Food and Agriculture Organization of the United Nations

21st Working Session of the Intergovernmental Technical Panel on Soils (ITPS)

November 18-19-20, 2024

Updates of the soil health indicators and key performance indicators of the GSP Action Framework

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The GSP Action Framework

The Action Framework was adopted by the 10th GSP Plenary Assembly and endorsed by the 28th Session of the COAG (2022).

Quantifiable Goals, Targets and Indicators

GSP AF has a clear ambition shared by all **GSP members and partners**, with the establishment of **quantifiable goals, targets and indicators that** will allow for the evaluation of the progress that the GSP is making towards its vision of healthy soils.

GSP Action Framework states:

- The progress of the GSP Action Framework will be monitored and measured through **Key Performance Indicators** derived from **SoilSTAT**.
- A **Global Soil Health Index (GSHI)** is to be developed.
- These crucial tasks are to be carried out by a dedicated working group **(ISAF WG).**

Indicator System for the GSP Action Framework (ISAF) – open call

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Call for a Working Group to develop the Indicator System of the GSP Action Framework (ISAF)

Background

In May 2022, the 10th GSP Plenary Assembly (PA) adopted the new GSP Action Framework 2022–2030 that was endorsed by the 28th Session of the FAO Committee on Agriculture (COAG). In this regard, "COAG *encouraged FAO and all GSP members to implement the activities outlined therein, as well as tools and initiatives of the GSP including the Voluntary Guidelines for Sustainable Soil Management, the International Code of Conduct for the Sustainable Use and Management of Fertilizers, among others, as appropriate*".

The overarching principle of the GSP Action Framework is that in a world in which soils are healthy and resilient, the provision of ecosystem functions and services by soils are sustained for all, leaving no one behind. The vision is that the GSP must work to improve and maintain the health of at least 50 percent of the world's soils by 2030. To further develop the GSP towards a flexible action-oriented approach and meet this objective, Pillars of Action have been replaced by Action Areas linked to concrete actions, initiatives, and programmes.

- Action Area 1: Manage sustainably and restore soils for the provision of ecosystem services
- Action Area 2: Strengthen soil governance
- Action Area 3: Promote knowledge and literacy on soils
- Action Area 4: Promote awareness raising and advocacy on soil health
- Action Area 5: Assess, map, and monitor soil health in a harmonized way
- Action Area 6: Foster technical cooperation (including gender and youth)

Another novelty of the GSP Action Framework is the inclusion of concrete and quantifiable targets to measure the impact of actions at the global, regional, national and local levels. In this regard, the GSP Action Framework is made up by clear actions and targets focused on addressing the different global challenges – from food insecurity, climate change, pollution, land degradation and the loss of biodiversity – through the improvement and enhancement of soil health. Key performance indicators (KPIs) are to be developed and agreed upon with GSP members and partners to allow monitoring of activities and progress towards these targets.

The Action Framework also proposes the development of a Global Soil Health Index (GSHI), as a composite index including the indicators endorsed in the Protocol for the assessment of sustainable soil management (SSM Protocol) to provide a proxy on the soil health status at global level.

- ✓ ITPS Chairperson & ITPS Members
- ✓ Chairs of the Regional Soil Partnerships
- ✓ Chairs of the GSP Technical Networks
- ✓ Experts nominated by GSP National Focal Points
- ✓ Global Soil Partnership Secretariat (facilitator)

