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Global Soil Partnership
Plenary Assembly

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Progress of the GSP Technical Networks: for information and decision
(GSPPA: X/2022/8)

Executive Summary

- The International Networks were established mainly as a concrete follow up action of the Global Symposia with the exception of the International Network of Soil Information Institutions (INSII) and the Global Soil Laboratory Network (GLOSOLAN). They constitute the technical arms of the GSP and is expected that all FAO Members can be actively part of them.
- The GSP Secretariat and INSII have successfully developed and implemented country-driven approach for developing global soil data products. This approach places emphasis on country-level activities and soil information and data ownership. The Global Soil Information System (GloSIS) country driven global datasets include the Global Soil Organic Carbon Map (GSOCmap), the Global Salt Affected Soils Map (GSASmap), the Global Soil Organic Carbon Sequestration Potential Map (GSOCseq), the Global Black Soil Distribution Map (GBSmap) and the Global Soil Erosion Map (GSERmap).
- The Global Soil Laboratory Network (GLOSOLAN) is currently made up of around 800 soil laboratories operating in more than 150 countries.
- During the fifth meeting of GLOSOLAN, held in November 2021, the network governance was revised and a global Steering Committee, a GLOSOLAN Technical Committee, and regional Steering Committees acting within the Regional Soil Laboratory Networks (RESOLANs) were established.
- A global proficiency test (PT), launched in 2021-2022, focuses on soil organic carbon, available phosphorus and nitrogen. About 230 laboratories in 100 countries participated.
- GLOSOLAN provided new equipment to soil laboratories in Botswana, Colombia, Costa Rica, Dominican Republic, Ecuador, Georgia, India, Jamaica, Kenya, Mexico, Peru, North Macedonia, the Philippines, Thailand, Viet Nam and Zambia.

- The International Network on Fertilizer Analysis (INFA) aims to support the implementation of the International Code of Conduct for the Sustainable Use and Management of Fertilizers. Governance, objectives and performance indicators were endorsed at the Second Meeting of INFA in June, 2022.
- INFA is currently made up by 153 soil laboratories operating in more than 80 countries. INFA focuses on three main aspects: (1) to standardize methods and protocols for the analysis of fertilizers, which links to the harmonization of fertilizer quality data; (2) to strengthen the performance of fertilizer laboratories using standardized methods and protocols; and (3) to harmonize fertilizer quality standards (classification and definitions) so that fertilizer information would be comparable and interpretable across laboratories, countries and regions.
- The International Network of Black Soils (INBS) is currently composed of 33 FAO Members. The INBS has focused on the preparation of the Global Black Soils map (GBSmap) to be launched at the 10th GSP Plenary Assembly.
- The International Network of Salt-Affected Soils (INSAS) was established in 2019 and started to operate in 2021. INSAS currently counts 662 members from 125 countries. The governance and work plan of the network were endorsed at the first meeting of INSAS in April 2021. In 2021, online sessions of the different working groups identified the priority tasks and started to implement them.
- The launch of the International Network on Soil Biodiversity (NETSOB) took place on 3 December 2021 in the framework of the World Soil Day official celebration. Four working groups were established to address 1) measurement, assessment and monitoring of soil biodiversity; 2) sustainable use, management, and conservation of soil biodiversity; 3) the economics of soil biodiversity; and 4) policies and legal instruments related to soil biodiversity.
- The International Network on Soil Pollution (INSOP) was launched on 22nd April 2022 as part of the International Mother Earth Day celebrations. The launch of the INSOP took place in a virtual format where its workplan was formulated and its governance established.

