Food and Agriculture Organization of the United Nations

5th Meeting of the
Asian Soil Laboratory Network
(SEALNET)

20 October 2021

Item 1
GLOSOLAN updates

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SEALNET
ASIAN SOIL LABORATORY NETWORK

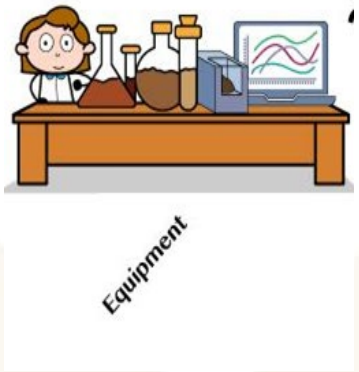
GLOBAL SOIL PARTNERSHIP

Global Soil Laboratory Network (GLOSOLAN)

Established in 2017 to harmonize soil laboratory methods and data, and to build the capacity of laboratories in soil analysis. Three plus one major areas of work:

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

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



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

INFA
International Network on Fertilizers Analysis

Harmonization of fertilizers quality assessment procedures

GLOSOLAN

GLOBAL SOIL LABORATORY NETWORK

Operates through
Regional Soil Laboratory Networks (RESOLANs)

SEALNET

ASIAN SOIL LABORATORY NETWORK

Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, DPR Korea, India, Indonesia, Japan, Lao PDR, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, Timor Leste, Vietnam

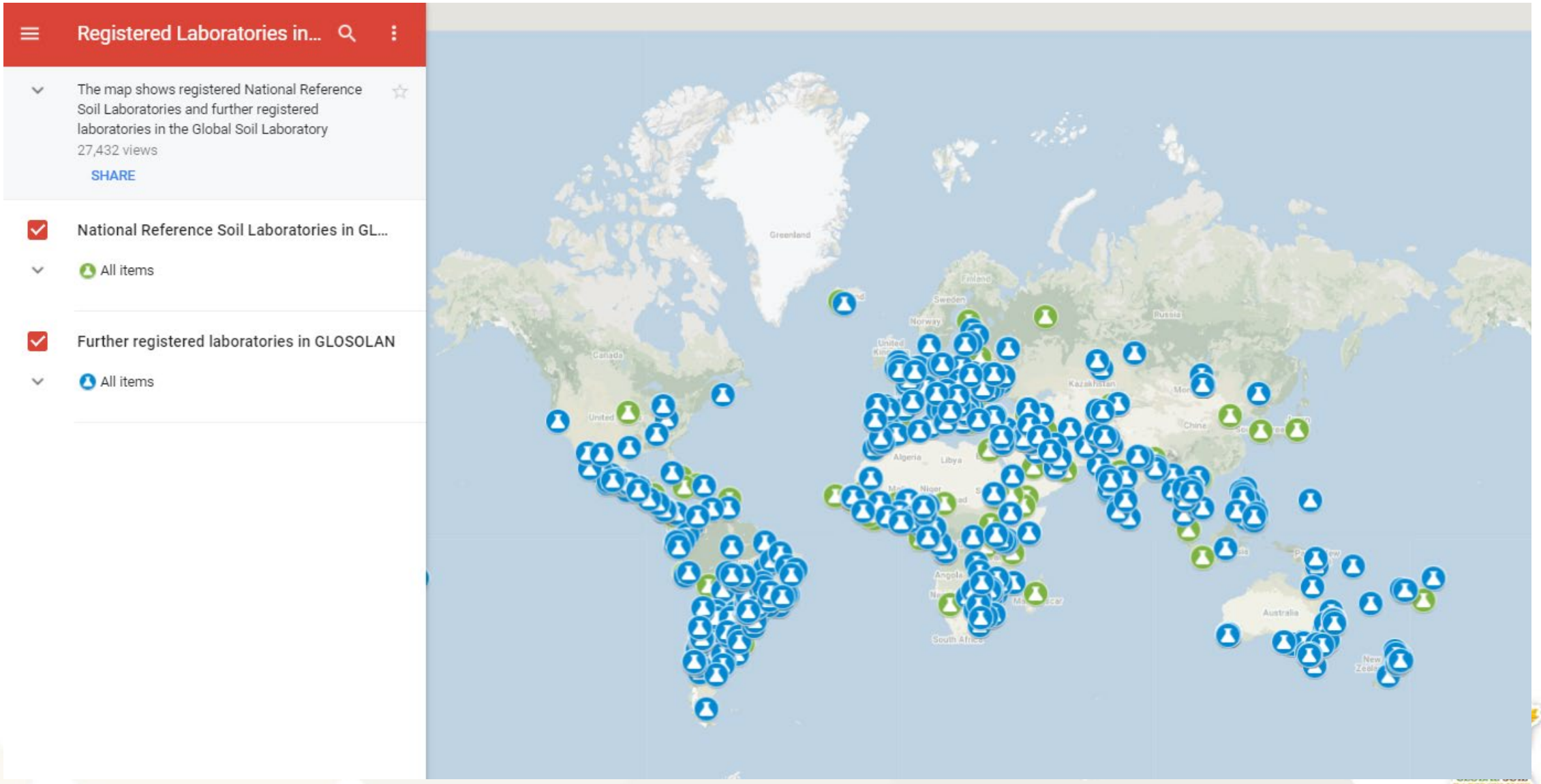
Operates at the national level through **registered laboratories** and **National Reference Laboratories** especially, which are tasked to establish **National Soil Laboratory Networks**