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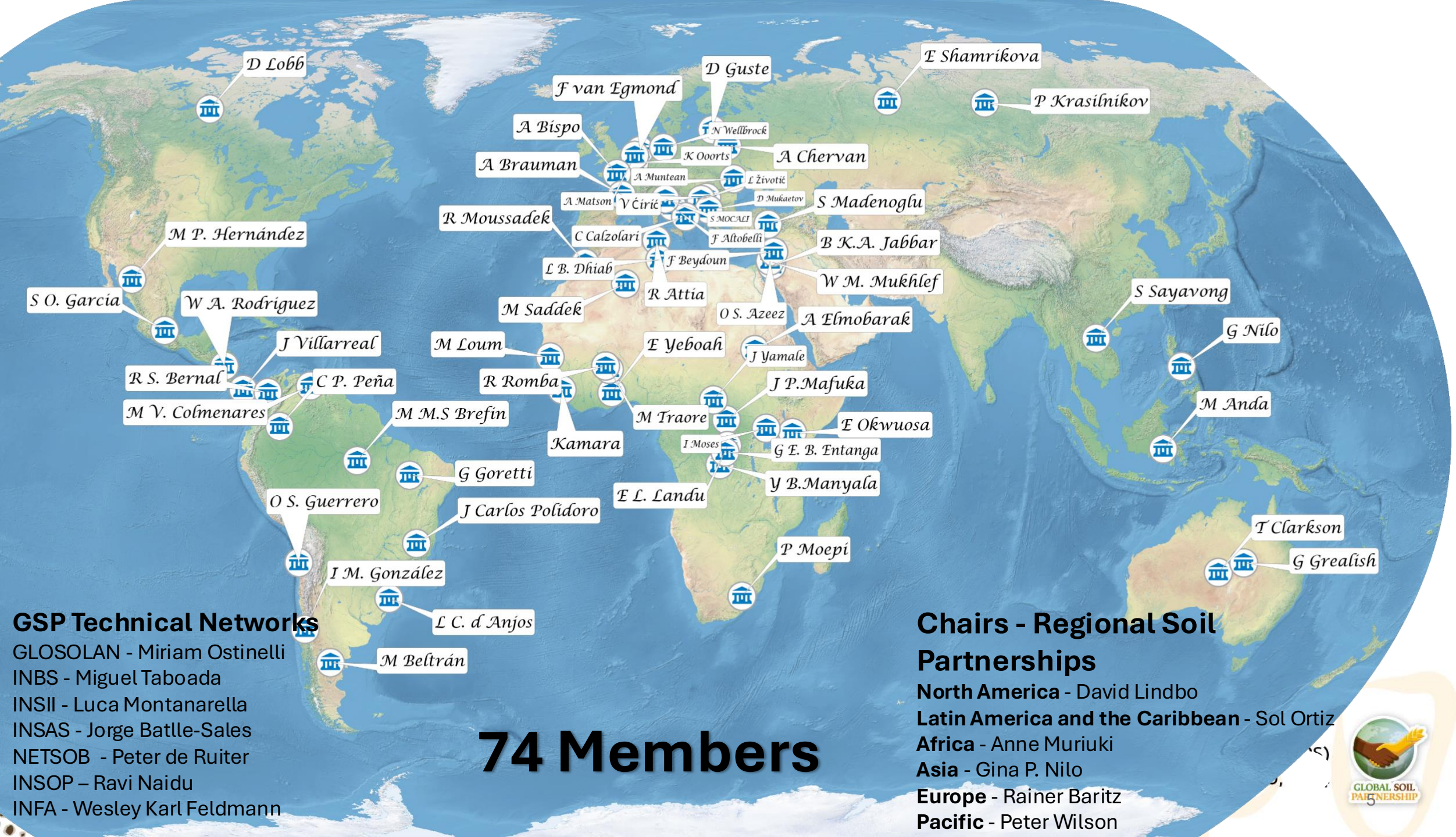

GSP Technical Networks

GLOSOLAN - Miriam Ostinelli
INBS - Miguel Taboada
INSII - Luca Montanarella
INSAS - Jorge Batlle-Sales
NETSOB - Peter de Ruiter
INSOP – Ravi Naidu
INFA - Wesley Karl Feldmann

74 Members

Chairs - Regional Soil Partnerships

North America - David Lindbo
Latin America and the Caribbean - Sol Ortiz
Africa - Anne Muriuki
Asia - Gina P. Nilo
Europe - Rainer Baritz
Pacific - Peter Wilson

Work of ISAF WG

1. **GSP Performance Indicator System**
   monitoring Key Performance Indicators (KPIs) for soil-related activities and initiatives of the GSP

2. **SoilSTAT Soil Health Indicator System**
   a comprehensive platform for monitoring key soil health indicators

3. **Global Soil Health Dashboard**
   Standardized metric to measure and track the soil health worldwide

