Food and Agriculture Organization of the United Nations

15th Working Session of the Intergovernmental Technical Panel on Soils (ITPS)

Soil Information & Data

ITPS - M. Costanza Calzolari, Lydia Chabala
GSP Secretariat - Yusuf Yigini, Isabel Luotto, Christian Omuto, Guillermo Peralta
Luciano di Paolo, Marcos Angelini, Moritz Mainka

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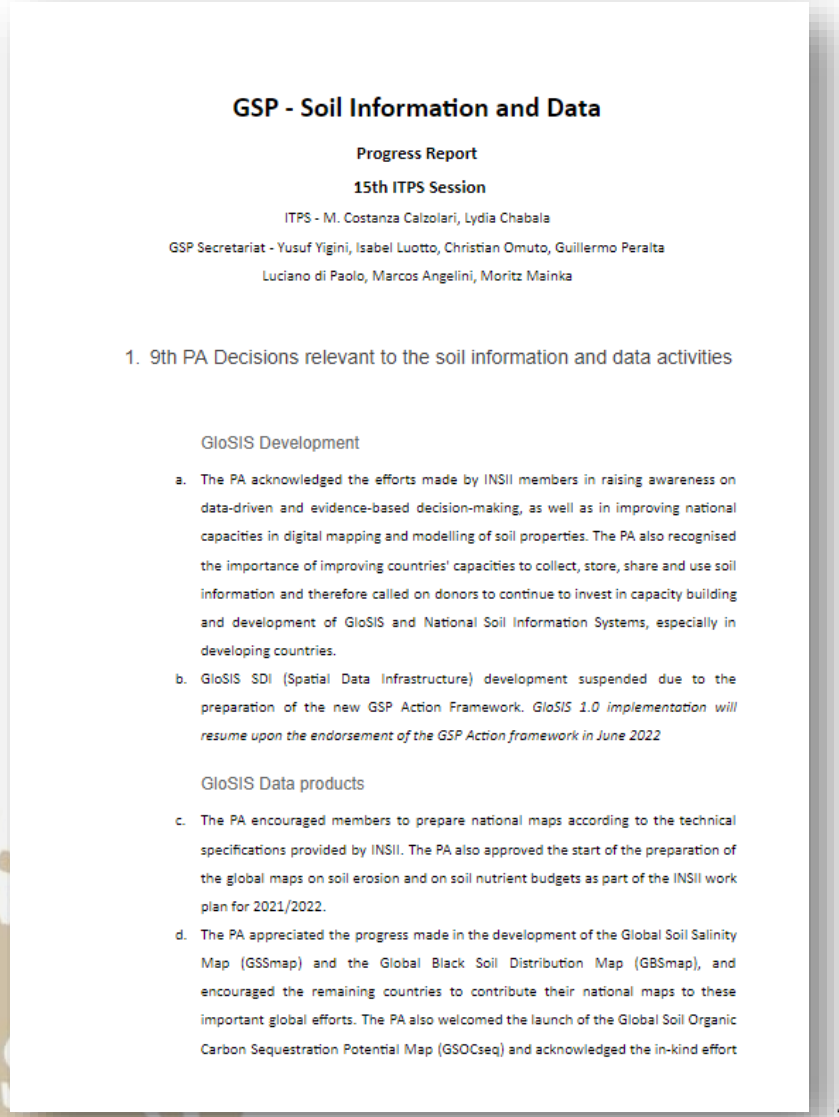
INTERGOVERNMENTAL TECHNICAL PANEL ON SOILS

15 - 17 November 2021 | Virtual meeting

GLOBAL SOIL PARTNERSHIP



GSP - Soil Information and Data

Progress Report

15th ITPS Session

ITPS - M. Costanza Calzolari, Lydia Chabala

GSP Secretariat - Yusuf Yigini, Isabel Luotto, Christian Omuto, Guillermo Peralta

Luciano di Paolo, Marcos Angelini, Moritz Mainka

1. 9th PA Decisions relevant to the soil information and data activities

GloSIS Development

a. The PA acknowledged the efforts made by INSII members in raising awareness on data-driven and evidence-based decision-making, as well as in improving national capacities in digital mapping and modelling of soil properties. The PA also recognised the importance of improving countries' capacities to collect, store, share and use soil information and therefore called on donors to continue to invest in capacity building and development of GloSIS and National Soil Information Systems, especially in developing countries.

b. GloSIS SDI (Spatial Data Infrastructure) development suspended due to the preparation of the new GSP Action Framework. *GloSIS 1.0 implementation will resume upon the endorsement of the GSP Action framework in June 2022*

GloSIS Data products

c. The PA encouraged members to prepare national maps according to the technical specifications provided by INSII. The PA also approved the start of the preparation of the global maps on soil erosion and on soil nutrient budgets as part of the INSII work plan for 2021/2022.

d. The PA appreciated the progress made in the development of the Global Soil Salinity Map (GSSmap) and the Global Black Soil Distribution Map (GBSmap), and encouraged the remaining countries to contribute their national maps to these important global efforts. The PA also welcomed the launch of the Global Soil Organic Carbon Sequestration Potential Map (GSOCseq) and acknowledged the in-kind effort

GSP - Soil Information and Data

Progress Report

15th ITPS Session

[LINK]

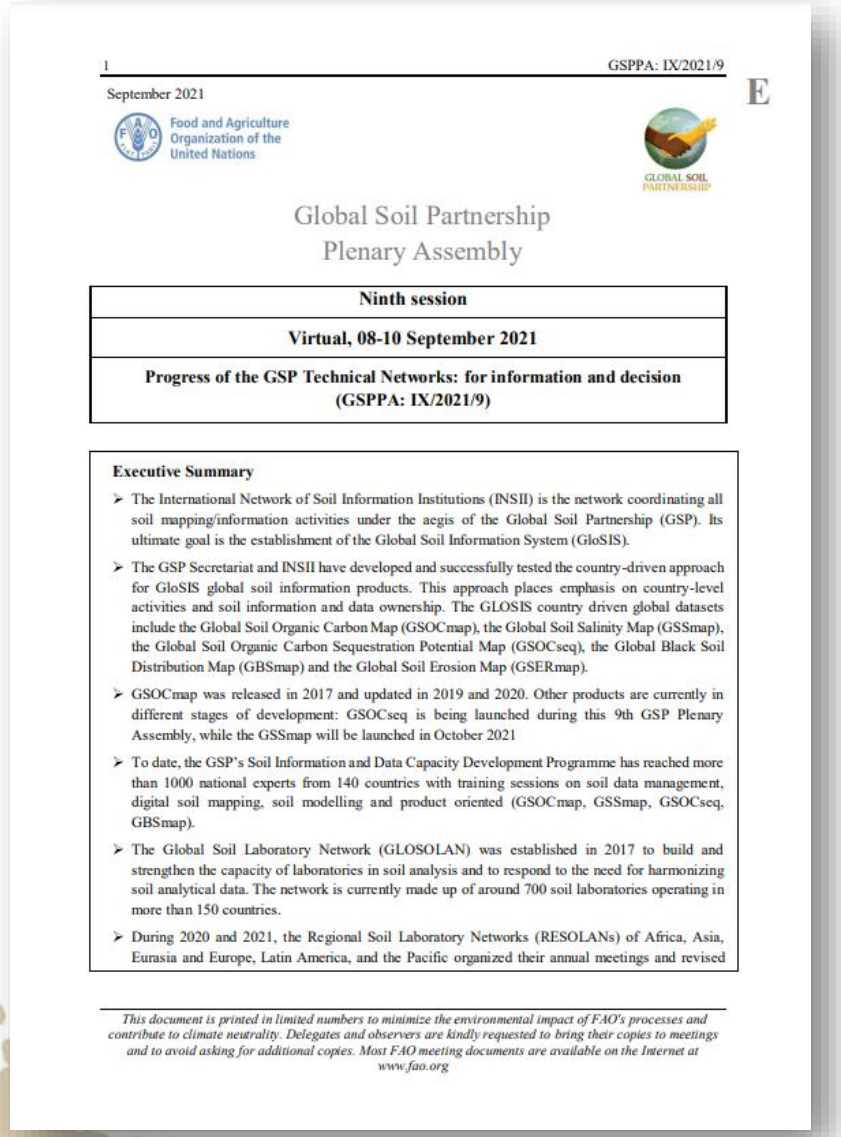
INTERGOVERNMENTAL TECHNICAL PANEL ON SOILS

