

INSII-IV/18/Report



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



Report of the fourth Workshop of the International Network of Soil Information Institutions (INSII)

Rome, Italy, 6 – 8 November 2018

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OF SOIL INFORMATION INSTITUTIONS (INSII)**

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**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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List of Acronyms

| | |
|-------------|---|
| COAG | Committee on Agriculture |
| EEA | European Environment Agency |
| 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 |
| GLOSOLAN | Global Soil Laboratory Network |
| GloSIS | Global Soil Spatial Data Information Centre |
| GSSmap | Soil Salinity Map |
| GSOCseq map | Global SOC Sequestration Potential Map |
| HWSD V2 | Harmonized World Soil Database version 2 |
| INBS | International Network on Black Soils |
| 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 fourth meeting 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, from the 6th to the 8th of November, 2018.

Mr. Eduardo Mansur, Director of the FAO Land and Water Division, opened the meeting and welcomed the participants. He highlighted the need for harmonized global soil data, and that FAO as an

intergovernmental organization is ready to support the development of a Global Soil Information System, which relies on INSII for its completion. He stressed the importance to fight against major soil threats. For this reason the 6th Plenary Assembly endorsed the establishment of three symposia which will tackle these issues:

- Symposium on soil erosion (2019)
- Symposium on soil biodiversity (2020)
- Symposium on soil fertility (2021)

2. Introduction to the workshop

Mr. Ronald Vargas (GSP Secretary) stressed the important role INSII plays in moving forward with the establishment of a Global Soil Information System (GloSIS). A number of documents about GloSIS and some of its components were prepared for this meeting. The Pillar 4 working group (P4WG) reviewed and discussed them.

Mr. Vargas encouraged the INSII members to be proactive and to take advantage of the great momentum soils are having in regards to the Sustainable Development Goals (SDGs) and other initiatives. He mentioned that for various UN-related reporting activities including SDG, national statistics offices are the main national contact points; however, they cannot provide data on soils, without soil information institutions and soil information systems in place.

He further explained that during the 6th GSP Plenary Assembly and the 9th working session of the ITPS, requests for improved data sets about various soil properties were raised. He reiterated that the GSOCmap should be viewed as a positive example of what can be achieved. Focusing on the creation of further maps with a bottom-up approach will help empower countries and ultimately support the creation of a national soil information systems (SIS).

Mr. Vargas informed that Mr. Neil McKenzie, former chair of INSII, whose work was highly appreciated, retired. A new chair will be elected during the 7th GSP Plenary Assembly. For this working session, Mr. Vargas suggested that the chair of Pillar 5, Mr. Rainer Baritz (member of the P4 working group) could moderate the workshop, which was then supported by participants.

Mr. Baritz (European Environment Agency, EEA) proceeded by underlining the need for cooperation between the INSII members and the regional Pillar 4 and 5 chairs.

3. Progress on the Global Soil Information System (GloSIS)

Mr. Bas Kempen (Soil Data Facility-SDF, ISRIC-World Soil Information), emphasized SDF's role as technical backbone for the Pillar 4 implementation plan (P4IP). He introduced the document "Design of the GloSIS infrastructure", which presents the GloSIS technologies and building blocks, and how countries and other data providers benefit and can be involved. The federated, so-called distributed or shared information system, will allow data holding institutions to own their data and to be able to control its access. He explained that countries and other data providers will be offered three distinct participation levels, based on whether (a) a national SIS is already present, (b) a data provider wishes to establish a SIS and is in the position to do so, and (c) a data provider lacks the capacity to establish their own SIS.

A timeline for action was proposed, which builds on the Pillar 4 WG and the feedbacks received from all INSII members and ITPS. On that basis, SDF would proceed implementing GloSIS components; volunteers will be needed to test the system, and a cookbook will be prepared as guidance for all INSII members; progress will be presented to the Plenary Assembly in June 2019; trainings will be offered in infrastructure building and web-based data exchange.

INSII members reacted with great interest since the topic relates to the building of national components. It was stressed that the domain mode used in GloSIS must be compatible to existing standards such as the European INSPIRE model. In relation to Pillar 5-led action, Mr. Baritz confirmed that the domain model for the GSP would be selected based on its compatibility with already present and established national and regional models.

