SEALNET-VI/22/Report

Food and Agriculture Organization of the United Nations

GLOBAL SOIL PARTNERSHIP

Report of the Sixth meeting of the Asian Soil Laboratory Network (SEALNET)

Virtual meeting, 21 - 22 September 2022

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 2022

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Introduction

The sixth meeting of the Asian Soil Laboratory Network (SEALNET) was held online on 21 and 22 September 2022. The meeting was attended by about 150 laboratory staff members from 18 Asian countries. The list of participants is available in Annex I.

The meeting was opened by Ms Gina Nilo, SEALNET Chair and Chair of the Asian Soil Partnership who recalled the objectives of the meeting: (i) to inform Asian laboratories on the progress and the way forward of the Global Soil Laboratory Network (GLOSOLAN), (ii) to bring soil laboratories issues and challenges to the attention of national governments by bridging the gap between soil laboratories and national focal points to the Global Soil Partnership (GSP), (iii) to discuss the results of the GLOSOLAN proficiency test (PT) 2022, (iv) to identify the standard operating procedure for GLOSOLAN and SEALNET to harmonize, and (v) to open the discussion on the interpretation of laboratory results and the provision of recommendations to farmers.

In order to meet these objectives, national focal points to the GSP were invited to attend the first day of the meeting (see agenda in Annex II).

Highlights and conclusions

Ms Lucrezia Caon (GLOSOLAN coordinator) opened the meeting by introducing national focal points to the GSP and new SEALNET members to GLOSOLAN, recalling that uncertainty in soil data is currently too large to monitor changes in soil properties, to make scientific conclusions or to pay for ecosystem services. By improving the performance of soil laboratories and reducing uncertainty in the measurement, GLOSOLAN plays a key role in providing better soil data for better soil management and decision-making. At present, GLOSOLAN is composed of almost 1 000 member laboratories organized into Regional Soil Laboratory Networks (RESOLANs). Since 2021, GLOSOLAN supports countries in establishing their National Soil Laboratory Networks (NASOLANs).

Thereafter, the discussion focused on the following topics:

- National Soil Laboratory Networks (NASOLANs).

During the meeting, representatives from Bangladesh, India, Indonesia, Mongolia, Philippines and Thailand shared their experience on the establishment of their NASOLANs. The main benefits obtained from an established, well-functioning NASOLAN were identified as the implementation of several activities, according to laboratories' main needs. These include the organization of regular national inter-laboratory comparisons (Proficiency Tests – PTs) and continuous training of laboratory staff members.

Sharing experience was useful to many other laboratories that are facing issues in establishing their own national network, who benefited from hearing successful stories from similar contexts. In general terms, countries reported the need to have more visibility at the national scale. It was suggested that this might be solved by increasing soil laboratories' participation to national meetings and soil conferences and by involving soil laboratories in decision-making processes. Soil laboratories are overall well distributed on national territories but they lack communication.

Substantially, main factors to effectively establish a NASOLAN were identified as (i) sharing of experiences from other countries on how to overcome obstacles, (ii) improving the communication among laboratories, (iii) receiving more support from the national government, and (iv) a stronger leadership of the national reference laboratories.

Countries were invited to provide information on the status of establishment of their NASOLAN or their NASOLAN activities to the GLOSOLAN coordinators. Information will be used by the GLOSOLAN coordinators to create or update NASOLAN webpages.

- Bridging the gap between soil laboratories and national governments

Mr Filippo Benedetti (GLOSOLAN Alternate coordinator) presented the results of the survey on the interaction between national reference laboratories and national focal points to the GSP. The survey was completed by the national reference laboratories for Bhutan, China, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka and Vietnam. When asked about the type of support they receive from the government, the majority of laboratories (40 percent) answered that they either do not receive any type of support or that they receive moral support or support in terms of recognition and visibility at the national level. Only ten percent of respondents declare to receive support in the form of additional staff or by having a preferential communication channel with the government.

The majority of laboratories (83 percent) do not receive any support from sponsors or donors other than the government. Still, the majority of laboratories that answered the survey (six) are the main data providers to their government although other institutions support national soil assessment and mapping activities. Three laboratories are the main and unique soil data providers to their government, one provides data to other organizations following the signature of a written agreement, and only one laboratory is not involved soil assessment and digital soil mapping at all.

