

INSII-III/17/Report



Food and Agriculture
Organization of the
United Nations



Report of the third workshop of the International Network of Soil Information Institutions (INSII)

Rome, Italy, 31 October – 1 November 2017

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**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 2016**

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List of Acronyms

FAO	Food and Agriculture Organization of the United Nations
GEOSS	Global Earth Observation System of Systems
GSOCmap	Global Soil Organic Carbon Map
GSP	Global Soil Partnership
GLOSIS	Global Soil Spatial Data Information Centre
HWSD V2	Harmonized World Soil Database version 2
INSII	International Network of Soil Information Institutions
IPCC	Intergovernmental Panel on Climate Change
ISRIC	International Soil Reference and Information Centre
ITPS	Intergovernmental Technical Panel on Soils
P4	Pillar 4
P4IP	Pillar 4 Implementation Plan
P4WG	Pillar 4 Working Group
P5	Pillar 5
PA	Plenary Assembly
SDGs	Sustainable Development Goals
SDF	Soil Data Facility
SOC	Soil Organic Carbon
SOM	Soil Organic Matter
SPI	Science-Policy Interface of UNCCD
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
WSD	World Soil Day

1. Opening of the workshop and tour de table

The third workshop of the International Network of Soil Information Institutions (INSII) was held at the Food and Agriculture Organization of the United Nations (FAO) Headquarters, Rome, Italy, on 31 October, 1 November, 2017.

Mr. Eduardo Mansur, Director of the FAO Land and Water Division, opened the meeting and welcomed the participants. He highlighted the importance of INSII for developing the Global Soil Information System (GLOSIS), reiterating FAO's commitment to the Global Soil Partnership (GSP) and emphasizing the task to develop a Global Soil Organic Carbon (GSOC) map to be released by 5 December 2017.

Mr. Neil McKenzie (INSII Chair) chaired the meeting in which ITPS members also participated. The meeting proceeded with a tour de table for an introduction of the workshop participants.

2. Introduction to the workshop and progress report

Mr. Ronald Vargas, GSP Secretary, described the momentum soil has gained in the global agenda (soils and climate change; Sustainable Development Goals), by recalling the main achievements/events to be celebrated on the occasion of World Soil Day (WSD) 2017.

He stressed that 2017 was a very successful year in terms of moving the Pillar 4 Implementation Plan to its full execution. The main goal is to establish the Global Soil Information System (GLOSIS). GLOSIS relies on national soil information systems, therefore it is a priority to support countries in establishing and/or strengthening them. During the 5th GSP Plenary Assembly, members endorsed the formal arrangement for INSII and GLOSIS, GSP Soil Data Policy, appointed the Chair of INSII (Mr Neil McKenzie) and they selected ISRIC as the GSP Soil Data Facility. With all these important tools, we are ready to move into execution. An important milestone is the Global Soil Carbon Map (GSOCmap) which is under preparation and constitutes a real experiment to see if a distributed system can be established. The positive response and contributions from a large number of countries indicates that a distributed system is not only viable but welcomed by member countries. Mr Vargas stressed the importance of this third meeting of INSII and in particular, the opportunity to review the technical aspects behind the GSOCmap. He noted that the ITPS is responsible for review and final endorsement of the product.

3. Pillar 4 Implementation Plan (P4IP) and current soil information developments

Mr McKenzie (INSII Chair) provided background information and an update to the INSII participants on recent progress in the implementation of Pillar Four.

He emphasized that the 5th GSP Plenary Assembly was particularly significant because after years of preparatory work it endorsed the formal administrative arrangements for establishing GLOSIS and INSII. It endorsed the GSP Soil Data Policy, elected the INSII Chair, and established the GSP Soil Data Facility. The Plenary also reached agreement on the nomination of national institutions to join INSII.

Mr McKenzie summarized the guiding documents for the work of INSII. These are the GSP Pillar Four Plan of Action, the GSP Pillar Four Implementation Plan, the Arrangement for the Establishment of GLOSIS and INSII (see GSPPA:V/2017/3), and the Rules and Procedures of the GSP. The Terms of Reference for INSII are outlined in Annex 1 of the Pillar Four Implementation Plan.

The role of the GSP Soil Data Facility (GSP SDF) is central to the implementation of Pillar Four. Mr McKenzie noted the simplified name of the Facility which was agreed to by the Plenary (replacing the original Global Spatial Soil Data Information Centre (GSP GSSDIC) which appeared in the original Pillar Four Implementation Plan). He highlighted the importance of the GSP SDF in providing information services and training.

