

INSII-VI/20/Report



Food and Agriculture
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Report of the sixth Workshop of the International Network of Soil Information Institutions (INSII)

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**REPORT OF THE SIXTH WORKSHOP OF THE INTERNATIONAL NETWORK OF
SOIL INFORMATION INSTITUTIONS (INSII)**

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List of Acronyms

ACIAR	Australian Center for International Agricultural Research
CSIRO	Commonwealth Scientific and Industrial Research Organization
EEA	European Environment Agency
ESIP	Earth Science Information Partners
EJP	European Joint Program
FAO	Food and Agriculture Organization of the United Nations
GBSmap	Global Black Soil Distribution Map
GLOSOLAN	Global Soil Laboratory Network
GLOSI	Global Soil Information System
GSERmap	Global Soil Erosion Map
GSOCmap	Global Soil Organic Carbon Map
GSP	Global Soil Partnership
GSSmap	Global Soil Salinity Map
GSOCseq	Global SOC Sequestration Potential Map
INSII	International Network of Soil Information Institutions
ISRIC	International Soil Reference and Information Centre
ITPS	Intergovernmental Technical Panel on Soils
IUSS	International Union of Soil Sciences
OGC	Open Geospatial Consortium
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
SIS	Soil Information System
SISLAC	Latin America and the Caribbean's Soil Information System
SOC	Soil Organic Carbon
SOM	Soil Organic Matter

Opening of the workshop

The sixth workshop of the International Network of Soil Information Institutions (INSII) was held online to ensure safety of all participants in the context of the COVID-19 pandemic, from 7 to 9 October, 2020.

Mr. Luca Montanarella (Chair of INSII), opened the meeting and greeted the participants. He welcomed the online modality of the meeting, and pointed out that participation was much higher than usual due to lack of necessity for expensive travel.

Mr. Yusuf Yigini (GSP Secretariat) gave an overview of the proposed agenda for the meeting. The main items focus on the reporting of regional progress, development of the Global Soil Information System (GloSIS) and the new Pillar 4 Implementation Plan (P4IP).

Mr. Ronald Vargas (GSP Secretary) welcomed the participants, stressing an added value of INSII institutions as main producers and holders of national soil data. He said that the evaluation of the GSP that was conducted in 2020 suggested gradually changing the structure of the GSP from Pillars to result-oriented work areas based on the SDGs. However, concerns were raised by some Regional Soil Partnerships (RSPs) that their work was already organized by pillars and changing it might have some negative effects on RSP work. Mr. Vargas pointed out that the GSP Secretariat has already been focusing on global data products, such as Global Soil Organic Carbon Map (GSOCmap), Global Map of Salt-Affected Soils (GSSmap), Global Soil Organic Carbon Sequestration Potential Map (GSOCseq) based on SDG needs. On the other hand, he emphasized that Pillar 4 (Soil Data and Information) is a cross-cutting and essential topic, therefore its main structural elements, such as INSII and Pillar 4 Working Group need to be preserved and possibly enhanced. He expressed commitment from the side of the GSP Secretariat to continue facilitating the development of GloSIS and having it online as soon as possible.

Approval of Agenda

Mr. Luca Montanarella asked INSII members for the approval of the proposed agenda, and it was unanimously adopted.

1. Regional reporting

1.a - Progress at Regional Level - European Soil Partnership

Ms. Maria Fantappie (European Soil Partnership, Pillar 4 Working Group) presented the progress of Pillar 4 activities in the region in 2020. She thanked GSP for organizing an online course on mapping salt-affected soils (20-23 July 2020). The course was attended by participants from 13 European countries: France, Germany, Greece, Israel, Italy, North Macedonia, Poland, Portugal, Slovenia, Spain, Finland, Czechia, Turkey. Most of the participating countries are now working on their maps. There is an ongoing activity for transborder harmonization for soil organic carbon (SOC) maps between Austria-

Czechia-Slovakia, that will be supported through the Work Package 6 (WP 6) of European Joint Programme on Soil (EJP-SOIL) project, and will be extended to the whole consortium. Regarding the Global Map of Soil Organic Carbon Sequestration Potential (GSOCseq) experts from EJP-SOIL project are currently testing the Roth-C scripts developed by the GSP Secretariat. There is an ongoing elaboration of a soil distributed system for Europe that is envisioned to be INSPIRE-GLOSI compliant. ESP is also working on the definition of legal aspects linked to soil data ownership and sharing through WP6 of EJP-SOIL. Country-SIS online survey is being promoted through EJP-SOIL. The following countries replied to it: Austria, Hungary, Slovakia, United Kingdom, Denmark, Norway, Latvia, Lithuania, Poland, Italy, Belgium, Estonia, Finland, Portugal, Slovenia, Spain and Turkey.

1.b - Progress at Regional Level – Eurasian Soil Partnership (sub-regional)

Mr. Iurii Rozloga (Eurasian Soil Partnership, Pillar 4 Working Group), reported on the progress of activities in Eurasian countries. He highlighted the participation of Eurasian countries in the GSP training on mapping of salt-affected soils, that was organized in Izmir, Turkey, 2-7 March 2020. 10 Eurasian countries participated in the training: Ukraine, Georgia, Kazakhstan, Kyrgyzstan, Azerbaijan, Moldova, Armenia, Russian Federation, Tajikistan, Turkey. Belarus, Uzbekistan and Turkmenistan did not participate in the training. At this stage, Ukraine has submitted GSS maps to the FAO, while other countries were still working on their maps. On 1-15 September 2020 the Eurasian Soil Partnership organized a series of online practical seminars on the creation and development of National Soil Information Systems (data centers-NSII). The main content of the seminars was practical work with a typical agricultural and soil data center (on the example of Moldova and Kyrgyzstan). 7 countries participated in these seminars: Azerbaijan, Kazakhstan, Moldova, Russia, Uzbekistan, Tajikistan, Kyrgyzstan. However, Georgia, Belarus, Turkmenistan, Ukraine did not respond to the requests of Eurasian Soil Partnership Secretariat and did not participate in the seminars.

1.c - Progress at Regional Level - Near East and North Africa Soil Partnership

Mr. Rachid Moussadek (NENA Soil Partnership, Pillar 4 Working Group) presented the progress of Pillar 4 activities in the Near East and North Africa region. He mentioned that the countries continued to improve their national soil organic carbon maps and that a training was organized on the preparation of national soil salinity maps. An important event for the region was the establishment of the International Network on Salt-Affected Soils (INSAS) during the ICBA's Global Forum on Innovations for Marginal Environment in November 2019. Mr. Moussadek also highlighted the participation of NENA Soil Partnership in the meeting of Middle East and North Africa Soil Fertility & Fertilizers Industries, organized by the Arab Fertilizer Association in Dubai in October 2019, where the communication about the proposed Soil Information System for Sustainable Agriculture in MENA was presented.

1.d - Progress at Regional Level - Africa Soil Partnership

Mr. Christian Omuto (GSP Secretariat, Africa Soil Partnership, Pillar 4 Working Group) presented the work of the African Soil Partnership. He explained that the consultations for the new Pillar 4 working group chair in Africa were still ongoing, therefore he was presenting on behalf of the partnership as the former chair. He stressed that the online training of mapping of salt-affected soils (GSSmap) organized

by the GSP in Africa was attended by representatives of more than more than 30 countries. Currently, meetings are being held in the region to put up a new regional implementation plan that would include work on modelling and mapping of soil organic carbon sequestration potential (GSOCseq). Mr. Omuto invited colleagues from African countries to complement his report.

Ms. Funmi Ande (Nigeria) commented that Nigeria participated in the GSSmap training, and that it submitted a project proposal to FAO focused on developing a National Soil Information System for the country. She elaborated that the mapping of soils at national level is ongoing in order to acquire information for the proposed soil information system. Moreover, supplementary data are being collected, and work on correlation of soil classifications is underway.

Ms. Anneliza Collett (South Africa) added that South Africa participated in GSSmap training and that the preparatory work on GSOCseq has started in the country to put processes underway. The country is also in the process of developing a framework towards the compilation of a Soil Information Policy for the country.

Mr. Rik van den Bosch (GSP Soil Data Facility, ISRIC) noted that a project funded by the European Union – Soils4Africa recently started in the region. The project intends to develop a soil information system (SIS) for Africa and will facilitate additional soil sampling. Mr. van den Bosch expressed his hope that the SIS developed through this project will also be connected to the GSP's Global Soil Information System (GloSIS). He added that African Soil Partnership and Global Soil Partnership are connected to this project and emphasized that its data will be open and accessible for all.