During the subsequent open discussion, many laboratory representatives shared the status of relations with their national governments. The lack of support from the national institutions was reported by most countries. One major root cause was recognized in the poor organization and connections among governmental offices, which are often scattered. Moreover, soil laboratories and decision-making bodies related to soil management usually belong to different branches of the government (i.e. different ministries). In this regard, an effort should be made to strengthen the relations between the National Reference Laboratories, the GSP Focal Points and FAO Offices. This should ultimately lead to strengthening the relations with the national government.

- SEALNET performance in the GLOSOLAN PT 2022

Mr Christian Hartmann (IRD France) presented an overview of the performance of the SEALNET members that participated to the GLOSOLAN Proficiency Test (PT) 2022. Fifty-one soil laboratories from 13 Asian countries received a parcel containing a set of ten soil samples. Each sample contained 10 g of homogenized soil material that has been dried, sterilized and packed in double-layers plastic bags. Each sample was labelled in progression using the suffix “GLO-” (i.e. GLO-1, GLO-2, etc.). Laboratories were asked to determine few basic chemical parameters for each sample, namely: soil carbon, total nitrogen and soil

available phosphorus. While total nitrogen and available phosphorus were not mandatory parameters to analyze, PT participants were asked to deliver results on carbon as a mandatory condition to join the PT. This condition was decided due to the global need to have precise data on the organic carbon content of the soil given its role in fighting climate change.

The PT instructions delivered to each participant specified that the Standard Operating Procedures (SOPs) harmonized by GLOSOLAN should have been used to analyze each soil parameter. These were:

SOPs on carbon:

- Total carbon by Dumas dry combustion method available in English, Spanish and Russian (EN | ES | RU);
- Organic carbon by Walkley and Black method – titration and colorimetric method available in English, Spanish and Russian (EN | ES | RU);
- Organic matter by loss of ignition. Please note that GLOSOLAN does not have a SOP for measuring organic matter by loss of ignition at 450-550 °C yet.

SOPs on phosphorus:

- Soil available phosphorus by Olsen method available in English only (EN);
- Soil available phosphorus by Bray I method available in English only (EN);
- Soil available phosphorus by Bray II method available in English only (EN).

SOPs on nitrogen:

- Soil total nitrogen by Dumas dry combustion method available in English only (EN);
- Soil total nitrogen by Kjeldahl method available in English only (EN).

The low amount of soil needed to carry out the analysis using the methodologies reported above allowed participants to perform more than one procedure for the same parameter.

Each laboratory was provided with a unique pin code to be used to upload the analysis results on an online platform that was developed by GLOSOLAN with the purpose of facilitating the collections of data from PT participants and guarantee anonymity. Mr Benedetti informed that in few cases major issues were faced with the shipment of samples. More in details, the parcel sent to Chinese participants were destroyed at the customs because of the lack of some needed documents. Moreover, due to internal issues, the samples addressed to Thai laboratories were shipped with major delays. These laboratories' results will be compared to the consensus values obtained from the results submitted by all other PT participants, allowing the laboratories operating in Thailand to receive a report of their performance anyway. Mr Benedetti remarked the importance of ensuring a clear overview of the countries' regulations prior proceeding in shipping the soil samples, as the preparation and delivery of PT samples is a time-consuming and expensive operation. This information should also be made available on the soil import legislation (SIMPLE) database.

Mr Hartmann shared some outcomes on the performance of Asian laboratories for the carbon analysis only. The overall results (on both regional and world scales) will be described in detail in the PT global report, which is under preparation. Moreover, all PT participants received an individual report of their performance.

The analysis of the PT results allowed for insight of the most adopted methodologies. For instance, it seems that most Asian laboratories use the Walkley and Black method to measure soil organic carbon (SOC), as

38 out of the 40 participants of the GLOSOLAN PT submitted results following this procedure. In contrast, only seven laboratories reported SOC values using Dumas method; while only four participants from the region measured SOC following the loss of ignition methodology. As explained above, laboratories could perform more than one methodology to determine the same parameter (e.g. both Walkley and Black and Dumas), as long as the amount of sample was sufficient.

