



Food and Agriculture
Organization of the
United Nations

8th Asian Soil Partnership MEETING

2 May 2023

STRENGTHENING OF THE INDONESIAN NATIONAL SOIL INFORMATION SYSTEM

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STRENGTHENING OF THE INDONESIAN NATIONAL SOIL INFORMATION SYSTEM

Key points of presentation

- I. Success progress on the establishment of Indonesian National Soil Information System (NSIS).
- II. Are NSISs useful?
- III. What is their practical impact?
- IV. What steps did you take to establish/strengthen the NSIS of Indonesia (link to the AFACI project)
- V. What is still missing?
- VI. Way forward



Location of Indonesia in South East Asian countries

Land Area : ~ 190 million ha



Indonesia's Land Area : ~ 190 million ha

- Sumatera's Land Area : 47.3 million ha
- Profile distribution : 1202 points

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I. Success progress on the establishment of Indonesian National Soil Information System (NSIS).

- **Soil Atlas of Asia and National Soil Information System of Indonesia**
- **Soil Organic Carbon (SOC) map of Indonesia**
- **Map of Soil Properties:**
 - Map of soil salinity; map of zinc (Zn) and manganese (Mn) micronutrients in Karawang Regency, west Java, Indonesia
 - Map of post-mount Semeru eruption hazard for rehabilitation of agricultural crops and ecosystem in Lumajang Regency, East Java, Indonesia
- **Development of database of soil profiles and their mineralogical constituents in Indonesia**
- **Capacity building of soil atlas of Indonesia:**
 - Soil survey and mapping
 - training for soil organic C sequestration potential (GSOCseq)
- **Addition of new soil profile database to increase Indonesian National soil information system**

Distribution of Reference Soil Group (RSG) in Indonesia

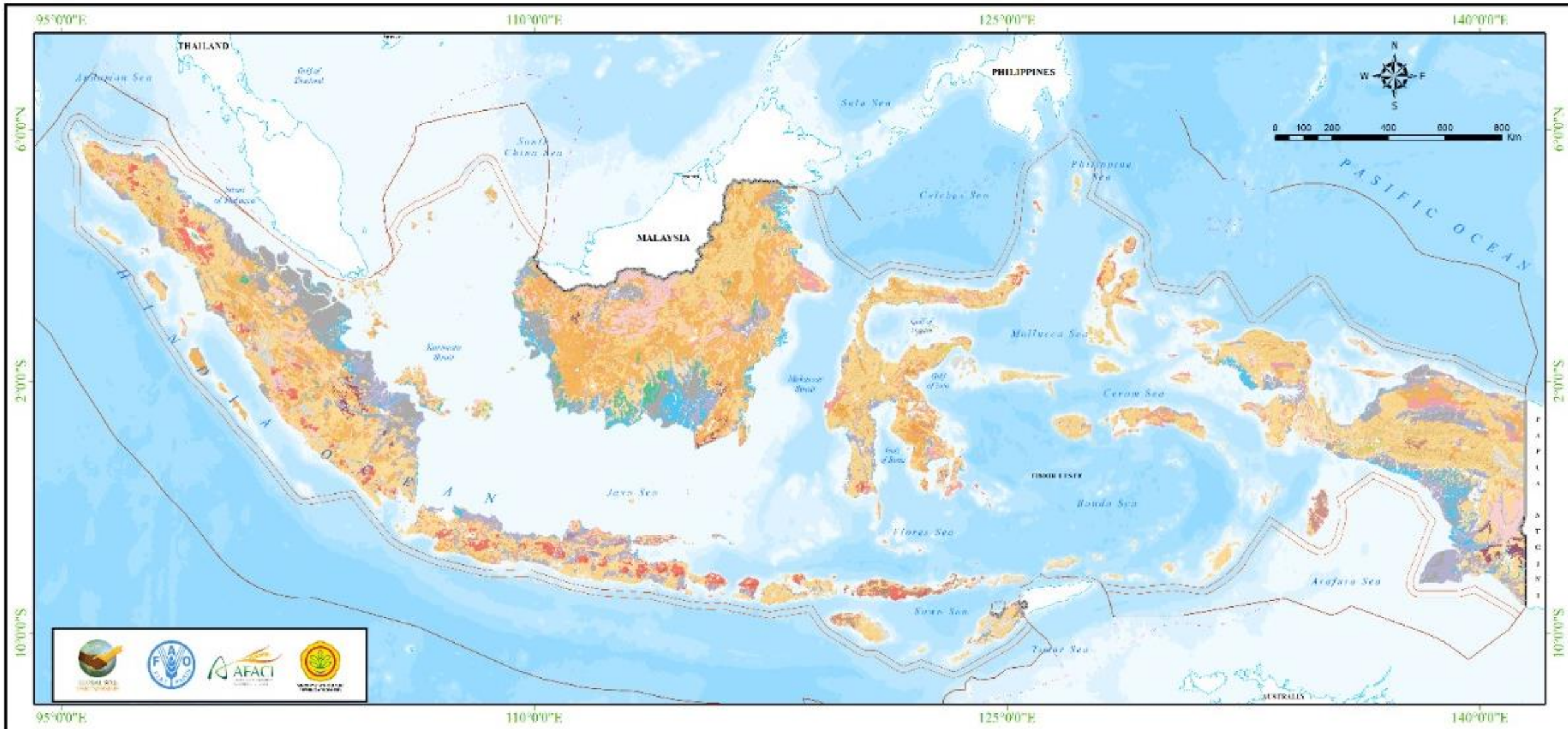
No.	Reference Soil Group	Area (x 1,000)	
		ha	%
1.	Plinthosols	1.086	0,57
2.	Andosols	4.569	2,39
3.	Luisols	6.373	3,33
4.	Lixisols	7.990	4,18
5.	Phaeozems	1.915	1,00
6.	Ferralsols	5.712	2,98
7.	Nitisols	37	0,02
8.	Acrisols	27.051	14,14
9.	Cambisols	79.787	41,70
10.	Chernozems	610	0,32
11.	Arenosols	2.299	1,20
12.	Regosols	4.095	2,14
13.	Durisols	11	0,01
14.	Vertisols	445	0,23
15.	Gleysols	19.666	10,28
16.	Histosols	13.431	7,02
19.	Leptosols	2.696	1,41
18.	Fluvisols	7.073	3,70
19.	Podzols	1.416	0,74
20.	Settlement, water body, etc	5.095	2,66
Total		191.358	100,00