GLOBAL SOIL PARTNERSHIP

On October 12, 2021, the network had 740 laboratories registered

Africa AFRILAB	Asia SEALNET	Europe & Eurasia EUROSOLAN	Latin America LATSOLAN	Near East & North Africa NENALAB	North America	Pacific ASPAC
148	117	143	184	68	8	77

Learn more on the laboratories registered in GLOSOLAN by consulting the GLOSOLAN interactive map at
https://www.google.com/maps/d/u/0/viewer?mid=1LrzYb6G9IMObU6M3ZXWy4BxY5UMlruyq&ll=-3.81666561775622e-14%2C130.67331682617169&z=2



GLOSOLAN is doing its best to keep its webpage updated and available in the 6UN official languages: English, French, Spanish, Arabic, Russian and Chinese

Food and Agriculture Organization of the United Nations

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العربية 中文 English Русский Español

Global Soil Partnership

Overview | Partners | Regional partnerships | ITPS | Technical networks | Areas of work | Pillars of action | Resources

Global Soil Laboratory Network

Soils: if you cannot measure it, you cannot manage it

The Global Soil Laboratory Network (GLOSOLAN) was established in 2017 **to build and strengthen the capacity of laboratories in soil analysis and to respond to the need for harmonizing soil analytical data**. Harmonization of methods, units, data and information is critical to (1) provide reliable and comparable information between countries and projects; (2) allow the generation of new harmonized soil data sets; and (3) support evidence-based decision making for sustainable soil management.

The work of GLOSOLAN supports the implementation of the Sustainable Development Goals, the Agenda 2030 for Sustainable Development and the mandate of FAO on food security and nutrition. For more information contact Lucrezia.Caon@fao.org

- GLOSOLAN homepage
- Soil Analysis
- Capacity development
- Fertilizers analysis – International Network on Fertilizer Analysis
- Equipment

GLOSOLAN FAQs

- **What are GLOSOLAN main areas of work?**
- **How does GLOSOLAN work?**
- **What are the differences between National Reference and other registered soil laboratories?**
- **Why shall I register my laboratory in GLOSOLAN?**
- **How can I register my laboratory in GLOSOLAN?**
- **What laboratories are registered in GLOSOLAN?**

ctober 2021

GLOBAL SOIL PARTNERSHIP

Each page contains frequently asked questions and detailed information on how activities are implemented.

Quality assurance (QA) / Quality control (QC)

Quality assurance (QA) focuses on the process of the analysis at the purpose of preventing and/or limiting the occurrence of errors in the measurement.