Results obtained using Walkley and Black method (see figure 1) highlighted that the uncertainty (i.e. dispersion of the results around the consensus values) of the analysis results received from Asian laboratories participating to the PT was quite similar to the global values (coefficient of variation between 10 and 15 percent). The only exceptions are samples A and F, which were those with the lowest and the highest carbon content, respectively. In these two cases, the variability was the largest, meaning that Walkley and Black method might not well adapt to such extreme values. Moreover, Mr Hartmann explained that within the ten-sample set received by laboratories, five samples were actually replicas of the same soil. This was done to test laboratories' precision in blindly measuring the same soil material multiple times. Overall, results suggested that SEALNET members determined similar consensus values but with different uncertainties, revealing issues with precision. Moreover, the boxplots reported in figure 1 highlight that some outliers were present and, even if few in numbers, are rather high reaching unrealistic values of almost 10 percent of carbon. This suggests a lack of internal quality control within the laboratory. More in details, the outliers for the five replicas (samples E1, E2, E3, E4, and E5) were rarely repeated. This leads to the conclusion that many laboratories had problems providing similar results when analyzing the same samples.

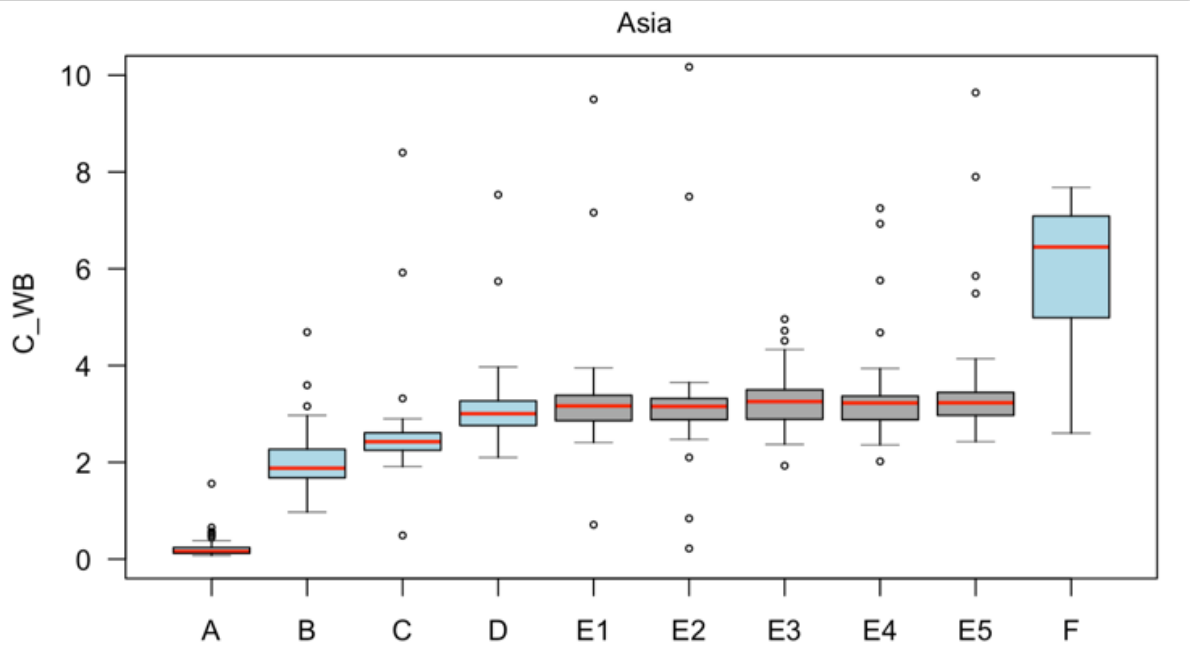

Figure 1 – Boxplots reporting the results collected from the SEALNET participants to the GLOSOLAN PT 2022 for soil organic carbon using the GLOSOLAN SOP for Walkley and Black method. Letters A-F correspond to the samples delivered to laboratories ordered from the lowest to the highest carbon content. Please note that the A-F order does not coincide with the order of samples' labelling (GLO-1, GLO-2, etc.). The y-axis report carbon content (percentage).

The boxplots of figure 2 reports the data collected from those Asian laboratories which submitted results for carbon using the Dumas method. As there were only seven submissions for this methodology, the information reported in the graph is not relevant to analyze the results. However, the unbalanced boxplots (tendency towards the lower portion of the y-axis) show that apparently only two or three laboratories were close to the consensus values, while the remaining submissions reported lower values. Anyhow, the uncertainty is too large (around 40 percent of coefficient of variations). Mr Hartmann remarked that outliers were observed even when using a high technology instrument (such as the Dumas apparatus). In such circumstances, this is likely to be caused by mistakes made by laboratory staff upon transcription of analysis results, meaning that wrong results might be derived from even a correct measurement.

