



Food and Agriculture
Organization of the
United Nations

3rd Workshop of the International Network of Black Soils



**Cooperation opportunities
between the Global Soil
Laboratory Network
(GLOSOLAN)
and the INBS**

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13-14 December 2021



Why does soil analysis matter?



GLOSOLAN aims to harmonize soil analysis methods so that soil data is comparable and interpretable across soil laboratories in a country, between countries and regions, and globally.



Decision making is based on data AVAILABILITY and QUALITY

...there are **dAt@** and **DATA**

- Data should be reliable (accurate and precise)
- Data should be comparable



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 (GLOSOLAN-Spec)**



Harmonization of fertilizers
quality assessment procedures

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On November 21, 2021, the network had 760 laboratories registered



Africa AFRILAB	Asia SEALNET	Europe & Eurasia EUROSOLAN	Latin America LATSOLAN	Near East & North Africa NENALAB	North America	Pacific ASPAC
143	117	151	192	72	8	77

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GLOSOLAN has been paying great attention to soil parameters of interest to the INBS

- Harmonization of **Standard Operating Procedures (SOPs)**, which are translated in the 6 UN languages (plus others)
- Organization of **proficiency tests (PTs)** – national, regional and global
- Organization of trainings in the form of **webinars** on the implementation of GLOSOLAN SOPs
- Recording of **video training** with subtitles in the 6 UN languages
- **Procurement** of equipment to laboratories in need

Standard Operating Procedures (SOPs) | Year of publication

2019	2020	2021
<ul style="list-style-type: none"> • Sample pre-treatment • Inorganic carbon (CaCO₃ eq.) • OC Walkley and Black • Total carbon (Dumas – dry combustion) 	<ul style="list-style-type: none"> • Bray I • Bray II • Olsen P • Mehlich I • Mehlich III (postponed to 2021) • pH in water • pH in KCl • pH in CaCl₂ • EC saturated paste • EC in water • N Dumas • N Kjeldahl • Mineral N (still under writing) • Tyurin 	<ul style="list-style-type: none"> • Particle size-distribution by pipette method and hydrometer • Bulk density • Moisture content by gravimetric method • Particulate organic carbon by physical fractionation • Quasi-total elements by digestion using aqua regia and EPA. This includes total heavy metals • Exchangeable bases and CEC by ammonium acetate • Available micronutrients (Fe Zn Cu Mn Mo Ni Cd) – extraction using DTPA • Boron by hot water extraction • Mehlich III for macro and micronutrients (including S and B) • Microbial biomass C and N by chloroform fumigation-extraction • Microbial enzyme activities • Soil respiration rate

Standard Operating Procedures (SOPs) | Work plan 2022

Chemical parameters

- Organic matter by loss of ignition
- Available phosphorus by KCl
- Exchangeable acidity by KCl 1M
- Greenhouse gases (GHGs) emissions in soil
- Soil buffer capacity using KOH
- Fe and Al oxides by ammonium oxalate
- Fe and Al oxides by sodium citrate plus sodium dithionite

Physical parameters

- Water retention (pF) curve
- Particle density by pycnometer

Biological parameters – to be discussed and harmonized with NETSOB

(International Network on Soil Biodiversity)

- Nitrifying bacteria
- Microbial population identification
- DNA extraction



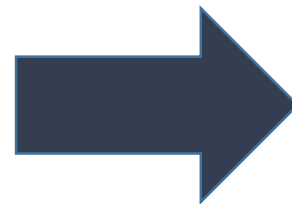
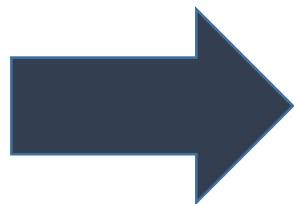
3rd Workshop of the International Network of Soil Organic Carbon Analysts



**26 trainers from 16
different countries
(6 regions)**



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Organization of Inter-laboratory comparisons or proficiency tests (PTs)

- 2 Regional PT 2018 (Asia & Latin America)
- Global PT 2019 (approx. 80 laboratories)
- **Global PT 2021 (approx. 280 laboratories)**

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GLOSOLAN procurement | Interactive map