Quality control (QC) is a set of activities or techniques aiming to ensure that all quality requirements are being met. The contin
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GLOSOLAN Inter-laboratory comparison programme

All laboratories registered in GLOSOLAN are given the opportunity to participate in its inter-laboratory comparison programme **for free**. However, only truly committed laboratories can continuously participate due to the limited availability of samples and the high cost of the service for the Global Soil Partnership, FAO.

- **How does the GLOSOLAN inter-laboratory comparison programme work?**
- **How can I participate to the GLOSOLAN inter-laboratory comparison programme?**
- **How does GLOSOLAN identify "truly committed" laboratories?**
- **Can I use the certificate of participation in GLOSOLAN's inter-comparison exercises for certification or accreditation purposes?**
- **Where do the soil samples used in GLOSOLAN inter-laboratory comparison exercises come from?**

Key publications

GLOSOLAN publications are also made available in the 6UN official languages (plus others) depending on the availability of translators

GLOSOLAN would like to thank all of you that served and are still serving as translators. Your work is greatly helping GLOSOLAN to implement activities at the national and regional scale!!!

Please let us know if you wish to translate any GLOSOLAN material in your local language

Organic carbon

Carbon, as soil organic matter, alters the physical (e.g. structure), chemical (e.g. cation exchange capacity), and biological (e.g. microbial activity) properties of soils with impacts on plant growth and yield, biodiversity and the soil water retention capacity. The content of organic carbon of mineral horizons can be used also in soil classification, taking the textural class into account. However, the inferred organic carbon status of a soil should always be locally checked as it is only a rough estimate.

The methods to measure organic carbon are rather easy to run but a special effort should be made by soil analysis laboratories to provide the best possible quality data. This will allow monitoring of changes in SOC at both local and regional scales and also give a better idea of the future scenarios, not only for SOC content but also for atmospheric CO_2 evolution. Did you know that the Global Soil Partnership launched a series of activities on soil organic carbon? For more information click here.

The methods to quantify SOC already harmonized by GLOSOLAN are the following:

SOP Walkley-Black method – titration and colorimetric method (**EN** | **ES** | **RU**)

Soil organic carbon – Tyurin colorimetric method (**EN** | **RU**)

Training video: Walkley and Black - **titration** method

Training video: Walkley and Black - **colorimetric** method

Soil Organic Carbon methods : Sustainability of methods

Method	Risk for human health related to the use of chemicals and the overall implementation of procedure by staff	Environmental risk (waste disposal)	Level of technology required	Average duration of the analysis	Global median price of the analysis (for the customers)
Walkley & Black	High	High	Low	Up to one working day	6 USD
Tyurin	High	High	Low	Up to one working day	7.6 USD

Training videos are also prepared to facilitate the implementation of e.g. standard operating procedures

GLOSOLAN would like to thank all laboratories that are recording training videos. Your work is greatly helping GLOSOLAN to implement activities at the national and regional scale!!!

Please let us know if you wish to record any training video for GLOSOLAN

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Method	ch		Global median price of the analysis (for the customers)
Walkley & Black		y	6 USD
Tyurin		y	7.6 USD

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GLOBAL SOIL PARTNERSHIP

Based on the decision made at the 4th GLOSOLAN meeting (November 2020), RESOLAN meetings will focus on decision making only.

All trainings are and will be implemented in the form of webinars.

Organization of webinars on a same topic in different languages and at different times to facilitate the participation of as many regions and countries as possible.

The recording of webinars on capacity building will also be added to topic specific webpages

- GLOSOLAN homepage
- Soil Analysis
- Capacity development
  - Wet chemistry
  - Dry chemistry
- Fertilizers analysis – International Network on Fertilizer Analysis
- Equipment
- Regional Soil Laboratory Networks
- National Soil Laboratory Networks
- SIMPLE - Soil Import Legislation

Capacity development

GLOSOLAN is actively working to strengthen the analytical capacity of soil laboratories worldwide by organizing training sessions.