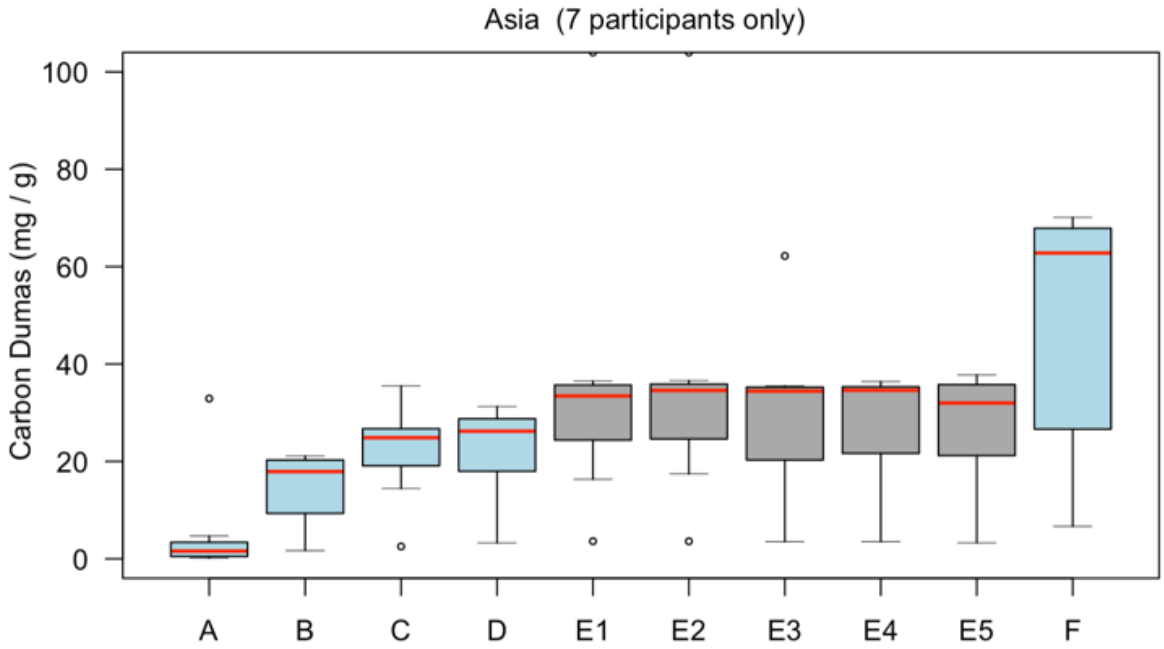

Figure 2 – Boxplots reporting the results collected from the SEALNET participants to the GLOSOLAN PT 2022 for soil total carbon using the GLOSOLAN SOP for Dumas method. Letters A-F correspond to the samples delivered to laboratories ordered from the lowest to the highest carbon content. Please note that the A-F order does not coincide with the order of samples' labelling (GLO-1, GLO-2, etc.). The y-axis report carbon content (mg/g).

Mr Hartmann informed participants that the data collected using the loss of ignition method was very low in number (four submissions only). For this reason, it was not possible to proceed with a statistical analysis and the derived boxplots results basically in an illustration of the consensus values depending on the method. Consequently, the graph for loss of ignition is not included in this report.

During the discussion, the willingness to organize regional and national PTs was shared. However, despite participants acknowledging the guidelines prepared by GLOSOLAN on how to produce a soil sample for proficiency testing, it was pointed out that further training should be organized to build the capacity of laboratories in organizing regional and national PTs. For this reason, GLOSOLAN Technical Committee is currently preparing a training video to provide systematic guidance on PT organization.

- Standard Operating Procedures (SOPs)

Ms Caon recalled how GLOSOLAN SOPs are harmonized, stressing that a modified procedure is followed when there are few experts on a topic in the working groups or when there are only few laboratories using a given method. In this regard, harmonization matrices are used as a reference within the working group and are not sent to the GLOSOLAN network for completion.

In order to open the discussion on the SOPs that SEALNET recommends GLOSOLAN to harmonize in 2022, Ms Caon summarized the SOPs that the network harmonized already. See table 1. To note that since GLOSOLAN already harmonized the majority of methods widely used worldwide, in 2023, RESOLANs will focus on harmonizing SOPs of regional relevance.