Various suggestions were made by INSII, for example, when publishing georeferenced data, it must be possible to use derived data. Conflicts may arise from the use of different versions; so that updating processes (“versioning”) must be clear. The wording in the section explaining the different participation levels for countries shall be improved.

4. CountrySIS framework

Mr. Yusuf Yigini (GSP Secretariat) presented the concept note for CountrySIS. It foresees the development of guidelines which will provide specific advice regarding functionalities, software and support tools. The guidelines shall address country needs, and thus will be based on the results of the recent INSII survey (June 2018). 59 countries participated with responses originating from 79 institutions. 60 % have a digital database for soil properties; only 34 % of the countries have publicly available data. As main challenges and constraints, the survey highlighted the lack of skilled staff and equipment.

The following timeline for the implementation of CountrySIS was proposed:

- The Pillar 4 WG will finalize the revision of the concept note; emphasis is on the terms of content for the CountrySIS guideline.
- INSII will receive this revised concept note for e-consultation and will be asked to thoroughly check whether individual needs are properly addressed. This review process shall be finalized by March 2019.
- Subsequently, the GSP Secretariat, SDF and Pillar 4 WG will begin the drafting process of the CountrySIS guidelines.
- During the third quarter 2019, some piloting with voluntary INSII members may begin. There will be many synergies between GloSIS and CountrySIS.

Some INSII members which have not yet filled the questionnaire, expressed their interest to complete it, if still possible. The GSP Secretariat will facilitate the process in this regard. Countries asked for support to build the technical infrastructure for a national SIS. The GSP Secretariat confirmed that capacity development will be an important objective of the CountrySIS framework. The need for a specific framework to facilitate countries with an already established system to join GloSIS was emphasized. Several INSII members raised the importance of compiling and disseminating national soil data related to the UNCCD Land Degradation Neutrality target and the SDGs.

During the discussion, the SDF recommended that the 'CountrySIS Guidelines' should be carefully cross-referenced and build upon the 'GloSIS Guidelines', because various elements of the basic data infrastructure design is valid for both the global as well as national information systems.

Finally, INSII members were asked if they agreed with the approaches and procedures suggested for GloSIS and CountrySIS, and if the SDF and GSP Secretariat could continue their efforts according to the drafts provided for this meeting. This was clearly supported.

5. GloSIS - T1 and T2 Soil Profile Database Technical Specifications

Mr. Bas Kempen (Soil Data Facility, ISRIC-World Soil Information) presented the draft specifications for the Tier 1 and Tier 2 soil profile databases. At this stage, it is essential to define relevant soil properties and vocabularies that should be considered in a soil data storage model. The soil parameters may follow specifications for describing profiles according to the FAO Guidelines and Soil and Terrain (SOTER) database.

The discussion focused on which soil parameters and what type of spatial data (derived data and/or data with x y coordinates) to include in the global database. It was suggested that the current list of soil parameters is too long. A subset with the most relevant soil properties relevant for the indicators about soil threats, should be selected. A clear methodology for Tier 2 should be proposed.

It was concluded that SDF and the P4WG will review the documents by January 2019.

6. Global Soil Map and Fine Resolution Soil Grid Specifications

Ms. Titia Mulder (Wageningen University) presented a proposal by the Global Soil Map WG of the International Union of Soil Sciences (IUSS), suggesting to join the Pillar 4 WG. Ms. Mulder provided background information on the project, addressing the importance of the GlobalSoilMap specifications for developing the fine resolutions grids as defined in the Pillar 4 Implementation Plan. The GSP could benefit from experts in the IUSS working group, for example by adapting the existing grid specifications to GloSIS and INSII needs. IUSS has already proven successful cooperation during the development of the GSOCmap cookbook.