Suggested actions by the GSP Plenary Assembly

The Plenary Assembly may wish to:

International Network of Soil Information Institutions (INSII)

- welcome the efforts made by INSII to produce soil maps following a country-driven approach and capacity development to build a robust Global Soil Information System;
- recognize the efforts made by INSII for the development and launch of the Global Soil Organic Carbon Sequestration Potential Map (GSOCseq), Global Salt Affected Soils Map (GSASmap) and Global Black Soil Distribution Map (GBSmap); update of the Global Soil Organic Carbon Map (GSOCmap) and *recognise* the efforts made to date for the Global Soil Erosion Map (GSERmap), and Global Soil Nutrients Map (GSNmap) and encourage countries to prepare national datasets as per the technical specifications endorsed by INSII;
- invite countries to establish national soil information systems country-driven global data products on soil threats and basic soil properties, as per INSII guidelines and with the GSP Secretariat support; and
- further invite resource partners to support the establishment of GloSIS and SoilSTAT.

Global Soil Laboratory Network (GLOSOLAN)

- welcome the progress made in the preparation of standard operating procedures, training material and other awareness-raising materials prepared by the GLOSOLAN as well as the continued work of the RESOLANs and the GLOSOLAN spectroscopy initiative;
- encourage national soil laboratories to join the network and implement the standard Operating Procedures harmonized by GLOSOLAN;
- invite resource partners to support GLOSOLAN activities and the National Soil Laboratory Networks;
- facilitate the implementation of the Resolution on the international exchange of soil samples for research purposes under GLOSOLAN, which was endorsed at the 27th Session of the FAO Committee on Agriculture (COAG), and promote the organization of national proficiency tests;
- contribute with information on national legislations on the import/export of soil samples to further develop the Soil Import Legislation database (SIMPLE);
- encourage national soil laboratories to participate on the Global Assessment of Soil Laboratories 2022; and
- invite countries to consider developing actively soil spectral laboratories, national soil spectral library and the estimation service, under the framework of GLOSOLAN – Spec.

International Network on Fertilizer Analysis (INFA)

- encourage soil laboratories and other key stakeholders to join INFA and implement recommended activities including harmonization, policy and regulations;
- facilitate the activities related to the intercomparison tests to be performed (i.e., shipping and receiving of fertilizer samples);
- support the adoption of the principles of the International Code of Conduct for the Sustainable Use and Management of Fertilizers at levels within the country, as appropriate**.**

International Network of Black Soils (INBS)

- invite interested FAO Members to join the INBS; and
- welcome the Global Black Soils map and foster its use for decision-making.encourage the preparation of a global international agreement towards the protection, conservation and sustainable management of Black Soils and submit it to the 11th Plenary Assembly in 2023.

International Network of Salt-Affected Soils (INSAS)

- encourage FAO Members facing soil salinity issues to join INSAS and participate in the different activities of the network to sustainably manage these soils and restore them where needed; and
- encourage the GSP Secretariat and INSAS to facilitate, as appropriate, the implementation of the outcomes of the Global Symposium on Salt-affected Soils.

International Network on Soil Biodiversity (NETSOB)

- welcome the establishment of NETSOB and support its work plan;
- encourage countries and stakeholders to join NETSOB and participate in its different activities to strengthen knowledge on the measurement, assessment, monitoring and sustainable use of soil biodiversity; and

- welcome the establishment of the Global Soil Health and Biodiversity Observatory (GLOSOB) and encourage Members and resource partners to support it.

International Network on Soil Pollution (INSOP)

- welcome the establishment of the network and support its work plan; and
- encourage all FAO Members to join INSOP and participate in its different activities of the network to stop soil pollution and achieve the global goal of zero pollution, by improving knowledge and strengthening technical capacities and legislative frameworks for the prevention of soil pollution and sharing experiences and technologies for the sustainable management and remediation of polluted soils.