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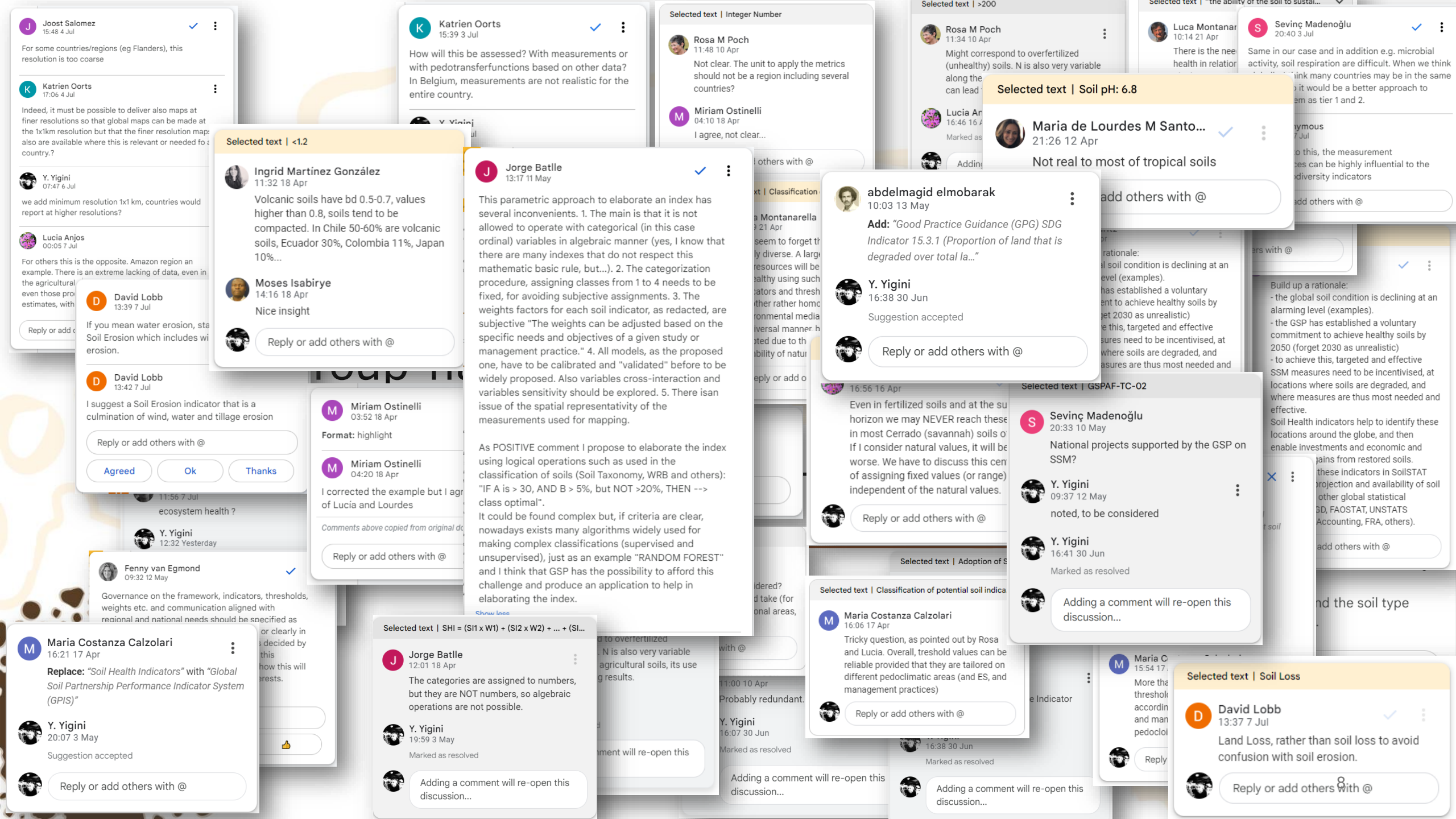
Over 500 valuable inputs! The Working Group has demonstrated an **extraordinary level of engagement** and **attention to detail** in the development.