Finally, Mr McKenzie outlined the responsibilities of the INSII Chair which are presented in GSPPA: V/2017/3 - Annex IV: Terms of Reference for the Chair of the International Network of National Soil Information Institutions.

4. Progress on Global Soil Information System (GLOSIS)

Mr Yusuf Yigini (GSP Secretariat) reported on the progress of the GLOSIS and SoilSTAT. He reiterated the importance of the formal arrangement for establishing the Global Soil Information System (GLOSIS) and the International Network of Soil Information Institutions (INSII) endorsed during the 5th Plenary Assembly. He also noted that the Plenary Assembly called on all concerned partners to become active members of the INSII by sharing expertise, data, information and other inputs.

SoilSTAT will be part of the Global Soil Information System. The GSP and its partners will design SoilSTAT and the system will be used for monitoring, forecasting and reporting periodically on the status of global soil resources. The name of the system mirrors the FAOSTAT family of global-status databases used for monitoring.

SoilSTAT will be built under GSP Pillar 4 as part of spatial data infrastructure for the exchange of web-based soil data services. Mr Yigini then referred to the P4IP, which states that a detailed concept note for SoilSTAT should be developed.

Action: A detailed concept note will be prepared by the Pillar Four Working Group in 2018.

5. GSP - Capacity Development Programme and the 2nd Edition of the Cookbook Manual

Mr Yusuf Yigini and Mr Guillermo Olmedo (GSP Secretariat) presented the progress made on GSP's Capacity Development Programme on soil information. As part of the execution of regional implementation plans and especially the preparation of the GSOCmap, resources were mobilized to implement a training programme on digital soil mapping and soil organic carbon mapping. During 2017, the secretariat published two key documents to support the GSOCmap process.

1. The *GSP Guidelines for sharing national data/information to compile a Global. Soil Organic Carbon (GSOC) map* which provides definitions and specifications for the GSOCMap products.
2. The first edition of the *Soil Organic Carbon Mapping Cookbook* which was published in May 2017. The second edition of the manual is being developed and it aims to make the manual more generic and harmonised using a single sample dataset through the document.

The capacity development programme has four main elements

- Training
- Technical Documents
- Online Support
- Data Repository

A series of global, regional and national training sessions were organized with different partners in order to train countries in the latest tools and methodologies for soil organic carbon mapping. To date, 108 countries have participated in the GSP training activities and the capacity development programme has covered 87% of developing countries. Most of the recent training sessions focused on digital soil mapping and soil organic carbon mapping in particular. The secretariat tailored the training to meet regional and local needs of the member countries.

Action : The secretariat shall continue fostering further capacity development activities in 2018.

Action : The 2nd Edition of the cookbook manual is to be ready by the World Soil Day 2017.

6. Global Soil Organic Carbon Map (GSOCmap): progress to date

The Secretariat reported on the progress made on the GSOCmap. The GSP and ITPS were requested by the SPI-UNCCD to develop a global soil organic carbon map by the end of 2017 as a support to the SDG 15.3.1 indicator. The proposal was presented during the 4th PA, which endorsed the ITPS work plan, including the development of the GSOCmap. During the second INSII workshop, the technical specifications (guidelines) for the GSOCmap were prepared and agreed.

The GSOCmap constitutes the first ever attempt to map SOC using a country-driven process in line with the efforts to support the development and empowerment of national capacities to build their National Soil Information Systems. This principle is at the core of the Pillar Four Plan of Action.

Mr Yigini presented the GSOCmap product timeline, achievements and planning for the last 30 days before the official launch. As requested by countries, he mentioned that the deadline for submission of national SOC maps was extended to 30/09/2017. He explained that the Secretariat has been working on training countries on the preparation of their national SOC maps. After a very intensive training period (see section 5), countries have started to submit their national SOC maps, associated metadata and reports.

Once the Secretariat receives a country submission, it proceeds with reviewing the quality of the maps and integrating to the global product while ensuring harmonization, mosaicking and border harmonisation.

