislation database (SIMPLE)**;



Suggested actions for the GSP Focal Points (2/2)

- Encourage national soil laboratories to participate on the **Global Assessment of Soil Laboratories 2024**;
- Invite countries to consider the establishment of **soil spectral laboratories, national soil spectral library with estimation service**, in collaboration with GLOSOLAN – Spec; and
- Encourage institutions which already have developed soil spectral libraries and estimation services to **make it partially/fully free available for research and other non-commercial purposes**.



Thanks to the support of



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THANK YOU

