

EUROSOLAN-III/21/Report



**Food and Agriculture
Organization of the
United Nations**



Report of the third meeting of the European and Eurasian Soil Laboratory Network (EUROSOLAN)

Virtual Meeting, 27 October 2021

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 2021

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1. Introduction

Based on the decision made at the fourth GLOSOLAN meeting in November 2020, all meetings of the Regional Soil Laboratory Networks (RESOLANs) will be focused on decision making only. In this regard, all trainings are being implemented in the form of webinars throughout the year.

The third meeting of the European and Eurasian Soil Laboratory Network (EUROSOLAN) took place on 27 October 2021, on the online platform Zoom (see the meeting agenda in Annex I). The meeting was attended by 76 participants from 29 countries (see list of participants in Annex II). Mr. Giorgi Ghambashidze, EUROSOLAN Chair and Ms. Nopmanee Suvannang, GLOSOLAN Chair opened the meeting by reminding participants about the importance of soil laboratories for decision making, for fighting climate change and for eradicating hunger worldwide. A note was made on the importance of national reference laboratories in establishing National Soil Laboratory Networks (NASOLANs) and trigger actions at the national level.

2. GLOSOLAN updates

Ms. Lucrezia Caon, GLOSOLAN Coordinator, introduced GLOSOLAN objectives and areas of work to new EUROSOLAN members, recalling that GLOSOLAN operates through regional and national soil laboratory networks. Thereafter, Ms. Caon informed participants that on October 12, the network counted on 143 members from the European and Eurasian region. This and other information, including GLOSOLAN availability of publications, on the GLOSOLAN webpage in English, Spanish, French, Arabic, Russian and Chinese. Ms. Caon also reminded participants that the GLOSOLAN webpage and its subpages contain frequently asked questions that GLOSOLAN members can consult before contacting the GLOSOLAN Coordinator by email.

Ms. Caon concluded by thanking all those members of EUROSOLAN that volunteered to translate GLOSOLAN documents, record training videos and act as trainers in webinars. In this regard, she made a call for more experts to support these activities.

Update on the harmonization on the writing of Standard Operating Procedures (SOPs): the working groups are intensively working to harmonize information provided by GLOSOLAN members. Regional harmonization was already achieved, whereas the global harmonization of information for most of the methods is ongoing. Overall, GLOSOLAN faced major delays on the preparation of the matrixes on soil biological parameters because of the presence of few experts on these methods in the working groups, and the few inputs submitted by GLOSOLAN members.

Update on the GLOSOLAN PT2021: 280 set of soil samples are available. Each set contains 10 self-seal bags of 10g homogenized soil material 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. 249 laboratories replied to the survey distributed by the GLOSOLAN Coordinator on their wish to participate to this global exercise. Overall, only 8 laboratories did not wish to participate to the PT2021. 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 serve basis.

A decision on the laboratories that will participate in the PT will be made by the end of October 2021. The shipment of the soil samples will start in November 2021. Participants will receive clear instructions on the analysis to perform on the samples, which should focus on organic carbon, available phosphorus and total nitrogen. PT results should be submitted through an online platform accessible through the GLOSOLAN website.

3. EUROSOLAN updates

Mr. Filippo Benedetti, GLOSOLAN alternate coordinator briefly spoke about the status of the regional network, by reporting the number of laboratories from Europe and Eurasia that registered in GLOSOLAN in 2021 (23 new members of EUROSOLAN, from 15 different countries). Mr. Benedetti highlighted that the GLOSOLAN coordinators will work to liaise with the GSP Focal Points and FAO Offices in those countries where a National Reference Laboratory had not been nominated yet and where no laboratory is registered in the network. Mr. Benedetti recalled the importance of National Soil Laboratory Networks (NASOLANs) in (i) improving the efficacy and outcomes of GLOSOLAN activities, (ii) developing ad-hoc programs to better face global and local challenges, and (iii) in reaching a larger number of laboratories. The role played by National Reference Laboratories in leading the establishment of NASOLANs was stressed as well. After providing a general overview of the status of NASOLANs in the region, Mr. Benedetti kindly asked participants to inform GLOSOLAN coordinators about any initiative in this regard, in order to keep the country profile in the NASOLAN database updated.