Table 1. SOPs harmonized by GLOSOLAN in 2019 - 2022

	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	Microbial Enzyme Activities (B-Glucosidase, Arylsulfatase, Dehydrogenase), N Mineralization (incubation method), Nematodes trophic groups (wet extraction), QBSar, ISO-TSBF

SEALNET will propose GLOSOLAN to harmonize the following SOPs:

- *Chemical parameters:* none
- *Physical parameters:*
  - laser granulometry method
  - Pario method
- *Biological parameters:*
  - DNA extraction

- Interpretation of laboratory results and provision of recommendations to farmers

Mr M.V. Krishnaji, Principal Scientist (Extension) at the Regional Agricultural Research of Maruteru (India) shared with participants his experience concerning the relationship between famers and soil laboratories, highlighting the low frequency with which farmers ask for soil analysis (in some cases even once every four years). Moreover, the lack of knowledge on how to properly collect soil samples and interpret laboratory results was pointed out. Mr Krishnaji also reported the main issues faced by laboratories in India, such as the delay in delivering analysis results and the diffuse inadequacy to perform other type of analysis (i.e.

physical, biological, fertilizers) rather than the chemical ones. The presentation focused also on the key role played by extension agents and agricultural research stations in bridging the gap between soil testing facilities and farmers, especially on how to properly collect samples, interpret analysis results and highlighting the importance of soil testing.

During the discussion, representatives from Bangladesh, Thailand and Malaysia shared their experience in interacting with farmers. These included on-site training on sample collection, provision of interpretation guidelines to farmers from the laboratory staff members (or even by agricultural officers or extension agents), and the analysis results delivered within two weeks, in order to allow farmers to apply the adequate amount of fertilizers and inputs to soil with promptness.

- Announcements

Mr Benedetti closed the meeting by introducing participants to the new GLOSOLAN website and by inviting them to participate in the 6th GLOSOLAN meeting from 22 to 24 November 2022. Laboratories were also invited to send video messages wishing happy birthday to GLOSOLAN in their local languages. Videos will be displayed at the *Five years of GLOSOLAN* celebration on November 10.

Venue and time of the next meeting

The seventh SEALNET meeting will take place online between September and October 2023.

Annex I. List of participants

Ms Lucrezia Caon, Global Soil Partnership Secretariat, FAO HQ

Mr Filippo Benedetti, Global Soil Partnership Secretariat, FAO HQ

Ms Magdeline Vlasimsky, Global Soil Partnership Secretariat, FAO HQ

Mr Giacomo Rocchegiani, Global Soil Partnership Secretariat, FAO HQ

Name	**Laboratory**	**Country**
Mohammad Rafi Salihzada	Parwan province soil Laboratory	Afghanistan
Nizam Abdulwaris	Nangrahar Research Station Ariculture Soil Analysis LabSoil	Afghanistan
A. F. M. Manzurul Hoque	Soil Resource Development Institute	Bangladesh
Shamim Al Mamun	Soil and Organic Waste Management Laboratory	Bangladesh
Zainal Abedin	Central Laboratory, Soil Resource Development Institute	Bangladesh
Jamyang Jamyang	SPAL	Bhutan
Jamyang Jamyang	Soil and Plant Analytical Laboratory	Bhutan
Sambo Pheap	Soil Science Laboratory	Cambodia
Qi Jin	China National Center for Quality Inspection and Test of Chemical Fertilizers(Beijing)	China
X Li	Daqiuyin Testing Sci & Tech, LLC	China
Christian Hartmann	IRD	France
Ashok Patra	India	India
Chetna Nimje	CRAL, ICRISAT, India	India
Pradip Dey	ICAR-IISS	India
Pushpajeet Choudhari	India	India
Sanjay Srivastava	ICAR Indian Institute of Soil Dcience	India
Sreenivas Ch	Soil Lab, Maruteru, ANGRAU, India	India