Thanks to the supp tional high-level experts, sev t topics related to soil preparation. The trainings will be ted in different languages and time zones, according to the trainer's availability, in order to allow a larger audience to attend the sessions.

Page under construction but content updated

particular, the topics listed below will be object of GLOSOLAN training sessions for 2021:

- Wet chemistry
- Dry chemistry (spectroscopy)
- Health and Safety
- Equipment purchasing
- Quality assurance and quality control (QA/QC)
- Laboratory management

Training list for wet chemistry

SESSION 1: Webinar on the determination of soil phosphorous by Olsen method/Seminario sobre la determinación del fósforo del suelo por el método Olsen

15 October 2021 | 16:00 CEST | Language of the training: Spanish

Guest speaker: Jorge D. Etchevers and Claudia Hidalgo, Members of the scientific staff of the Laboratorio de Fertilidad de Suelos y Química Ambiental at Colegio de Postgraduados in Montecillo, Mexico

Biography: J. D. Etchevers is a Ph. D. who graduated from North Dakota State University with more than 50 years of experience in soil chemical analyses. He has worked in several Latin-American countries and in the USA. He has accomplished sabbatical years and short-term stages in various European countries. He is a member of the Mexican Academy of Science, Professor Emeritus of the Colegio de Postgraduados, and National Researcher Emeritus of the Mexican National System of Researchers. Dr. Etchevers has received numerous recognitions from the State of Mexico and professional and scientific societies of the continent. The soil analytical laboratory under his direction performs traditional soil chemical routines for evaluating soil fertility and, in addition, conducts research employing X rays, chromatographic (liquid and gas), potentiometric, TEM, and SEM microscopy techniques, among others.

Biography: Claudia Hidalgo is Dr. of Science who graduated from the Université de Nancy, France, with more than 30 years of experience in soil science, particularly in analytical chemistry and clay minerals. She has spent a sabbatical year in Spain and short-term stances in Europe and Latin American countries. She is a Full Professor of Soil Science at the Colegio de Postgraduados, Mexico, and a Mexican Soil Science Society member. Dr. Hidalgo is also a member of the Mexican National System of Researchers. Her main interest is in soil chemistry, particularly soil carbon and organic matter analysis, and the interaction of both with the inorganic clay minerals. She was responsible of the soil analytical facility at her institution for several years and has been an essential part of the Mexican soil analytical quality control program. In addition to her knowledge of soil analytical determinations, she operates the X-ray section, IR spectroscopy (MIR, NIR) and the automatized carbon and nitrogen facilities at the Colegio de Postgraduados soil fertility laboratory.

Abstract: This webinar presents how to measure soil phosphorous by Olsen method, following the Standard Operating Procedure (SOP) harmonized by GLOSOLAN in 2021. The lecturers will provide an insight of the procedure, describing each step of the measurement, from sample preparation to quality assurance and control, focusing also on the health and safety measures. Participants will have the chance to raise questions and directly interact with the speakers in a Q&A session at the end of the presentation.

- Title of the training
- Date, time and language of the training
- Information on the trainers
- Abstract

Before the webinar takes place…

IR spectroscopy (MIR, NIR) and the automatized carbon and nitrogen facilities at the Colegio de Postgraduados soil fertility laboratory.

Abstract: This webinar presents how to measure soil phosphorous by Olsen method, following the Standard Operating Procedure (SOP) harmonized by GLOSOLAN in 2021. The lecturers will provide an insight of the procedure, describing each step of the measurement, from sample preparation to quality assurance and control, focusing also on the health and safety measures. Participants will have the chance to raise questions and directly interact with the speakers in a Q&A session at the end of the presentation.

Details of the event | Register here

After the webinar is implemented…

Abstract: This webinar reviews the basic mechanisms for soil visible–near infrared (vis–NIR) spectroscopy. It also provides information on applications related to precision agriculture and the use of large regional soil spectral libraries for estimating small scale variations.