The national GSOCmap contributions were produced using the following approaches:

- **National preparation:** member countries produced their maps by themselves and submitted using the GSOCmap data submission tool.
- **Joint Efforts:** member Countries who could not attend in the training sessions or did not have technical capacity to produce their maps, worked with the GSP Secretariat and the maps were jointly prepared.
- **Gap Filling:** in the case of countries that were unable to respond to this joint initiative, the 5th PA agreed that if a member country should explicitly request that it be left blank, such a request would be respected. In the case of countries that are not able to provide data, but who wish to be included in the global map, a solution will be determined to fill the gap using available data and mapping techniques. To this end, the GSP Secretariat is producing the maps to fill in the gaps on the global product making use of the best available data/information.

Mr Yigini presented V0.7 of the GSOCmap while stressing that the Secretariat is collecting detailed metadata information from the countries. Collected metadata are being harmonised and will be published in the

GSOCmap report. Metadata revealed that currently more than 900,000 soil samples had been used for the current version of the GSOCmap. Mr Yigini also addressed the following key issues;

- Is the GSOCmap a Baseline? He clarified that the GSOCmap cannot be considered to be a baseline, but the best SOC information available to date. Instead, the GSOCmap will constitute the Status Zero and will constitute the basis for designing a Global Soil Organic Carbon monitoring system
- Uncertainty assessment: only a limited number of countries submitted their uncertainty maps or assessments to the secretariat. This makes it difficult to map the uncertainties globally. The Secretariat is currently working on uncertainties and will produce an uncertainty map (see below).

Data sources and uncertainties in the GSOCmap

Mr Olmedo reported on the different data sources of the GSOCmap. In the presentation, five different cases were shown: countries who already had the map; countries who produced a map specifically for the GSOCmap initiative, without the direct support of GSP; countries who could built their map after the training course offered by the GSP Secretariat; countries where the map was produced with the direct support of the GSP Secretariat, and countries where the GSP Secretariat has produced a map using available data like WOSIS Soil Profile database, LUCAS soil database or soilgrids.org.

Following this, Mr Olmedo presented some high-resolution images from the current version of the GSOCmap showing how these different sources work together. In some cases the agreement between the different maps is good. But in other cases there are big differences between borders. The GSP Secretariat strategy for solving this is working very closely with the countries trying to understand the source of the differences. Mr Olmedo explained that in many cases the source was identified and corrected (e.g. different units like kg m^{-2} instead of Mg ha^{-1} ; wrong calculations).

In the last part of his presentation, Mr Olmedo outlined the problems concerning the global uncertainty assessment. The main problem is that despite being explicit in the guidelines, many countries did not send their uncertainty maps. And when they did, the methodologies used were difficult to compare (e.g. percentage versus standard deviation). The proposed strategy is to: 1) process all the uncertainty maps of the countries using statistical standardization techniques; 2) validate the map using available data (i.e. WOSIS Soil Profile Database, LUCAS Database: data contributed by countries); 3) Study the agreement between the GSOCmap and other SOC maps available (e.g. HWSDa, WISE, NRCS, soilgrids).

Metadata

Mr Konstantin Viatkin (GSP Secretariat) reported on the process and the results of metadata collection for GSOCmap. Metadata were collected from each country through an online submission form. They included information about data source, methods of analysis, upscaling techniques used by the countries to create their maps, as well as the contact information of the national data holder institution.

Mr Viatkin presented the preliminary results of metadata analysis which showed wide diversity in the data sources, analytical methods and mapping techniques used throughout the world. He explained that due to the heterogeneity of the input data, the GSOCmap should not be considered as a baseline, but rather as the current status of soil information in the world.

Mr Viatkin presented the examples of national reports and outlined main challenges for the countries during GSOCmap project. These challenges included data collection, consolidation of the data from different sources, new digital soil mapping methods suggested for SOC and uncertainty assessment. Many countries in their reports expressed their intention to continue the work and to update their maps in the future.

Mr Viatkin emphasized on the effectiveness of the GSOCmap data sharing framework which allowed to make a map based on more than 900,000 field observations which is unprecedented for global mapping projects. The flexibility in mapping methods which is allowed by GSOC Guidelines gives an opportunity for national experts to choose the most suitable technique depending on the specifics of their country's nature and available data. The GSP Secretariat is working directly with each country to identify an address potential harmonization issues.

Feedback from INSII institutions on the GSOCmap

Participants briefly presented their feedback on the GSOCmap process. The majority of institutions attested that data and maps have been prepared to begin data processing; others informed that they have data but do not yet conform to the specifications required in the guidelines. Some institutions indicated that limited SOC data was available in-country, or that existing data may not be georeferenced. Specific feedback from INSII members was given as follows:

Mexico: Mr Carlos Omar Cruz Gaistardo suggested that five factors could be used for estimation of global uncertainty: level of disaggregation, density of points, representatively of pixel, spatial variability and positioning of soil profile.