1.e - Progress at Regional Level - Pacific Soil Partnership

Mr. David Medyckj-Scott (Pacific Soil Partnership, Pillar 4 Working Group) reported the progress of the Pacific Soil Partnership. He mentioned that COVID-19 pandemic significantly hampered the work in 2020. However, some progress has been made, in particular: in Australia new version of soil and landscape grids are being developed; new CSIRO project is investigating potential online soil spectral library and soil analysis platform with a link to GLOSOLAN spectroscopy initiative; efforts in improving policy framework include establishment of the National Soil Policy Team, appointment of the National Soil Advocate, as well as ongoing work to define a framework for inclusion of soil (state and trend monitoring) within natural capital assessments.

New Zealand has released 3 new national soil grid products: soil pH, soil carbon stocks and soil phosphate retention; National Soils Data Repository has been expanded with new samples, as well as additional coverage was added for the soil map unit database; New Zealand was continuously partnering with the GSP Soil Data Facility on the development of GLOSIS, as well as participating in the group working on the creation of an Earth Science Information Partners (ESIP) Soil Ontology and Informatics Cluster. Mr. Medyckj-Scott emphasized that New Zealand has decided not to provide GSS map data and requested that the GSP Secretariat does not generate a map on New Zealand's behalf. GSP Secretariat has been duly informed about this decision.

Mr. Medyckyj-Scott also elaborated on the ongoing projects of the Australian Center for International Agricultural Research (ACIAR) supporting island Pacific nations. In particular, the beta version of Pacific Soils Portal was launched in April 2020. However, part of the project focusing on the development of Papua New Guinea soil information system and mapping was repurposed due to COVID-19 pandemic.

Mr. Medyckyj-Scott outlined main challenges for the region, including: COVID-10 hindering progress, especially in movement of experts; changes of focal points; little capacity in data exchange standards and protocols. He stressed that in general, it was only possible to make progress with the Regional Implementation Plan if its objectives were aligned with national priorities and resources – otherwise it was difficult to implement.

1.f - Progress at Regional Level – North America Soil Partnership

Mr. Bert VandenBygaart (North America Soil Partnership, Pillar 4 Working Group) presented the progress of Pillar 4 activities in North America. He stressed on the efforts to promote digital soil mapping framework in the region. In particular, the United States of America contributed to the GSP initiative for mapping salt-affected soils (GSSmap) by producing and submitting national salinity maps. Mr. VandenBygaart highlighted the importance of the assessment on soil organic carbon sequestration potential (GSOCseq). He reported that Canada identified specialists and found funding for the GSOCseq initiative. He also presented ongoing work on the soil erosion assessment in the region.

1.g - Latin America and the Caribbean Soil Partnership

Mr. Mario Guevara (Latin America and the Caribbean Soil Partnership, Pillar 4 working group) reported on the progress of pillar 4 activities in Latin America and the Caribbean. He highlighted 3 GSP training on mapping salt-affected soils organized in the region for English and Spanish speaking countries. He noted that 3 countries already finalized and delivered their salinity maps, while others are still working on them. The challenges in the region include COVID-19 that hampered travel and communication and forced many experts to work from home with limited computer capacities. Due to difficulty in communication, there remain some low-response countries. Work is ongoing to engage them in the GSP activities.

Mr. Guevara also highlighted the initiatives in the region related to soil organic carbon sequestration. In particular, he mentioned a pilot exercise of developing SOC sequestration potential maps in Costa Rica and the initiative of Mexico to launch a recarbonization program. He outlined regional plans to hold a meeting regarding progress with salinity mapping, plans for soil organic carbon sequestration mapping and Latin America and Caribbean Soil Information System (SISLAC). It is also planned to expand the FAO Technical Cooperation Program (TCP) in the region to implement sustainable soil, management, strengthen soil carbon monitoring and to facilitate recarbonization.

2. GLOSI development

Mr. Yusuf Yigini (GSP Secretariat) and Ms. Fenny van Egmond (GSP Soil Data Facility, ISRIC) presented each one half of the jointly prepared presentation on GLOSI progress this year, which was

a collaboration of ISRIC as Soil Data Facility (technical) and GSP Secretariat (country needs and TCP). Mr. Yusuf Yigini (GSP Secretariat) gave a comprehensive overview of the development of the Global Soil Information System (GLOSIS). He emphasized that GLOSIS is aimed at empowering countries (and other data providers) to develop their national soil information systems and making soil data available, compatible and exchangeable. He outlined the main principles of the proposed system being decentralized, federated, having national ownership, being light and affordable, open source, and country driven. The GLOSIS country driven global datasets include Global Soil Organic Carbon Map (GSOCmap), Global Map of Salt-Affected Soils (GSSmap), Global Soil Organic Carbon Sequestration Potential Map (GSOCseq), Global Black Soil Distribution Map (GBSmap) and Global Soil Erosion Map (GSERmap). GSOCmap was released in 2017 and updated in 2019 and 2020. Other products are currently in different stages of development.

Mr. Yigini described the goals of developing GLOSIS divided in 2 phases: short-term goals – to help countries to organize and share their data through national soil information systems (thus building GLOSIS 1.0 as a platform that increases findability of data); long-term goals – to establish a fully functional system for harmonized data storage and exchange with several add-ons/plugin using standards and the latest IT solutions for optimal functionality (GLOSIS 2.0). Mr. Yigini further elaborated on GLOSIS design elements and participation levels. He stressed on the importance of national soil information systems as GLOSIS nodes and the aim of GSP to make their deployment as easy as possible based on open-source software. On the other hand, Mr. Yigini noted significant hidden costs of developing national soil information systems, including costs of data collection, field surveys, digitalization, harmonization, capacity development and mapping. He proposed the FAO Technical Cooperation Programme (TCP) as a feasible framework for the countries to obtain necessary funding for developing their information systems. TCP projects allow for funding up to USD 500 000 and were already used for developing soil information systems in several countries, including Macedonia, Sudan, Afghanistan, and Lesotho, as well as a regional information system SISLAC. Mr. Yigini suggested that GSP would support countries with their TCP proposals by developing guidelines for such proposals, tailored to the GLOSIS workflow. Mr Yigini also described the work of the GSP to develop a GLOSIS Discovery Hub as a single access point to look for soil data of the GSP partners and to host GLOSIS data products such as global maps.

In the following discussion several questions were raised regarding the role of the INSII institutions in the GLOSIS development and the procedure for TCP proposals. Mr. Yigini explained INSII institutions are main beneficiaries of GLOSIS and are involved in its development through the Pillar 4 working group. Mr. Vargas (GSP Secretary) confirmed that GSP so far was able to support some countries with their national soil information systems through TCP projects. In FAO every country has an allocation for TCPs for a biennium, however, it is up to the national government to decide in which topics technical cooperation with FAO will take place. If national priorities for funds allocation in the biennium include soil information systems, the government may request FAO country office for a TCP. After that GSP can help to develop a project document at no cost and may support the project in the capacity of a lead technical officer.

Ms. Fenny van Egmond (GSP Soil Data Facility, ISRIC) characterized the conceptual design of the long-term GLOSIS development, towards GLOSIS 2.0 and the progress of its realisation so far. The

basic functionality of the various building blocks is almost in place, the next step is to include the domain model and its implementation, the semantic data model. She stressed the current challenges in the data exchange, including the necessity to finalize the domain model in order to be able to move on with GLOSIS 2.0 development and recent changes in the Open Geospatial Consortium (OGC) standards. The discussion on the domain model is currently ongoing in Pillar 5. Other issues include the need to define performance requirements for GLOSIS and its nodes, as well as requirements on query results; agreement on governance of the domain model, ontology and codelists/vocabularies needs to be reached. Ms. van Egmond suggested that GLOSIS 2.0 could have 'plug-ins' or additional tools such as SOILSTAT module for statistical reporting and the Global Soil Spectral Calibration Library and Estimation Service linked to the GLOSOLAN spectroscopy initiative.

Ms. van Egmond gave an overview of the ongoing work of Pillar 5 to develop the GLOSIS domain model. The model was decided to be based on existing standards such as ISO 28258, OGC IE, AnzSoilML, INSPIRE, OGC O&M. Currently, the model that is developed in the FAO funded consultancy study by Tomas Reznik and Kathi Schleidt in consultation with INSII members and experts from Europe and the Pacific, is primarily derived from ISO 28258 and extended with elements from AnzSoilML and INSPIRE. It uses OGC Observation & Measurements. However, codelists and vocabularies for the model still need to be developed. Ms. van Egmond emphasized that the activities on GLOSIS are linked to the European Joint Programme (EJP) on Soil Work Package 6 that focuses on harmonized soil information and reporting as well as to Pillar 5 work on GLOSOLAN. She also presented results of the GLOSOLAN spectral data survey that showed a great interest of GSP partners in soil spectral data and in the distributed infrastructure of GLOSIS. It is therefore proposed to include spectral data in the GLOSIS data exchange model and to think about linkages between GLOSIS nodes and GLOSOLAN laboratories. Ms. van Egmond invited INSII members to join the discussion on all issues of GLOSIS development.