4. Projects of regional interest

Participants were informed on activities with a link to soil analysis and soil laboratories ongoing in the region:

- **EJP Soil**

Mr. Andreas Baumgarten (EJP Soil, Austria) presented the EJP programme, an European Joint Programme which includes activities aiming to support the cooperation between laboratories operating in different countries by supporting visits for knowledge exchange as well as soil sampling and analysis. Mr. Baumgarten introduced participants to the two main tasks of the initiative: (i) “Visiting scientists support”, focussed on strengthening institutional partnerships and networks to advance scientific joint work on climate-smart agricultural soils, and (ii) “Access to infrastructure”, which aims to facilitate the access to agricultural soil research infrastructures as well as laboratories for researchers. Mr. Baumgarten provided a detailed presentation on the field applications of the initiative, including information on how to apply for the funding, the needed requirements and the positive impact on EUROSOLAN members to improve their analytical capacity. The next call for tender will be launched in spring 2022 at <https://ejpsoil.eu/visit-the-ejp-soil-ltes-labs/>

- **Global Soil Doctors Programme**

Ms. Silvia Pioli (GSP Secretariat) introduced the Global Soil Doctors Programme to participants; a farmer-to-farmer training programme to promote the practice of sustainable soil management, and to support the work or cover the lack of national extension services. Ms. Pioli reported that several European and Eurasian countries expressed an interest in the programme by completing an online survey. Since the programme counts on the use of a soil testing kit, EUROSOLAN members

could contribute to the implementation of the programme by preparing and supplying reagents for the soil testing kit.

- **GSP mapping activities**

Ms. Caon and Ms. Maria Fantappiè, Pillar 4 Chair for the European Soil Partnership, (on behalf of Mr. Yusuf Yigini, GSP Secretariat) introduced the International Network of Soil Information Institutions (INSII), the GSP network in charge of preparing global maps, databases and information systems through a country-driven approach to participants. Since INSII faces several constraints in terms of data availability, data quality and harmonized data, it would be advantageous if INSII and GLOSOLAN could collaborate. INSII can provide GLOSOLAN with the infrastructure for storing, serving and exchanging soil lab information/spectral services (in relation to the Global Soil Information Systems - GloSIS). It can also implement the harmonization of laboratory data, and build the capacity of laboratories in data processing, storing, mapping and modelling. Otherwise, GLOSOLAN can support INSII by providing fresh measured data, harmonized data, and good quality data. Some proposals previously made by Mr. Yigini on how the INSII-GLOSOLAN collaboration could be implemented were shared with meeting participants. A possibility would be to establish a joint working group to implement specific activities, and to connect GLOSOLAN and INSII members from a same country.

4.1 How to apply for a Technical Cooperation Programme (TCP) project

GLOSOLAN is a self-financed initiative that receives no financial support from the FAO. Financial resources come from projects granted to the Global Soil Partnership (GSP). As a result, budget is mostly allocated to the implementation of global activities since the GSP has very few regional and national projects. GLOSOLAN members are kindly invited to make an effort to mobilize financial resources for the implementation of national and regional activities. The GLOSOLAN coordinator can help countries and laboratories in preparing the concept notes to submit to donors.

There is the possibility for countries to approach FAO as a donor by submitting requests for Technical Cooperation Programme (TCP) projects. General information:

- TCP projects are assigned by FAO every 2 years. All proposals should be submitted within specific deadlines;
- TCP projects provide maximum US\$ 500 000;
- TCP projects should be implemented on average in one – one and a half years' time;
- TCP projects can be used to kick off activities, assess needs and write a second phase project proposal.