Note: Indonesia has an area of 191 million hectares, consisting of 17,000 islands. Based on WRB, Indonesia consists of 19 RSGs, and 3 of them have the widest distribution, which is Cambisols (41.70%), Acrisols (14,14%) and Gleysols (10.28%).

LEGEND OF INDONESIAN SOIL ATLAS OF ASIA

Acrisols		CMhu	Eutric Cambisols (Humic)	GLhu	Reductigleyic Dystric Gleysols (Humic)	Nitisols	
ACcr	Chromic Acrisols	CMle	Leptic Cambisols	GLoy	Oxygleyic Eutric Gleysols	NTal	Allic Nitisols
ACfl	Ferralic Acrisols	CMro	Rhodic Cambisols	GLoy	Oxygleyic Gleysols	NTro	Rhodic Nitisols
ACgl	Gleyic Acrisols	CMvi	Vitric Eutric Cambisols	GLpl	Plinthic Gleysols	Phaeozems	
ACha	Haplic Acrisols	CMvr	Vertic Cambisols	GLry	Reductigleyic Dystric Gleysols	PHch	Chernic Phaeozems
AChu	Humic Acrisols	Chernozems		GLsz	Eutric Gleysols (Salic)	PHgl	Vertic Phaeozems (Gleic)
ACle	Leptic Acrisols	CHha	Haplic Chernozems	GLti	Thionic Gleysols	PHha	Haplic Phaeozems
ACpl	Plinthic Acrisols	CHle	Leptic Chernozems	GLum	Umbric Dystric Gleysols	PHle	Leptic Phaeozems
ACro	Rhodic Acrisols	Durisols		GLvr	Eutric Gleysols (Vertic)	PHlv	Luvic Phaeozems
ACfr	Ferralic Acrisols	DUdy	Dystric Durisols		Oxygleyic Gleysols (Vertic)	PHph	Luvic Phaeozems (Pachic)
Andosols		Ferralsols		Histosols		PHvr	Vertic Phaeozems
ANdu	Duric Andosols	FRac	Acric Ferralsols	HSfi	Fibric Histosols	Plinthosols	
ANdy	Dystric Andosols	FRdy	Rhodic Ferralsols (Dystric)	HShm	Hemic Histosols	PTac	Haplic Plinthosols (Acric)
ANeu	Eutric Andosols	FReu	Rhodic Ferralsols (Eutric)	HSji	Hemic Histosols (Hyperthionic)	PTpa	Pisoplinthic Plinthosols
ANgl	Gleyic Andosols	FRha	Haplic Ferralsols	HSsa	Sapric Histosols	Podzols	
Anha	Haplic Andosols	FRhu	Humic Ferralsols	HSsf	Hemic Histosols (Sulfidic)	PZfg	Ortsteinic Podzols (Fragic)
ANle	Leptic Andosols	FRlx	Lixic Ferralsols		Sapric Histosols (Sulfidic)	PZgl	Gleyic Podzols
ANle	Leptic Andosols	FRpl	Plinthic Ferralsols	HSti	Thionic Hemic Histosols	PZhi	Histic Podzols
ANmo	Mollic Andosols	FRpp	Petroplinthic Ferralsols		Thionic Sapric Histosols	PZos	Ortsteinic Podzols
ANum	Umbric Andosols	FRro	Rhodic Ferralsols	HStr	Hemic Histosols (Terric)	PZpi	Gleyic Podzols (Placic)
Anvi	Vitric Andosols	FRxa	Xanthic Ferralsols	HSwg	Hypohionic Hemic Histosols	PZum	Umbric Podzols