Discussion

In the following discussion Ms. Maria Fantappiè (Pillar 4 working group, Italy) and Ms. Nicole Wellbrock (Germany) suggested that laboratories should be linked to GLOSIS through soil data owner nodes (national or regional nodes). Several questions were raised on harmonization of data within GLOSIS. Mr. Yigini (GSP Secretariat) suggested that data harmonization should be done at national level with technical support from the GSP.

Harmonization of spectral data and its correlation between different instruments was a particular concern of several countries. Ms. van Egmond (GSP Soil Data Facility, ISRIC and co-leader of the GLOSOLAN Soil Spectroscopy Working Group) explained that this is an ongoing topic of international research, and proposed interested countries to provide their samples to be tested for free in the USDA-NRCS Soil and Plant Science Division, National Soil Survey Center, Kellogg Soil Survey Laboratory (KSSL) which is considered as a Gold Standard laboratory in the GLOSOLAN spectroscopy initiative. Shipping costs are for the sample submitter. This would allow to obtain a set of soil samples measured by different spectral instruments and thus to develop calibration between them. Mr. Christian Thine Omuto (GSP Secretariat) added that the problem with local calibration models is lack of spectral data that makes prediction unstable. He suggested that a global spectral library, developed by GLOSOLAN, would help to solve this issue.

Several countries pointed out that capacity building is crucial for the ability of national institutions to participate in GLOSIS. Ms. van Egmond confirmed the necessity for capacity building and announced that the writing of the GLOSIS Cookbook manual has started. Ms. Karma Dema Dorji (Bhutan) suggested that while capacity building is most important, not all countries are at the same level in terms of having soil information. Ms. Rafla Attia (Tunisia, ITPS) further added that countries are at different levels of developing soil maps, so specific implementation is needed for each country. Mr. Yigini confirmed that the GSP is giving utmost importance to capacity development and tailoring the training sessions to the regions/countries, as well as following up with them one by one. Mr. Rik van den Bosch (GSP Soil Data Facility, ISRIC) made a remark that the purpose of the complex technical development of GLOSIS was to make a package that is easy to use and accessible for all INSII members, including those that are only starting to develop their soil information systems.

Mr. Johan Stendahl (Sweden) asked whether GSP was considering including soil biodiversity data, e.g. based on DNA/metabarcoding into GLOSIS. Ms. van Egmond replied that GSP is open to doing it and invited partners to contribute to the development of GLOSIS code lists and vocabularies on this topic.

Mr. Luca Montanarella (INSII chair) suggested that while work on the soil information systems was important, collecting data from the field was crucial for the development of relevant soil data and information. Many countries expressed their agreement with this point, while Ms. Katrien Oorts (Belgium) and Ms. Maria Fantappiè (Pillar 4 working group, Italy) added that resource mobilization is needed to support soil surveying in the field. Mr. van den Bosch added that there was also an added value in operationalizing legacy data, and suggested that the community of practice is important. Ms. Dorji (Bhutan) suggested that soil spectroscopy could be useful for obtaining more field data with limited resources. Ms. van Egmond replied that while spectroscopy cannot be the answer for all soil properties, it can really help with some main ones, e.g. clay content, SOC, pH etc.

Mr. Rafael Balta (Peru) emphasized that countries don't have the same capacity to develop and implement national soil information systems, so it is necessary to know their strengths and weaknesses to provide tailored technical support. Mr. Yigini replied that capacity building is the strength of the GSP and referred to numerous trainings implemented since 2012. He stressed that capacity building should be a crucial part of the new Pillar 4 Implementation Plan (P4IP). He also suggested that the GSP capacity building needs to be harmonized, as a robust complete platform. Mr. Yigini also emphasized the vital role of resource mobilization, especially in supporting field surveys. He reiterated his suggestion to use FAO TCP projects as a possible solution for supporting countries. Mr. Yigini noted that through the discussion of the new P4IP it will be possible to distribute tasks and agree on realistic deadlines for 2021. Ms. van Egmond further added that short-term implementations of GLOSIS are ready to be tested by countries and suggested to do a survey on the needs of countries in capacity building, thus moving to develop a community of practice.

3. GLOSIS data products

3.a - Global Soil Salinity Map

Mr. Christian Thine Omuto (GSP Secretariat) gave an overview of the progress made in developing the Global Map of Salt-Affected Soils (GSSmap). He emphasized on the harmonized country-driven process and the capacity building programme, which included 8 regional trainings reaching more than 270 national experts from 117 countries. He noted progress that has been made by many countries in their national mapping efforts, and the challenges they encounter, including lack of routine measurement of salinity indicators, challenges in obtaining and processing of legacy data as well as other associated issue e.g. movement restrictions due to COVID-19, lack of computing capacities and different prioritization.

In the following discussion Mr. Luca Montanarella (INSII chair) asked whether INSII members contributed to the development of the GSSmap. He suggested that salinity is a specialized domain, so institutions other than INSII may be better positioned to deliver data in this case. Several INSII members, including Germany, Italy, Nigeria, Cameroon, Ukraine and Zimbabwe confirmed their participation in the mapping activities. Mr. Omuto added that while INSII members did contribute, GSP is always open for all partners to participate.

Ms. Nicole Wellbrock (Germany) raised a question about the aim of developing the GSSmap. The current methodology does not allow distinction between naturally occurring salinity/sodicity and human-induced problem. Therefore, the interpretation of the map might be problematic, since the eventual conclusion should be related to sustainable soil management which would be different for cases of natural and anthropogenic salinity. Ms. Wellbrock requested the discussion on the final product before publishing it and thanked FAO for the support in this activity. Mr Omuto replied that currently at the global level GSP is asking to make a contribution to the GSSmap with all the data the countries have. Once the first version of the global map is finished, it will be possible to interpret it and to separate areas that are naturally saline from those that have salt problems due to mismanagement. Ms. Funmi Adebisi (Nigeria) thanked GSP for organizing the training on mapping salt-affected soils and commended the team that conducted the training. She noted that Nigeria has dry areas with salt-affected soils both due to management and due to natural reasons, and suggested that national reports should separate different factors for salinity in each country.

Mr. Rik van den Bosch (GSP Soil Data Facility, ISRIC) suggested that focus on soil management was really important in national salinity maps and raised a question of the added value of the global map compared to a collection of national maps. Mr. Wellbrock supported the idea to focus on the management and stressed that the discussion at the GSP Plenary Assembly regarding salinity mapping was revolving around anthropogenic issues rather than natural salinity. Ms. Maria Fantappiè (Pillar 4 working group, Italy) suggested that soils with natural salinity can be used and managed differently than non-saline soils, therefore there was an added value in identifying natural salinity on the global map. Ms. Nyaradzo Marilyn Muzira (Zimbabwe) noted that the added value of having the global map is the harmonization component as well as the fact that all national maps will be accessible from one platform. Mr. Yigini explained that the GSSmap was intended as a starting point at the global scale from which it would be possible to move to identifying local anthropogenic causes. He further explained that the GSSmap technical report and the Global Report on Salt-Affected Soil clarify salinity drivers for each country. Mr. Yigini stressed that GSSmap is a global map and yet at the same time a collection

of national maps due to the nature of country-driven mapping framework. Mr. Antonio Bispo (France) suggested that indication of “natural” vs “anthropogenic” salinity needs to be done on the map itself, rather than in the reports. Mr. Montanarella supported the point that there might be a danger of misinterpreting the map if such distinction is not made clear. Ms. Fantappiè noted that with the current methodology it is impossible to distinguish between natural and human-induced salinity on the GSSmap. Therefore she suggested producing another map with such a distinction as a 2nd step of the process.

Ms. Katrien Oorts (Belgium) and Mr. Borut Vrščaj (Slovenia) commented that there is no data on salinity indicators in their countries and asked whether participation in the GSSmap makes sense for their countries. Mr. Peter Wilson (Australia) noted that there was no indication of Australian Government’s intention to participate in providing the GSSmap. He asked the GSP Secretariat to clarify if there has been any agreement with the Australian focal point on this matter. Mr. Omuto explained that the request to update the global information and develop the map of salt-affected soils was made by the GSP Plenary Assembly, for the reason that salinity is a serious problem for soil management in many regions. While many countries know the problem, some may be unaware of it, and unless salinity is monitored, the problem can emerge outside of control. Therefore, there is a need to understand globally, if saline regions identified many years ago are still valid or whether they changed. He stressed that many countries were still developing their databases on soil salinity indicators before initiating mapping activities. He also noted that Australian experts participated in the GSP training on mapping salt-affected soils for the Pacific region, and that GSP was open to working with Australian government on this matter.