Application steps:

1. Know what you want in terms of activities and final objective. The GLOSOLAN coordinator can support the country with the project formulation if needed.
2. Ask your government (e.g. Ministry of Agriculture) to send an official letter requesting a TCP project to your country FAO office (for national TCPs) or to the regional FAO office (for regional TCPs). The

letter should mention: the problem/challenge faced by your country, the request for a TCP project with a note on how the TCP will help to tackle the problem/challenge. Please copy the GLOSOLAN coordinator to your email for internal follow up on the request.

3. Prepare the project document. Please note that there is a ready template for this, that countries cannot prepare it by their own. The GLOSOLAN coordinator and the TCP officer at the FAO country or regional office should be involved in the preparation of the project document.
4. Submission of the project document, waiting for approval and an eventual start of its implementation.

5. EUROSOLAN main needs

Mr. Filippo Benedetti showed the results of an online survey that was launched some days before the meeting, to collect preliminary information on the EUROSOLAN main needs. These are:

- adoption of more modern methods (e.g. soil spectroscopy for soil analysis);
- harmonization of Standard Operating Procedures (SOPs);
- adoption of quality control (QC) procedures (both internal and external);
- provision of regular training on SOPs, soil spectroscopy, equipment use and maintenance, implementation of internal and external QC procedures.

Survey results were used as a base to open the discussion among meeting participants and to develop an ad-hoc regional work plan, especially in regards to the organization of webinars.

Participants were also asked to express their opinion on the level of awareness of national governments on soil laboratories' activities. Fifty percent of participants stated that governments are somewhat aware of what is going on in laboratories but should be more informed. Otherwise, 38 percent of attendees reported that governments are not aware on soil laboratories activities at all. Only 6 percent of meeting participants affirmed that their governments are fully aware of soil laboratories activities, while another 6 percent was not sure about that and thus preferred not to answer to this question. Therefore, the strong majority of meeting participants asked GLOSOLAN to work on the preparation of awareness raising material which may result in a larger technical, financial and political support to soil laboratories operating in the region.

Mr. Christian Hartmann (IRD France) shared with participants a comprehensive presentation on the importance of joining proficiency tests (PTs). Presenters stressed the need of identifying PT sample providers and PT organizers on a regional scale, in order to allow each RESOLAN to implement regional (and national) PTs. Mr. Hartmann and Mr. Watts provided step-by-step guidelines on how to prepare samples for a PT, giving details on the equipment and know-how needed. A call was launched among EUROSOLAN member laboratories to identify volunteers to provide and prepare samples for the implementation of an EUROSOLAN PT.

6. Position of EUROSOLAN in GLOSOLAN

EUROSOLAN members were asked to express their opinion on the main topics for discussion at the upcoming 5th GLOSOLAN meeting:

- **Standard Operating Procedures (SOPs):** Ms. Caon informed participants that so far GLOSOLAN gave priority to the harmonization of soil chemical parameters, those parameters that are most important to soil fertility, and the most used methods in the world. However, in 2020, GLOSOLAN started to work also on soil physical and soil biological parameters (see table 1).

Table 1. SOPs harmonized by GLOSOLAN since 2018

2018	2019	2020 (ongoing)
<ul style="list-style-type: none"> • Sample pre-treatment • Inorganic carbon (CaCO₃ eq.) • OC Walkley and Black • Total carbon (Dumas – dry combustion) 	Bray I Bray II Olsen P Mehlich I Mehlich III (postponed to 2020) pH in water pH in KCl pH in CaCl ₂ 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

A reflection was made on the fact that five years after the establishment of GLOSOLAN, the network might be ready to make a step forward and start working on those methods that are less frequently used but have lower risks for the human health and the environment. This might help the transition towards the use of more sustainable methods.