Joost Salomez
15:48 4 Jul
For some countries/regions (eg Flanders), this resolution is too coarse
Katrien Oorts
17:06 4 Jul
Indeed, it must be possible to deliver also maps at finer resolutions so that global maps can be made at the 1x1km resolution but that the finer resolution maps also are available where this is relevant or needed fo country.?
Y. Yigini
07:47 6 Jul
we add minimum resolution 1x1 km, countries would report at higher resolutions?
Lucia Anjos
00:05 7 Jul
For others this is the opposite. Amazon region an example. There is an extreme lacking of data, even in the agricultural even those pro estimates, with
Reply or add
David Lobb
13:39 7 Jul
If you mean water erosion, sta Soil Erosion which includes wi erosion.
David Lobb
13:42 7 Jul
I suggest a Soil Erosion indicator that is a culmination of wind, water and tillage erosion
Reply or add others with @
Agreed
Ok
Thanks
11:56 7 Jul
ecosystem health ?
Y. Yigini
12:32 Yesterday
Fenny van Egmond
09:32 12 May
Governance on the framework, indicators, thresholds, weights etc. and communication aligned with regional and national needs should be specified as
or clearly in
decided by
this
how this will
erests.
Maria Costanza Calzolari
16:21 17 Apr
Replace: "Soil Health Indicators" with "Global Soil Partnership Performance Indicator System (GPIS)"
Y. Yigini
20:07 3 May
Suggestion accepted
Reply or add others with @
Katrien Oorts
15:39 3 Jul
How will this be assessed? With measurements or with pedotransferfunctions based on other data? In Belgium, measurements are not realistic for the entire country.
Selected text | Integer Number
Rosa M Poch
11:48 10 Apr
Not clear. The unit to apply the metrics should not be a region including several countries?
Miriam Ostinelli
04:10 18 Apr
I agree, not clear...
Selected text | <1.2
Ingrid Martínez González
11:32 18 Apr
Volcanic soils have bd 0.5-0.7, values higher than 0.8, soils tend to be compacted. In Chile 50-60% are volcanic soils, Ecuador 30%, Colombia 11%, Japan 10%...
Moses Isabirye
14:16 18 Apr
Nice insight
Reply or add others with @
Miriam Ostinelli
03:52 18 Apr
Format: highlight
Miriam Ostinelli
04:20 18 Apr
I corrected the example but I agr of Lucia and Lourdes
Comments above copied from original do
Reply or add others with @
Jorge Batlle
13:17 11 May
This parametric approach to elaborate an index has several inconvenients. 1. The main is that it is not allowed to operate with categorical (in this case ordinal) variables in algebraic manner (yes, I know that there are many indexes that do not respect this mathematic basic rule, but...). 2. The categorization procedure, assigning classes from 1 to 4 needs to be fixed, for avoiding subjective assignments. 3. The weights factors for each soil indicator, as redacted, are subjective "The weights can be adjusted based on the specific needs and objectives of a given study or management practice." 4. All models, as the proposed one, have to be calibrated and "validated" before to be widely proposed. Also variables cross-interaction and variables sensitivity should be explored. 5. There isan issue of the spatial representativity of the measurements used for mapping.
As POSITIVE comment I propose to elaborate the index using logical operations such as used in the classification of soils (Soil Taxonomy, WRB and others): "IF A is > 30, AND B > 5%, but NOT >20%, THEN --> class optimal".
It could be found complex but, if criteria are clear, nowadays exists many algorithms widely used for making complex classifications (supervised and unsupervised), just as an example "RANDOM FOREST" and I think that GSP has the possibility to afford this challenge and produce an application to help in elaborating the index.
Show less
Selected text | SHI = (SI1 x W1) + (SI2 x W2) + ... + (SI...
Jorge Batlle
12:01 18 Apr
The categories are assigned to numbers, but they are NOT numbers, so algebraic operations are not possible.
Y. Yigini
19:59 3 May
Marked as resolved
Adding a comment will re-open this discussion...
Selected text | >200
Rosa M Poch
11:34 10 Apr
Might correspond to overfertilized (unhealthy) soils. N is also very variable along the
can lead
Lucia Ar
16:46 16 A
Marked as
Adding
Selected text | Soil pH: 6.8
Maria de Lourdes M Santo...
21:26 12 Apr
Not real to most of tropical soils
Reply or add others with @
abdelmagid elmobarak
10:03 13 May
Add: "Good Practice Guidance (GPG) SDG Indicator 15.3.1 (Proportion of land that is degraded over total la..."
Y. Yigini
16:38 30 Jun
Suggestion accepted
Reply or add others with @
16:56 16 Apr
Even in fertilized soils and at the su horizon we may NEVER reach these in most Cerrado (savannah) soils o If I consider natural values, it will be worse. We have to discuss this cen of assigning fixed values (or range) independent of the natural values.
Reply or add others with @
Selected text | Adoption of S
Selected text | Classification of potential soil indica
Maria Costanza Calzolari
16:06 17 Apr
Tricky question, as pointed out by Rosa and Lucia. Overall, treshold values can be reliable provided that they are tailored on different pedoclimatic areas (and ES, and management practices)
Reply or add others with @
Selected text | GSPAF-TC-02
Sevinç Madenoğlu
20:33 10 May
National projects supported by the GSP on SSM?
Y. Yigini
09:37 12 May
noted, to be considered
Y. Yigini
16:41 30 Jun
Marked as resolved
Adding a comment will re-open this discussion...
Luca Montanar
10:14 21 Apr
There is the nee health in relatior
Sevinç Madenoğlu
20:40 3 Jul
Same in our case and in addition e.g. microbial activity, soil respiration are difficult. When we think
it would be a better approach to
as tier 1 and 2.
ymous
Jul
this, the measurement
ces can be highly influential to the diversity indicators
dd others with @
rationale:
soil condition is declining at an evel (examples).
has established a voluntary ent to achieve healthy soils by et 2030 as unrealistic)
e this, targeted and effective sures need to be incentivised, at where soils are degraded, and asures are thus most needed and
Build up a rationale:
- the global soil condition is declining at an alarming level (examples).
- the GSP has established a voluntary commitment to achieve healthy soils by 2050 (forget 2030 as unrealistic)
- to achieve this, targeted and effective SSM measures need to be incentivised, at locations where soils are degraded, and where measures are thus most needed and effective.
Soil Health indicators help to identify these locations around the globe, and then enable investments and economic and
ains from restored soils.
these indicators in SoilSTAT
rojection and availability of soil
other global statistical
SD, FAOSTAT, UNSTATS
Accounting, FRA, others).
dd others with @
nd the soil type
Selected text | Soil Loss
David Lobb
13:37 7 Jul
Land Loss, rather than soil loss to avoid confusion with soil erosion.
Reply or add others with @