Ms. Karma Dema Dorji (Bhutan) commented that a previously unknown salinity problem was identified in Bhutan thanks to the current mapping exercise, however more time is needed for a comprehensive assessment in the country. She asked whether the countries that are not able to contribute before the deadline will be left out as blank in the published GSSmap. Mr. Wilson (Australia) added that it was difficult for his country to acquire comprehensive data in time due to federated governance system and the uncertainty of the government’s involvement in the process. He asked whether the countries will have options to be left out or to be gap-filled in the final global product. Mr. Montanarella suggested that mapping salinity presented quite a different task from the previous efforts on SOC due to the fact that not all countries have salt problems. He also asked the GSP Secretariat to clarify at which point will the INSII members have the chance to see the final product and to decide whether to publish it or not. Ms. Wellbrock (Germany) supported the point that the GSSmap needs to be reviewed and discussed by INSII members before publishing. Mr. Omuto replied to these comments by emphasizing that there is no rush to produce something not agreeable and not useful and that in the continuing process we can still engage more countries to avoid gap-filling. He suggested that the current status of the GSSmap activities is the beginning of a journey, not an ending. Mr. Yigini further clarified that the map will be shared with INSII for an online review before publishing, and that the countries have the right to ask to be left out from the final map.

Mr. van den Bosch (GSP Soil Data Facility, ISRIC) praised GSP activities, especially capacity building, as very valuable for all the countries. He suggested caution regarding the gap-filling and asked whether it was really needed. Mr. Yigini replied that the GSP Secretariat was currently developing a gap-filling

approach, however the aim is for all the map to be filled with national data by the time it becomes available. He added that if gap-filling was used for any country, it will be clearly indicated in the technical report and on the online map. Mr. Montanarella emphasized that the decision of gap-filling or not should be made by INSII members. Mr Bispo (France) supported this suggestion and proposed a process where the countries would validate their national maps, produced through gap-filling, before they are published. Mr. Ronald Vargas (GSP Secretary) clarified that according to the GSP procedure technical specifications for the GSSmap were endorsed by the ITPS and the Pillar 4 working group. He acknowledged that the GSSmap is different to the GSOCmap since many countries don't have issues with salinity – he suggested that these countries may be left out of the map as gaps. He confirmed that if any country doesn't want to be a part of the GSSmap, it is possible to tell the GSP Secretariat about it and be left blank. Mr. Vargas also acknowledged that due to many challenges, the work on the GSSmap went beyond the originally envisioned timeline. Due to requests of many countries to have more time for developing national maps, GSP Secretariat will not launch GSSmap in 2020, and will explore the progress in the 1st quarter of 2021. He confirmed the decision to launch the map in 2021. Mr. van den Bosch asked for further clarification on the necessity of gap-filling. Mr. Vargas agreed that gap-filling is not bringing any additional data, but noted that the GSP Secretariat performs gap-filling when the countries that do not have data ask for it. He also stressed that it creates an issue when Permanent Representatives of countries in FAO see a global map produced by FAO with certain countries being blank. Mr. van den Bosch noted that the map is not produced by FAO, but rather jointly by the GSP members. Mr. Vargas confirmed this point, but noted that it appears to be produced by FAO to the Permanent Representatives, because it is published in FAO.

Ms. Sevinc Madenoglu (Turkey) asked for a clarification whether the INSII institution or the data provider is able to make a decision to request gap-filling or to be left blank on the map, since in some countries salinity data is provided by institutions that are not members of INSII. Mr. Vargas confirmed that data providers are every country, the decision to develop the map or not is with a country, the decision to be gap-filled or not is also with the country.

3.b - Global Soil Organic Carbon Sequestration Map (GSOCseq)

Mr. Yusuf Yigini (GSP Secretariat) presented the progress in the technical development of the Global Soil Organic Carbon Sequestration Map (GSOCseq). He explained that the map will project potential sequestration of carbon in soils during the 20-year period considering the preservation of current management practices 'business as usual' and considering 3 hypothetical scenarios of introducing sustainable soil management (SSM) practices which would increase carbon inputs into soil. He noted that all the mapping process will be country-driven and emphasized on the benefits for the countries, including the following: setting attainable and evidence based national targets for carbon sequestration; achieving national commitments to the LDN Target Setting Programme implemented by the UNCCD; simulating national soil organic carbon stocks under different scenarios; identifying which regions, soil types and production systems have greater risks of decreasing and which have greater potential to increase SOC stocks; establishing priorities for research and implementation of public policies; supporting policy making in adoption of SSM practices that fostering SOC sequestration at national scale; improving technical capacities on sustainable soil management, soil data management, digital soil mapping and modelling; improve soil health as an integral step towards achieving the Sustainable

Development Goals (SDGs); supporting the provision of incentives to farmers implementing SOC-centred SSM practices. Mr. Yigini presented the timeline and achievements of the GSOCseq process. To date Technical specifications and country guidelines for GSOCseq were developed through an extensive research and consultation process, involving scientists, policy makers, FAO members, and international and intergovernmental panels, providing a background, product specifications and deliverables. The next step is capacity development and production of national maps. It will include capacity online training workshops in all GSP regions. The trainings will consist of 2 modules: module 1 focusing on learning the methodology and tools; module 2 dedicated to production of country maps with national inputs. To support the trainings, a Technical Manual (Cookbook) was developed by the GSP Secretariat, including general workflow, step-by-step instructions and scripts. The methodology and scripts were tested in pilot countries – Argentina and Costa Rica, and being tested by the Pillar 4 working group. Mr. Yigini noted the challenges posed by the mapping methodology, including certain requirements for computational capacities, need for national inputs for land use, land cover, climate, texture, and SOC, as well as the fact that modelling is limited to the top 30cm of soil.

Ms. Maria Fantappiè (Pillar 4 working group, Italy) suggested that soil management should be included as an input to the map. Mr. Guillermo Peralta (GSP Secretariat) replied that management is included in the mapping approach by introducing SSM scenarios that increase the percentage of carbon inputs by 5, 10, and 20% compared to 'business as usual'. Model estimates current inputs and by adding scenarios allows to predict potential SOC changes. Ms. Katrien Oorts (Belgium) inquired whether suggested percentages of increase in C inputs were realistic or not in the current management systems for each country. Mr. Peralta replied that it was decided to use standard SSM scenarios to achieve harmonized results among all countries. On the other hand, countries are encouraged to produce additional maps for locally relevant C inputs.

Several questions were raised regarding the required inputs for the GSOCseq modelling. Mr. Peralta explained that the process required climatic data series for years 1990-2000 and 2000-2020. For current SOC data it is suggested to use the latest version of the GSOCmap which is assumed to represent current SOC stocks for year 2000. Mr. Luca Montanarella (INSII Chair) noted that GSOCmap did not always represent actual SOC stocks due to differences in the age of SOC data used by countries. Mr. Peralta replied that for this reason GSOCmap is assumed to represent SOC at year 2000, and then additional simulation is performed to adjust for potential differences and obtain accurate current SOC stocks for the year 2020.

Mr. Anonio Bispo (France) countries expressed concern that the trainings need to be announced in advance to allow for proper preparation. Mr. Tao Fulu (Finland) noted that it was challenging for many countries to obtain gridded data on land use, SOC stock, management practices and cropping systems. He predicted large uncertainties due to these factors. Mr. Macoumba Loum (Senegal) asked whether other models, such as CENTURY, would be covered during the GSOCseq trainings. Mr. Ronald Vargas (GSP Secretary) commented that the aim was to conduct all trainings in 2020. He expressed hope that the GSOCseq map could be completed by April 2021. He noted that though uncertainties are unavoidable, it is better to have some information on carbon sequestration potential than none at all. Mr. Yigini further added that the trainings will be product-oriented, thus only involving RothC model. Mr.

Peralta noted that to help the countries, GSP will provide standard global datasets on land use, and that the uncertainty will be quantified in the process.

Ms. Fantappiè (Pillar 4 working group, Italy) and Ms. Oorts (Belgium) emphasized that some European countries are going to produce carbon sequestration potential maps within the EJP Soil project, probably with a different timeline than was announced by the GSP. Mr. Montanarella (INSII chair) added that plenty of other groups and organizations were working and publishing on this topic, and suggested developing synergies with ongoing efforts, instead of duplicating them. Mr. Vargas emphasized that the GSP Secretariat is aware of other initiatives and invited them to review all the documents on GSOCseq, though he indicated that other initiatives did not invite GSP to participate in their work. Mr. Vargas pointed out that while many initiatives were ongoing in Europe, most developing countries have nothing on this topic. He suggested that it was important to empower developing countries to be able to produce carbon sequestration maps even though quality and usefulness of the results might be limited. Mr. Bispo (France) added that in the framework of the EJP project it was planned to produce a first version of the map according to the GSP specifications, and then to continue work on a second version with more customized management scenarios, thus ensuring synergies between EJP and GSP work. Ms. Fantappiè (Pillar 4 working group, Italy) also noted that EJP experts were involved in testing GSOCseq scripts and thanked GSP Secretariat for facilitating the joint work.