GLOBAL SOIL PARTNERSHIP

9th GSP Plenary Assembly

8-10 September 2021

Online



1 GSPPA: IX/2021/9

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September 2021

Food and Agriculture Organization of the United Nations

GLOBAL SOIL PARTNERSHIP

Global Soil Partnership
Plenary Assembly

Ninth session

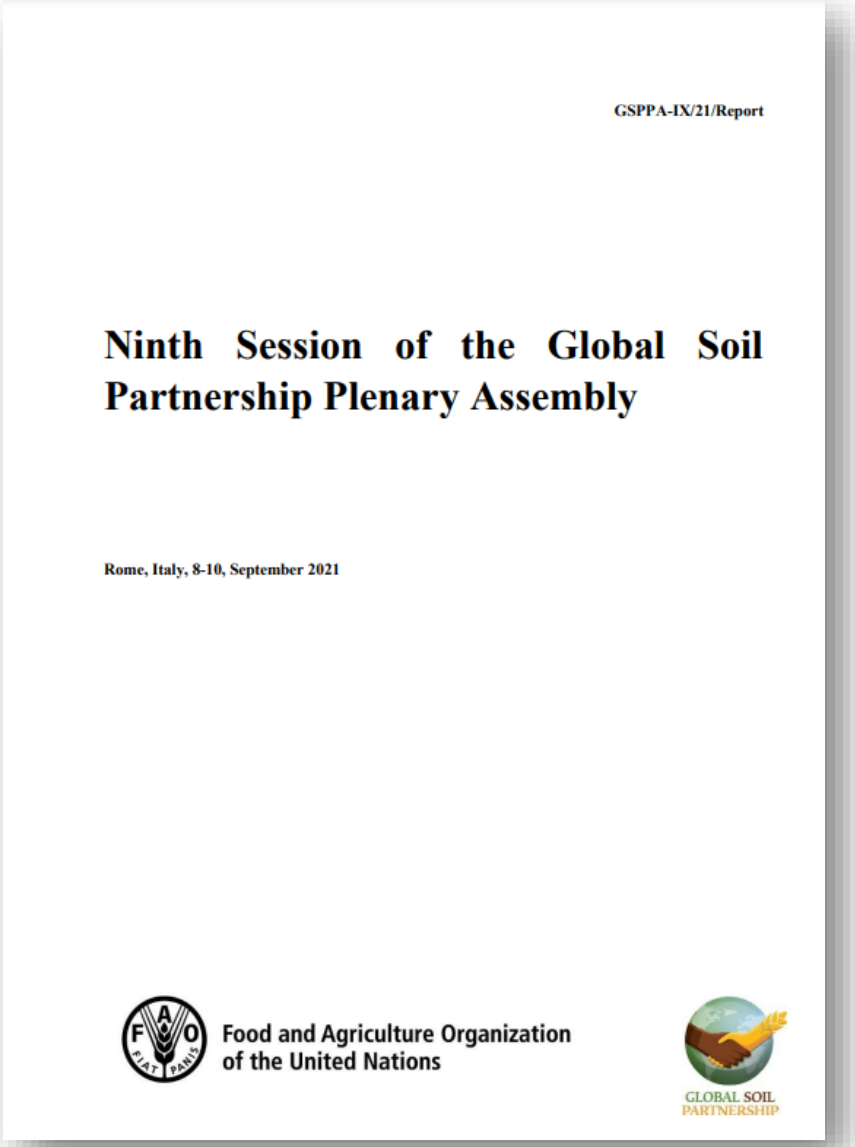
Virtual, 08-10 September 2021

Progress of the GSP Technical Networks: for information and decision (GSPPA: IX/2021/9)

Executive Summary

- The International Network of Soil Information Institutions (INSII) is the network coordinating all soil mapping/information activities under the aegis of the Global Soil Partnership (GSP). Its ultimate goal is the establishment of the Global Soil Information System (GloSIS).
- The GSP Secretariat and INSII have developed and successfully tested the country-driven approach for GloSIS global soil information products. This approach places emphasis on country-level activities and soil information and data ownership. The GLOSIS country driven global datasets include the Global Soil Organic Carbon Map (GSOCmap), the Global Soil Salinity Map (GSSmap), the Global Soil Organic Carbon Sequestration Potential Map (GSOCseq), the Global Black Soil Distribution Map (GBSmap) and the 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: GSOCseq is being launched during this 9th GSP Plenary Assembly, while the GSSmap will be launched in October 2021
- To date, the GSP's Soil Information and Data Capacity Development Programme has reached more than 1000 national experts from 140 countries with training sessions on soil data management, digital soil mapping, soil modelling and product oriented (GSOCmap, GSSmap, GSOCseq, GBSmap).
- The Global Soil Laboratory Network (GLOSOLAN) was established in 2017 to build and strengthen the capacity of laboratories in soil analysis and to respond to the need for harmonizing soil analytical data. The network is currently made up of around 700 soil laboratories operating in more than 150 countries.
- During 2020 and 2021, the Regional Soil Laboratory Networks (RESOLANs) of Africa, Asia, Eurasia and Europe, Latin America, and the Pacific organized their annual meetings and revised

[9th PA Official Documents]



GSPPA-IX/21/Report

Ninth Session of the Global Soil Partnership Plenary Assembly

Rome, Italy, 8-10, September 2021

Food and Agriculture Organization of the United Nations

GLOBAL SOIL PARTNERSHIP

[9th PA Report]

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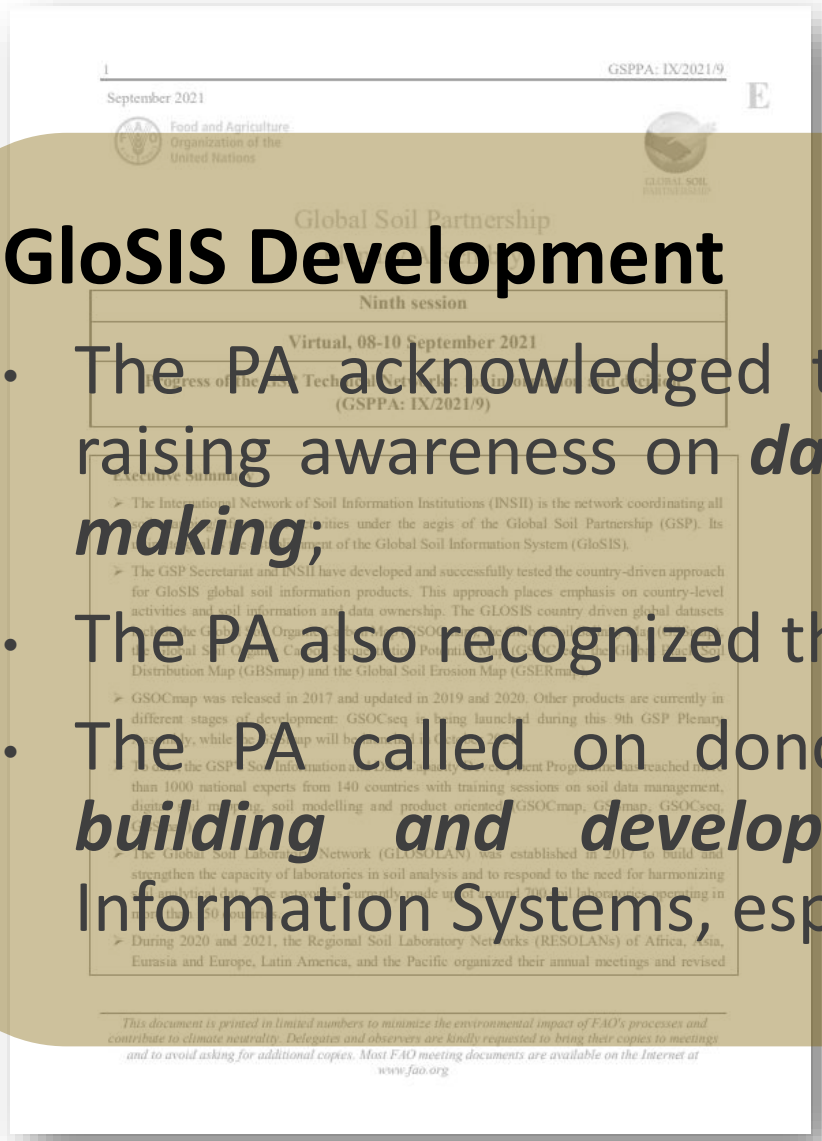
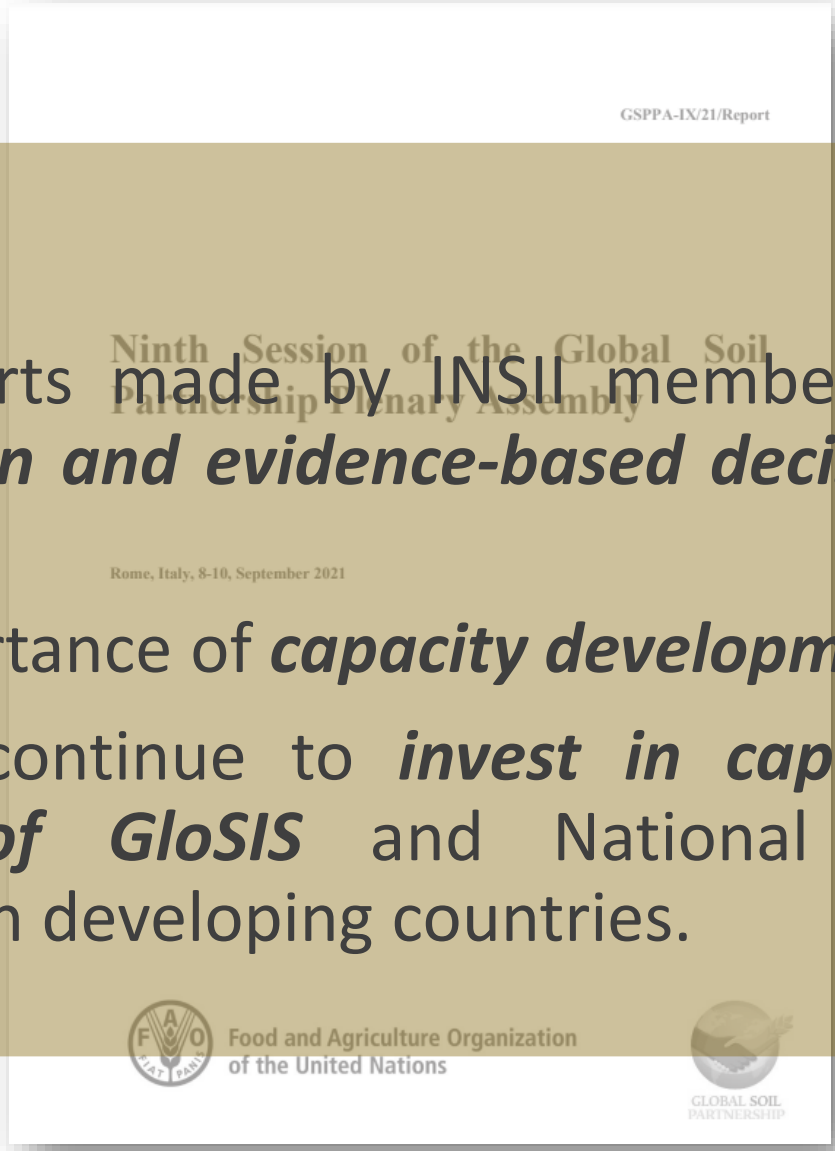
GLOBAL SOIL PARTNERSHIP