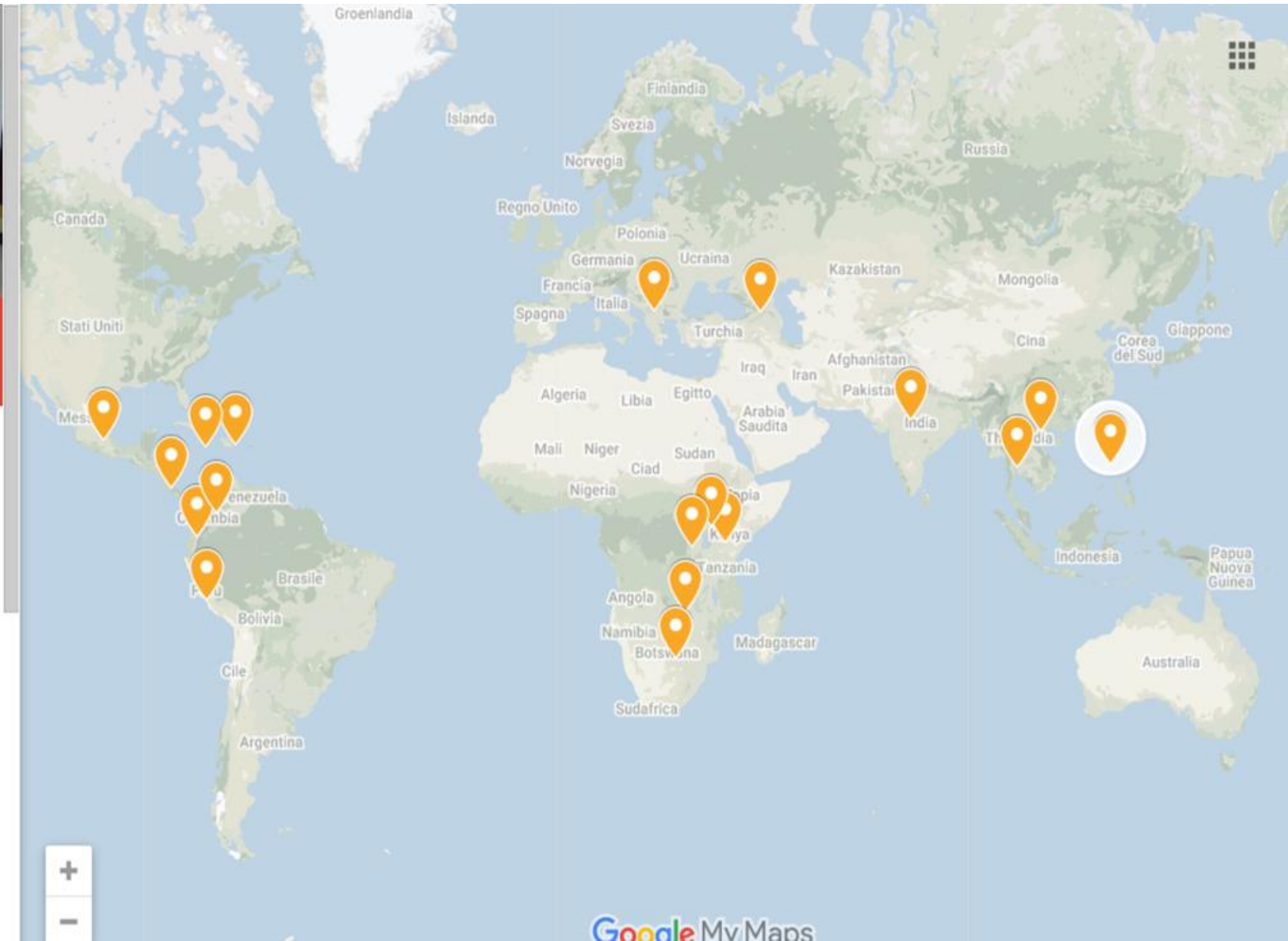
← Philippines ↻

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



GLOSOLAN – INBS collaboration proposal

1. INBS to spread the voice on GLOSOLAN to motivate laboratories working on black soil analysis to join the network
2. INBS experts to contribute to the writing, review and update of GLOSOLAN SOPs and training material

GLOSOLAN would like to promote the *transition* towards the use of **more sustainable methods**.

Can INBS experts help us to **develop** new and sustainable methods of analysis?

Overall, GLOSOLAN can take care of NETSOB's work related to soil laboratories in order to avoid duplication of efforts

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



Most laboratories implement **NOT sustainable methods** (e.g. Walkley and Black), which bring risk both for the environment (waste disposal) and human health

GLOSOLAN – INBS collaboration proposal

1. INBS to spread the voice on GLOSOLAN to motivate laboratories working on black soil analysis to join the network
2. INBS experts to contribute to the writing, review and update of GLOSOLAN SOPs and training material
3. INBS and GLOSOLAN to prepare **awareness raising material** on black soil analysis and management
4. INBS experts to provide **training** on black soil analysis (as per the GLOSOLAN SOPs)
5. INBS experts to **support and advice** laboratories as needed

Overall, GLOSOLAN can take care of NETSOB's work related to soil laboratories in order to avoid duplication of efforts

Thanks for your attention