Mr. Hernan Figueredo (Bolivia) noted that the country recently produced an updated national SOC map. He asked to clarify what would be the approach to use this data for recarbonization. Mr. Xiaoyuan Geng (Canada) suggested that there is need to improve the GSOCmap first and expressed the opinion that the current version is not of sufficient quality for reliable carbon sequestration potential modelling, and thus it would be problematic to get scientific acclaim for the product. He added that in Canada there was a lot of effort going on to model soil organic carbon, but using a different approach. Mr. Vargas (GSP Secretary) noted that the spirit of the GSOCmap was always to raise awareness of the countries and to stimulate data acquisition and gradual improvement towards developing reliable baselines. He emphasized that the quantity and quality of available data is very different across the globe hence the need to bring all countries to the same level.

3.c – Global Soil Organic Carbon Map (GSOCmap) and Global Soil Erosion Map (GSERmap)

Mr. Yusuf Yigini (GSP Secretariat) briefly presented the progress on updating the Global Soil Organic Carbon Map (GSOCmap). He emphasized that while the map is not perfect, it is continuously improving and is now at version v.1.6. Regarding the Global Soil Erosion Map (GSERmap), Mr. Yigini mentioned that it's production will start in 2021.

Mr. Ebrima Jarra (Gambia) expressed his country's interest in updating their national SOC map. Mr. Yigini welcomed the initiative and offered methodological support of the GSP.

4. Pillar 4 Global Implementation Plan (2021-2030)

Mr. Yusuf Yigini (GSP Secretariat) introduced the working document of the draft Pillar 4 Global Implementation Plan (P4IP) that was previously made available for the INSII to review and comment on.

Mr. Rik van den Bosch (GSP Soil Data Facility, ISRIC) suggested that the draft document produced by the Pillar 4 working group is currently immature due to being a result of merging 2 different versions. He expressed an opinion that it was premature to discuss the document with INSII and proposed to leave it to the Pillar 4 working group for finalizing before presenting to INSII. Mr. Peter Wilson (Australia) supported this suggestion. Mr. Luca Montanarella (INSII chair) emphasized that INSII is the ultimate decision-making body of Pillar 4, therefore INSII should decide on the general activities for the future. Mr. David Medyckyj-Scott (Pillar 4 Working Group, New Zealand) expressed concern that the document was too difficult to edit online. He suggested having a general discussion with INSII to gather data for further writing of the document by the Pillar 4 working group. Mr. Ronald Vargas (GSP Secretary) pointed out the necessity to reflect on the previous P4IP which was very ambitious, but many of its planned outputs were not achieved. He suggested a more realistic plan taking into account 2 components: core activities for continuous development and a flexible part to respond to dynamics in the United Nations system. He proposed to start from identifying what countries consider as their priorities and current gaps. Then, based on the feedback of the countries, the Pillar 4 working group should develop the P4IP. Mr. Montanarella (INSII chair) noted the general agreement of INSII members to follow the procedure suggested by Mr. Vargas. Ms. Fenny van Egmond (GSP Soil Data Facility, ISRIC) proposed to use online polls to survey the opinion of INSII members on certain topics. Her proposal was supported by several countries.

4.a – The first Pillar 4 Implementation Plan 2015-2020

Mr. Montanarella (INSII chair) asked INSII members to provide feedback on the main lessons of the past five years.

Mr. Rainer Baritz (European Soil Partnership Chair) suggested that one of the issues of previous implementation was that the products on soil indicators were developed without prior definition of the indicator system. He noted that actual implementation often deviated from the plan, there were certain problems with the governance system and a particular concern was lack of participation from all parties. Mr. Baritz emphasized the need to better organize work on regional level and note that due to weak participation of regions all the work ends up on the GSP Secretariat. To facilitate that, he suggested that the Global Implementation Plan should address both regional and global priorities, which was not happening in the prior period. Ms. Rafla Attia (ITPS, Tunisia) supported the idea to put more attention to regional priorities and needs of the countries. She emphasized that projects are needed for successful implementation of Pillar 4 activities in the regions.

Ms. Katrien Oorts (Belgium) suggested to provide more time for the production of a specific product after finalization of its technical specifications. This suggestion was backed from the side of Netherlands by Ms. Fenny van Egmond (Netherlands).

Ms. Maria Fantappiè (Pillar 4 working group, Italy) and Mr. David Medyckyj-Scott (Pillar 4 Working Group, New Zealand) emphasized the necessity to improve collaboration between Pillar 4 and Pillar 5 due to their mutual dependence in many areas.

Mr. Rik van den Bosch (GSP Soil Data Facility, ISRIC) suggested that from the side of Soil Data Facility (SDF) it was difficult to adapt to a new program, deviating from the P4IP. He stressed the importance to define precisely what is expected from SDF in order to avoid tensions in the future. Mr. Peter Wilson (Australia) pointed out that expectations of Pillar 4 seemed to grow beyond initial roles to develop and deliver a Global Soil Information System. He complained that attention was diverted to developing specifications for global thematic products, and expressed the opinion that this should have been the role of ITPS as the body of experts in soil science in general, rather than purely in soil information. Mr. Montanarella (INSII Chair) noted that the confusion of roles of different bodies in GSP was also identified by the GSP evaluation and suggested the necessity to find more effective ways of governance. Mr. Baritz (European Soil Partnership Chair) commended the original Pillar 4 governance model, however he pointed out that the plan was implemented as if governance already exists. He emphasized the necessity to invest time in building a governance system and communication. He suggested starting the work from developing infrastructure, indicator system, and then organizing thematic symposia and developing thematic products. This suggestion was supported by Mr. van den Bosch (GSP Soil Data Facility, ISRIC) and Mr. Wilson (Australia). Ms. Nicole Wellbrock (Germany) added that a clear time schedule was needed for effective implementation. Ms. Katrien Oorts (Belgium) suggested focusing on soil indicators (SOILSTAT), not only data and maps. Mr. Ronald Vargas (GSP Secretary) pointed out that while building all components of GLOSIS infrastructure is a crucial task, it is impossible to ignore the requests from countries to develop thematic products. He stressed on the crucial challenge of mobilizing resources for Pillar 4 activities and noted that work solely on GLOSIS components was not attractive to donors. Mr. Vargas also pointed out that GLOSIS is envisioned as a federated system of systems, thus even with global components in place it will not be functional until most countries develop their own soil information systems. He emphasized the disparity of available resources between developed and developing countries and urged to take it into account. This point was supported by Mr. Abdou Rahman Jobe (Gambia).

Mr. Montanarella (INSII Chair) brought attention to the recommendation of the GSP evaluation for the GSP Secretariat and ITPS to embark on the formulation of a revamped GSP Action Framework, including transforming the current Pillars into Outcome Areas for Soil Health and developing specific work streams around major soil threats or issues, e.g. soil degradation, recarbonization, erosion, pollution, soil productivity, etc. He suggested that sticking to the old governance structure may not allow to bring innovations recommended by the evaluation. Ms. van Egmond (GSP Soil Data Facility, ISRIC) proposed the following topics to be included in the new P4IP: governance structure and how to decide on activities; global products and how to address requests from the Plenary Assembly; GLOSIS and national soil information systems; capacity building and community of practice. Mr. Vargas (GSP Secretary) noted that the GSP Secretariat is committed to implementing recommendations of the evaluation by focusing on soil threats identified by ITPS. He described the transition process from the Pillars to cross-cutting areas of work and emphasized that soil information is a crucial and cross-cutting topic itself. Mr. Vargas suggested to call GLOSIS as a cross-cutting area of work, involving elements of both Pillar 4 and Pillar 5. He stressed on the need to build a functional system that would be useful,

especially for the requests of developing countries. Mr. van den Bosch (GSP Soil Data Facility, ISRIC) supported the point of Mr. Vargas and added that a staged approach was appropriate, where short-term priority would be given to useful products for national institutions, as well as to harmonized capacity building.

4.b – Activities

Mr. Yusuf Yigini (GSP Secretariat) prepared a set of questions to the INSII members based on the previous discussion to steer the development of the new P4IP. He asked whether GSP activities falling under Soil Information and Data domain stay under the pillared (Pillar 4 and Pillar 5) structure or should they be restructured under an umbrella name GloSIS.