GloSIS Development

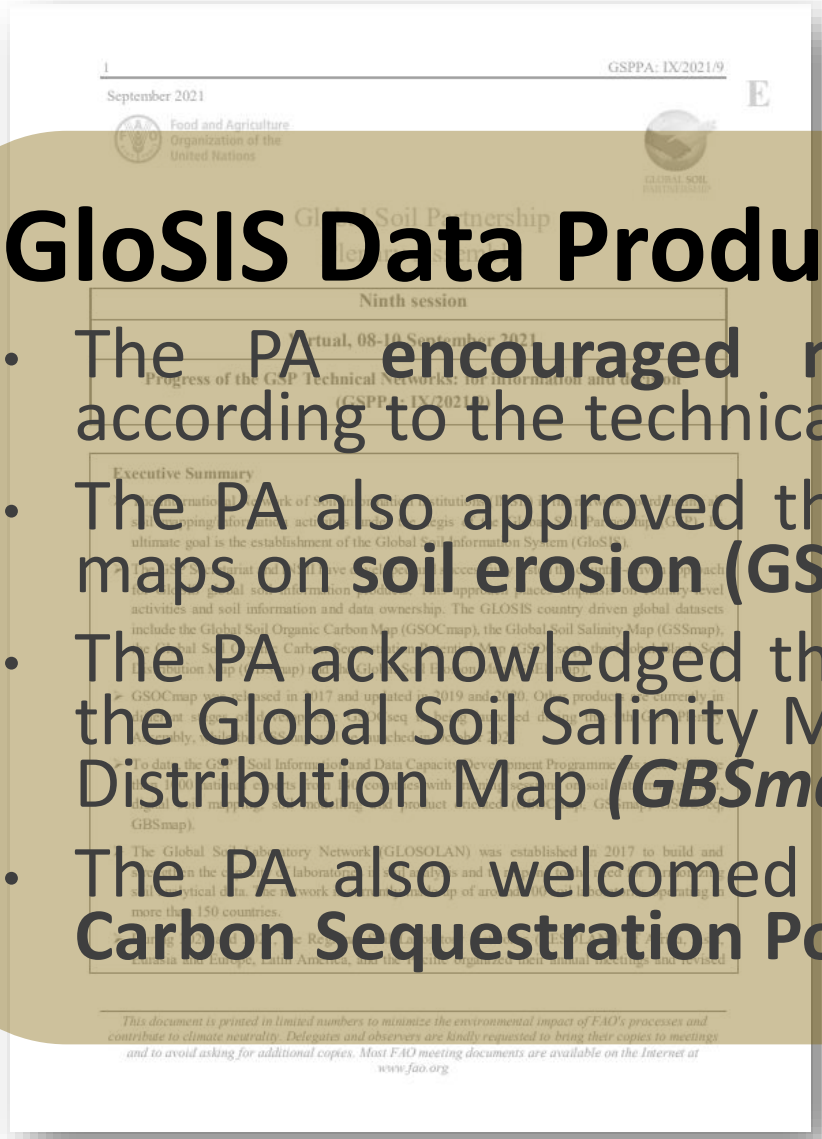
- The PA acknowledged the efforts made by INSII members in raising awareness on ***data-driven and evidence-based decision-making***;
- The PA also recognized the importance of ***capacity development;***
- The PA called on donors to continue to ***invest in capacity building and development of GloSIS*** and National Soil Information Systems, especially in developing countries.

9th PA Official Documents

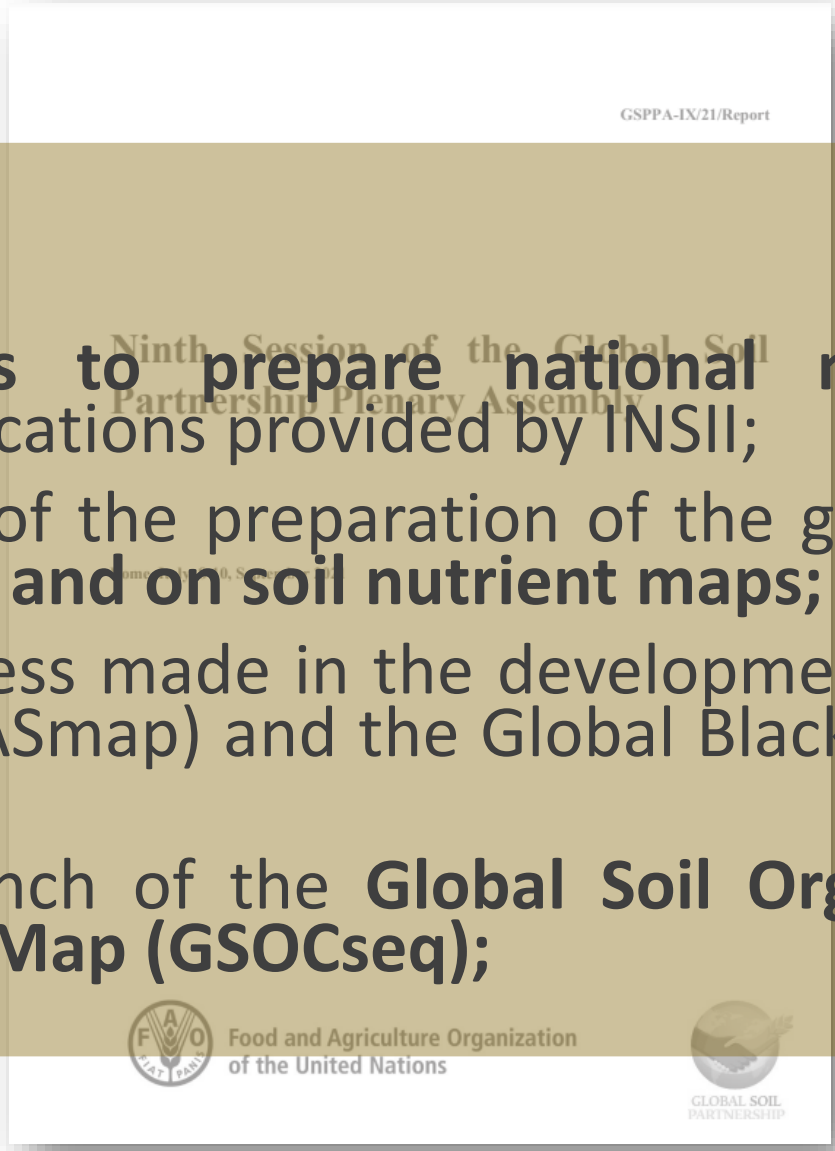
9th PA Report

GloSIS Data Products

- The PA **encouraged members to prepare national maps** according to the technical specifications provided by INSII;
- The PA also approved the start of the preparation of the global maps on **soil erosion (GSERmap) and on soil nutrient maps;**
- The PA acknowledged the progress made in the development of the Global Soil Salinity Map (GSASmap) and the Global Black Soil Distribution Map ***(GBSmap);***
- The PA also welcomed the launch of the **Global Soil Organic Carbon Sequestration Potential Map (GSOCseq);**