8.1 International Network of Soil Information Institutions (INSII)

1. The International Network of Soil Information Institutions (INSII) facilitates the development of national soil information systems and country driven soil data products to support evidence-based decision making by establishing the Global Soil Information System (GloSIS) and SoilSTAT.
2. The 7th INSII meeting was held on 9-11 November 2021. The meeting reviewed the progress and status on the implementation of relevant activities, GloSIS and its data products, and discussed the implementation of future activities.
3. To date, more than 1 000 national experts from 120 countries were trained on soil data management, digital soil mapping, soil modelling following on the job training to prepare the various INSII products (GSOCmap, GSASmap, GSOCseq, GBSmap).
4. As stated in the new GSP Action Framework 2022-2030 developed by an Open-Ended Working Group (OEWG), INSII's role in the development, and subsequently monitoring and reporting of key performance indicators will be central.

Global Soil Organic Carbon Map (GSOCmap)

5. The Global Soil Organic Carbon Map (GSOCmap) was released in 2017 as v1.0 and updated in 2019 to v1.2, 2020 to v1.5 and 2022 to v1.6.
6. The GSP Secretariat has been taking necessary steps for a major GSOCmap update to version 2.0 that will include additional depths, higher resolution, better uncertainty assessment, single digital soil mapping approach, simplified data processing and new set of covariates.

Global Soil Organic Carbon Sequestration Potential Map (GSOCseq)

7. The preparation of the Global Soil Organic Carbon Sequestration Potential Map (GSOCseq) consists of 29 layers hosted on the GloSIS Global Platform (Beta).
8. The GSOCseq Technical Report after undergoing an extensive round of review by relevant technical networks and experts, was published in March 2022. The GSOCseq Technical Report is a companion document to the GSOCseq v1.1. It presents its methodology, the country-driven process, its main findings and way forward.
9. The GSOCseq brochure was published. It provides a user-friendly at glance description of the GSOCseq, including its main objectives, the country-driven process and main findings.
10. Following a country-driven approach, the launch of the GSOCseq was made possible through an extensive capacity development program which supported 95 national experts from 26 countries in producing their national GSOCseq layers. The GSOCseq Technical Manual extended through the contribution of the national experts was published in early 2022.
11. To date, 49 countries contributed to the GSOCseq with their national submissions (Argentina, Bangladesh, Bhutan, Burkina Faso, Cabo Verde, Cameroon, Canada, Chile, Colombia, Costa Rica, Cuba, Ecuador, Eritrea, Estonia, Ethiopia, Finland, France, Georgia, Germany, Greece, India, Kazakhstan, Lesotho, Mexico, Moldova, Morocco, Nicaragua, Nigeria, Oman, Paraguay, Philippines (the), Portugal, Russian Federation, Senegal, Slovakia, Slovenia, South Africa, Sri Lanka, Sudan, Switzerland, Turkey, United Arab Emirates, United States of America, Uruguay, Venezuela, Viet Nam and Zimbabwe).
12. The current version of the GSOCseq is v.1.1 (published November 2021) and being updated constantly through country submissions alongside improvements to the approach that still guarantee the interoperability of the national products within the global layers. A concept note for GSOCseq v.2.0 which includes more comprehensive updates and therefore not compatible with the current version of the GSOCseq v.1.1, is currently being drafted.

13. A dedicated GSOCseq Working Group (WG) has been established with the objective of consolidating a way forward for improvements to be incorporated in future versions of the GSOCseq v.1.x and GSOCseq v2.x, and contribute and review the GSOCseq manuscript to be published in a high impact journal. The first meeting of the GSOCseq WG was held in February 2022.

Global Salt Affected Soils Map (GSASmap)

14. The first version of the Global Salt Affected Soils Map (GSASmap) was launched in October 2021 during the Global Symposium on Salt Affected Soils (GSAS21). The GSASmap v1.0 was contributed by 118 countries from all GSP regions.
15. After the launch, the GSP Secretariat delivered on-demand technical support and trainings focusing on the hotspot regions where the salinisation is the leading soil threat (Eurasia, NENA).
16. The dataset is being updated to v1.1 with new submissions from Algeria, Kazakhstan, Libya, Mongolia and Uganda.
17. The GSASmap brochure was published in October 2021 which summarizes the main results from the GSASmap dataset.