Several countries raised concerns whether all Pillar 4 and Pillar 5 activities could be included in such a definition or that it will mean refocusing solely on the development of GLOSIS infrastructure. Mr. Luca Montanarella (INSII Chair) clarified that GLOSIS is proposed as a term to define an outcome area, including data products, capacity building and all other relevant activities. Mr. Peter Wilson (Australia) suggested that regardless of the name the work should be focused on GLOSIS system, data exchange standards and data policy. Mr. Montanarella pointed out that the GSP evaluation recommended to go to thematic areas as outcomes, so thematic work should be included. Ms. Katrien Oorts (Belgium) suggested that emphasis should be on harmonization, exchange and delivery of products – not that much on a particular system itself.

Mr. Ebrima Jarra (Gambia) pointed out the necessity to establish a clear connection between work of the Pillars at the global level and National Soil Partnerships (NSPs), as well as to provide financial support to NSPs. In the following discussion it was emphasized that while National Soil Partnerships have their own structure of Pillars, INSII institutions are appointed by the national focal points, which can create a confusion of roles. Mr. Yigini (GSP Secretariat), suggested that coherence between global regional and national levels needs to be ensured in the new P4IP, with a specific focus on resource mobilization.

Mr. Luca Montanarella (INSII chair) asked INSII members to decide, whether they would like to redefine all the new P4IP around GLOSIS or to move forward with the old structure of Pillars. He reminded that the GSP Plenary Assembly recommended the GSP Secretariat and ITPS to embark on formulation of reforming GSP beyond pillars. He suggested that it was up to INSII to decide whether they wanted to have a P4IP consistent with the new structure, but noted that guidance from the GSP Secretariat and ITPS was needed. Mr. Rik van den Bosch (GSP Soil Data Facility, ISRIC) noted that the naming was more a matter of branding, while the important thing was to shape the structure of work. Mr. Bert VandenBygaart (Pillar 4 Working Group, Canada) supported the point that structure should be the subject of discussion, while the naming could be altered later if necessary. Mr. Rainer Baritz (European Soil Partnership Chair) emphasized that from the governance point of view it is important to keep Pillar structure that is also relevant for National Soil Partnerships, but from branding point of view all activities could fit under the umbrella of GLOSIS. Mr. Rachid Moussadek (Pillar 4 Working Group, Morocco) added that GSP has been promoted at the national level through the Pillar structure thus changing it might create confusion among stakeholders and hamper resource mobilization. Ms Nicole Wellbrock

(Germany) pointed out that changing the structure of GSP Pillars was an unresolved discussion point at the Plenary Assembly. She suggested to wait for the final resolution on this issue at the GSP level, while focusing on timelines for products in the new P4IP. This point was supported by several countries. Mr. Ronald Vargas (GSP Secretary) also supported Ms. Wellbrock's suggestion. He added that the recommendation to move from Pillars was welcomed by the Plenary Assembly, however, Regional Soil Partnerships expressed concerns with this change, because they were organized according to pillars. Mr. Vargas said that the GSP Secretariat will work on the ideas of transition and present a proposal for the new GSP structure at the next Plenary Assembly. He emphasized that regardless of the Pillars, development of GLOSIS and soil information should continue. Mr. Montanarella (INSII chair) asked whether the proposal was to rename the global P4IP as "GLOSIS Implementation Plan". Mr. Vargas and Mr van den Bosch supported the renaming. Mr. Baritz (European Soil Partnership Chair) suggested branding Pillar 4 and Pillar 5 differently, maintaining the underlying governance. He expressed concern that branding as "GLOSIS" may sound a bit technical for stakeholders and suggested alternative options for branding: "Global Soil Knowledge Base", "Global Soil Observing System", etc. Mr. Moussadek (Pillar 4 Working Group, Morocco) supported the proposal to rename the P4IP to GLOSIS, while keeping governance essentially intact.

As was suggested earlier, Mr. Yigini (GSP Secretariat) launched a poll to survey the opinions of INSII members on this matter. The poll had the following question: "Should GSP activities falling under Soil Information and Data domain stay under pillared (4-5) structure or restructure under an umbrella named GLOSIS (Global Soil Information System, Data Products, Harmonisation, Capacity Development)?" After the vote the option "Should be restructured as GLOSIS" received 54% (22 votes) and option "Should continue as Pillar 4" received 46% (19 votes). Mr. Montanarella (INSII Chair) concluded that the slight majority was in favor of restructuring as GLOSIS, but results were uncertain, and suggested focusing on short-term planning.

To decide on governance, Mr. Yigini launched another poll with the following question: "GSP Secretariat is taking necessary steps to address the recommendations in the report of the GSP Stocktaking Exercise. Should GSP continue developing an implementation plan with the current governance structure (INSII, Pillar 4 Working Group, SDF)?" After the vote the option "Yes" received 86% (24 votes) and option "No" received 14% (4 votes). Mr. Montanarella (INSII chair) concluded that the GLOSIS development should be continued with the current structure.

Mr. Yigini suggested that INSII will be more responsive to various product requests if more than 1 institution per country could be included. Mr. Montanarella (INSII chair) supported this idea and suggested that in the new P4IP it should be stated that representation in INSII is not limited to 1 member per country. Mr. Antonio Bispo (France) noted that the appointment of INSII was at the hands of national focal points, thus it was difficult for INSII representatives to take a position on this matter. He added that he was overall supportive of the idea to invite other institutions to INSII network to have a more complete picture of existing data in the countries. Mr. Peter Wilson (Australia) pointed out that having multiple INSII representatives may result in multiple products from a country. He suggested that it is the role of the INSII member and the national focal point to ensure involvement of different institutions and product integration at the country level. Ms. Wellbrock (Germany) emphasized that this point is not the choice of INSII, but of focal points and urged to move to the discussion of products and timelines.

To understand the position of INSII members, Mr. Yigini launched a poll with the following question: “One INSII per country is not enough to cover all soil information and thematic products envisioned in P4GIP. INSII would become more responsive by involving more institutions. Should more than 1 institution be allowed to represent a country in INSII?” After the vote the option “Yes” received 51% (18 votes) and option “No” received 49% (17 votes).

Mr. Yigini (GSP Secretariat) suggested that the new P4IPlan should have work streams for each activity group for smoother operation and clear workflows as well as delivery mechanisms. He proposed the following workstreams (WS): WS1 - Awareness raising/capacity development/resource mobilization; WS2 - GLOSIS development; WS3 - Development of standards/guidelines/product specifications; WS4 - Building a community of practice; WS5 - Developing data products. Mr. Abdelmagid Ali Elmobark Elhag (Sudan) noted that all 5 workstreams, not just the 2nd one, were related to GLOSIS development.

Mr. Yigini launched a poll with the following question: “Should execution of the P4GIP activities have clear work streams?” After the vote the option “Yes” received 92% (33 votes) and option “No” received 8% (3 votes). Mr. Wilson (Australia) emphasized that the agreement was on the fact of having workstreams, not on the content of proposed workstreams. Mr. Rainer Baritz (European Soil Partnership Chair) commented that the work streams are not clear enough and suggested that a draft table of content should be developed and given to the INSII members for commenting. This point was supported by several INSII members.

Mr. Yigini launched a poll with the following question: “New Pillar 4 Implementation Plan is envisioned to be in force for 10 Years (2021-2030). Annual plans would be developed for smooth implementation (Annual Activities, Task Sharing, Deadlines”. After the vote the option “Yes” received 97% (33 votes) and option “No” received 3% (1 vote). Ms. Katrien Oorts (Belgium) proposed to have plans for the coming 3 years, since finding funding and planning work inside the country often takes at least 1 year. This suggestion was widely supported by INSII members. Mr. Yigini confirmed that many countries need to know activities in advance. He proposed that Pillar 4 Working Group would develop 3 types of workplans: annual plans, mid-term plans and the 10-years plan.

Mr. Yigini (GSP Secretariat) raised a point that national data products and soil information systems are relying on existing soil data and information, therefore countries should be encouraged and supported for new soil data acquisition through sampling campaigns. He noted that this would require more collaboration with other initiatives such as GLOSOLAN and JRC-ESDAC. This point was supported by Ms. Oorts (Belgium). Ms. Karma Dema Dorji (Bhutan) noted that any techniques and approaches that would make field soil data collection easier are very welcome by the countries. Mr. Yigini launched a poll with the following question: “Should the new implementation plan also catalyse and bring mechanisms for new data acquisition (sampling design, resource mobilization...)”. After the vote the option “Yes” received 92% (36 votes) and option “No” received 8% (3 votes).