Arenosols		Fluvisols		HSwi	Hypothionic Hemic Histosols (Terric)	Regosols	
ARdy	Dystric Arenosols	FLax	Gleyic Eutric Fluvisols (Alcalic)		Hypothionic Sapric Histosols (Terric)	RGdy	Dystric Regosols
AReu	Eutric Arenosols	FLdy	Dystric Fluvisols	Leptosols		RGeu	Eutric Regosols
ARgl	Gleyic Arenosols	FLeu	Eutric Fluvisols	LPLi	Lithic Leptosols	RGgl	Gleyic Regosols
ARhu	Dystric Arenosols (Humic)	FLgl	Gleyic Fluvisols	Lixisols		RGle	Leptic Regosols
ARle	Leptic Arenosols	FLhi	Histic Fluvisols	LXcr	Chromic Lixisols	RGtf	Tephric Regosols
ARso	Sodic Arenosols	FLhu	Gleyic Fluvisols (Humic)	LXha	Haplic Lixisols	Vertisols	
Cambisols		FLsf	Gleyic Dystric Fluvisols (Sulfidic)	LXhu	Humic Lixisols	VRcr	Chromic Vertisols
CMan	Andic Cambisols	FLgl	Histic Gleyic Fluvisols (Sulfidic)	LXro	Rhodic Lixisols	VRha	Haplic Vertisols
CMar	Dystric Cambisols (Arenic)	FLgl	Gleyic Sodic Fluvisols	Luisols		VRgl	Chromic Vertisols (Gleyic)
CMcr	Chromic Cambisol	FLti	Thionic Fluvisols	LVan	Chromic Luisols (Andic)	VRpe	Pellic Vertisols (Gleyic)
CMdy	Dystric Cambisols	Gleysols		LVcr	Chromic Luisols		
CMeu	Eutric Cambisols	GLdy	Dystric Gleysols	LVgl	Gleyic Luisols		
CMfr	Ferralic Cambisols	GLEu	Eutric Gleysols	LVha	Haplic Luisols		
CMfv	Fluvic Cambisols	GLfc	Dystric Gleysols (Fractic)	LVle	Leptic Luisols		
CMgl	Gleyic Cambisols	GLfv	Fluvic Gleysols	LVro	Rhodic Luisols		
CMhi	Histic Cambisols	GLhi	Histic Gleysols	LVvr	Vertic Luisols		

INDONESIAN SECTION OF THE SOIL ATLAS OF ASIA



Note: Indonesia has an area of 191 million ha, consisting of 17,000 islands. Based on WRB, Indonesia consists of 19 RSGs, and 3 of them have the widest distribution, namely Cambisols (41.70%), Acrisols (14,14%) and Gleysols (10.28%).

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II. Are National Soil Information Systems useful?

- **NSISs is useful for students, researchers, and academicians**
- **Ministry of Agriculture**
- **Policy makers at local, regency, province and national levels**
- **Other departments:**
 - Ministry of Coordinating for Maritime Affairs and Investment,
 - Ministry of Coordinating for Economy
 - Ministry of environment and forestry,
 - Ministry of National Development Planning/Bappenas,
 - Ministry of Agrarian Affairs and Spatial Planning/ National Agency for Land and spatial planning)
 - Etc.