Global Black Soil Distribution Map (GBSmap)

18. The Global Black Soil Distribution Map (GBSmap) has been developed by the INBS members and GBSmap v1.0 is being launched at the 10th GSP PA.
19. The product consists of two maps - the Global Black Soil Distribution Map and the Global Black Soil Probability Map - the GBSmap brochure and the GBSmap Technical Report.
20. 14 INBS countries (Argentina, Brazil, Bulgaria, Canada, China, Colombia, Indonesia, Mexico, Poland, Russian Federation, Slovakia, Ukraine, United States of America, and Uruguay) contributed to the first version of the GBSmap.
21. Many INBS members could not contribute to the first version of the map due to the data availability constraints for mapping black soils according to the endorsed black soil definition. The GSP Secretariat has prepared a gap-filling data for the countries that could not provide their GBSmap layers until the launch date.
22. The GBSmap will be updated upon the contribution from the remaining INBS members.

Global Soil Nutrient and Nutrient Budget Maps (GSNmap)

23. The process to develop the global soil nutrient and soil budget maps (GSNmap) was initiated at the beginning of 2022. To date, GSNmap Concept Note has been prepared.
24. The GSNmap approach aims to generate data products in two phases. Soil macronutrients, micronutrients and key soil properties will be developed during the first phase and the global soil nutrient budget maps in the second phase.
25. A GSNmap working group has been established to support the process. The GSNmap Working Group consists of experts from INSII, ITPS and interested experts from the research community.
26. INSII and GSP Secretariat are taking necessary steps for further development (GSNmap Technical Specifications and Country Guidelines, GSNmap Technical Manual, GSNmap Capacity Development Programme).

Global Soil Erosion Map (GSERmap)

27. The Global Soil Erosion Map (GSERmap) activities have started in the first quarter of 2022 with a focus on country-driven development of harmonized database for soil erosion assessment.
28. The activities begun with the formation of a GSERmap Working Group, which is responsible for the development of technical documents for GSERmap. The working group comprises experts from INSII, ITPS and lead experts in soil erosion research. The group has started reviewing tools and documents for capacity building of national experts.
29. Country-level activities for GSERmap will begin from the third quarter of 2022. GSERmap will produce harmonized national, regional, and global databases for assessing and reporting soil erosion and updated maps of erosion.

GloSIS System Development

30. GloSIS 1.0 implementation will resume upon the endorsement of the GSP Action Framework.

8.2 Global Soil Laboratory Network (GLOSOLAN), including the GLOSOLAN Initiative on soil spectroscopy (GLOSOLAN-Spec)

31. The number of soil laboratories registered in GLOSOLAN kept growing in 2021-2022 thanks to the organization of online meetings and training sessions, and the establishment of the National Soil Laboratory Networks (NASOLANs). The network currently counts more than 800 members from 153 countries.
32. The 5th GLOSOLAN meeting was organized virtually in November 2021 to define its work plan for the year 2022 and to revise the network governance. Ms. Miriam Ostinelli from Argentina was elected GLOSOLAN Chair and Mr. Elh Moudi Moustapha Abdourahaman from Niger was elected GLOSOLAN vice-Chair for 2021-2023. A Steering Committee composed by five experts and a Technical Committee composed by 20 experts were established. These committees are tasked to support the GLOSOLAN Chair and vice-Chair in complying with their role, and to provide technical advice and support to the GLOSOLAN working groups (see the Terms of Reference endorsed during the 5th GLOSOLAN meeting). Members were selected based on their technical skills and ensuring regional and gender balance.
33. The annual meetings of the Regional Soil Laboratory Networks (RESOLANs) for Africa (AFRILAB), Asia (SEALNET), Europe and Eurasia (EUROSOLAN), Latin America (LATSOLAN), the Near East and North Africa (NENALAB), and the Pacific (ASPAC) were successfully convened in virtual modality between October and November 2021, to revise the network work plan and position in GLOSOLAN. All RESOLANs agreed to establish a regional Steering Committee to support the RESOLAN Chair and vice-Chair(s) in triggering and implementing national and regional actions, and to monitor the performance of National Reference Laboratories against their ToRs.
34. Countries were motivated to establish their National Soil Laboratory Networks (NASOLANs) to downscale GLOSOLAN activities and to develop country specific work plans. The implementation of this activity is led by the National Reference Laboratories in GLOSOLAN as reported in the Terms of Reference of laboratories in GLOSOLAN. GSP Focal Points were asked to nominate/reconfirm National Reference Laboratory as needed and to support them and NASOLANs in formulating projects, organizing activities and assist as needed.
35. Countries and territories where a National Reference Laboratory has not yet been nominated are: Afghanistan, Côte d'Ivoire, Denmark, Ireland, Italy, Kazakhstan, Kuwait, Libya, Mali, Moldova, Papua New Guinea, Qatar, Serbia, Solomon Islands, Somalia, Spain, Switzerland, Uganda, United Arab Emirates, and United Kingdom of Great Britain and Northern Ireland.