Mr. Yigini suggested a Community Needs Assessment and Gaps Analysis to help INSII to better understand national, regional needs and priorities for the new P4IP. He noted that a true Community of Practice (CoP) with continuous and structured capacity building is needed. Ms. Emily Toner (GSP

Soil Data Facility, ISRIC) commented that she would prefer an “asset-based” survey rather than “needs-based”. Mr. Baritz (European Soil Partnership Chair) pointed out that gap analyses should be done for every product, not just once for the global P4IP. Ms. Katrien Oorts (Belgium) agreed with Mr. Yigini on the necessity to survey the needs of countries and emphasized that management and politicians are often not interested in pure technical information systems, but rather interested in the products such as soil indicators, soil information and soil maps. This point was supported by Mr. Yiyi Sulaeman (Indonesia). Mr. Yigini launched a poll with the following question: “Should Pillar 4 Working Group conduct a survey among INSII for needs and gap analysis?”. After the vote the option “Yes” received 92% (33 votes) and option “No” received 8% (3 votes).

Mr. Yigini suggested that the new P4IP should encourage countries and data providers to use F.A.I.R. data principles. F.A.I.R. data are data which meet principles of Findability, Accessibility, Interoperability, and Reusability. Mr. Yigini launched a poll with the following question: “Should the new P4GIP have an activity item for raising the level of knowledge and awareness of the importance of open data?”. After the vote the option “Yes” received 91% (31 votes) and option “No” received 9% (3 votes).

Mr. Yigini (GSP Secretariat) noted that considering the fundamental role of Regional Soil Partnerships (RSPs), their role should be made clear in the new P4IP and its workstreams. Mr. Rainer Baritz (European Soil Partnership) suggested that workflows involving RSPs can be improved, yet this discussion is not for Pillar 4 or INSII, but for broader GSP. Ms. Maria Fantappiè (Pillar 4 working group, Italy) expressed concern that there are some national institutions working with soil data (e.g. in Ireland) but not involved in the GSP or RSP. She asked for clarification on what can be done in the case when a country does not have a national GSP focal point. Mr. Peter Wilson (Australia) suggested that the role of a RSP is to assist member countries to develop their own soil information systems so that they can participate in delivery of data and products for GLOSIS. Mr. Rachid Moussadek (Pillar 4 Working Group, Morocco) supported this point and added that RSP could help in raising funds at regional level. Mr. Elh Moudi Moustapha Abdourahaman (Niger) emphasized that RSP in Africa needs more assistance in performing its duties.

Mr. Luca Montanarella (INSII chair) concluded the discussion with the following statement: INSII mandates Pillar 4 Working Group to finalize the Implementation Plan by the next GSP Plenary Assembly according to the suggestions of this session. The draft document will be circulated to INSII members for their feedback before the Plenary Assembly.

4.c – INSII Annual Work Plan (10/2020 - 10/2021)

Mr. Yusuf Yigini (GSP Secretariat) proposed to work on an annual work plan from current date till next INSII in October 2021. He shared an online document with INSII members and suggested to populate it together during the session.

Mr. Reiner Baritz (European Soil Partnership Chair) suggested that 2 main activities on the table are GLOSIS infrastructure and products. He proposed to discuss the readiness of infrastructure elements with the SDF and continue with testing them with INSII members. Regarding the products, he noted that there were issues with dynamics between Pillar 4 Working Group and INSII and suggested focusing

on specifications for new products. He also noted that it was premature to discuss spectroscopy issues yet. Ms. Fenny van Egmond (GSP Soil Data Facility, ISRIC) noted that the first step for the SDF and the GSP Secretariat would be to write documentation on version 1 GLOSI nodes. She asked INSII members to indicate if they would like to test and implement version 1 nodes and to test version 2 data exchange. She mentioned the necessity to look for funding to implement GLOSI nodes and emphasized that testing and implementation should be a joint process – not done by SDF on its own, but jointly with the country. The following countries expressed their interest to participate in the testing and implementation of GLOSI elements: Italy, Indonesia, Australia, Gambia, Tunisia, Morocco, Senegal, Niger, Mongolia, Canada, Cape Verde, Zimbabwe, Ukraine, Israel, Bolivia, Philippines and Sudan. In particular, Mr. Peter Wilson (Australia) shared an initiative to implement a country SIS for Papua New Guinea and possibly some other Pacific countries. He noted that there were funds available for this task that could be further supplemented through a TCP project. Mr. Ebrima Jarra (Gambia) emphasized that a lot of capacity building is needed in the country regarding soil problems and information. He expressed interest in testing both version 1 and version 2 elements of GLOSI. Ms. Rafla Attia (ITPS, Tunisia) noted that for national SIS implementation it was necessary to establish a framework in the Ministry of Agriculture and to coordinate with FAO Tunisia. Ms. Larysa Bondarenko (Ukraine) suggested that her country can test GLOSI infrastructural elements using the funds of the ongoing GEF project. Ms. van Egmond (GSP Soil Data Facility, ISRIC) added that she had information that the United States of America and New Zealand are also interested in testing certain GLOSI elements. Mr. Yigini suggested that TCP is a good option to support development of national soil information systems. This point was widely supported by the INSII members. In particular, Bolivia and Ukraine emphasized that ongoing work on their soil information systems needs TCP support to be brought to the GLOSI technical level.

Mr. Yigini (GSP Secretariat) highlighted the importance of developing specifications for high resolution global grids of inherent soil properties. He suggested to task the IUSS Global Soil Map working group to start working on this product. Mr. Baritz (European Soil Partnership Chair) noted that it was impossible to finish filling the work plan table during the INSII session. He stressed that certain topics need to be pre-discussed between GSP-Secretariat, SDF, Pillar 4 Working Group, INSII and other networks. He also proposed to discuss the table with regional partnerships. This suggestion was widely supported by the INSII members. Mr. Luca Montanarella (INSII Chair) concluded that the annual work plan table should be finalized by the Pillar 4 Working Group.

Ms. Katrien Oorts (Belgium) suggested that it was essential to respond to the emerging needs for reporting about specific soil parameters and the soil related SDGs. She emphasized that not only maps are needed, but also calculated soil indicator factsheets and SoilSTAT Guidelines (with specifications on the proposed soil indicators). The suggestion to work on indicators was widely supported by INSII members. Mr. Baritz proposed to create a joint Pillar 4 and Pillar 5 team which would continue developing the concept of indicators. Mr. Montanarella (INSII Chair) noted that the GSP Secretariat can establish such a team or group to start working on it. Mr. Ronald Vargas (GSP Secretary) suggested to make use of the indicators listed in the endorsed Protocol for Assessing Sustainable Soil Management.

5. Closure

Mr. Luca Montanarella (INSII chair) concluded that the 6th INSII meeting was very productive and allowed INSII members to learn about ongoing processes and interact with key players – SDF, Pillar 4 Working Group, GSP Secretariat, as well as to influence the decisions regarding future Pillar 4 work. He noted that Pillar 4 Working Group was delegated with the task of drafting a new P4IP and that INSII will have the chance to review it before the Plenary Assembly. Mr. Montanarella thanked all the participants for attending the meeting, and the GSP Secretariat for facilitating it.

Annex I: List of participants

First Name	Last Name	Institution	Country
Suada	Luzati	Center of Agricultural Technology Transfer, Fushë - Krujë	Albania
Guillermo	Peralta	GSP	Argentina
Peter	Wilson	CSIRO	Australia
Amin	Ismayilov	Institute of Soil Science and Agrochemistry of Azerbaijan National Academy of Science	Azerbaijan
Jameela	Zaimoor		Bahrain
Kamaruzzaman	Md	Soil Resource Development Institute (SRDI)	Bangladesh
Katrien	Oorts	Government of Flanders, Flemish Planning Bureau for the Environment and Spatial Development	Belgium
Karma	Dorji	NSSC	Bhutan
Hernán	Figueredo	FAO-VT	Bolivia (Plurinational State of)
Gustavo	Vasques	Embrapa Solos	Brazil
Margareth Simoes	Margareth Simoes	Embrapa	Brazil
Margareth Simoes	Margareth Simoes	Embrapa	Brazil
Maria Jose	Sampaio	Embrapa	Brazil
Zacharie	Segda	BUNASOLS	Burkina Faso