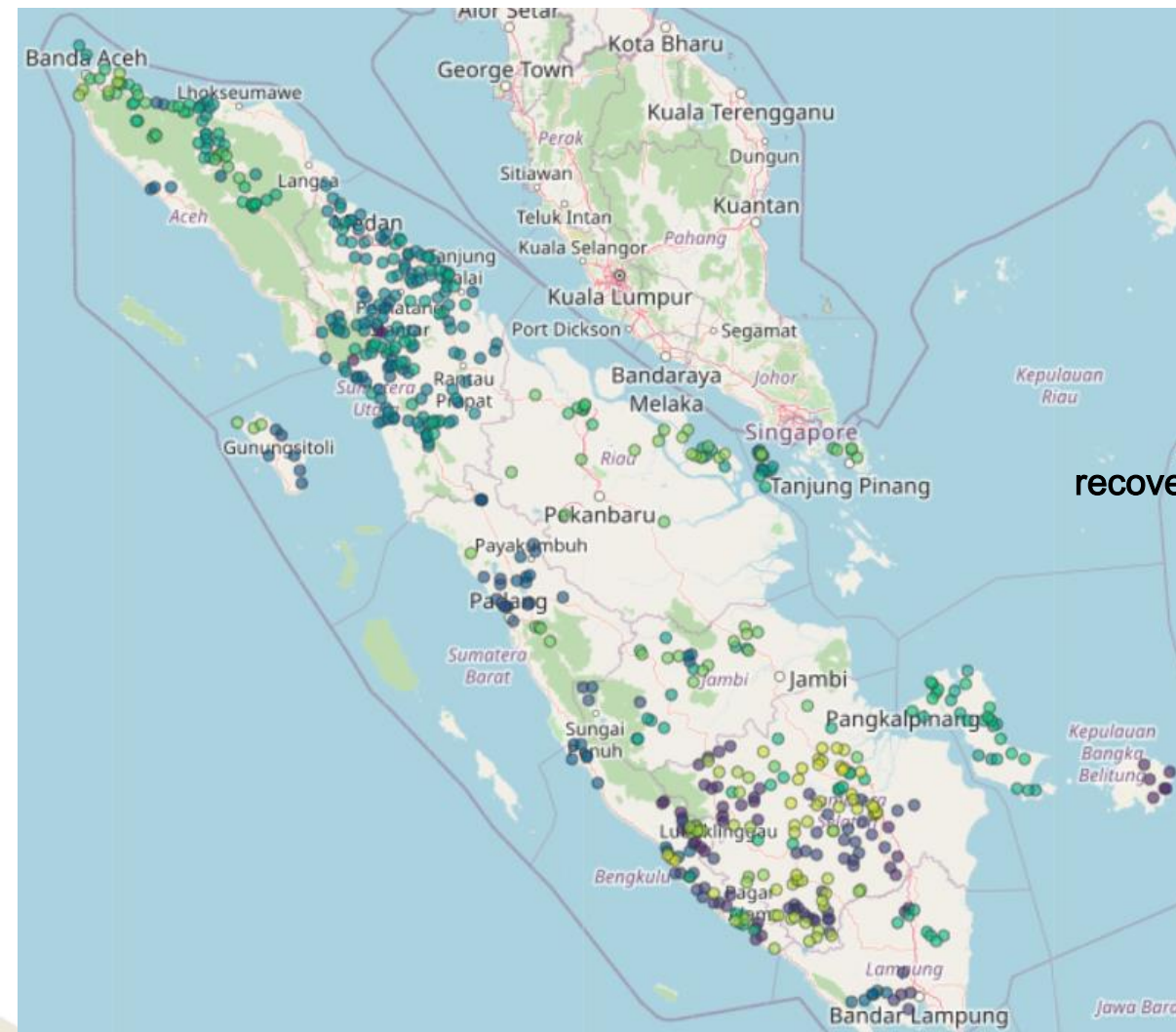
III. Practical impact of Indonesian Soil Information Systems

- **Source of soil information in relation to soil productivity and ecosystem functions**
- **The information has positive impacts in assessment of land suitability for strategic national commodities**
- **Soil property maps give the guide to determine targeted areas for allocation of fertilizer subsidy, conservation, and rehabilitation**
- **Soil maps as a basis for policy makers to prepare spatial planning for various usages at Regency, Province and National levels**