The Final Draft:


Global Soil Partnership
Action Framework 2030

SoilSTAT

Development and Integration of Key Performance Indicators for the Global Soil Partnership, the Soil Health Indicator System, and the Global Soil Health Index (GSHI)

Concept Note

ISAF Working Group

2023

1. **Global Soil Partnership Performance Indicator System**
2. **SoilSTAT: Soil Health Indicator System**
3. **Global Soil Health Dashboard**

\+ Indicator Factsheets, Operational Aspects, Reporting Lines, Data Policy, QA/QC

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1 GSP Performance Indicators

- **16** KPIs
- **6** Domains (SSM, Soil Governance, Knowledge and literacy, Awareness raising, Soil Information and Data, Technical Cooperation)

6	Soil Governance	Implementation of the Fertilizer Code	# of countries technically supported to include the Fertilizer Code principles into national policies and strategies.	1	#	GSPAF-SG-02	National Counterpart (INSII)	202x
7	Soil Governance	Formalization of cooperation between the FAO/GSP and other relevant intergovernmental processes and monitoring frameworks	# of official agreements between FAO/GSP and relevant intergovernmental bodies	1	#	GSPAF-SG-03	National Counterpart (INSII)	202x
8	Knowledge and literacy	Capacity development programmes/courses on SSM	1)# of participants trained through the GSP's capacity development programmes 2) # of training sessions organised by the GSP	1	#	GSPAF-KL-01a GSPAF-KL-01b	GSP Secretariat	202x
9	Knowledge and literacy	Global assessments reports on the state of world's soils and soil threats	# of global assessments and reports on soils published by the GSP..	1	#	GSPAF-KL-02	GSP Secretariat	202x
10	Awareness raising and Advocacy on Soil Health	Outreach of the World Soil Day	1) Social Media Engagement Rate[2] 2) Campaign Reach[3]	1	% - #	GSPAF-AR-01a GSPAF-AR-01b	GSP Secretariat	202x