Details of the event | Presentation | Recordings | Highlight

Webinars on wet chemistry:

Title	Time, date and language
SESSION 1: Webinar on the determination of soil phosphorous by Olsen method/Seminario sobre la determinación del fósforo del suelo por el método Olsen	15 October 2021 | 16:00 CEST | Language of the training: Spanish
SESSION 2: Health and safety	26 October 2021 | 11:00 CEST | Language of the training: English
SESSION 3: Webinar on the determination of soil phosphorous by Olsen method	TBC | Language of the training: English
SESSION 4: Webinar on saturated soil paste extract	9 November 2021, TBC | TBC | Language of the training: English
SESSION 5: Webinar on saturated soil paste extract	10 November 2021, TBC | TBC | Language of the training: Arabic
SESSION 6: Webinar on the determination of soil electrical conductivity in water. Soil/water, 1:5	15 November 2021, TBC | TBC | Language of the training: English
SESSION 7: Webinar on the determination of soil organic carbon by Walkley and Black method	17 November 2021, TBC | TBC | Language of the training: English

Webinars on soil spectroscopy:

Title	Time, date and language
SESSION 1: An Introduction to Soil Spectroscopy	Monday, 6 September 2021 | 15:00 CET
SESSION 2: Soil Spectroscopy for accurate measurement of soil physical and chemical soil properties	Thursday, 16 September 2021 | 09:00 CET
SESSION 3: A future for soil spectral inference	Thursday, 23 September 2021 | 08:00 CET
SESSION 4: The Brazilian Soil Spectral Library Experience from scientific to society services	Monday, 4 October 2021 | 15:00 CET
SESSION 5: Characterization of soil properties using French national Vis-NIR and MIR spectral libraries	Thursday, 14 October 2021 | 14:00 CET
SESSION 6: Measuring reflectance of undisturbed soil surface in the field under laboratory quality: A protocol to assess soil properties that are sensitive to the soil sealing phenomenon	Thursday, 28 October 2021 | 15:00 CET

GLOSOLAN would like to thank all experts that made themselves available to prepare and give webinars.
Your work is greatly helping GLOSOLAN to implement activities at the national and regional scale!!!

Please let us know if you wish to provide any webinar. We are in great need of trainers!

Update on the harmonization of the GLOSOLAN Standard Operating Procedures (SOPs) 2020-2021

PHYSICAL PARAMETERS	Status
particle size-distribution by pipette method	Harmonization of the global matrix
particle size-distribution by hydrometer	Harmonization of the global matrix
bulk density	Harmonization of the global matrix
moisture content by gravimetric method	Harmonization of the global matrix
CHEMICAL PARAMETERS	
Particulate organic carbon by physical fractionation	Harmonization of the global matrix
Quasi-total elements by digestion using aqua regia and EPA. This includes total heavy metals	Harmonization of the global matrix
Exchangeable bases and CEC by ammonium acetate	Harmonization of the global matrix
Available micronutrients (Fe Zn Cu Mn Mo Ni Cd) – extraction using DTPA	Harmonization of the global matrix
Boron by hot water extraction	Harmonization of the global matrix
Mehlich III for macro and micronutrients (including S and B)	Harmonization of the global matrix
BIOLOGICAL PARAMETERS	
Microbial biomass C and N by chloroform fumigation-extraction	Harmonization of the global matrix
Microbial enzyme activities	Drafting of the matrix
Soil respiration rate	Harmonization of the global matrix

Update on the harmonization of the GLOSOLAN Standard Operating Procedures (SOPs) 2020-2021

We faced some delays on the preparation of the SOPs but we should be able to publish them by the end of the year.

Overall, we faced major delays on the preparation of the matrixes on soil biological parameters: few experts in the working group. Little inputs on the procedures implemented for each method by laboratories.