Venkata Satish	ICRISAT	India
Ambar Fitri Rochyati	ISRI laboratory	Indonesia
Dessy Dwi Septian	Indonesian Soil Research Institute	Indonesia
Husnain Msc	Husnain Msc	Indonesia
Laili Purnamasari	Indonesian Soil Research Institute	Indonesia
Lenita Herawaty	ISRI_Lab.	Indonesia
Linca Anggria	ISRI Laboratory	Indonesia
Yuji Maejima	Institute for Agro-Environmental Sciences, NARO	Japan
Yuta Ise	Institute for Agro-Environmental Sciences, NARO	Japan
Xaysatith Souliyavongsa	Soil lab_Laos	Laos
Christopher Teh	Dept. of Land Management, Fac. of Agriculture	Malaysia
Faridah Manaf	Soil Chemistry Laboratory, MARDI	Malaysia
Liza Nuriati Lim Kim Choo	Soil and Water Laboratory MARDI Saratok	Malaysia
Muhammad Izzat Ilmin	Department of Agriculture (DOA), Malaysia	Malaysia
Norziana Zin Zawawi	soil chemistry laboratory MARDI Serdang Malaysia	Malaysia
Nur Azarina Abu Bakar	Laboratory Services Division, Department Of Agriculture Malaysia	Malaysia
Nurjahirah Janudin	Soil Laboratory	Malaysia
Sumathy Rajendran	Laboratory Service Division, Department Of Agriculture	Malaysia
Dulamsuren Byambasuren	The soil and water's chemical laboratory in The specialized inspection	Mongolia
Enkhbat Jamsran	Soil laboratory	Mongolia
Enkhtuya Bazarradnaa	Soil laboratory of IPAS	Mongolia
Ganbold Altantuya	Agrochemistry Laboratory IPAS	Mongolia
Khadbaatar Sandah	Monlab	Mongolia

Khishigjargal Delgersaikhan	Soil agrochemistry Laboratory	Mongolia
Munkhbat Batjargal	Soil-Agrochemistry laboratory of IPAS	Mongolia
National University Of Mongolia_Nyamdavaa	Geopedology	Mongolia
Zandraagombo Dovchin	Soil science agrochemistry laboratory	Mongolia
NA	Soil And Plant Analysis Laboratory	Myanmar
Aung Kyaw Thu	Irrigation Water Quality Analysis Laboratory	Myanmar
Cho Mar Htwe	Land Use Laboratory, Mandalay, Department of Agriculture	Myanmar
Thandar Nyi	DoA, LUD soil and fertililzer analysis lab	Myanmar
Santosh Shrestha	Agricultural Technology Center Pvt. Ltd.	Nepal
Abdul Jabbar	FFC LAB Sheikhupura	Pakistan
Muhammad Aziz	Soil & Water Testing Laboratory, FFC	Pakistan
Muhammad Faheem Shahid	FFC Soil and Water testing lab	Pakistan
Muhammad Hashir	Soil & Water Testing Lab, Fatima Fertilizer, Multan, Pakistan	Pakistan
Muhammad Humza	FFC Soil & Water Testing Labs	Pakistan
Muhammad Irshad	FFC	Pakistan
Muhammad Saleem Chang	Crop plants and soil analysis laboratory department of Agronomy Sindh Agriculture University Subcampus Umerkot Pakistan	Pakistan
Munir Zia	FFC Soil Testing Labs	Pakistan
Waqar Ahmad	National Focal Person	Pakistan
Jovino De Dios	Philippine Rice Research Institute Soils Laboratory	Philippine
Agnes Morada	BSWM-Laboratory Services Division	Philippines
Aileene Millare	Regional Soils Laboratory-Department of Agriculture RFO 1	Philippines
Ann Fatima Benjamin	Laboratory Services Division	Philippines

Annie Espiritu	PhilRice - Agronomy Soils and Plant Physiology Laboratory	Philippines
Aurora Manalang	Bswm laboratory services division	Philippines
Beatriz Magno	Laboratory Services Division, BSWM	Philippines
Bergil Bernaldo	Bureau of Soils and Water Management	Philippines
Bureau Of Soils And Management	Bureau of Soils and Water Management	Philippines
Carleen Calimpon	Regional Soils Laboratory	Philippines
Christopher Ian Bahinting	Regional Soils Laboratory IX	Philippines
Cristel Andrea Reyes Gardoce	PhilRice ASPPD	Philippines
Dennis Sibongga	F.A.S.T. Laboratories	Philippines
Diana Rica Godez	DA4A - Regional Soils Laboratory	Philippines
Elena Susaya	Regional Soils Laboratory DA RFO - 10	Philippines
Elena Susaya	Regional Soils Laboratory	Philippines
Emma Tayad	Regional Soils Laboratory	Philippines
Eunice Aquino	Department of Agriculture-Regional Soils Laboratory Region 1	Philippines
Evangeline Valdez	F.A.S.T. Laboratories-Cubao	Philippines
Ezra Mae Gamboa	Bureau of Soils and Water Management-Laboratory Services Division	Philippines
Gerame Calapre	Department of Agriculture RFO VII - Regional Soils Laboratory	Philippines
Gina Nilo	Bureau of Soils and Water Management LSD	Philippines
Gina P. Nilo	BSWM-LSD	Philippines
Ina Mae Leoro	Bureau of Soils and Water Management	Philippines
Jamie Ann Tumolva	Bureau of Soils and Water Management	Philippines
Jay Mark Tingcang	Regional Soils Laboratory 8	Philippines
John Michael Fabellar	Regional Soils Laboratory IV-A	Philippines