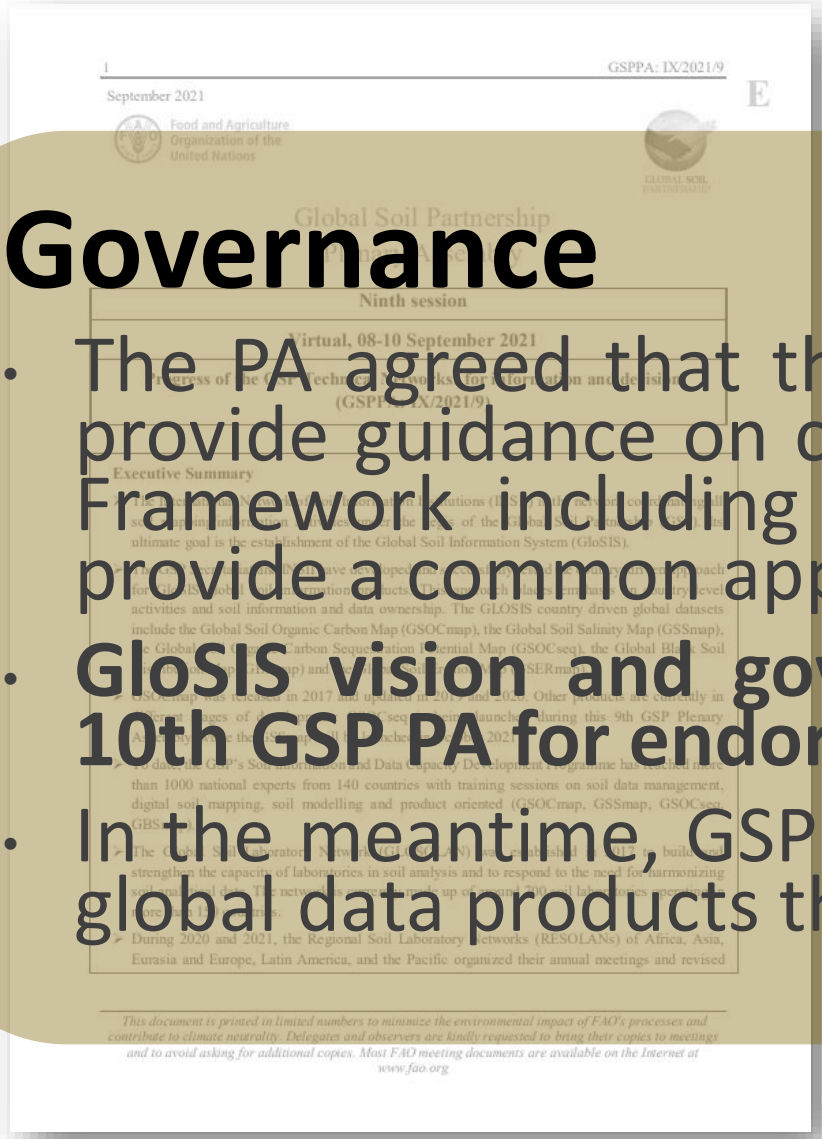
9th PA Official Documents



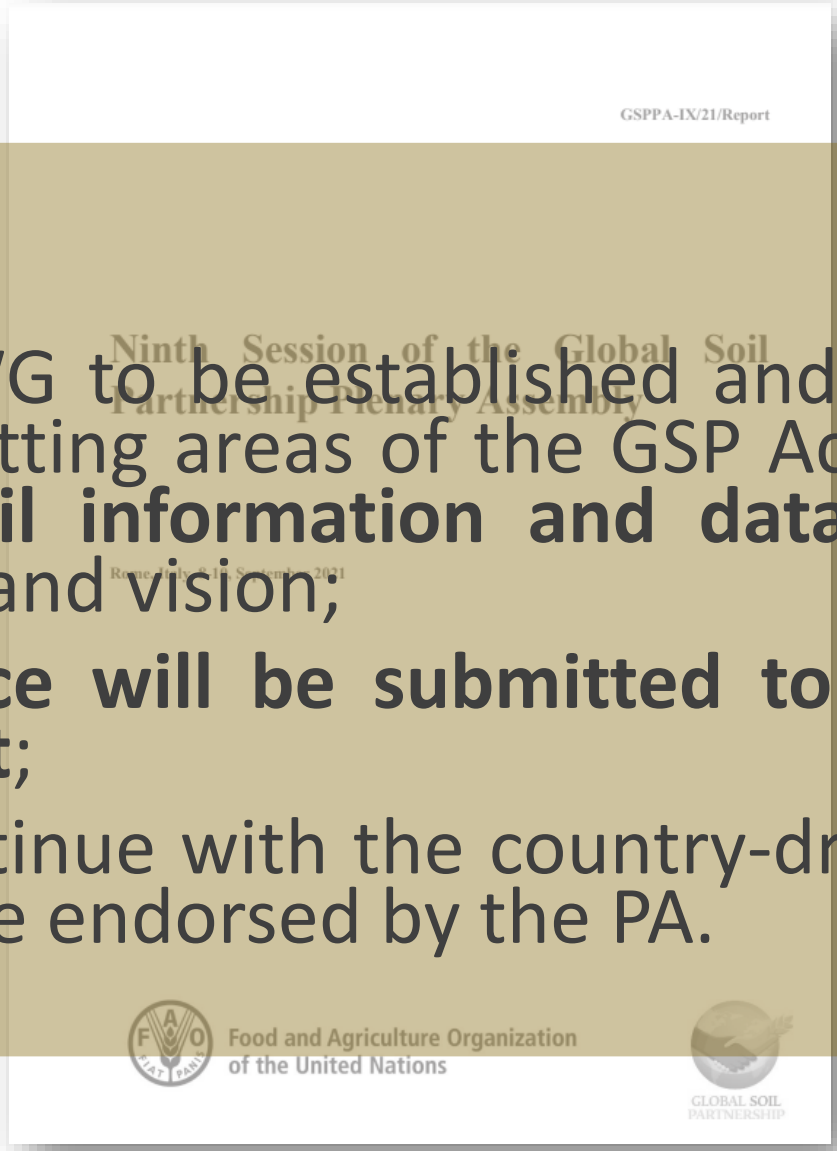
9th PA Report

Governance

- The PA agreed that the OEWG to be established and will provide guidance on cross-cutting areas of the GSP Action Framework including the **soil information and data**, to provide a common approach and vision;
- **GloSIS vision and governance will be submitted to the 10th GSP PA for endorsement**;
- In the meantime, GSP to continue with the country-driven global data products that were endorsed by the PA.



9th PA Official Documents



9th PA Report

7th INSII Working Session

9-11 November 2021

Online

In this Meeting – 7th INSII

- 175 Registered Participants (130 attendees)
- 82 INSII Representatives + 104 National Experts
- All GSP Regions
- 90 Countries + EU

Guest Talks

12:30 - 12:50 - Scotland's National Soils Archive (*Guest Talk)*

Dr Allan Lilly - Principal Soil Scientist / The James Hutton Institute Scotland, UK

Presentation

12:30 - 12:55 Cloud-based Geospatial Analysis (Guest talk)

Dr Serkan Girgin - Center Of Expertise In Big Geodata Science (CRIB), University of Twente, The Netherlands

11:40 - 12:00 Aging Soil Data (Guest talk)

Dr Marcos Angelini - Instituto Nacional de Tecnología Agropecuaria (INTA), Argentina

INSII

INTERNATIONAL NETWORK
OF SOIL INFORMATION INSTITUTIONS

GloSIS-*SDI*

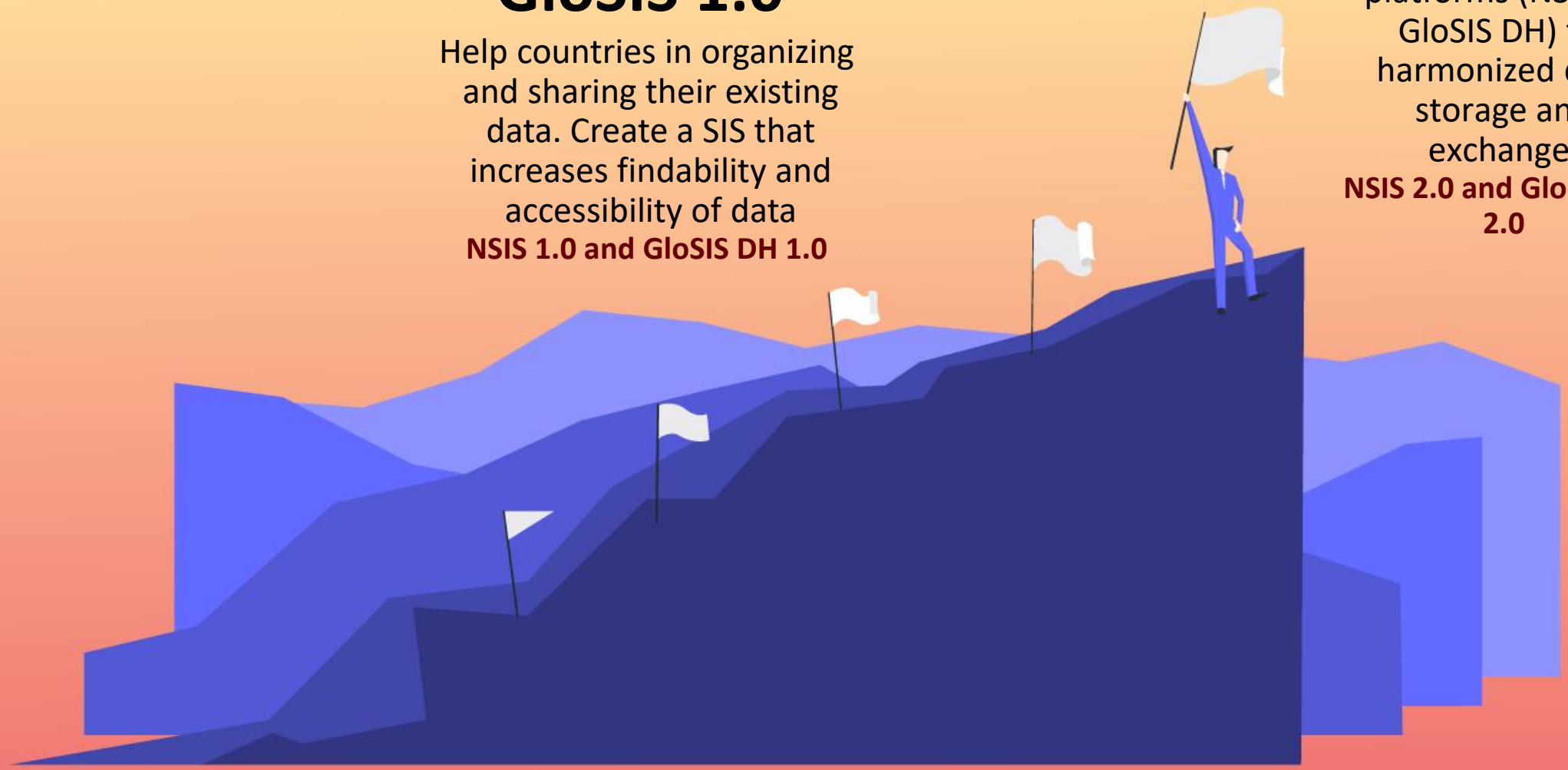
INSII
INTERNATIONAL NETWORK OF SOIL INFORMATION INSTITUTIONS

GLOSIS
Global Soil Information System

GloSIS 1.0

Help countries in organizing and sharing their existing data. Create a SIS that increases findability and accessibility of data