Update on the organization of the GLOSOLAN proficiency test (PT) 2021

- 280 set of soil samples available. 10 self-seal bags of soil labeled with a unique sample code: GLO-01, GLO-02, GLO-03, GLO-04, GLO-05, GLO-06, GLO-07, GLO-08, GLO-09 and GLO-10. Each self-seal bag contains 10 g of homogenized soil material.
- 249 laboratories replied the survey. 8 laboratories do not wish to participate to the PT

Laboratories that will participate in the GLOSOLAN PT2021 will be selected based on:

- geographical balance: we will involve at least 1 laboratory per country
- number of parameters (in the list provided below) that interested laboratories can measure
- method of analysis (in the list below) that the interested laboratories can perform
- first come, first served

Decision on the laboratories to participate in the PT: **end of October 2021**
Shipment of the soil samples: **November 2021**

Update on the organization of the GLOSOLAN proficiency test (PT) 2021

Participa ·bon, available

No replic

Laborato

Recomm d in the PT in

Soil parameter to measure	Method to use	Units of measure	Amount of soil needed for the analysis in the GLOSOLAN SOPs	GLOSOLAN preference
CARBON (please choose maximum two methods)				
Soil organic carbon	Walkley and Black	% (OC)	1 g	X
Total carbon	Dumas	g kg^{-1}	2 g	X
Organic matter	Loss of ignition 450-550°C	% (OM)	1 g	
PHOSPHOROUS (please prefer to analyze available phosphorus by Olsen)				
Available phosphorus	Olsen	mg kg^{-1}	5 g	X
	If the amount of soil you have left allows, please choose only one of the following methods			
	Bray I	mg kg^{-1}	2 g	X
	Bray II	mg kg^{-1}	2 g	X
	Mehlich I	mg kg^{-1}		
NITROGEN (if the amount of soil you have soil left allows, please analyze it for nitrogen content)				
Total nitrogen	Dumas	% (TN)	1 g	
Total nitrogen	Kjeldahl	% (TN)	1 g	

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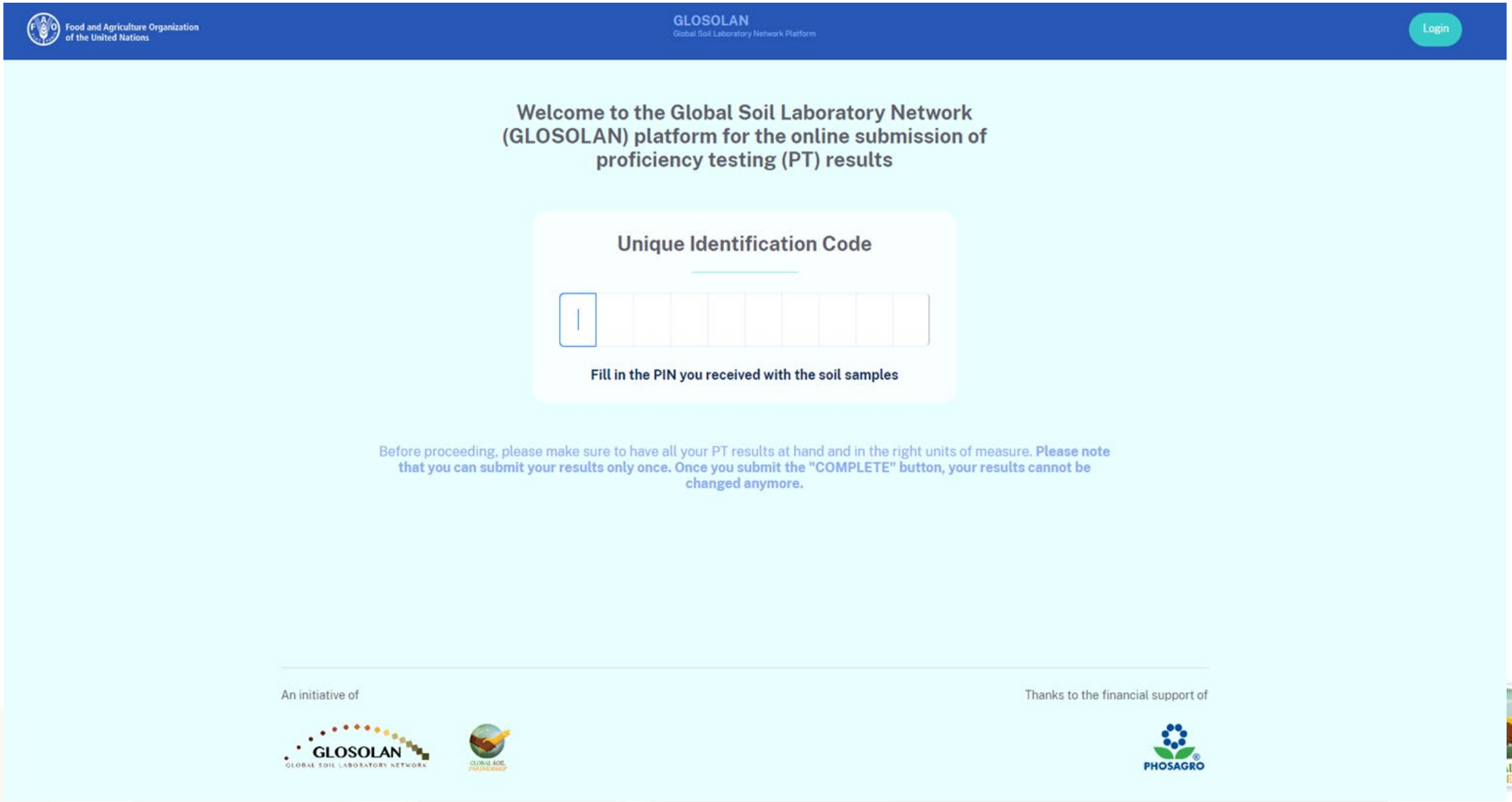
GLOBAL SOIL PARTNERSHIP