Moreover, countries with no laboratory registered in the network are: Andorra, Angola, Antigua and Barbuda, Bahamas, Barbados, Belize, Bosnia and Herzegovina, Brunei Darussalam, Burundi, Central African Republic, Comoros, Congo, Cook Islands, Cyprus, Democratic People's Republic of Korea, Dominica, Equatorial Guinea, Faroe Islands, Grenada, Guinea-Bissau, Guyana, Kiribati, Lithuania, Luxembourg, Maldives, Malta, Marshall Islands, Mauritius, Micronesia, Monaco, Montenegro, Nauru, Niue, Norway, Palau, Saint Kitts and Nevis, Saint Vincent and the Grenadines, San Marino, Seychelles, Singapore, Suriname, Sweden, Tajikistan, Timor-Leste, Tokelau, Turkmenistan, Tuvalu and Vanuatu.

36. Within each RESOLAN, members of the regional Steering Committee were tasked to identify and contact soil laboratories operating in the above-listed countries and invite them to register in GLOSOLAN. Further, GSP Focal Points are kindly requested to encourage soil laboratories from those countries to register in GLOSOLAN.
37. In 2021, GLOSOLAN worked on harmonizing 13 standard Operating Procedures (SOPs).
38. GLOSOLAN will collaborate with other GSP networks (i.e. INBS, INSAS, NETSOB) to (i) harmonize new standard operating procedures (SOPs), (ii) revise the SOPs harmonized by GLOSOLAN in the previous years, (iii) organize training sessions on how to implement the SOPs, and (iv) prepare awareness raising material on the importance of measuring soil parameters.
39. Seventeen training workshops on the implementation of the GLOSOLAN SOPs, soil spectroscopy, quality control in the laboratory, and laboratory health and safety were organized in Arabic, English, French, and Spanish. These were attended by around 6 000 participants and counted on the support of 26 experts from 16 different countries from all regions that acted as trainers. Training topics focused on the main needs pointed out by countries at the RESOLAN meetings, and the outcomes of the Global Soil Laboratory Assessment 2020 (laboratories capacities and needs). A new series of webinars is scheduled to take place starting from March 2022.
40. Three training videos, supporting the implementation of GLOSOLAN SOPs on soil organic carbon determination, were developed by the national reference laboratories from Thailand, the Russian Federation and the Philippines. Videos are available online with subtitles in all FAO official languages. More videos on sample pre-treatment and pH determination will be prepared in 2022.
41. In addition to the online training, GLOSOLAN started working on laboratory health and safety by producing a poster on some basic guidelines, available in all FAO official languages. Material on laboratory risk management (risk identification, assessment and control) is under preparation.
42. A global proficiency test (PT) was organized in 2021-2022 involving around 230 soil laboratories from 106 different countries. This activity aims to assess the quality of the analytical performance of the laboratories when implementing the GLOSOLAN SOPs, in order to validate the SOPs and identify any necessary adjustments (revision of the SOPs, capacity building or training, better equipment, etc.). Targeted soil parameters were: soil organic carbon, available phosphorus and total nitrogen. A regional PT for the Near East and North Africa and a national PT for the Russian Federation will be launched upon completion of the global PT. Other countries like Mexico have already expressed interest in organizing independent PTs.
43. The Soil Import Legislation (SIMPLE) database was revised and updated in order to support laboratories on the organization of regional and national PTs.
44. The Global Soil Laboratory Assessment 2020 | laboratories capacities and needs was published in September 2021 and launched during World Soil Day 2021. The document provides a clear