During the discussion, scope and composition of the Pillars working groups was recalled. It was stressed that INSII and P4WG are officially mandated, and that data products would represent country interests. It must be ensured that these frame conditions are always respected when recommendations for implementation are developed by the P4WG. Since this objectivity can be ensured through the WG composition (focus is on representation of the regional partnerships), the proposal of IUSS was welcomed and supported by INSII. Upon recommendation by INSII members during this meeting, a note shall be prepared by the GSP Secretariat for the next GSP Plenary Assembly, suggesting to endorse the enlargement of the Pillar 4 WG with one member of the IUSS Global Soil Map Working Group.

7. Building soil information systems: experiences from FYROM Macedonia, Ukraine, Latin America and the Caribbean

Two national and one regional examples of recently established soil information systems were presented, highlighting the challenges and envisioned potential of these data products.

Macedonian Soil Information System (MASIS)

Mr. Dushko Mukaetov (FYROM) presented the Macedonian Soil Information System (MASIS) which was developed with the technical and financial support of FAO. 100 existing hard copy soil maps and soil legacy data from about 15,000 soil profiles were digitized. The project was divided into three phases which yielded a publicly available national soil map as web services. More functionalities will be added in the future. MASIS is expected to be fundamental for guiding decision making at national and local levels, including land use planning, land suitability assessment, soil fertility policies, soil degradation, climate change adaptation, and ecosystem services.

Ukraine

Mr. Mykola Miroshnichenko (National Science Center, Institute for Soil Science and Agrochemistry Research, Kharkiv, Ukraine named after O.N. Sokolovsky) presented the current state and prospects of development of the Ukrainian SIS with technical and financial support of FAO. To date, a large number of soil profiles have been digitized. Moreover, important practical actions have been taken to obtain state support for the creation of a national soil monitoring system and a soil information center of Ukraine.

SISLAC

Ms. Carolina Olivera (FAO, Colombia) presented the Soil Information System of Latin America and the Caribbean (SISLAC) which was established with support by FAO. SISLAC is a spatial soil database which presents regional soil data following open data principles, multilinguality, and technical functionalities such as well as upload and query options. This regional SIS is expected to be compatible with GloSIS. The creation of SISLAC has been supported by several capacity building activities. Ms. Olivera highlighted the challenges related to the harmonization of soil data.

The GSP secretariat also informed that currently FAO is funding the establishment of national information systems in Afghanistan, Cambodia, Lesotho, Sao Tome and Principe and Sudan.

All three examples were received with great interest because they provide test cases for CountrySIS, options for capacity building and – in the case of SISLAC – an example for data coordination inside and across two regional soil partnerships.

8. Towards a global soil erosion map

Ms. Lucrezia Caon (GSP Secretariat) introduced the Global Symposium on Soil Erosion 2019, which was endorsed by the 6th GSP Plenary Assembly. As raised during the last GSP Plenary Assembly, this action is intended to support the development of a global soil erosion map, which could be launched during World Soil Day 2019. A concept note with its specifications is currently being drafted by the GSP Secretariat. Since modelling is usually implemented to estimate soil erosion, representative national

soil profile data are key to accomplish the realization of such a product. It was suggested that the experiences gained through the GSOCmap, which was based on the compilation of national soil profile data sets, could serve as a reference for the global soil erosion map.

The specifications for the global soil erosion map shall be ready by March 2019 in order to be discussed during the next ITPS meeting. The draft concept note will be shared with the P4WG as soon as possible, and made available for e-consultation with INSII.

INSII members appreciated the engagement of the GSP Secretariat, and the building of capacity to endeavour in such a project. However, concerns were raised regarding the limited data availability of certain countries. The SDF pointed out that investing efforts on several new global data products, although relevant, might distract from the implementation of GloSIS. This implementation will require significant inputs from countries and given that capacity and funding is still very limited, parallel development of additional map products might therefore threaten the GloSIS implementation. Mr. Baritz asked INSII members to study the specifications – once provided – very carefully, in order to estimate the available capacity and needed time, but also to suggest and select approaches which can be realistically implemented. The GSP Secretariat will summarise the implementing conditions and suggest a road map accordingly.

9. Soils4EU – Identification of priority areas for improving consistency and inter-operability of EU-wide and national soil monitoring and information systems

Ms. Maaïke Blauw (DELTARES, The Netherlands) presented the Soils4EU project, which aims at identifying priority areas for improving consistency and interoperability of EU-wide and national soil monitoring and information systems. She introduced the side event that took place during this INSII session. The event promoted the exchange of knowledge, and discussed the current state of available data, gaps and barriers.