Update on the organization of the GLOSOLAN proficiency test (PT) 2021

Please decide what analysis to conduct and methods to use before starting the analysis of the soil samples in order to ensure the sufficient soil to do the analysis (not more than 10 g).

YES		NO	
Total carbon by Dumas	2 g	OC by Walkley and Black	1 g
Available phosphorus by Olsen	5 g	Total carbon by Dumas	2 g
Available phosphorus by Bray I	2 g	Available phosphorus by Olsen	5 g
Total Nitrogen by Kjeldhal	1 g	Available phosphorus by Bray I	2 g
		Total Nitrogen by Kjeldhal	1 g
Amount of soil needed to conduct the analysis	**10 g**		**11 g**

Update on the organization of the GLOSOLAN proficiency test (PT) 2021



Update on the GLOSOLAN procurement

Laboratories from developing countries that participated in the GLOSOLAN PT 2019 and demonstrated not to need of training, were granting with some laboratory equipment based on their needs.

In Asia, GLOSOLAN provided or is still delivering equipment to India, Thailand, Viet Nam and the Philippines.

Information on the equipment provided to laboratories are available on the GLOSOLAN equipment interactive map

https://www.google.com/maps/d/u/0/viewer?mid=1jBPpxWuR11zZBdb33uKPc5p-b7YMZasw&ll=-4.071089731893589%2C50.49734587214468&z=4

To learn more on the GLOSOLAN programme on soil laboratory equipment please visit