NSIS 1.0 and GloSIS DH 1.0



GloSIS 2.0

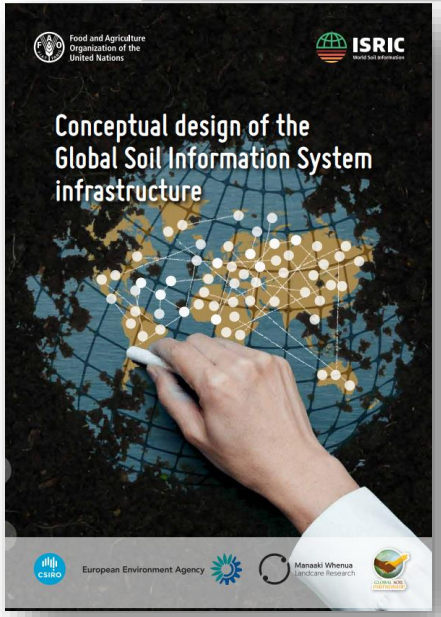
Full-fledged platforms (NSISs & GloSIS DH) for harmonized data storage and exchange.

NSIS 2.0 and GloSIS DH 2.0

GloSIS - Key DOCUMENTS

fao.org/documents/card/en/c/cb4355en

Conceptual design of the Global Soil Information System infrastructure



Year of publication: 2021
Place of publication: Rome, Italy
Pages: #30 p.
Author: de Sousa, L., Kempen, B., Mendes de Jesus, J., Yigini, Y., Viatkin, K., Medyckyj-Scott, D. Richie, A., Wilson, P. van Egmond, F. and Baritz, R.
Publisher: FAO and ISRIC
Agrovoc: information systems; soil profiles; information infrastructure; data management

Abstract:
This document provides a proposal for the design of the GLOSIS infrastructure at higher level. It considers the required architectural and engineering building blocks. The architectural building blocks are mostly abstract, setting out structures and formalising knowledge into an information model. The engineering building blocks concern primarily the technologies that realise the structures set out in the architecture. It presents a number of implementing units and enumerates some of the technologies on which it may depend. The broad aim is to have an implementation that is lightweight, cheap and easy to deploy by data holders, while at the same time relieving data providers from technical details.

Cite this content as:
de Sousa, L., Kempen, B., Mendes de Jesus, J., Yigini, Y., Viatkin, K., Medyckyj-Scott, D. Richie, A., Wilson, P. van Egmond, F. and Baritz, R. 2021. *Conceptual design of the Global Soil Information System infrastructure*. Rome, FAO and Wageningen, Netherlands, ISRIC.

GloSIS Design Document, T1/T2 Specifications, GloSIS Data Model

GLOSIS 2.0 - domain model and data exchange

International consultancy

for the

Food and Agriculture Organization of the United Nations

Final report

Data Model Development for the Global Soil Information System (GloSIS)

Editors:

Tomáš Řezník

Katharina Schleidt

GLOSIS domain model created by two leading experts, some remaining issues to be addressed

GloSIS 1.0 - Beta Phase (National Systems and Discovery Hub)

GloSIS Beta Testing Countries: *Bolivia, Canada, Cape Verde, Fiji, Gambia, Indonesia, Israel, Italy, Mongolia, Morocco, Niger, Papua New Guinea, Philippines, Senegal, Sudan, Tunisia, Turkey, Ukraine, Zimbabwe, ASP CESRA*

1st Beta Testing Countries Meeting (Jan'21)
2nd Beta Testing Countries Meeting (April'21)

GloSIS | Beta (National Systems and Discovery Hub)

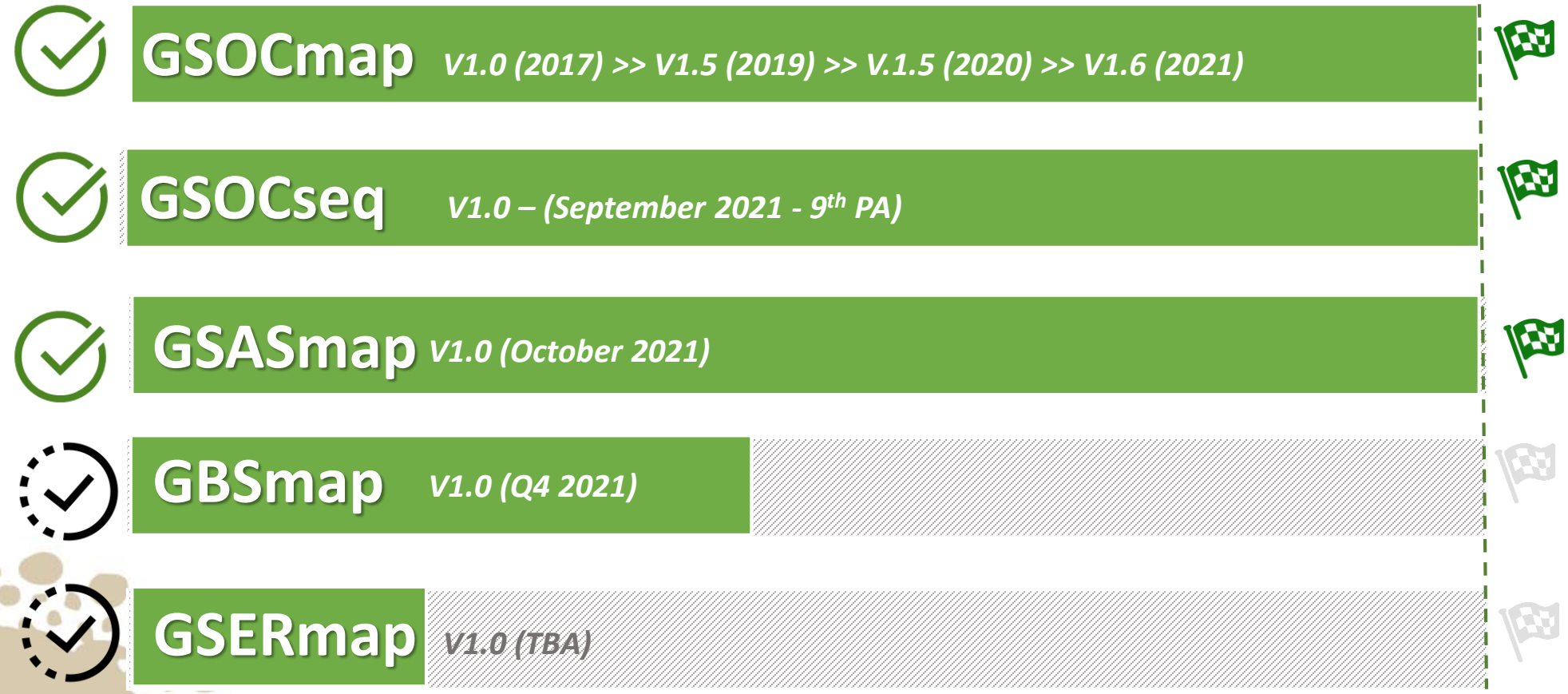
- We named the technologies for national soil information systems;
- We introduced GloSIS Instructions Guide and the software package to be used for National Soil Information Systems *(Open Source – GeoNode)*
- We introduced requirements for beta testing (Technical, Human Resources);
- Beta version GloSIS Discovery Hub has been developed *(Open Source – GeoNetwork)*
- GSP Consultancy to develop GloSIS Data Exchange Language