10. SoilSTAT concept note

Mr. Rainer Baritz (Chair, GSP Pillar 5) presented the draft concept note for SoilSTAT. SoilSTAT will be the GSP's official system for exchanging soil indicators, embedded in the global system of environmental statistics (bridging with UN Statistics, SDG, FAOSTAT, OECD and others), and country-driven. Furthermore, it will build and profit from the data exchange infrastructure built for GloSIS, and is intended to become an efficient mechanism connecting national, harmonized soil information to global targets such as Land Degradation Neutrality (LDN).

During the discussion, methodological and organizational issues were raised: indicator definitions and methods should be compatible, or build upon existing mechanisms, such as greenhouse gas inventories or land degradation assessments, as in the case of soil organic carbon, or soil erosion. The need for efficiency in the case of indicator assessments was also raised for pollution-related indicators. As for the methodological specifications of indicators, models as well as measured data, or combinations, shall be promoted. Regarding responsibilities, the link between INSII members and

national statistical institutions was emphasized. While Pillars 4 and 5 should be connected more closely, also regional coordination may favour and support the implementation of SoilSTAT.

P4WG and INSII members are now asked to review and finalize the SoilSTAT concept note by March 2019. In parallel, Pillar 5 will develop a global soil indicator review. Priority indicators will be defined and explained; this Pillar 5 document will be an important supplement for the SoilSTAT concept. The final SoilSTAT concept note will be reviewed by ITPS, before being presented to the next Plenary Assembly in June 2019 for endorsement.

11. Global Soil Salinity Map: review of the concept note and the technical specifications

Mr. Yusuf Yigini (GSP Secretariat) presented the draft concept note of the Global Soil Salinity Map (GSSmap). This product was requested by member countries during the sixth GSP Plenary Assembly, especially from the Near East and North Africa (NENA) region and Central Asia; it was also discussed during the 26th session of the Committee on Agriculture (COAG). The objective of GSSmap is to generate a country-driven global map of soil salinity, in order to assess salt affected areas, its management, and to monitor management effects. The GSSmap V1.0 is suggested to be launched on the next World Soil Day in December 2019.

During the discussion, concerns were raised about the compatibility between the GSSmap and areas where such assessment have already been performed (e.g. in Europe, for the delineation of so-called less-favoured areas). Questions about the exact definition of the required indicators were raised, and the role of legacy data was discussed. It is important to define a reference point because of the dynamic nature of salinization. Experiences with current mapping of salinity indicate that a realistic time frame for implementation of this task is needed.

The GSP Secretariat indicated that the current draft specifications will be updated and shared with the Pillar 4 WG, before a revised version will be shared with the INSII members. Mr. Baritz indicated that it is very important that INSII members not only help to refine the specifications based on what is feasible, but also thoroughly plan and estimate available and needed capacity to create this global product. The GSSmap technical specifications will be made available by INSII.

12. Global SOC Sequestration Potential Map: review of the concept note and technical specifications

Ms. Rosa Cuevas (GSP Secretariat) presented the concept note and technical specifications for the Global SOC Sequestration Potential map (GSOCseq map). This product was requested by member countries during the sixth GSP Plenary Assembly. A global map on carbon sequestration potential is one of the recommendations of the Global Symposium on Soil Organic Carbon in 2017, important as follow-up to utilize the recently developed global soil carbon map (GSOCmap). The draft specifications suggest three methodologies with distinct carbon sequestration models considering country-specific data and experiences. The GSP Secretariat asked INSII to develop the respective national layers by December 2019.

INSII members supported the idea but several points were raised regarding the feasibility of this activity, especially since few countries adopted those models to local conditions and they are demanding in terms of some data layers. It was also suggested that synergies with existing international initiatives should be sought for as much as possible, e.g. 4per1000, H2020 and the CIRCASA project.