Italy: Mr Edoardo Constantini suggested that the capacity development training would be useful for European countries and would help to ensure the consistency of methods. Mr Yusuf Yigini explained that the training sessions were organised upon request from countries.

European Commission: Mr Luca Montanarella suggested that taking into account the EU standard grids for the global map would be helpful. He explained that European Commission was well-positioned to deliver the harmonized data for the whole EU, but the countries decided to deliver their maps separately.

Russia: Mr Pavel Krasilnikov raised a question of ambiguous statement in the Guidelines regarding the inclusion of litter layer in the map.

Mr Oleg Golozubov emphasized that the map shows that "small steps for each country mean a giant leap for the mankind". He suggested that INSII network can improve the map by sharing techniques and methods used for mapping. He also proposed an online validation tool for the GSOCmap.

Brazil: Ms Maria de Lourdes Mendonca and Mr Saeb AbdelHaleem Khresat (**Jordan**) expressed their concerns that different methods of SOC analysis and mapping can lead to contradictory values on the map. Ms Mendonca emphasized that the map is not a baseline, it shows where we are in terms of SOC information, but we need to know where we want to be, hence the necessity for harmonization.

Japan: Mr Kazuyuki Yagi said that the participation in GSOC mapping project was a good opportunity for his country to integrate the soil data which was distributed between different organisations. He also raised the question of the possible need of harmonisation of the GSOCmap for better consistency with UNCCD reporting requirements.

South Africa: Ms Liesl Wiese said that the map produced for GSOC is the best to date estimation of SOC stocks for the country.

France: Representative from France expressed his country's concerns about the intellectual property rights related to data sharing.

Moldova: The map from Moldova is based on soil profiles and soil map which has 74000 polygons. These polygons were made of basic profiles collected in the 1980s and 1990s. Correction coefficients and pedotransfer functions (e.g. for bulk density) were used to estimate soil organic carbon stocks. Unfortunately, direct measurements were not available. That's why we could not really create the map for uncertainties. But for the future, the planned soil data centre in Moldova will organize the measurements and improve the maps.

Belgium: Belgium explained the procedure that they followed to produce their national GSOCmap data. The Belgian map was combination of 4 regional maps. These maps were produced by different methodologies. The main issue was the measurement of the bulk density, because it has a large influence on the stocks and they had very few measurements. Pedotransfer functions were used to calculate bulk density values. Another issue was the upscaling from the very fine grids to a large grids, it was difficult to harmonise them properly. And also the uncertainty map was also a challenge because of different approaches among the regions because some uncertainty maps were taken into account to the spatial, analytical and mortal uncertainty and also for the pillar transfer functions for bulk density.

India: India explained their methodology and they relied on three different approaches.

Turkey: Mr Akgul mentioned that the soil organic carbon map of Turkey is a result of a FAO project. Turkey is planning to update the map within 2 years.

Israel: Ms Zahavi said that the main issue for Israel is only having organic matter data from the 1960s and 1970s.

Hungary: The SOC map of Hungary was produced using the random forest statistical technique using the samples from a soil monitoring network.

UK: The UK was fortunate in having a product which created 11 years ago (1x1 km). It includes Scotland, Northern Ireland and England-Wales. There were some problems with projections and also supplying the metadata which because the three different countries have different metadata.

7. GSP Soil Data Facility

Mr Rik van den Bosch presented ISRIC proposal for the SDF's work plan 2018. He listed the agreed roles of SDF as being to:

- host, develop, maintain elements of the GLOSI
- provide components for INSII members who choose not to develop own services
- actively participate in P4WG
- support technical elements of the GLOSI
- support the design and implementation of GLOSI
- support the delivery of SoilSTAT
- connect to GEOSS.

Due to resource constraints, it is not possible at this stage to deliver the full list of functions and activities outlined in the Pillar Four Implementation Plan. Mr van den Bosch proposed an initial focus on the Tier 1 and Tier 2 soil profile databases and Version 0-1 grids. This would imply postponing of the HWSD V2. He

highlighted that the GSP Soil Data Facility is primarily concerned with the provision of the technical infrastructure and the delivery of GLOSIS products as web services using the ISRIC managed servers to ensure long-term stability.

Mr van den Bosch proposed three main activities in the work plan for 2018-2020.