overview of the status of soil laboratories worldwide, thanks to the information provided by 241 laboratories operating in 142 countries. A new global assessment will be launched in 2022.

45. Soil laboratory equipment was donated to soil laboratories in Botswana, Colombia, Costa Rica, Dominican Republic, Ecuador, Georgia, India, Jamaica, Kenya, Lebanon, Mexico, North Macedonia, Peru, Philippines, Thailand, Viet Nam and Zambia that participated in the GLOSOLAN PT 2019 and that did not require major training.
46. The GLOSOLAN initiative on soil spectroscopy (GLOSOLAN-Spec) held its second plenary meeting in November 2021. Around 250 experts from 81 countries met to revise the objectives and the governance of the initiative, and to define the work plan of the network for 2022. The revised structure of the governance is made up by the GLOSOLAN-Spec Chair (Prof. Eyal Ben Dor, Israel), and a Steering Committee made up by experts on soil spectroscopy from all regions. Several leading institutes/research groups dealing with soil spectroscopy are gathered under the GLOSOLAN-Spec to further develop soil spectroscopy at the country level.
47. In 2021, GLOSOLAN-Spec worked on writing a beginner-level training material ("A Primer on Soil Analysis Using Visible and Near-Infrared (vis-NIR) and Mid-infrared (MIR) Spectroscopy"), and started preparing training video courses on "Using R Software for soil spectral analysis" for the GLOSOLAN-Spec national capacity development training program 2022. GLOSOLAN-Spec aims to provide a rapid, reliable and free soil organic carbon estimation service to the world based on a spectroscopy estimation service platform (GlobeSpeC) with advanced machine-learning algorithms. This estimation service platform will largely reduce the cost and time for soil organic C analysis, and facilitate soil C monitoring at global scale by regularly updating and improving current global soil organic carbon (GSOCmap) and global soil organic carbon sequestration potential map (GSOCseq). Estimated soil property data can be used to update national soil maps in terms of spatial resolution and accuracy by national soil institution. The estimation service will be further extended to other soil properties (e.g: Soil Texture, pH, etc.).
48. The Global Soil Spectroscopy Assessment | spectral soil data: needs and capacities was released in September 2021 and was based on the inputs collected from 97 laboratories from 56 countries.
49. The success of GLOSOLAN and GLOSOLAN-Spec strongly depends on the voluntary actions of its members. All the produced material and implemented activities are accessible by all GLOSOLAN members at no cost and aim to improve their analytical performance. However, this can be enhanced only if national governments support laboratories with financial support and adequate policies.
50. Worldwide there is a need of raising the awareness of the role played by soil laboratories in producing reliable and comparable soil data, which are essential to develop plans of actions to promote sustainable soil management. GLOSOLAN worked on this by publishing a poster on the positive impact of soil laboratories to a series of stakeholders. However, greater support is needed, also by the GSP Focal Points. For this reason, GLOSOLAN will develop a series of policy briefs to be released in 2022-2023, focusing not only on the key-role of soil laboratories in producing good quality data, but also to highlight the need of better policies to i) support soil laboratories in sustainably dispose the soil analysed and the reagents used, ii) to invest in better infrastructures and iii) to promote the adoption of health and safety measures.