Jon Klyde Mayol	Department of Agriculture - Regional Soils Laboratory RFO IX	Philippines
Joshua Mikhel Reyes	BSWM	Philippines
Kiven Florendo	RSL Zamboanga City	Philippines
Leah Fe Briones	DA-Regional Soils Laboratory	Philippines
Liwayway Honrade	Department of Agriculture IVA-Regional Soils Laboratory	Philippines
Lyra Espectacion	Bureau of Soils and Water Management - Laboratory Services Division	Philippines
Ma Aussielita Lit	ASTS	Philippines
Ma. Celia Raquepo	Laboratory Services Division	Philippines
Mabelle Oblianda	DA Regional Soils Laboratory IVA	Philippines
Mari Mar Mahalan	DARFO1-Regional Soils Laboratory	Philippines
Maria Carmela Capule	CRL Environmental Corporation	Philippines
Maria Kristina Ventura	PSWL-SK	Philippines
Maribel Jalalon	Bureau of Soils and Water Management	Philippines
Maribel Mananguit	DA-RFO CAR RSL	Philippines
Marie Mercedita Pascual	Department of Agriculture - Regional Soils Laboratory 9	Philippines
Marife Rebalde	Regional Soils Laboratory Department of Agriculture RFO7	Philippines
Marjorie Jean Tao	Bureau Of Soils And Water Management	Philippines
Marnellie Pini	Nueva Vizcaya State University-Soil Laboratory	Philippines
Mary Claire Alyssa Pras	Bureau of Soils and Water Management	Philippines
Mary Elizabeth Suson-Banda	DARFO5 Regional Soils Laboratory 5	Philippines
Micah Carmela Dulnuan	Regional Soils Laboratory - CAR	Philippines
Morena Arnigo	Department of Agriculture-Regional Soils Laboratory	Philippines

Myrna Pabiona	Soil and Plant Analysis Laboratory	Philippines
Neil Ivan Baribe	Laboratory Services Division, Bureau of Soils and Water Management	Philippines
Nelsie Grace Gela	Agro-Based Materials Laboratory	Philippines
Nora L. Talain	Department of Agriculture-Regional Soils Laboratory IV-A	Philippines
Olivia Klarina Paraoan	Philippine Coconut Authority	Philippines
Paralyn Sana	RSL 9 department of agriculture	Philippines
Rainear Mendez	Soil and Plant Analysis Laboratory-Central Mindanao University (SPAL-CMU)	Philippines
Rhodielyn Bacsarpa	Regional Soils Laboratory - DA RFO 13	Philippines
Rikko Jeremy Pedroza	Department of Agriculture-Regional Soil Laboratory 9	Philippines
Rosalie Laxamana	Regional Soils Laboratory - Department of Agriculture RFO III	Philippines
Shaira Mhel Joy Granada	Bureau of Soils and Water Management	Philippines
Sheila Mae Bautista	BSWM-LSD	Philippines
Sherafin Simon Calacar	RSL10	Philippines
Shirley Buduan	Bureau of Soils &Water Mgt	Philippines
Vince Albert Ching	Bureau of of Soils and Water Management - Laboratory Services Division	Philippines
Virgie Celestial	SRA Soils Laboratory	Philippines
Wilfredo De Mesa Jr	Wilfredo O. De Mesa Jr.	Philippines
Renuka Silva	central soil and fertilzer testing laboratory	Sri Lanka
Sudaeshani Perera	Central soil and fertilizer testing laboratory	Sri Lanka
Piyawan	Soil Analysis Group, LDD 3	Thailand
Arthit Sukhkasem	Soil Biotechnology Division	Thailand
Audjima Phongjinda	LDD	Thailand
Aunthicha Phommuangkhuk	Soil Chemistry and Fertility Laboratory	Thailand