1. **Technical specifications** of GLOSIS (2018): develop technical specifications of data portal and its data products.
2. **Building the GLOSIS data portal** (2019): develop data portal and its data products.
3. **Population of the GLOSIS data portal** (2019 – 2020): facilitate population of the Tier 1 and Tier 2 soil profile databases with national and regional contributions.

The Secretariat welcomed the proposed approach and highlighted that the SDF work plan should be agreed and decided by the INSII (see Item 9) and should take into consideration the overall plan of INSII for GLOSIS and the availability of resources.

8. Pillar 5 Progress, Activities related to the development of the Global Soil Information System (GLOSIS)

Mr Rainer Baritz (acting chair of Pillar 5) updated INSII members on progress with Pillar 5 and specific activities related to the development of the Global Soil Information System (GLOSIS) that are currently listed the Pillar 5 deliverables.

- Tools to support conversion of nationally defined and coded soil properties according to standards
- Tools to apply WRB (global soil polygon map)
- Terminology and concepts for the 1:1 Million soil map
- Web information system (CMS): documentation and coding
- Best practice manual, standard, application tools, WIKI methods, guidelines.

Mr Baritz suggested the need to organize an event (maybe a workshop/symposium) on soil data/information to identify the potential users and tailor Pillar 4 activities towards it. The reaction from INSII was relatively positive and suggested that if this is organized it could be in 2019 so that members could have time to consider the proposal more thoroughly.

9. INSII Roadmap & P4 Work Plan

Mr. Neil McKenzie (INSII Chair) presented the progress made in Pillar 4 since the second INSII workshop, referring to regional as well as global level aspects. He presented the original work plan outlined in the implementation plan and highlighted priority actions for the coming year (2018). He emphasized that:

- Full list of actions is defined by the Pillar 4 Implementation Plan but we are starting later than anticipated and do not yet have the funds outlined in that plan (\$8.6M over six years)
- INSII is required to set priorities for the coming year to provide formal direction to the Pillar Four Working Group
- The Pillar Four Working Group will ensure the activities are done
- INSII is also providing formal direction to the GSP Soil Data Facility who work with the Pillar Four Working Group to execute the plan
- We do not yet have the resources anticipated by the Implementation Plan (~\$8.6M external funds over 6 years).

Mr McKenzie then listed the deliverables according to the Pillar 4 Implementation plan including general deliverables: SoilSTAT, Tier 1-2 profile databases, global soil polygon coverage, HWSD V2, Low and Fine resolution grids and capacity development. Two of the general items have been delivered since the 2nd INSII Meeting and these were the GSP Soil Data Policy to guide soil data sharing of the Global Soil Information System and appointment ISRIC as the GSP SDF for a mandate expiring on 31/12/2020.

The meeting considered the full list of activities and the proposed strategy outlined previously by Mr Rik van den Bosch. The meeting agreed to the following activities being implemented during 2018 and the Pillar Four Working Group will have responsibility for operational oversight during the year.

Agreed actions

- Prepare a concept note for Soil STAT including feasibility and design principles for soil monitoring. The concept note will be approximately 20 pages in length and pay particular attention to current monitoring activities undertaken by the UN and OECD. The Pillar Four Working Group is to ensure that input is obtained from relevant GSP partners and specific input will be sought from the IUSS Working Group on Soil Monitoring.
- Develop a promotional brochure on Pillar Four that can be shared with current and potential resource partners to ensure sufficient funds are raised to enable full implementation.
- Develop technical specifications for the Tier 1 and Tier 2 databases
- Prepare of Version 2 of the GSOCmap and follow the recommendation from the GSOC17 Symposium in relation to establishing a working group for guidelines/protocol for the measurement, mapping, reporting, verifying and monitoring of SOC stocks.
- Develop a proposal for the Global Soil Polygon coverage with a view to testing demand for the product. Close consultation will be necessary with technical teams that supply related products at present (e.g. the European Commission's JRC and their implementation of SOTER for various regions).
- Clarify whether an updated version of the Harmonised World Soil Database is still required. Originally conceived in the Implementation Plan as an interim product, the availability of new products (e.g. GSOCmap, Global Grids) may have satisfied the demand. Check with members of the HWSD Consortium to determine the preferred approach.
- Ensure regular and active communication with INSII members.
- Support the Regional Soil Partnerships and, in particular, determine the need for the development and hosting of national data products for countries that do not have sufficient capacity and resources.
- Facilitate updating of the technical specifications for the fine resolution grid products in collaboration with the IUSS Working Group on *GlobalSoilMap* (Key contact: Mr Dominique Arrouays, INRA, France).
- Provide an update on progress to the 6th Plenary of the GSP in June 2018.
- In recognition of his work in preparing the GSP Pillar Four Implementation Plan, the meeting resolved to send a formal letter of appreciation to Mr David Rossiter.