It was agreed that the concept note and technical specifications will be further reviewed by the P4WG and ITPS and made available to INSII by January 2019. Similar to the previously discussed products, agreeable detailed specifications, descriptions of best suitable methods, and capacity development, may allow INSII members to engage in this demanding but needed exercise.

13. INBS – International Network of Black Soils

Mr. Yuxin Tong (GSP Secretariat) presented the International Network of Black Soils (INBS), which was established as a platform for knowledge sharing about the conservation and sustainable management of black soils. Mr. Tong explained that one of the products of the INBS is a report on the global status, current management, threats and challenges related to black soils. The concept note for this global assessment is still being drafted and will be made available for review by ITPS. The report is envisaged to be published by October 2019.

The discussion brought up challenges related to the definition of black soils; the scope is not limited to agricultural soils. Several countries showed interest in joining the INBS. The GSP Secretariat will extend the INBS invitation letter to INSII members.

14. Soil Organic Carbon Working Groups

Mr. Yusuf Yigini (GSP Secretariat) provided background about the implementation of GSOC17 recommendations. The recommendations of the GSOC Symposium aimed at supporting the development of policies and actions to encourage the implementation of soil management strategies that foster the protection, sequestration, measurement, mapping, monitoring and reporting of SOC. This entails the establishment of two working groups:

1. Working Group on Soil Organic Carbon Management, to produce a technical manual on soil organic carbon management (facilitated by Ms. Cuevas).
2. Working Group on Soil Organic Carbon Monitoring, to develop guidelines for measuring, mapping, monitoring and reporting SOC (facilitated by Mr. Yigini).

For the SOC management manual, the following timeline has been established by the GSP Secretariat:

- Submission of chapters: 30 November 2018
- Editing to harmonize chapters (ITPS/GSP Secretariat, feedback process with lead authors): 30 December 2018
- Review by ITPS/UNCCD-SPI/IPCC and other stakeholders: 31 January 2019
- Preparation of final version: 30 March 2018
- Final review and clearance by ITPS: 30 April 2018
- Layout and printing: by 30 May 2019

- Launch of the Technical Manual on Soil Organic Carbon Management at the regional and sub-regional scale during the 7th GSP Plenary Assembly– from 5 to 7 June 2019

A call for experts on WG SOC monitoring was launched in April 2018. The outline of the chapters of the technical manual are currently being reviewed. Mr. Yigini explained that the selection of lead and co-/authors is still open and that interested INSII members are encouraged to add their contribution to the chapters.

15. The Global Soil Laboratory Network (GLOSOLAN)

Ms. Lucrezia Caon (GSP Secretariat) informed about the progress of the Global Soil Laboratory Network (GLOSOLAN). This network aims to strengthen laboratory capacities and the quality of soil analyses. Ms. Caon shared the results of a recently launched online survey. Among other key issues, the need for improved quality control and accreditation was emphasized; for details, she referred to the 2nd GLOSOLAN meeting 28. – 30. Nov. 2018 (see [here](#)).

INSII members supported the cooperation with the International Standardization Organization (ISO), but also emphasized that all regions should be well-represented in the network. There are some links between INSII and GLOSOLAN, for example regarding vocabulary services and definitions; analytical data are core elements of soil databases which need to be properly structured and built; spectroscopy and the linkages between spectral libraries shall be promoted.

16. Global Soil Pollution Assessment

Ms. Natalia Rodriguez (GSP Secretariat) informed that the 3rd United Nations Environment Assembly (UNEA 3, 2017) has agreed on a resolution on soil pollution (UNEP/EA.3/Res.6 “Managing soil pollution to achieve Sustainable Development”). By UNEA 5 in 2020, UNEP together with FAO, GSP/ITPS and others have been requested to prepare a report about the extent and future trends of soil pollution, and its risks and impacts, and to elaborate technical guidelines for the prevention of soil pollution; a progress report is expected by UNEA 4 (11-15 March 2019).

The global status on soil pollution has never been assessed before. During the Global Symposium on Soil Pollution 2018 (GSOP18), contributions and overviews from the GSP regional soil partnerships were collected and published (see [here](#)). A WG has been created in order to assess, map and monitor soil pollution; INSII members are invited to participate. The objective of this WG is to develop a technical manual on soil contamination management and remediation.