Chanida Charanworapan	Office of Science for Land Development	Thailand
Chiraphon	soil analysis technical service group	Thailand
Hutthaya Khongsuk	Soil Analysis	Thailand
Hutthaya Khongsuk	soil Analysis group 1	Thailand
Juthamard Kaiphoem	Soil Technical Service Group	Thailand
Jutharat	Office of Science for Land Development	Thailand
Kornkanok Priammuenwai	Land development development	Thailand
Monthatip	Soil laboratory LDD 3	Thailand
Nopmanee Suvannang	Land Development Department	Thailand
Onanong Chomsiri	Office of science for land development	Thailand
Oomara Klahan	Soil analysis group Regional office 4	Thailand
Owat Yutthum	Soil analysis group region 4. Land Development Department Thailand	Thailand
Pawarisa Janudom	soil Analysis group 1	Thailand
Pitayakon Limtong	LDD	Thailand
Ratchita Pimbueng	soil Analysis group 1	Thailand
Sukanya Klaokliang	Soi Analysis Group, Land Development Regional Office 2, Land Development Department	Thailand
Sukunya Yampracha	Laboratory of Soil Science, KMITL	Thailand
กัญจน์รัชต์ ลชิตาวงศ์	ไทย	Thailand
Do Duy Phai	Central Analytical Laboratory - Soils and Fertilizers Research Institute	Viet Nam
Hoang Cao	Central laboratory of NOMAFSI	Viet Nam
Quocnghi Tong	Center for Agricultural Analysis and Services	Vietnam

Annex II: Agenda

21 September - NFP and laboratories	
7:00 – 7.15	**Opening, endorsement of the agenda and group picture** *Dr Gina P. Nilo, SEALNET and ASP Chair*
7:15 - 7:50	**Item 1. Quick updates (global, regional)** • What is GLOSOLAN • Main achievements at global and regional levels • NASOLANs: establishment and activities (stories from the region) *Ms Lucrezia Caon, GSP Secretariat FAO*
7.50 - 8:50	**Item 2. Soil laboratories and national government: bridging the gap** • NRLs survey outcomes • National Soil Laboratory Networks • Open discussion on how to strengthen the collaboration and communication between laboratories and national Focal Points (governments) • Resource mobilization • Improvement of national soil legislation systems (soil import, waste management and disposal, drainage system, etc.) *Mr Giacomo Rocchegiani, GSP Secretariat, FAO* • Discussion on country-specific project proposals *Moderator: Dr Ch. Sreenivas, SEALNET Steering Committee*
8:50 - 9:00	**Item 3. Announcements** • New GLOSOLAN website • GLOSOLAN 5th anniversary celebrations • 6th GLOSOLAN meeting *Mr Filippo Benedetti, GSP Secretariat FAO*
9:00	**Closure of the meeting**
22 September	

7:00 - 7:30	**Item 4. Proficiency testings** • GLOSOLAN proficiency test (PT) 2021: regional outcomes • Regional and national PTs • Contribution to GLOSOLAN PT organization and implementation
7:30 - 8:00	**Item 5. Standard Operating Procedures (SOPs)** • GLOSOLAN harmonization process (updates, introductory session organization) • Regional harmonization of methods not used worldwide • Prioritize GLOSOLAN documents to be translated *Moderator: Ms Lucrezia Caon, GSP Secretariat FAO*
8:00 – 8:20	**Item 6. Capacity building** • GLOSOLAN video trainings (need for more subtitles, launch a call for new videos) • GLOSOLAN webinars: call for trainers *Mr Filippo Benedetti, GSP Secretariat FAO*
8:20 – 8.50	**Item 7. Interpretation of laboratory results and provision of recommendations to farmers** • Develop regional-based interpretation guidelines • How soil data are used in the field? Extension agent's experience *Dr M.V. Krishnaji, Principal Scientist (Extension), Regional Agricultural Research, Maruteru, ANGRAU, India* *Moderator: Dr Ch. Sreenivas, SEALNET Steering Committee*
8:50 – 9:00	**Wrap up and closure of the meeting**
9:00	**Closure of the meeting**