After recalling how SOPs are harmonized in GLOSOLAN and the role that regional leaders play in it, Ms. Caon opened the discussion on the SOPs EUROSOLAN would suggest for GLOSOLAN to harmonize in 2022. These are:

Chemical parameters

- Exchangeable acidity by KCl 1M. Regional leader: Giorgi Ghambashidze (Georgia);
- Organic matter by loss of ignition. Regional leaders: Giorgi Ghambashidze (Georgia), Lauris Leitans (Latvia);
- Organic carbon by static temperature (prior acidification) ref. Ms. Beata. This is an update of the Dumas method we already published. Regional leader: Beata Tomczyk (Netherlands);

- Carbon fractions - temperature gradient (ref. Ms. Vinci: Temperature dependant differentiation of total carbon (TOC400, ROC, TIC900) draft EN 17505) (postponed). Regional leader: Ialina Vinci (Italy);
- Fe and Al oxides by ammonium oxalate. Regional leader: Elena Shamrikova (Russian Federation);
- Fe and Al oxides by sodium citrate plus sodium dithionite. Regional leader: Elena Shamrikova (Russian Federation);
- Fe and Al oxides by pyrophosphate (not so much used);
- CEC by hexamminecobalt chloride (postponed). Regional leaders: Beata Tomczyk (Netherlands), Marie Tella (France);
- CEC by Ba Cl₂. Regional leader: Giorgi Ghambashidze (Georgia).

Soil pollutants:

- Soil plastic pollution (microplastic) - several methods but there is not a common accepted method (wait - let's see how it evolves at the international level). Regional leader: Oguz Can Turgay (Turkey).

Physical parameters:

- Water retention (pF). Regional leaders: Aurore Degre (Belgium), Marie Tella (France);
- Texture determination by laser diffraction. Regional leaders: Lauris Leitans (Latvia), Beata Tomczyk (Netherlands), Valmire Havolli (Kosovo);
- Aggregate stability. Regional leader: Remigio Paradelo (Spain).

Biological parameters:

- DNA extraction (it is at the basis of microbial identification). Regional leader: Thomas Lerch (France).

EUROSOLAN was informed that in 2021, GLOSOLAN struggled to harmonize some SOPs because of the few inputs received from soil laboratories (completion of the harmonization matrix) and the few experts in the working group. EUROSOLAN suggested to run surveys to enquire on the most used methods before deciding what methods to harmonize. Therefore, efforts should focus on harmonizing the most used methods. Top experts on specific topics should also be involved and take the leadership over the harmonization of some SOPs. Therefore, working groups can be abolished for some SOPs while Review Panels should be preserved.

- **Range and reference values.** The Global Soil Partnership asked GLOSOLAN to work on range and reference values to facilitate the provision of recommendations to farmers and other stakeholders. **Range values** indicate the range of validity of the method. E.g. Method X is reliable for SOC content from xx to xx. This information should be included in the GLOSOLAN SOPs. **Reference values** provide an indication on the status of soil.

Participants to the meeting expressed the following opinion on the topic:

- *Range values*: these are useful but difficult to define because they are dependent on the equipment and other factors. Range values should be defined by the labs themselves that should also take care of their validation and verification. Still, range values are not applicable to some parameters. EUROSOLAN made the suggestion to narrow range values down to the soil type

- *Reference values*: EUROSOLAN did not agree on working on reference values because these are very variant and relates to experimental work. Thus, they cannot be defined in laboratories.

7. EUROSOLAN Governance

The governance of EUROSOLAN was defined at the first EUROSOLAN meeting in 2019. At present, EUROSOLAN counts on the support of a Chair and a vice-Chair. The mandate for these positions is two years after election. However, due to the need to improve the communication with Russian speaking countries, EUROSOLAN agreed to have two vice-Chairs, one to represent European countries and one to represent Eurasian countries.