It was discussed:

- a) How the GSP can work with UN Environment to prepare a global assessment on soil pollution?
- b) How soil pollution data can be included in GloSIS?

A regional-specific questionnaires for INSII members will be prepared The GSP Secretariat will consult each RSP for fine-tuning the questionnaire for their region, so that the available information in countries can be understood, and an overview be generated. On that basis, the GSP Secretariat may compile a

global assessment, to be presented during UNEA 5. INSII members are encouraged to discuss the feasibility of a future soil pollution map.

INSII members raised various issues, such as the role of urban agriculture, and that country-level assessments should be facilitated before a global view can be generated. It was questioned how meaningful global data bases can be, while soil pollution is a local phenomenon. The sensitivity of data on contamination was stressed.

17. Awareness Raising, World Soil Day and International Soil Awards

Ms. Isabelle Verbeke (GSP Secretariat) informed the INSII members about the awareness raising activities of the GSP. Among others, the World Soil Day, established in 2013, represents the main awareness raising platform.

INSII members welcomed the interesting set of activities and products; it was asked whether scientific publications could be accessed through the GSP website. According to the GSP Secretariat, this could be accommodated, while referring to Pillar 3, where several partners are currently developing soil research service portals.

Questions were raised about the GSP publication process and about how joint products are cited and the authors acknowledged. It is important that joint products including the authors are properly cited and clearly branded as GSP. Bearing in mind the recently produced GSOCmap, the GSP Secretariat announced to explore this question with the ITPS in order to define and establish a good practice.

18. Pillar 5 Progress, activities related to the development of GloSIS

Mr. Rainer Baritz (EEA, Chair Pillar 5) briefly summarized the Pillar 5 activities, mainly focusing on two issues, harmonization of soil analysis (GLOSOLAN), and the development of a harmonized domain model for the exchange of digital soil data through web services.

Questions were raised about the link to current developments in soil classification. Mr. Baritz responded that this is ensured through the representation of the International Union of Soil Sciences (IUSS in the Pillar 5 WG. One of the participants requested guiding methods for soil mapping. According to Mr. Baritz, this would be closely related to the new global soil polygon map, a topic currently not prioritized in Pillar 5. However, the topic shall be discussed by the P5WG. It was mentioned that the GSP data policy should promote open soil data and shared approaches such as GEOSS. Mr. Baritz responded that this is indeed the approach pursued by the existing data policy and the GloSIS design. It was stressed several times that Pillars 4 and 5 should closely operate.

19. Conclusions and way forward

Mr. Baritz presented an overview of the INSII work items 2018/2019 (see also Appendix 2). The demand for global soil data is high, and the development of information systems is complex. While many INSII members still struggle with building their infrastructures and capacities, new data products are already

requested. At the same time, not all regional Pillar 4 chairs are fully engaged yet. The importance of the Pillar 4 (and Pillar 5) WGs was emphasized.

Related to the products, the following comments were made by members of the P4WG and INSII:

- SOC Sequestration potential: the product specifications and methods need to be more clearly defined;
- SoilSTAT: the document seems mature, and now requires review by INSII, before it can be presented to the Plenary Assembly after review by ITPS;
- Tier 1 and Tier 2 soil profile data bases: the draft specification requires substantial review;
- CountrySIS: the terms of content for a guideline document requires revision;
- GloSIS: rather than a vision document, the available draft will be titled “GloSIS design and implementation plan”, and the document will more clearly distinguish between databases (soil profiles), data exchange (domain model) and data infrastructure (discovery-, view-, download- and transformation-services).

The importance of the regional chairs for Pillars 4 and 5 to facilitate information flows and some level of coordination was highlighted. The GSP Secretariat confirmed that regional trainings will be organized. In order to support and coordinate writing processes effectively and efficiently (access, progress, versioning, reviewing, citing and download), the GSP Secretariat was asked to develop a repository of working-level and/or finalized documents.