8.3 International Network of Fertilizers Analysis (INFA)

51. As endorsed by the 8th GSP Plenary Assembly, the International Network on Fertilizers Quality Analysis (INFA) was established in December 2020, under the framework of GLOSOLAN. The network currently counts more than 150 members, from around 80 countries and is made up by

three categories of laboratories displayed in the global map of INFA laboratories: (i) laboratories that have the official mandate of their government to do fertilizer analysis; (ii) laboratories that do fertilizer analysis on a voluntary basis; and (iii) laboratories which do not perform fertilizer analysis yet but are interested in the topic. INFA has increased its membership by 7 percent and has expanded its presence in 10 additional countries since 2021.

52. The Second Meeting of INFA was held virtually on June 2021, with the following main outcomes: objectives and indicators of performance endorsed, election of Chair (Dr. Wesley Karl Feldmann, Malawi) and vice Chair (Dr. Gerardo Ojeda, Colombia), and discussion for the topics to be addressed in the working groups.
53. An INFA brochure was issued with key information on the network including the background, importance and goals being sought and how to join it.
54. After the working groups were established at the 2nd INFA meeting in June 2021, a specific workplan was developed for each one of the working groups. Harmonization of protocols for the determination of nutrient content in fertilizers, capacity development for laboratory methodologies and practices, and the standards requirements for fertilizer analysis will be addressed by the different working groups.
55. INFA had its third meeting in April 2022 where members agreed to focus on the harmonization of standard operating procedures for mineral fertilizers, the development of video tutorials, and gathering information on fertilizer use and marketing.
56. Collaboration with the International Fertilizers Association is under discussion in the framework of the Fertilizers Code.

8.4 International Network of Black Soils (INBS)

57. Since 2021, the International Network of Black Soils (INBS) has focused on the preparation of the Global Status of Black Soils report and the Global Black Soils distribution map (GBSmap). Both publications followed a country-driven and inclusive framework engaging INBS members, national experts, ITPS and GSP Secretariat.
58. Eighty-five experts from 26 black soil countries contributed to the development of the Black Soils map (GBSmap) that was launched during this PA. The Global Black Soils report will be launched in July 2022.
59. During the 9th PA in September 2021, the Heilongjiang Province of China proposed to establish an International Research Institution on Black Soils under the INBS. The Institution would aim at capacity building and promoting international cooperation in research and knowledge exchange for sustainable use and management of black soils.
60. INBS organized its 3rd workshop in December 2021. INBS approved the establishment of the International Research Institution on Black Soils (IRIBS) to support implementation of INBS's activities. INBS work plan for 2022 includes the development of the International Guidelines on Sustainable Management of Black Soils and associated training courses.
61. The INBS is committed to address the gaps identified in the report and map in order to conserve black soils.

8.5 International Network of Salt Affected Soils (INSAS)

62. The International Network of Salt-Affected Soils (INSAS) was established in 2019. The Network aims to facilitate the sustainable and productive use of salt-affected soils (SAS) for current and future generations. The network is currently composed by 662 members from 125 countries.
63. The INSAS activities are entrusted to four working groups comprised of experts in the relevant areas of work: (i) Mapping, assessing and monitoring of salt-affected soils; (ii) Sustainable

management of salt-affected soils (practices, policy); (iii) SAS and crops: Halophyte agriculture and salt-tolerant crops; (iv) SAS and Water: Integrated soil and water management under saline/sodic conditions.

64. In 2021, working sessions of the different groups were held virtually to identify the priority tasks and start moving towards them. The Assessment working group started to work on review and refinement of methodology for mapping salt-affected soils; the sustainable soil management (SSM) working group started to work on the database on SSM practices in the context of SAS; the crops working group prioritized the work on the review of existing models connecting crop/plant production and soil salinity/sodicity; the water working group prioritized the work on a manual on sustainable water management in saline/sodic environments.
65. The INSAS members are contributing to the development of the Global report on the status of salt-affected soils.