Building on the extraordinary experience of the Latin American Soil Laboratory Network (LATSOLAN), EUROSOLAN agreed to establish a Steering Committee to support the Chair and Vice-Chairs in triggering and implementing national and regional actions. Thus, the EUROSOLAN governance was revised as following:

- 1 EUROSOLAN Chair
- 2 EUROSOLAN Vice-Chairs
- 1 Steering Committee composed by a few (maybe 5?) active members of the network

The GLOSOLAN coordinator will draft the Terms of Reference for the Steering Committee and send them to EUROSOLAN members for review by email.

In order to strengthen the position of the Chair and Vice-Chairs of EUROSOLAN and allow them to do real follow ups in each country and in the overall region. GLOSOLAN proposed EUROSOLAN to review the Terms of Reference (TORs) for the position of Chair and Vice-Chairs and to have TORs common to all RESOLANs. The proposal was endorsed. The GLOSOLAN coordinator will draft the revised Terms of Reference for the position of RESOLAN Chair and Vice-Chair and send them to EUROSOLAN members for review by email.

Ms. Caon closed this session by thanking Dr. Mr. Giorgi Ghambashidze from Georgia (EUROSOLAN Chair) and Ms. Špela Velikonja-Bolta from Slovenia (EUROSOLAN Vice-Chair) for supporting the network from 2019 to 2021. Ultimately, the network elected their new representatives for the years 2021-2023. Prof. Marija Romić from Croatia was elected EUROSOLAN Chair, Dr. Oğuz Can Turgay from Turkey was elected EUROSOLAN vice-Chair for European countries and Dr. Elena Shamrikova from the Russian Federation was elected EUROSOLAN vice-Chair for Eurasian countries.

8. Venue and time of the next meeting

The third EUROSOLAN meeting will take place online between September and October 2022.

Annex I. Agenda

Wednesday, 27 October 2021	
10:00 – 10:10 AM	Opening, endorsement of the agenda and group picture <i>Mr. Giorgi Ghambashidze, EUROSOLAN Chair</i> <i>Ms. Nopmanee Suvannang, GLOSOLAN Chair</i> <i>Lucrezia Caon, GLOSOLAN Coordinator, GSP/FAO</i>
10:10 – 10:30 AM	Item 1. Global Soil Laboratory Network updates <ul style="list-style-type: none">- Network growth- GLOSOLAN proficiency test (PT) 2021- Online trainings- Standard Operating Procedures (SOPs) under harmonization- Publications and translation of GLOSOLAN material- Procurement of soil laboratory equipment- GLOSOLAN website- 5th GLOSOLAN meeting <i>Ms. Lucrezia Caon, GLOSOLAN Coordinator, GSP/FAO</i>
10:30 – 11:30 AM	Item 2. EUROSOLAN updates followed by an open discussion <ul style="list-style-type: none">- EUROSOLAN growth: trends on the registration of new laboratories- National Soil Laboratory Networks (NASOLANs): establishment and activities <i>Mr. Filippo Benedetti, GLOSOLAN Alternate Coordinator, GSP/FAO</i>

	<ul style="list-style-type: none"> - Presentation of the projects implemented/under implementation in the region (both by GSP and other organizations) <ul style="list-style-type: none"> o EJP Soil, tasks 5.4 and 7.4 (visiting scientists and experts program) o Global Soil Doctors Programme: eventual provision of reagents to the soil testing kits and preparation of a poster on the interpretation of laboratory results o GSP mapping activities: provision of good quality data from GLOSOLAN laboratories - Discussion on country-specific project proposals <p><i>Moderator: Ms. Špela Velikonja-Bolta, EUROSOLAN Vice-Chair</i></p> <p><i>Panelists from the Global Soil Partnership Secretariat, FAO: Ms. Carolina Olivera, Mr. Yusuf Yigini, Ms. Lucrezia Caon</i></p> <p><i>Mr. Andreas Baumgarten, EJP Soil, Austria</i></p>
11:30 – 12:00 PM	<p>Item 3. EUROSOLAN main needs</p> <ul style="list-style-type: none"> - Presentation of the results of the online survey - Discussion of the regional work plan - Organization of a EUROSOLAN PT <p><i>Panelists and moderators: Mr. Filippo Benedetti, GLOSOLAN Alternate Coordinator, GSP/FAO, and Mr. Christian Hartmann, IRD France</i></p>
12:00 – 12:40 PM	<p>Item 4. Position of EUROSOLAN in GLOSOLAN</p> <ul style="list-style-type: none"> - Proposals on the SOPs to harmonize in 2022 - Requests on specific topics for GLOSOLAN online trainings (presentation of the survey results) - Definition of range values and reference values in GLOSOLAN SOPs - Other requests <p><i>Moderators: Lucrezia Caon, GSP Secretariat and Mr. Giorgi Ghambashidze, EUROSOLAN Chair</i></p>