Participants raised their concerns about the target of 3 new maps in one year and were more in favour of a one map per year approach. Concerning prioritization, it was noted by various people that during the GSP Plenary of 2018, Erosion was the one with highest priority. The GSP Secretariat replied, that based on the experiences with country-driven GSOCmap, synergies exist such as using the same soil profile data bases, combined with digital soil mapping, and through cooperation with experienced soil modellers. The already existing cookbook on soil carbon can be updated and further developed for new products. It was then discussed how to re-prioritize the products in Appendix 2. For instance, salinization is an issue for certain countries (e.g. NENA and Eurasia), while erosion will be the main topic of the next global symposium, it will be the motto of the next World Soil day and is overall considered to be the world’s largest soil threat. The GSP Secretariat clarified that the demand for different data products (such as salinity, erosion and SOC sequestration potential) by member countries and stakeholders constitute a unique opportunity to advance the establishment of GloSIS as financial resources are made available for these products.

Given the experience of the GSOCmap, for which the GSP Secretariat took all aspects of data collection and processing, and did not give a role to the regional partnerships, thus factually bypassing the role of regional partnership, it was asked what the role of the Regional Soil Partnerships (RSPs) could be. The answer by the GSP Secretariat was that RSPs should be only instrumental in capacity building and training for preparing the country-level maps.

Next steps:

- All documents (concept notes and technical specifications) need to further mature and be submitted as almost final versions to ITPS;

- In January 2019, the improved product specifications shall be made available to INSII members by the GSP Secretariat; if possible, different implementation options and paces shall be provided (e.g. Tiers).
- By February 2019, each INSII member can undertake a reliable investigation of available and needed resources and time frames. Each draft specification will contain a roadmap including training activities. This roadmap can then be commented by each country, so that activities can be properly planned by the GSP Secretariat taking also into consideration the high demand for these products.

Mr. Baritz thanked all participants for their devoted discussions, which greatly helped to progress towards the implementation of GloSIS and the development of new data products.

The INSII meeting was followed by a P4WG meeting, with its members reassuring support and commitment.

Annex 1: List of participants

| Name | Country | Organization |
|--------------------|----------------|--|
| Peter Wilson | Australia | The Commonwealth Scientific and Industrial Research Organisation Australia |
| Amin Ismayilov | Azerbaijan | Institute of Soil Science and Agrochemistry of Azerbaijan National Academy |
| Katrien Oorts | Belgium | Flemish Planning Bureau for the Environment and Spatial Development |
| Josiane Masson | Belgium | European Commission |
| Karma Dorji | Bhutan | National Soil Services Centre, Ministry of Agriculture & Forests |
| Svetla Rousseva | Bulgaria | Institute of Soil Science "N. Poushkarov" |
| Ibrahim Siele | Burkina Faso | Bureau National des Sols (Bunasols) |
| Carolina Olivera | Colombia | FAO Colombia |
| Napoleon Ordonez | Colombia | Geographic Institute Agustin Codazzi |
| Caroline Keay | England | Cranfield University |
| Alar Astover | Estonia | Estonian University of Life Sciences |
| Antonio Bispo | France | National Institute for Agricultural Research, Paris (INRA) |
| Abdou Rahman Jobe | Gambia | Soil And Water Management Services Unit, Ministry of Agriculture |
| Nicole Wellbrock | Germany | Thünen Institute of Forest Ecosystems |
| Waleed Al Shafie | Iraq | Ministry of Agriculture |
| Simone Priori | Italy | Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA) |
| Robert Delve | Italy | International Fund for Agricultural Development (IFAD) |
| Edoardo Costantini | Italy | Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA) |