8.6 International Network on Soil Biodiversity (NETSOB) and establishment of the Global Soil Biodiversity Observatory (GLOSOB)

66. The International Network on Soil Biodiversity (NETSOB) was launched on 3rd December 2021 in the framework of the World Soil Day official celebration. The overall goal of NETSOB is to promote the sustainable use and conservation of soil biodiversity. The network is currently composed by 884 members from around the world.
67. NETSOB was established as per recommendation of the Global Symposium on Soil Biodiversity and as a direct contribution to the Convention on Biological Diversity's International Initiative for the Sustainable Use and Conservation of Soil Biodiversity. Collaboration between GSP and CBD on soil biodiversity is very solid.
68. The launch meeting defined the working groups and governance of the Network, as well as agreed on the roadmap and key activities to strengthen and improve knowledge on soil biodiversity at all levels.
69. NETSOB serves the global community by offering reliable evidence to support better decision-making both in the field and at the policy level in the sustainable use and conservation of soil biodiversity; strengthening knowledge about soil biodiversity; contributing to the development of internationally accepted biological indicators; improving the monitoring of soil biodiversity status and loss; promoting actions to increase the sustainable use of soil biodiversity and overall soil health; and identifying knowledge gaps and fosters investment and cooperation in soil biodiversity research.
70. The activities of NETSOB focuses on responding to four areas of work: (i) on measurement, assessment, and monitoring of soil biodiversity; (ii) on sustainable use, management and conservation of soil biodiversity; (iii) on the economics of soil biodiversity; (iv) on policies and legal instruments related to soil biodiversity.
71. NETSOB supports the implementation of the Global Soil Health and Biodiversity Observatory (GLOSOB). The GLOSOB will aim to monitor and forecast the condition of soil biodiversity and soil health and will serve as the framework for developing policies, promoting good practices, and developing national capacities on the state-of-the-art tools and methods on soil biodiversity and soil health assessment and maintenance.
72. GLOSOB is expected to be launched in the second half of 2022. A global survey was launched and its design is under preparation following an inclusive process.

8.7 International Network on Soil Pollution (INSOP)

73. The International Network on Soil Pollution (INSOP) was established on 22nd April 2022 during the celebration of International Mother Earth Day. The Network aims to stop soil pollution and achieve the global goal of Zero Pollution. The network is currently composed by around 800 members from 70 countries.
74. INSOP was established as per recommendation of the Global Symposium on Soil Pollution and as a direct contribution to the UNEA3 and UNEA5 declarations. Indeed, there is strong collaboration on soil pollution between GSP and the United Nations Environment Programme (UNEP).
75. At the launch meeting, relevant initiatives, organizations and individuals with expertise on soil pollution agreed on the vision, mission and overall work plan for the network. The governance of the network was also set for the next biennium.
76. INSOP will serve the global community by: i) providing an international forum for the generation and dissemination of knowledge on soil pollution; ii) promoting and exchanging good practices, practical and scientific knowledge and ideas for managing polluted soils in a sustainable manner; iii) establishing interdisciplinary cooperative links between governments, academia, the private sector, and society to stimulate the development of cleaner and more sustainable solutions and consumption options; and iv) strengthening technical and technological capacities through coordination among existing networks.
77. The activities of INSOP focus on responding to four areas of work: (i) Assessment of soil pollution, in close cooperation with GLOSOLAN; (ii) Mapping polluted soils in close cooperation with INSII; (iii) Monitoring of polluted soils, especially linked to the development of the Global Soil Pollution Observatory and policy development; (iv) Remediation and management of polluted soils, including nature-based solutions for which the network will collaborate closely with NETSOB.