GloSIS-*Global*

INSII
INTERNATIONAL NETWORK OF SOIL INFORMATION INSTITUTIONS

GLOSIS
Global Soil Information System

GloSIS Global - Country Driven Global Datasets



GLOSIS
Global Soil Information System

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GSASmap

Global Salt Affected Soils Map

INTERGOVERNMENTAL TECHNICAL PANEL ON SOILS

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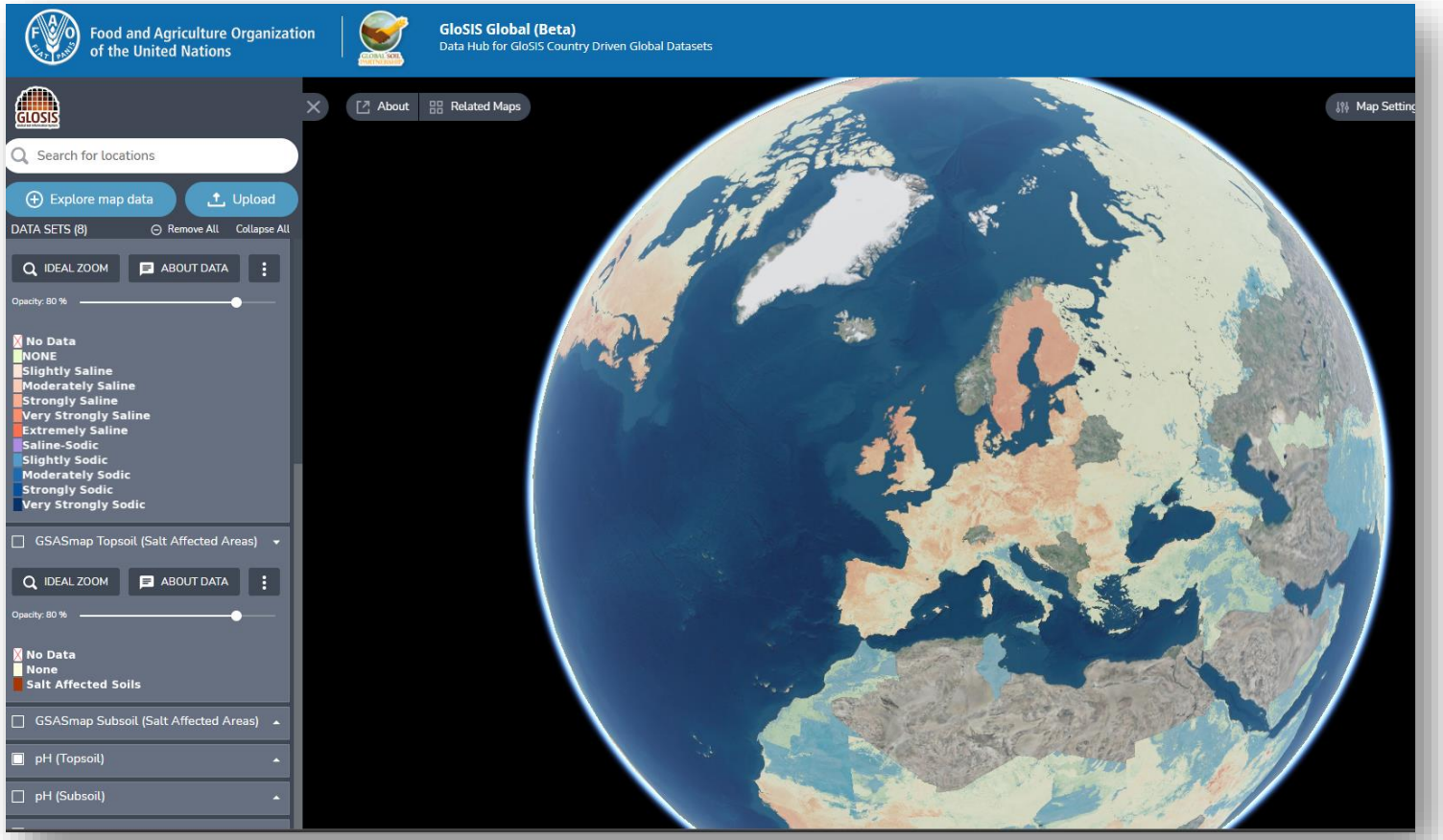
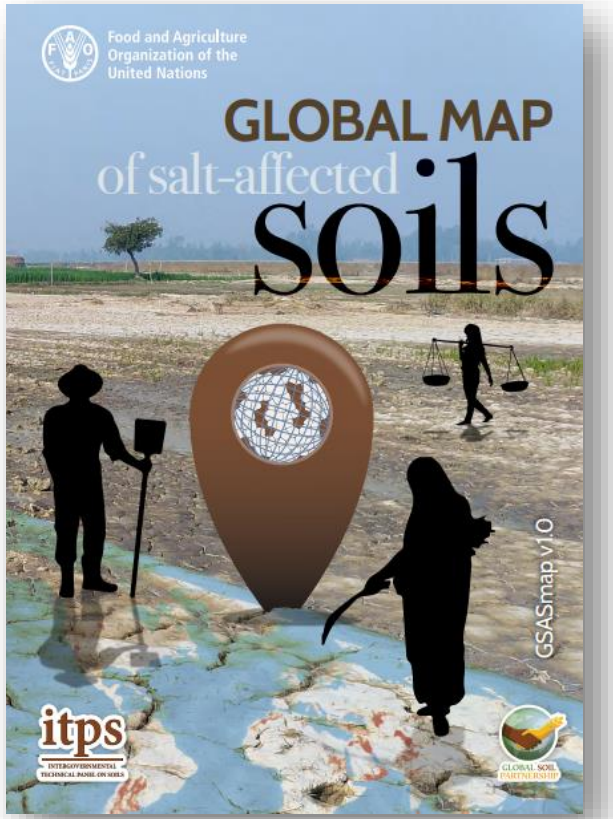
GSASmap

https://www.fao.org/global-soil-partnership/gsasmap/en



GloSIS Global Data Browser

GSASmap Leaflet



GSASmap – Way forward

Global Salt Affected Soils Map

- Engage INSII members form countries with missing data for filling-in the gaps (Particularly **Central Asia, NENA, the Pacific**, etc.)
- Develop key GSASmap statistics identifying sustainable soil management practices to be adopted for control of salinization and sodification, conserve natural salt-affected ecosystems, and restoration of areas that had lost their original potential due to salt accumulation.
- Develop a framework for monitoring soil salinization and sodification and early detection particularly in agriculture areas.
- The map can support **evidence-based decision making** for interventions related to agro-food systems, climate change adaptation and irrigation projects.

GSOCseq

Global Soil Organic Carbon Sequestration Potential Map

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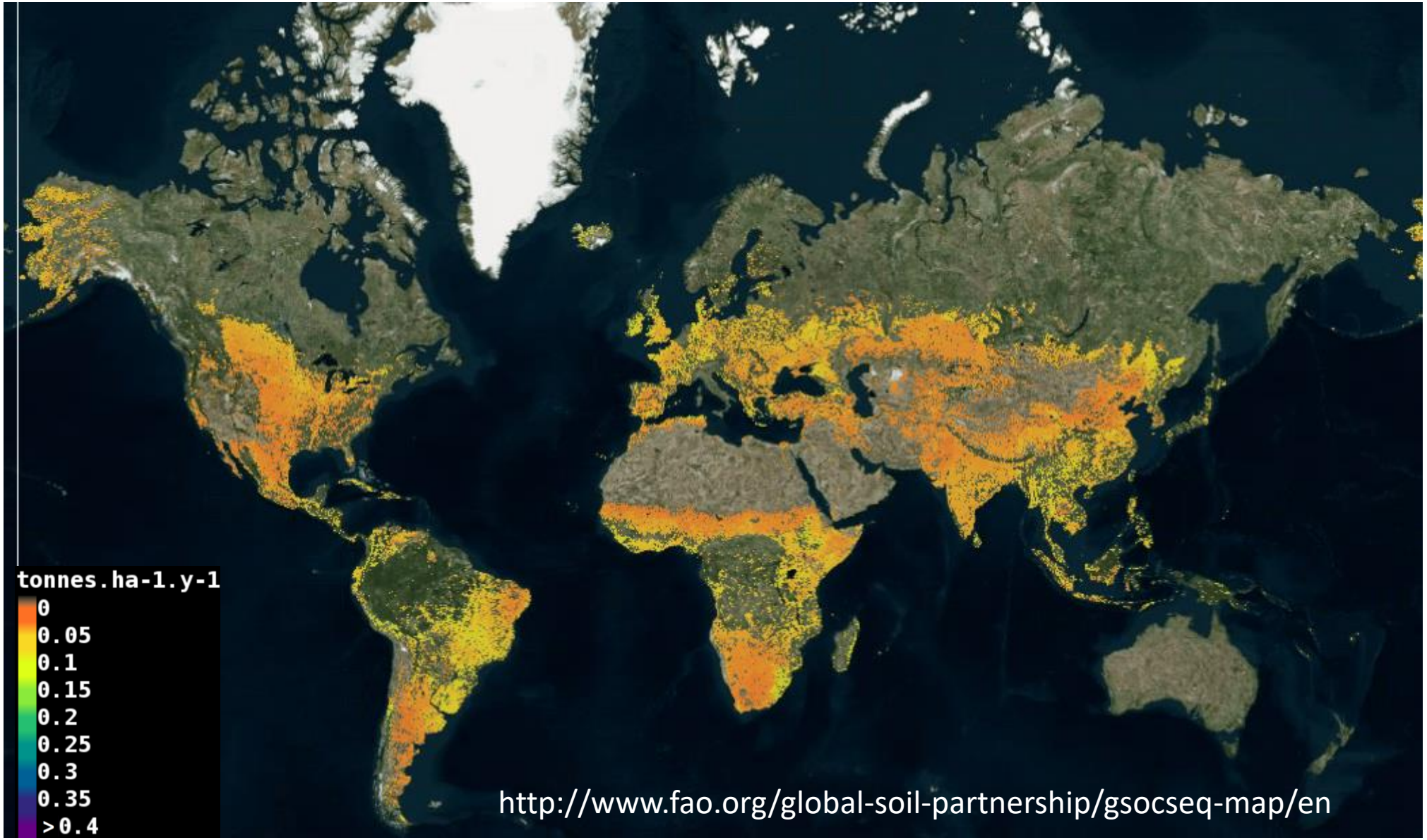
GSOCseq data platform