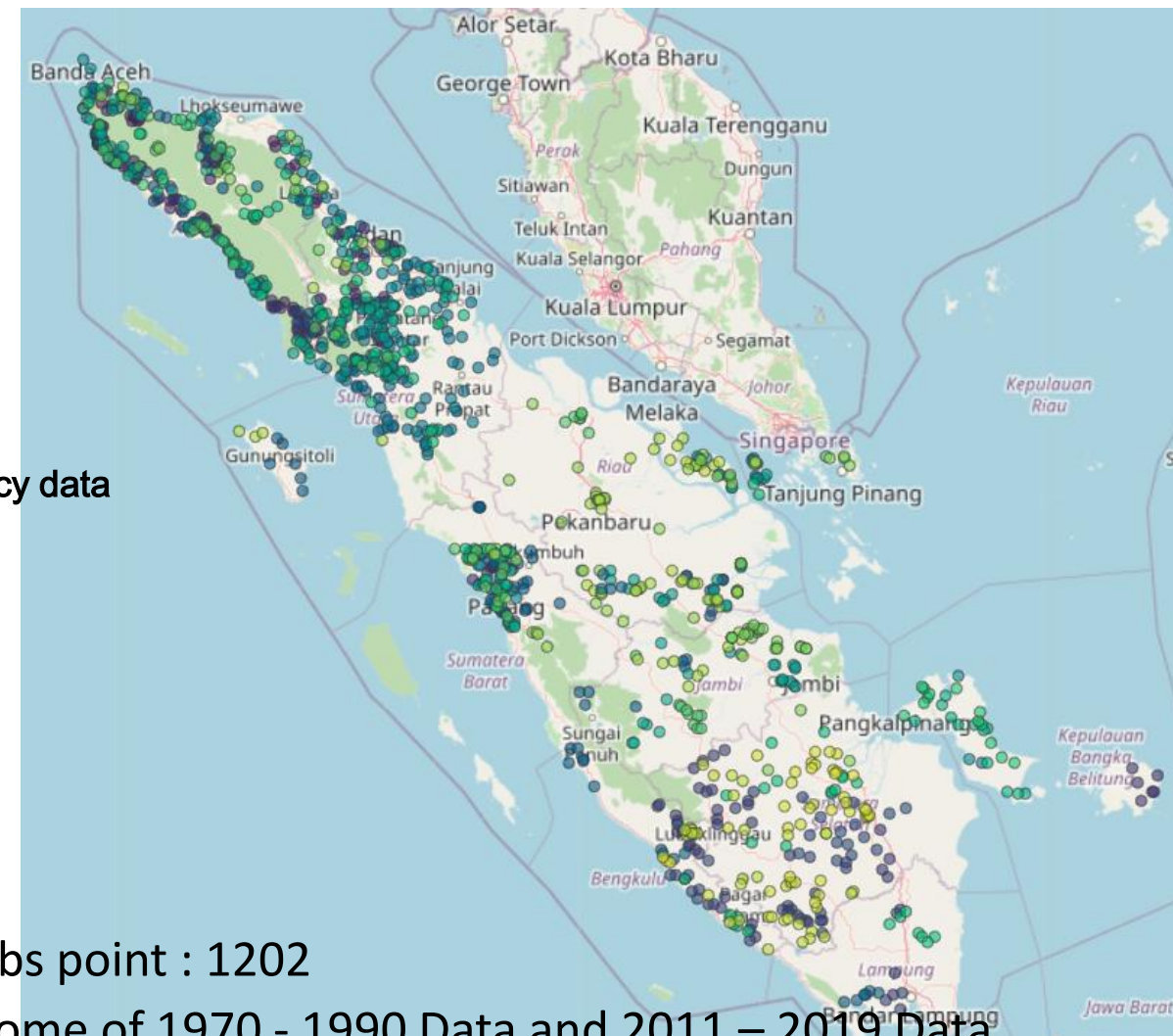
IV. steps have been made to strengthen the NSIS of Indonesia

- **Updating soil legacy data and is still ongoing**
- **Production of soil organic carbon (SOC) map**
- **Production of Soil properties Maps:**
e.g. National soil pH, CEC, and clay content.
- **Development of database of soil mineralogical constituents (primary minerals/sand fraction and secondary minerals/clay fraction)**
- **Capacity building :**
 - Soil survey and mapping
 - training for soil organic C sequestration potential (GSOCseq)
- **Addition of new soil profiles to database**

Example of updating of legacy soil data points/profiles



recovery legacy data



- obs point : 592
- 2016 – 2019 Data
- r^2 for soil organic carbon map: 10%

- obs point : 1202
- Some of 1970 - 1990 Data and 2011 – 2019 Data
- r^2 for soil organic carbon map: 42%

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V. What is missing?