12:40 – 1:00 PM	<p>Item 5. EUROSOLAN governance</p> <ul style="list-style-type: none"> - Review the Terms of Reference for the position of the Chair and Vice-Chair(s). Proposal to give more coordination, technical support and monitoring control to these positions in the region. - Proposal to have two Vice-Chairs, one for Europe and one for Eurasia to overcome sub-regional specific issues and language barriers - Proposal to establish a Steering Committee to support the work of the Chair and Vice-Chair(s) - Presentation of candidates for the role of <u>EUROSOLAN Chair</u> - Presentation of candidates for the role of <u>EUROSOLAN Vice-Chair for Europe</u> - Presentation of candidates for the role of <u>EUROSOLAN Vice-Chair for Eurasia</u> - Election of the new Chairs and Vice-Chairs (online poll) <p><i>Moderators: Filippo Benedetti, GSP Secretariat and Ms. Lucrezia Caon, GSP Secretariat</i></p>
1:00 PM	<p>Closing remarks by the former and new Chair and Vice-Chair and closure of the meeting</p>

Annex II: List of participants

Ms. Lucrezia Caon, Global Soil Partnership Secretariat, FAO HQ

Mr. Filippo Benedetti, Global Soil Partnership Secretariat, FAO HQ

Ms. Silvia Pioli, Global Soil Partnership Secretariat, FAO HQ

Ms. Nopmanee Suvannang, GLOSOLAN Chair

Mr. Rob de Hayr, GLOSOLAN Vice-Chair

Country	Name of laboratory	First Name	Last Name
Austria	AGES	Andreas	Baumgarten
Belgium	ULiège GxABT	Aurore	Degre
Belgium	VITO	Kristof	Tirez
Croatia	Analytical laboratory of Department of Plant Nutrition (ALIB)	Sanja	Slunjski
Croatia	Marija Romic	Marija	Romic
Czechia	Central Institute for Supervising and Testing in Agriculture	Jiří	Čuhel
Estonia	Soil Science Chair of Estonian University of Life Sciences	Tõnu	Tõnutare
Estonia	Soil Science chair of Estonian University of Life Sciences	Tõnu	Tõnutare
France	IEES-Paris	Thomas	Lerch
France	Cirad US Analyse	Marie	Tella
France	IRD	Christian	Hartmann
France	IRD	Hanane	Aroui
Georgia	Laboratory of Soil Fertility Research Service	Giorgi	Ghambashidze
Georgia	Ltd Multitest	Maia	Sebiskveradze
Germany	GFZ spectroscopy lab	Sabine	Chabrilat
Germany	Soil Landscape Spectral Lab	Wanderson	Mendes
Germany	laboratory of soil monitoring	Arne	Heidkamp
Greece	Interbalkan Environment Center	Δημήτριος	Γκουτζηκώστας
Greece	Interbalkan Environment Center	Dimitris	Gkoutzikostas
Greece	Interbalkan Environment Center	Georgios	Galanis
Hungary	Ecology Laboratory	Katalin	Bereczki
Hungary	Soil Conservation Laboratory, Hungary	Ágnes	Nagy
Iceland	Iceland	María	Svavarsdóttir
Israel	RSL	Eyal	Ben Dor
Italy	ARPAV	Ialina	Vinci
Italy	Timesis srl	Enrico	Quaglino
Italy	CREA	Maria	Fantappiè