Relative sequestration rates tonnes.ha-1.y-1

SSM1 >> SSM3

GSOCseq v1.0

- SOC sequestration (tC/ha/yr) SSM 1-3
- Agricultural lands (croplands + grazing lands)
- 20-year period
- Depth: 0-30 cm
- 1 x 1 km resolution



- **Regular Updates: GSOCmap and GSOCseq**
- Involve more countries
- Organize additional trainings/workshops
- Strengthen **Expert Network (expand expert GSOCseq working group)**
- Improve approach and GSOCseq versions:
  - **Country**-specific SSM **scenarios;**
  - Local scenarios/practices: **C input increments vs specific practices?**
  - **Climate Change**
  - Specific **conditions** (e.g. allophanic soils, salt affected soils)
  - SOC changes at **subsoil**
  - **Finer resolutions (1km >>> 250m >> 100m?)**
  - **Multi-model** approach?
  - **Improved production runtime**

GSOCmap

Global Soil Organic Carbon Map

INTERGOVERNMENTAL TECHNICAL PANEL ON SOILS

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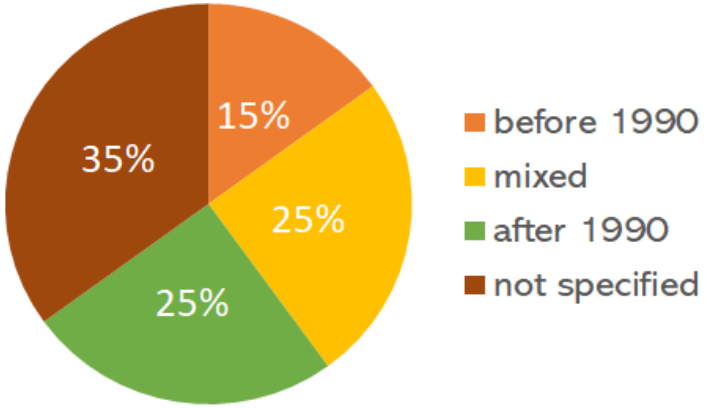
GSOCmap *2.0*

- Mapping approach
- Harmonised Uncertainty assessment
- Temporal Harmonization
- Subsoil SOC Stocks



GSERmap
Global Soil Erosion Map

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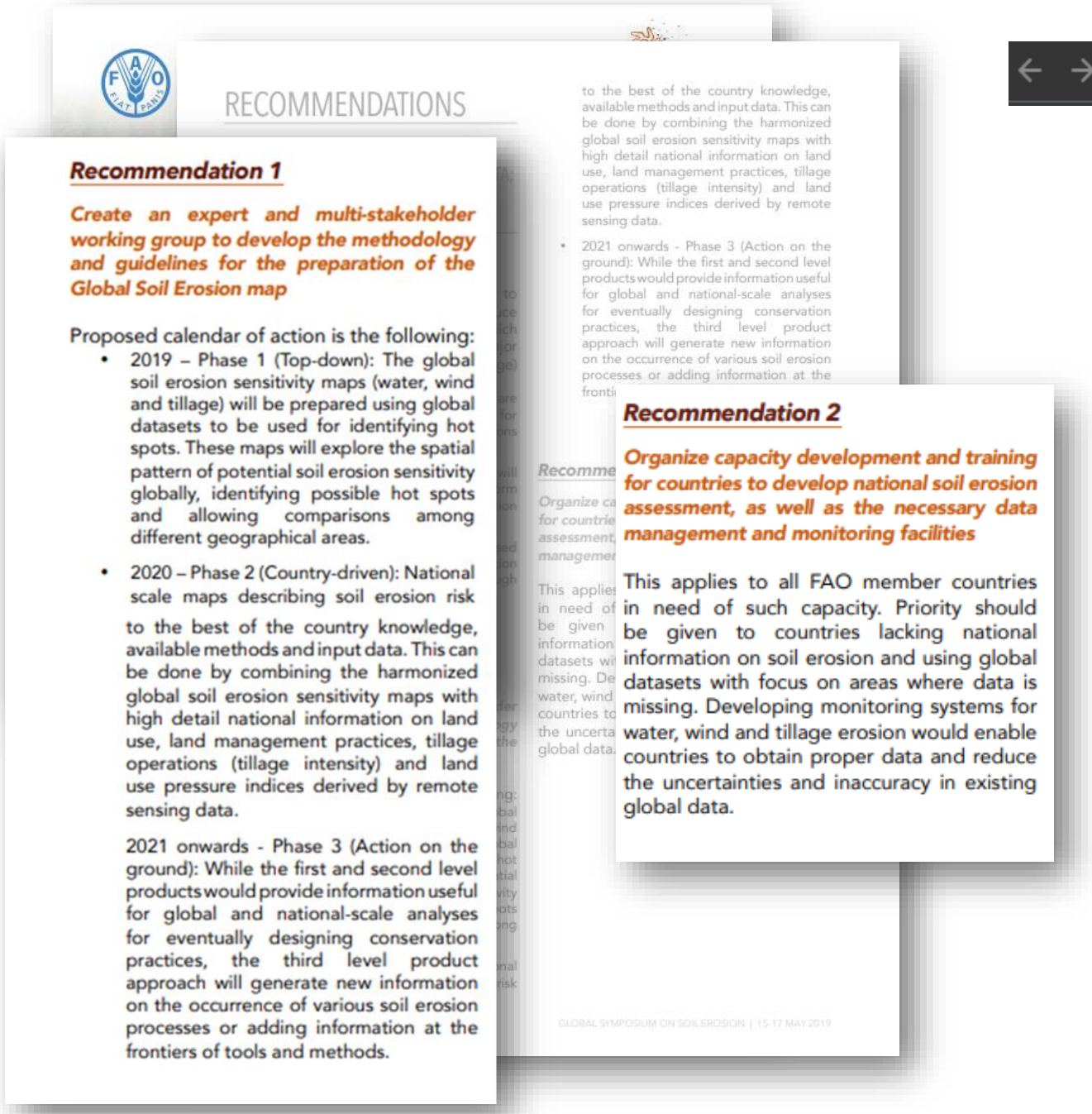
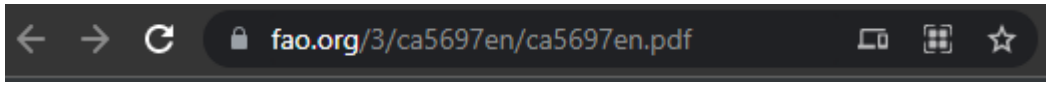