Francis	Silatsa	Sustainable Tropical Solution (STS)	Cameroon
Georges Kome	Kogge	Department of Soil Science, Faculty of Agronomy and Agricultural Sciences, University of Dschang, Cameroon	Cameroon
Bert	VandenBygaart	Agriculture & Agri-food Canada	Canada
Xiaoyuan	Geng	Canadian Soil Information Service (CanSIS), AAFC	Canada
Lady Marcela	Rodriguez Jinenez	INSTITUTO GEOGRÁFICO AGUSTÍN CODAZZI	Colombia
Napoleon	Ordonez Delgado	INSTITUTO GEOGRÁFICO AGUSTÍN CODAZZI	Colombia
Silvia	Caguasango	IGAC- Instituto Geográfico Agustín Codazzi	Colombia
Yeni	Rodriguez	AGROSAVIA	Colombia
Bryan	Alemán Montes	Universidad de Costa Rica	Costa Rica
Rainer	Baritz	European Environment Agency	Denmark
Mohamed	Egueh Walieh	CERD/LABORATOIRE DE PÉDOLOGIE	Djibouti
Dermas Sultan	Dainom	National Agricultural Research Institute	Eritrea
samuel Bereket	Ghebremariam	National Agricultural research Institute	Eritrea
Tsegay Berhane	Ghebremariam	National Agricultural research Institute	Eritrea
Senzo	Ntshakala	Ministry of Agriculture_Soil Testing Unit	Eswatini

Marc	Van Liedekerke	European Commission (Joint Research Centre)	European Union
Yuxin	Tong	FAO - GSP	Italy
Antonio	Bispo	INRAE	France
Clara	Lefèvre	FAO	France
Jacques	Tavares	INIDA-Ministry of Agriculture and Environment	France
Médard	Obiang Ebanega	Université Omar Bongo	Gabon
Abdou Rahman	Jobe	Ministry of Agriculture	Gambia
Ebrima	Jarra	Soil Solution Gambia	Gambia
Giorgi	Ghambashidze	Scientific-Research Centre of Agriculture	Georgia
Destika	Cahyana	Indonesian Center for Agricultural Land Resources Research and Development (ICALRRD)	Indonesia
Markus	Anda	Indonesian Centre for Agricultural Land Resource Research and Development	Indonesia
Yiyi	Sulaeman	Indonesian Agency for Agricultural Research and Development, Ministry of Agriculture	Indonesia
Waleed	Al Shafie	Ministry of Agriculture	Iraq
Dafna	Casaretto	-	Israel
Maya	Zahavi	Ministry of Agriculture and Rural Development	Israel

Tal	Baker	Soil conservation & drainage unit, ministry of agriculture and rural development Israel	Israel
Carolina	Olivera	FAO - GSP	Italy
Giulia	Stanco	FAO - GSP	Italy
Hugo	Bourhis	FAO - GSP	Italy
Kostiantyn	Viatkin	FAO - GSP	Italy
Luca	Montanarella	European Commission	Italy
Lucrezia	Caon	FAO - GSP	Italy
Maria	Fantappiè	CREA	Italy
Matteo	Sala	FAO - GSP	Italy
Ronald	Vargas	FAO - GSP	Italy
Rosa	Cuevas	FAO - GSP	Italy
Zineb	Bazza	FAO - GSP	Italy
Joan	Brown Morrison	Agricultural land management Division	Jamaica
Shoji	Matsuura	National Agriculture and Food Research Organization	Japan
Yusuke	Takata	NARO	Japan
Mahmoud	Alfraihat	MoA	Jordan
Christian	Omuto	FAO - GSP	Kenya

Saysongkham	Sayavong	Department of Agricultural Land Management	Lao People's Democratic Republic
Vikham	Mektakoul	Department of Agricultural Land Management (DALaM)	Lao People's Democratic Republic
Vita	Dernova	State Plant Protection Service	Latvia
Zane	Kalniņa	State Plant Protection Service	Latvia
Tesha	Mardamootoo	Mauritius Sugarcane Industry Research Institute	Mauritius
Mario	Guevara	-	Mexico
Enkhtuya	Bazarradnaa	Institute of Plant and Agricultural Sciences	Mongolia
Rachid	Moussadek	-	Morocco
Aung Kyaw	Thu	Department of Agricultural Research	Myanmar
Emily	Toner	ISRIC World Soil Information	Netherlands
Fenny	van Egmond	ISRIC - World Soil Information	Netherlands
Jorge	Mendes de Jesus	ISRIC - World Soil Information	Netherlands
Luís	de Sousa	ISRIC - World Soil Information	Netherlands
Rik	van den Bosch	ISRIC - World Soil Information	Netherlands
David	Medyckyj-Scott	Manaaki Whenua - Landcare Research Ltd	New Zealand
Gerard	Grealish	Landcare Research	New Zealand

Elh Moudi Moustapha	Abdourahaman	INRAN(Institut National de la Recherche Agronomique du Niger)	Niger
James	Jayeoba	Nasarawa State University,Keffi/Nigeria Institute of Soil Science	Nigeria
Olufunmilayo	Ande	Institute of Agricultural Research and Training	Nigeria
Imad	Ghanma	MoA	Palestine
Rafael	Balta	Ministerio de Agricultura y Riego	Peru
Andrew	Flores	Bureau of Soils and Water Management	Philippines
Baldwin	Pine	Bureau of Soils and Water Management	Philippines
Dominciano	Ramos	Bureau of Soils and Water Management	Philippines
Marjorie	Arriola	DA-BSWM	Philippines
Stanislaw	Bialousz	Warsaw University of Technology	Poland
Rozloga	Iurii	INSTITUTE OF PEDOLOGY, AGROCHEMISTRY AND SOIL PROTECTION "NICOLAE	Republic of Moldova
Oleg	Golozubov	Lomonosov Moscow State University, Soil science department	Russian Federation
Macoumba	LOUM	Institut National de Pédologie (Dakar,SENEGAL)	Senegal
Rastislav	Skalský	National Agricultural and Food Centre, Soil Science and Conservation Research Institute	Slovakia
Borut	Vrščaj	Agricultural institute of Slovenia	Slovenia
Anneliza	Collett	Department of Agriculture, Land Reform & Rural Development	South Africa

Natalia	Rodríguez Eugenio	FAO - GSP	Spain
Abdelmagid	Ali Elmobarak Elhag	Land and Water Research Centre, Agricultural Research Corporation	Sudan
Abdelmoneim	Elgubshawi	Soil and Fertilizer Dep., plant wealth Directorate	Sudan
Nuha	Abdalla Mohamed Khamis	Land and Water Research Centre, Agricultural Research Corporation	Sudan
Johan	Stendahl	Swedish University of Agricultural Sciences	Sweden
Alaa	Khallouf	GCSAR	Syria
Abalo-Esso	MAGAMANA	ITRA: Institut Togolais de Recherche Agronomique	Togo
Dosseh K. Atah	ANOUMOU	ITRA	Togo
Koffi	AFAWOUBO	ITRA	Togo
Komla	GANYO	ITRA	Togo
Sili'a	To'o Pologa Perez	EDNRE	Tokelau
Leila	ben dhiab ben daya	DGACTA	Tunisia
Mounir	SELLAMI	DRS/DGACTA	Tunisia
Rafla	Attia	Ministère de l'Agriculture	Tunisia
Mehmet	Gür	Atatürk Soil Water and Agricultural Meteorology Research Institute	Turkey

Muhammed Halil	KOPARAN	SOIL, FERTILIZER AND WATER RESOURCES CENTRAL RESEARCH INSTITUTE- TAGEM	Turkey
Sevinc	Madenoglu	Ministry of Agriculture and Forestry, General Directorate of Agricultural Research and Policies	Turkey
Arkadiy	Levin	National Scientific Center «Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky» (NSC ISSAR)	Ukraine
Artur	Skrypui	Ukrainian Soil Partnership (UaSP)	Ukraine
Larysa	Bondarenko	Ukrainian Soil Partnership (UaSP)	Ukraine
Liudmila	Vorotyntseva	National Scientific Center «Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky»	Ukraine
Maryna	Zakharova	National Scientific Center «Institute for Soil Science and Agrochemistry Research named after O.N. Sokolovsky»	Ukraine
Oksana	Davis	FAO	Ukraine
Victoria	Hetmanenko	NSC ISSAR, Ukraine	Ukraine
Yurii	Zalavskiy	NSC ISSAR	Ukraine
Leonid	Boiko	State Institute of Soil Protection	Ukraine
Jacqueline	Hannam	Cranfield University	United Kingdom
Tao	Fulu	-	United States of America
Jean Aurelien	Moukana Libongui	UOB	United States of America

Nicole	Wellbrock	Thuenen Institute	Germany
Fernando	Fontes	Ministerio de Ganadería, Agricultura y Pesca	Uruguay
Stalin	Sichinga	Zambia Agriculture Research Institute	Zambia
Bolton	Kakava	Chemistry and Soils Research Institute	Zimbabwe
Emmanuel	Chikwari		Zimbabwe
Hope Takudzwa	Mazungunye	Chemistry and Soil Research Institute	Zimbabwe
Nyaradzo Marilyn	Muzira	Chemistry and soils research Institute	Zimbabwe
Shelter	Shelter	Chemistry and Soil Research Institute	Zimbabwe