Italy	ERSA - agenzia regionale per lo sviluppo rurale, Laboratorio di Chimica Agraria	Lidia	Vicentini
Kosovo	KIA	Valmire	Havolli
Latvia	Laboratory of Forest Environment	Aldis	Butlers
Latvia	Ministry of Agriculture	Dace	Guste
Latvia	SIA Augsnes Laboratorija	Egija	Stepina
Latvia	Laboratory of forest environment	Andis	Lazdiņš
Latvia	State Plant Protection Service Agrochemical Laboratory	Lauris	Leitāns
Netherlands	Golden Standard Laboratory	Beata	Tomczyk
Poland	Laboratory of the department of the Soil Science Erosion and Land Protection	Bożena	Smreczak
Poland	Warsaw University of Technology	Stanislaw	Bialousz
Portugal	Lab Análises de Solos - UTAD	João	Coutinho
Portugal	A2 Analises Quimicas	Alan	Evans
Republic of Moldova	Soil Microbiology	Serghei	Corcimaru
Republic of North Macedonia	Laboratory for soil quality, fertilizers and plants	Hristina	Poposka
Russian Federation	Ecoanalytical laboratory (Institute of Biology Komi Scientific Center of the Russian Academy of Sciences)	Elena	Shamrikova
Russian Federation	MSU	Olga	Yakimenko
Serbia	Laboratory for IR spectroscopy; Faculty of Science; University of Novi Sad	Branislav	Jović
Slovenia	AGricultural Institute of Slovenia, Central laboratories	Špela	Velikonja Bolta
Slovenia	IKEMA d.o.o.	Tjasa	Cencic
Spain	Soil Quality Assessment	Remigio	Paradelo
Spain	Gedysa Laboratorio	Marta	Garcia
Spain	Edafo lab	Sara	Alcalde-Aparicio
Spain	Spanish Soil Science Society	Miguel	Aran
Spain	MAPA	Paloma	Melgarejo
Spain	UPM	Marta	García
Tunisia	LCAS	Rafla	Attia
Turkey	Akdeniz University Soil Science and Plant Nutrition	Sule	Orman
Turkey	Aydın Adnan Menderes University Agricultural Faculty Soil Science and Plant Nutrient Laboratory	Saime	Seferoğlu
Turkey	Lita Analytical	Tacettin	Öztürk
Turkey	International Agricultural Research and Training Center IARTC/UTAEM Lab	Huriye	Bayram

Turkey	International Agricultural research and training center	Onder	Ozal
Turkey	SOFREL-TR	Oğuz Can	Turgay
Turkey	Dsi Takk Dairesi Başkanlığı Su ve Toprak lab.	Erdem	Peker
Turkey	Siirt University Science and Technology Application and Research Center	Ümit	Çalışır
Turkey	Ministry of Agriculture and Forestry, TAGEM Soil Fertilizer and Water Resources Central Research Institute lab.	Sevinc	Madenoglu
Turkey	Ministry of Agriculture and Forestry, TAGEM Soil Fertilizer and Water Resources Central Research Institute lab.	Kadriye	Kalınbacak
Ukraine	FARMER.UA	Mariia	Ditkovska
Ukraine	LCBF	Svitlana	Stanislaviv
Ukraine	LCBF	Aleksandr	Zaslavsky
Ukraine	LCBF	Olena	Gavrylenko
Ukraine	LCBF	Tetiana	Gonchar
Ukraine	Ukrainian Laboratory of Quality and Safety of Agricultural Products	Oksana	Samkova