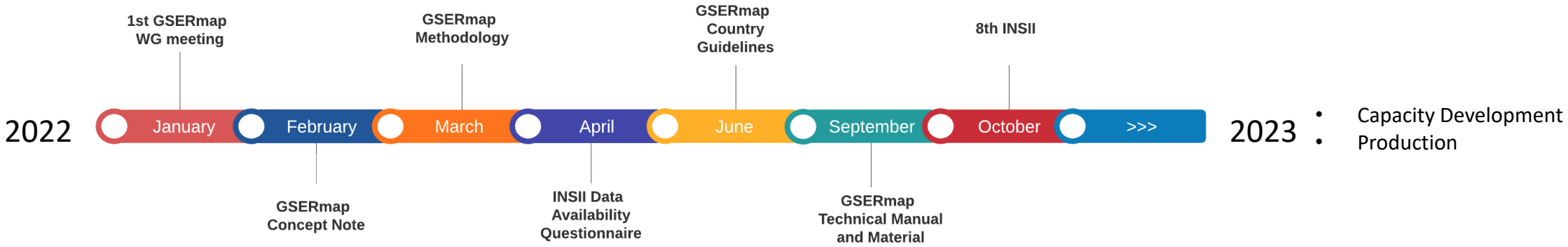


GSER'19 OUTCOME DOCUMENT

GSERmap

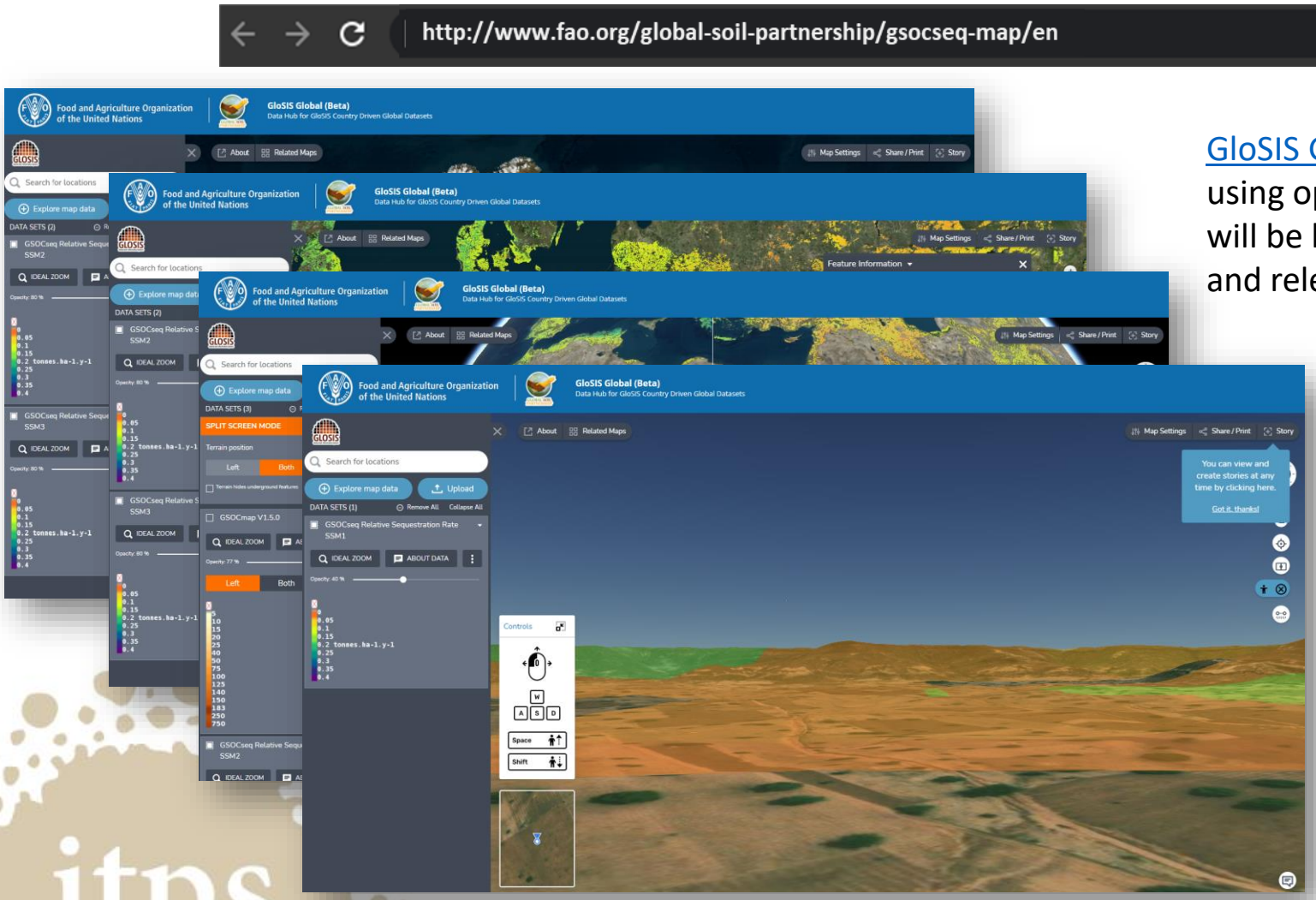
R.1 - Create an expert and multi-stakeholder working group to develop the methodology and guidelines for the preparation of the Global Soil Erosion Map (GSERmap)

- 25 Scientist/experts expressed their interest to be in the working group during GSER'19
- The list to be expanded (INSII, ITPS …)
- Kick-off in January 2022



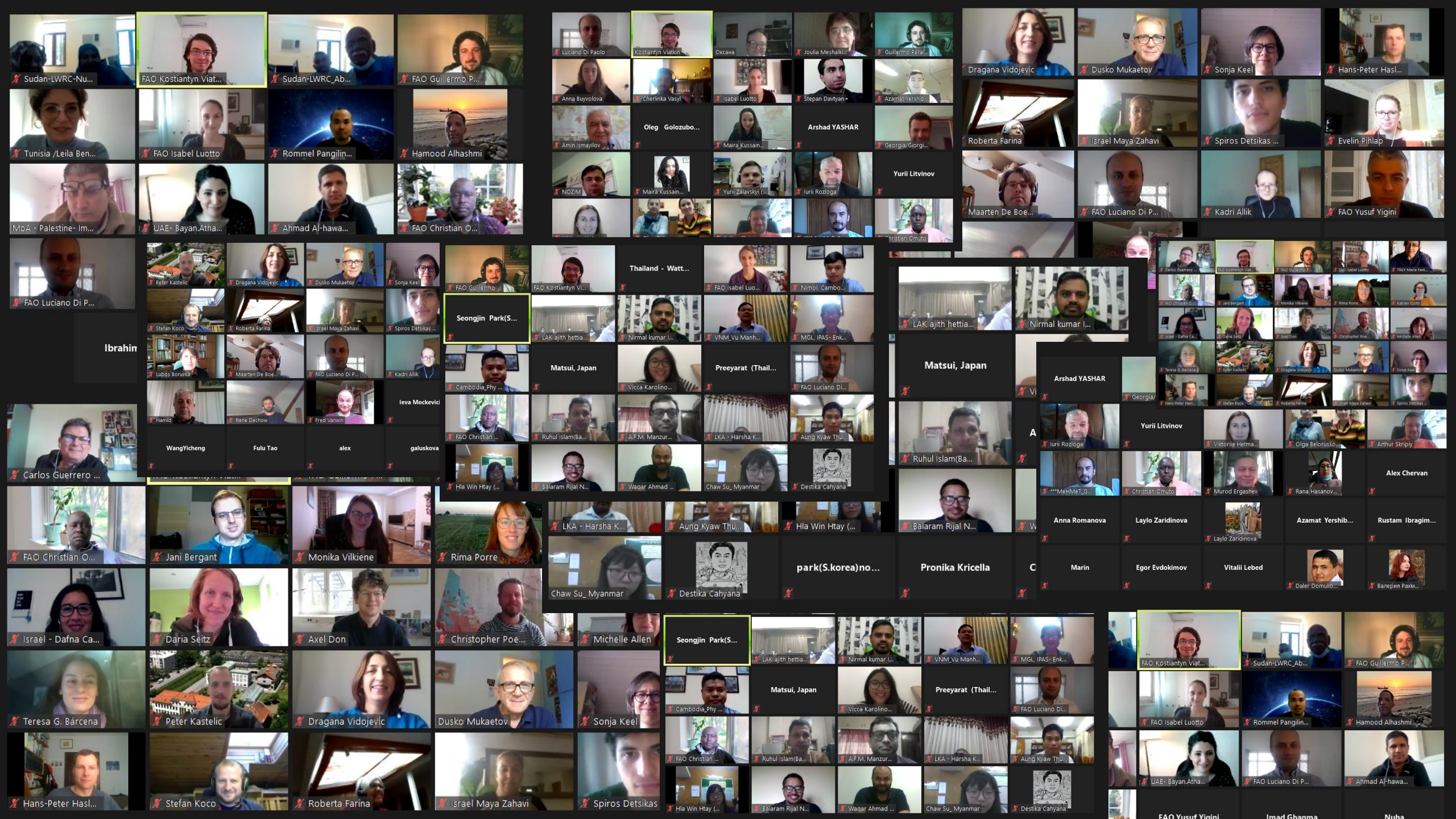
R.2 - Organize capacity development and training for countries to develop national soil erosion assessment, as well as the necessary data management and monitoring facilities

GloSIS Global - Launched



[GloSIS Global](#) Web Platform developed by FAO/GSP using open source libraries [(TerriaJS/TerriaMap)](#) and will be housing GloSIS country-driven global datasets and relevant soil data;

- GSOCmap
- GSOCseq
- GSASmap
- …
- HWSD - Harmonised World Soil Database Derivatives DSMW - Digital Soil Map of the World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FAO Kostiantyn Viat...
Sudan-LWRC_Ab...
FAO Guillermo P...
Tunisia /Leila Ben...
FAO Isabel Luotto
Rommel Pangilin...
Hamood Alhashmi
MoA - Palestine- Im...
UAE- Bayan.Atha...
Ahmad Al-hawa...
FAO Christian O...
FAO Luciano Di P...
Ibrahim
Peter Kastelic
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Ľubo Boruvka
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FAO Luciano Di P...
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Hamid
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Rima Porre
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Kostiantyn Viatkin
Оксана
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Guillermo Peral...
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Cherlinka Vasyl
Isabel Luotto
Stepan Davtyan
Azamat Yershib...
Amin Ismayilov
Oleg Golozubo...
Maira Kussain...
Arshad YASHAR
Georgia/Giorgi...
NOZIM
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Iurii Rozloga
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Balaram Rijal N...
Waqar Ahmad ...
Chaw Su_ Myanmar
Destika Cahyana
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Matsui, Japan
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Balaram Rijal N...
Pronika Kricella
Arshad YASHAR
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Laylo Zaridinova
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Rustam Ibragim...
Marin
Egor Evdokimov
Vitalii Lebed
Daler Domullo...
Валерия Рахм...
Seongjin Park(S...
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A.F.M. Manzur...
LKA - Harsha K...
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Rommel Pangilin...
Hamood Alhashmi
UAE- Bayan.Atha...
FAO Luciano Di P...
Ahmad Al-hawa...
FAO Yusuf Yigini
Imad Ghanma
Nuha

Capacity Development Programme

OUTREACH

GSOCmap
- 110+ Countries
- 250+ National Experts

GSSmap
- 120+ Countries
- 320+ National Experts

GSOCseq
- 130 Countries
- 390+ National Experts

GSP Digital Soil Mapping Trainings

90+ Countries

250+ National Experts

140+ Countries

1100+ Experts

50+ Sessions

8 Regions

- **Training Sessions:** Global, Regional, National, One-on-One
- **Technical Documents:** Country Guidelines, Technical Manuals
- **Software/Data:** Tools, Scripts, input data
- **Financial Support:** Remained limited due to

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THANKS!

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INTERGOVERNMENTAL TECHNICAL PANEL ON SOILS

15th Working Session of the Intergovernmental Technical Panel on Soils (ITPS)
15 - 17 November 2021 | Virtual meeting

GLOBAL SOIL PARTNERSHIP