10. Date and venue of the next meeting

It was agreed that the IV INSII Workshop will be held on 23-25 Oct 2018 at FAO HQ (venue to be confirmed).

Annex I: List of participants

Name	Name	Organization/Country
Åpela	Velikonja Bolta	Kmetijski inštitut Slovenije/Agricultural Institute of Slovenia
Abdelmagid Ali	Elmobarak Elhag	Land and Water Research Centre, ARC, Sudan
Abdou Rahman	Jobe	Soil and Water Management Unit, Ministry of Agriculture, Gambia
Ana	Jeleapov	Institute of Pedology, Agrochemistry and Soil Protection "N. Dimo" of Moldova
Andry	Andriamana njarah	Laboratoire des Radioisotopes, Madagascar
Anna	Benedetti	Centro di Ricerca Agricoltura e Ambiente, CREA, Italy
Antónia	Neto	Centro de Investigação Agronomica e Tecnologica de Sao Tome e Príncipe
Arne	Heidkamp	Thuenen Institute of Climate-Smart Agriculture, Germany
Borut	VRÅ ÅCEAJ	Agricultural Institute of Slovenia
Brice Tiburce Cossi	Oussou	Institute National Des Recherches Agricoles du Bénin
Carlos	Cruz	Instituto Nacional de Estadística y Geografía, INEGI. Mexico
Christy	van Beek	SoilCares, The Netherlands
Daniel	Perez	Embrapa-Solos, Brazil
David	Lindbo	USDA-NRCS, USA
Edoardo	Costantini	Centro di Ricerca Agricoltura e Ambiente , CREA, Italy
Enkhtuya	Bazarradnaa	Mongolian University of Life sciences, Mongolia
Erick	Towett	ICRAF, Kenya
Hendrik	van den Bosch	ISRIC - World Soil Information, The Netherlands
Hussain	Al Ajmi	Ministry of Environment, Water and Agriculture
Iurii	Rozloga	Institute of Pedology, Agrochemistry and Soil Protection "N. Dimo" of Moldova

Johan	Stendahl	Swedish University of Agricultural Sciences, Sweden
Katrien	Oorts	Vlaams Planbureau voor Omgeving, Departement Omgeving, Vlaamse overheid, Belgium
Linda	Lilburne	Landcare Research, New Zealand
Liping	Yang	Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agriculture Sciences, China
Luca	Montanarella	European Commission, Joint Research Centre
Macoumba	Loum	Institut National de Pedologie de Senegal
Maksym	Solokha	National Scientific Centre, Institute for Soil Science and Agrochemistry Research, Ukraine
Maria De Lourdes	Mendonca Santos	EMBRAPA, Brazil
Maya	Zahavi Hertz	Ministry of Agriculture and Rural Development of Israel
Nils	König	Northwest German Forest Research Institut, Germany
Oleg	Golozubov	M.V. Lomonosov Moscow State University, Russian Federation
Olga	Yakimenko	Moscow State University, Russian Federation
Rachid	Moussadek	INRA, France
Rainer	Baritz	European Environment Agency, Denmark
Rosa	Cuevas	REDLABS, Mexico
Sevinc	Madenoglu	Ministry of Food Agriculture and Livestock of Turkey
Suat	Akgul	Soil Fertilizer and Water Resources Central Research Institute, Turkey
Suresh Kumar	Chaudhari	Indian Council of Agricultural Research, India
Svetla	Rousseva	Institute of Soil Science "N. Poushkarov", Bulgaria
Tibor	Toth	Institute for Soil Sciences and Agricultural Chemistry, Hungary
Tine	Alfred Kouly	Institut Senegalais de recherches agricoles (ISRA), Senegal
Tuul	Dooshin	Institute of Plant and Agricultural Sciences,

Victor	Chude	National Programme for Food Security, Federal Ministry of Agriculture and Rural. Nigeria
Winnie	van Vark	Wageningen University-WEPAL, the Netherlands
Olufunmilayo	Ande	Institute of Agricultural Research and Training, Nigeria