Required information for sustainable soil management but is absence in the soil map

- Landform/topographic/slope (e.g. Plain, undulating, rolling, hilly etc)
- Soil parent materials
- Elevation
- The scale is too small (e.g. 1:3 000 000 for global soil map), led to limited implementation



What is still missing

Erosion threat VS conservation practices on **Andosols**



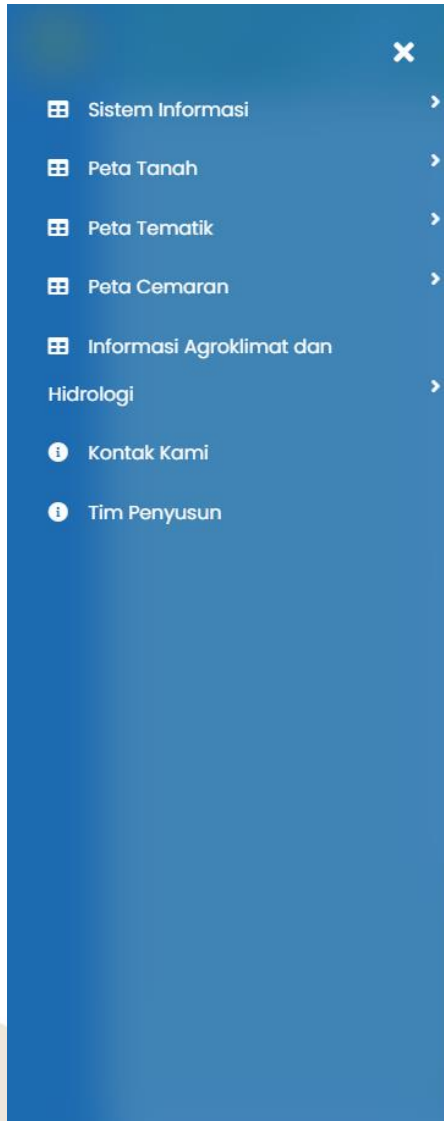
Required information for sustainable soil management, which is not available in digital soil map. We know eg. Dystric Andosol, but not for its environment (landform/slope, parent materials, elevation)

VI. Way forward

- Addition of new soil profile database to strengthen Indonesian National soil information system
- Enrichment of database of soil mineralogical constituents in Indonesia
- Harmonization of Soil Atlas of Indonesia using three soil classification systems (USDA, WRB/FAO, National system) at 1:250.000, which was developed from 1:50.000
- Develop soil map at national soil partnership, regency soil partnership to support implementation of SSM, improved soil productivity associated with ecosystem functions/services
- Soil suitability maps for various crops as basis to promote sustainable soil management
- Peatland maps associated to land use and their protection
- Thematic Maps of soil landform/sloping, elevation, and parent materials
- Website development of national soil information system
- Expected financial support from AFACI to be extended for another two years to allow full development of Indonesian soil information system.

INA SOIL AGRO

<http://awr.litbang.pertanian.go.id/>



Menu :

- Information System (Siscrop, Crop Calendar)
- Soil Map
- Thematic Map

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Soil Map

Sistem Informasi

Peta Tanah

- Peta Tanah Skala 1:50.000
- Peta Tanah Skala 1:250.000
- Peta Tanah Skala 1:1.000.000

Titik Observasi

Peta Tematik

Peta Cemar

Informasi Agroklimat dan Hidrologi

Kontak Kami

Tim Penyusun

PROVINSI RIAU
KABKOTA INDRAGIRI HILIR
Link ke: [Peta Tanah 50K](#)

Thematic Map

Sistem Informasi

Peta Tanah

- Peta Tanah Skala 1:50.000
- Peta Tanah Skala 1:250.000
- Peta Tanah Skala 1:1.000.000

Titik Observasi

Peta Tematik

- Peta Jenis Sawah
- Peta Status Hara P
- Peta Status Hara K
- Peta Rekomendasi Pup
- Peta Lahan Gambut
- Peta Lahan Rawa
- Peta Rawan Longsor

Contamination Map

Peta Cemar Logam Berat

- Peta Cemar Besi (Fe)
- Peta Cemar Arsen (As)
- Peta Cemar Nikel (Ni)
- Peta Cemar Seng (Zn)

Legenda

- Normal: (100-500 ppm)
- Normal-Toxic: (4.8-100 ppm)
- Toxic: (>500 ppm)





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