https://www.fao.org/global-soil-partnership/glosolan/equipment/en/

Update on the GLOSOLAN procurement

Philippines

Country
Philippines

Laboratory
Bureau of Soils and Water Management Laboratory Services Division

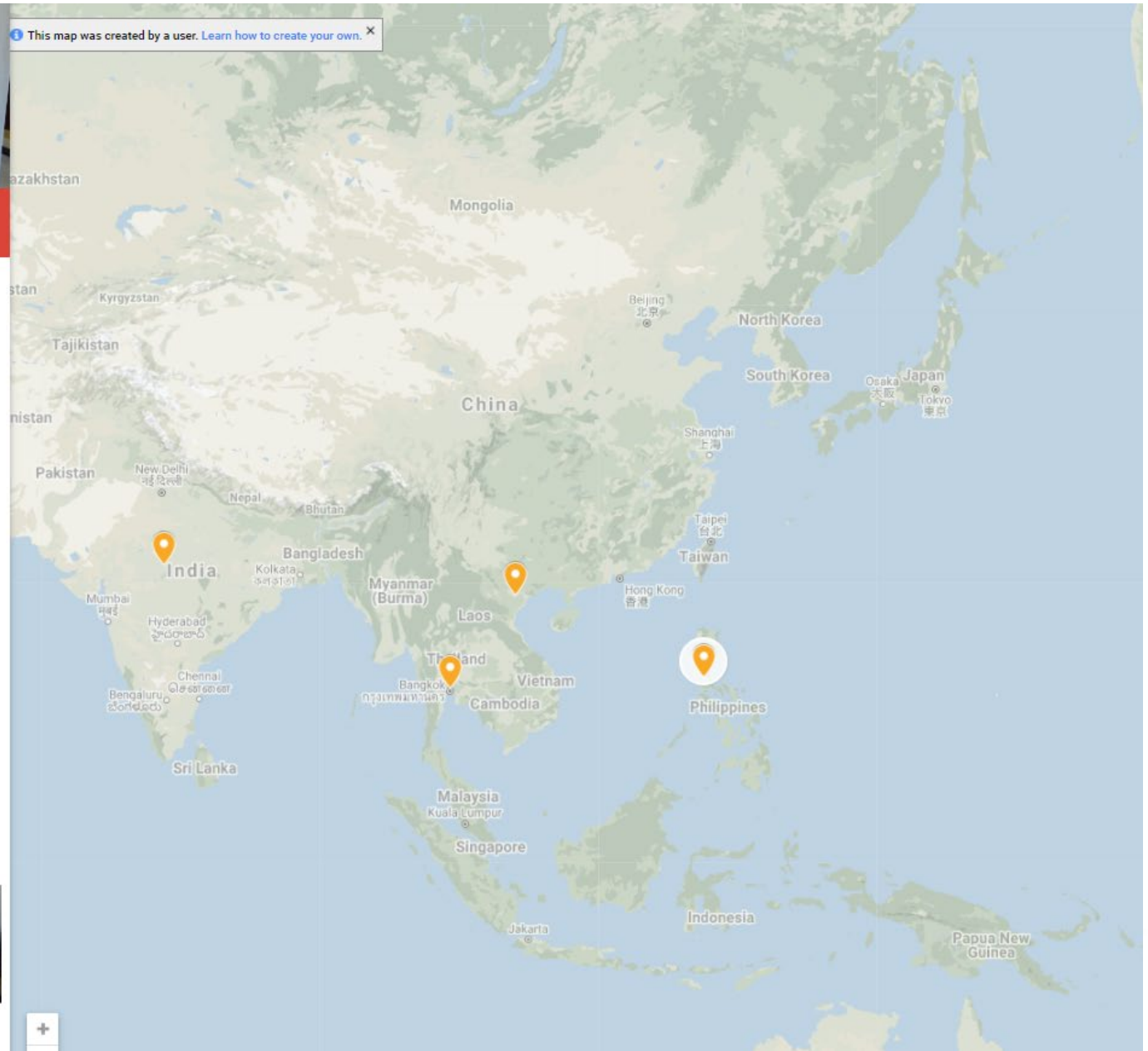
Participation in the GLOSOLAN PT
2019

Address
SRDC Bldg., Elliptical Road cor Visayas Ave., Diliman, Quezon City

Equipment donated
pH electrode (7 pieces), EC electrode for conductivity/temperature (2 pieces), EC electrode for conductivity (2 pieces), digital titrator (3 pieces)

Financial Support
PhosAgro

Status
Delivered



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ASIAN SOIL LABORATORY NETWORK

Thanks for your attention

GLOBAL SOIL PARTNERSHIP