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|----------------------|--------------------|---|
| Toshiaki Ohkura | Japan | Institute for Agro-Environmental Sciences (NARO) |
| Christian Omuto | Kenya | University of Nairobi |
| Chang-Hoon Lee | Korea | Organic resources, Soil and Fertilizer division |
| Jae Chun Kim | Korea | Organic resources, Soil and Fertilizer division |
| Jeonghun Yu | Korea | Organic resources, Soil and Fertilizer division |
| Tamara Ceban | Moldova | Institute of Pedology, Agrochemistry and Soil Protection "Nicolae Dimo" |
| Iurii Rozloga | Moldova | Institute of Pedology, Agrochemistry and Soil Protection "Nicolae Dimo" |
| Gerard Grealish | New Zealand | Landcare Research New Zealand |
| David Medyckyj-Scott | New Zealand | Manaaki Whenua - Landcare Research |
| Olufunmilayo Ande | Nigeria | Institute Of Agricultural Research And Training, Moor Plantation |
| Andrew Flores | Philippines | Bureau of Soils and Water Management |
| Angel Enriquez | Philippines | Bureau of Soils and Water Management |
| Dominciano Ramos | Philippines | Bureau of Soils and Water Management |
| Oleg Golozubov | Russia | M.V.Lomonosov Moscow State University, soil science department |
| Jovica Vasin | Serbia | Institute of Field and Vegetable Crops, Serbia |
| Janez Bergant | Slovenia | Agricultural Institute of Slovenia |
| Edwin Moshia | South Africa | Institute for Climate and Water of ARC |
| Josef Kozak | The Czech Republic | Czech University of Life Sciences Prague (CULS) |
| Marc Van Liedekerke | The European Union | Joint Research Centre of the European Commission |
| Fenny van Egmond | The Netherlands | ISRIC-World Soil Information World Soil Information |

| | | |
|--------------------------|---|--|
| Bas Kempen | The Netherlands | ISRIC-World Soil Information World Soil Information |
| Hendrik van den Bosch | The Netherlands | ISRIC-World Soil Information World Soil Information |
| Titia Mulder | The Netherlands | Wageningen University |
| Dushko Mukaetov | The former Yugoslav Republic of Macedonia | Institute of Agriculture - University "Ss Cyril and Methodius" |
| Attia Rafla | Tunisia | Ministry of Agriculture Water Resources Fishing Tunisia |
| Mykola Miroshnychenko | Ukraine | National Scientific Center Institute for Soil Science and Agrochemistry Rese |
| Arkadiy Levin | Ukraine | National Scientific Center Institute for Soil Science and Agrochemistry Research |
| Fernando Fontes | Uruguay | Uruguay Ministerio De La Ganadería Agricultura Y Pesca |
| Gulchekhra Khasankhanova | Uzbekistan | Uzbek State Uzgipromeliiovodkhoz Institute (UZGIP) |

Annex 2: Overview of INSII work items 2018/2019

| Topic | Document type | GSP Sec/SDF | P4WG | P5WG | INSII | ITPS | Product |
|---|--|--|----------------------------|-------------------------------------|--|-------------------|-------------------------------------|
| Global Salinity Map | Specification | latest version End of Nov | Review Dec 2018/Jan2019 | Indicator fact sheets | Review 02 2019 | Review 03 2019 | (12.2019) ¹⁾ |
| Global SOC sequestration map | Specification | latest version End of Nov | Review Dec 2018/Jan2019 | Indicator fact sheets | Review 02 2019 | Review 03 2019 | (12.2019) ¹⁾ |
| Global Soil Erosion map²⁾ | Draft being developed by GSP Secretariat | <i>Review P4WG</i> | <i>Review INSII</i> | <i>Indicator fact sheets</i> | <i>Review</i> | | |
| Indicator report | Drafting | | | 1 st draft by 02 2019 | Review 03 2019 | Review 04 2019 | |
| GloSIS | Vision/Design paper for the infrastructure | SDF continues | feedback from P4WG | Pillar 5/GSP Secretariat on SoilML | Voluntary INSII members for testing SoilML: probably 03 2019 | | |
| SoilSTAT | Concept Note | Mature Version November 2018 | (done) | | Review 01 2019 | Review 03 2019 | Endorsement by the Plenary Assembly |
| Tier1/Tier 2 soil profile specifications | Specification | SDF continues | feedback from P4WG | | Voluntary INSII members to provide feedback | | |
| CountrySIS | Concept note with ToC for Guideline | GSP Secretariat continues Feedback from SDF | feedback from P4WG | | Voluntary INSII members to help writing guideline | | |

¹⁾ Feasibility of the delivery needs to be assessed once specifications are finalized and INSII feedback about implementation options is collected.

²⁾ Discussion showed that soil erosion seems to have high priority despite very initial level of specifications development.