2 Soil Health Indicators

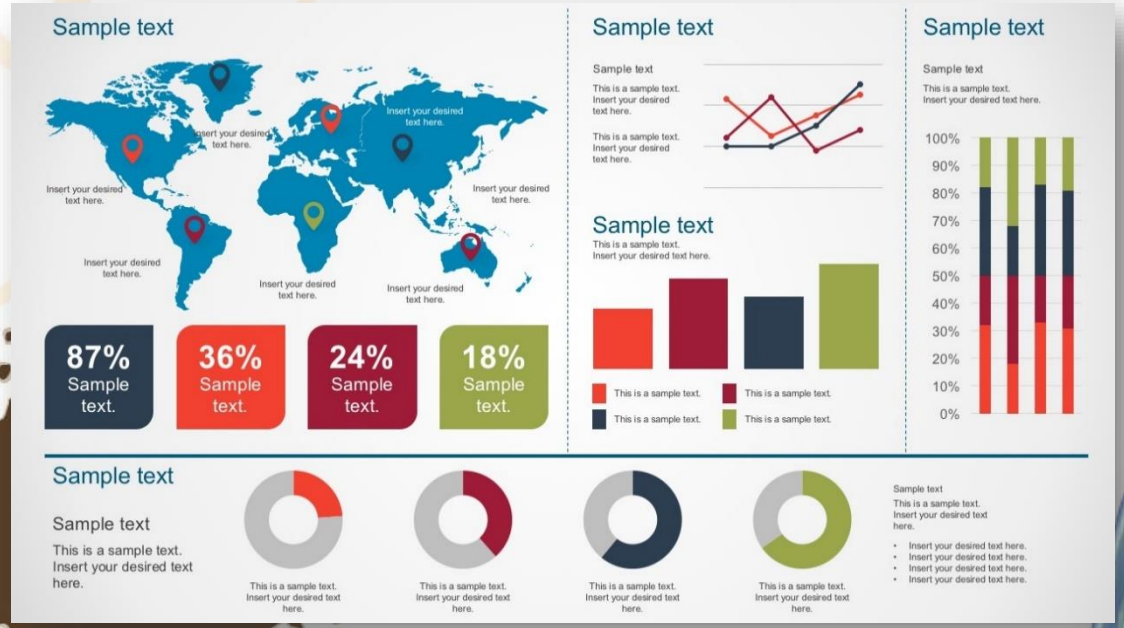
- **10** Soil Threats - in line with the Status of the World's Soil Resources Report (SWSR)

Domain	Indicator	Metric	Unit	Tier 1 Data	Spatial Res.	Mandatory (Y/N)
SOC decline	Soil Organic Carbon Sequestration Potential	Predicted SOCseq Potential	Mg/ha/yr	GSOCseq	1x1km	N
SOC decline	Soil Organic Carbon Stock	Predicted variation on SOC Stocks	Mg/ha	GSOCmap	1x1km	Y
SOC decline	Soil Organic Carbon Concentration	Soil Organic Carbon Concentration	% or g/kg	N/A	1x1 km	N
Salinization	Electrical Conductivity	Measured or Predicted Electrical Conductivity (EC)	dS/m at 25ºC	GSASmap	1x1km	Y
Sodification	Exchangeable Sodium percentage or Sodium Adsorption Ratio	Predicted/Measured ESP or SAR	%	GSASmap	1x1km	N
Erosion	Water Erosion Risk	Area under severe risk of erosion	tonnes/ha/y	N/A		N
Erosion	Tillage Erosion	Predicted Annual Soil Loss by Tillage	Mg/ha/yr	N/A		N
Erosion	Water Erosion Rate	Predicted Annual Soil Loss by Water	Mg/ha/yr	JRC/ESDAC -Glosem 1.3 -Global Soil Erodibility -EPM	100 m x 100 m (crops) 1 km x 1 km 800 m x 800 m	Y
Erosion	Wind Erosion	Susceptibility to Wind Erosion	% (ILSWE)	N/A		N

3 Soil Health Index

- **Approach**: ~~Soil Ecosystem Services~~ Soil Threats/Degradation as a proxy for soil health, agricultural soils.

Global Soil Health Dashboard



3 Soil Health Index ?

- Lack of agreed-upon thresholds for many soil attributes such as soil organic carbon and pH. The wide range of values for natural soils makes identification of a threshold of concern very difficult.
- Lack of agreed-upon models for processes such as soil erosion by water, wind and tillage.
- Thresholds depend on the ecosystem service considered and on the soil management system applied.
- For some attributes (e.g. soil pollution) there are many national thresholds in place and there would be considerable concern with the imposition of global thresholds.

Next Steps - conclusions of the 12th GSP PA

- The 12th GSP PA urged the ISAF working group and the GSP Secretariat to finalize the indicator system of the GSP Action Framework 2022-2030 and the Global Soil Health Indicator System.
- The Plenary Assembly requested that the proposal be first shared with the focal points for validation and presented to the 13th GSP Plenary Assembly for approval.

Next Steps - 13th PA

- Review of the Indicator Systems proposed by ISAF by INSII (document to be opened for review Dec 15).
- Submission for review (Q1 2025) and final endorsement of the Indicator System during the 13th Plenary Assembly of the GSP (June 2025).
- INSII and GLOSOLAN work plans to be developed in accordance with the indicator system.
- Dedicated working sessions during the 10th INSII meeting with the ISAF working group (Jan 15-16-17) to develop an implementation plan for 2025-2030 to support national reporting on soil health indicators.

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Thank you

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