



Food and Agriculture  
Organization of the  
United Nations

# Asian Soil Partnership (ASP)

*Seventh Asian Soil Partnership Meeting*  
*9 and 10 March 2022*  
*from 7AM to 10AM CET (Rome time)*  
*Virtual meeting*

## National updates on soil

Country: **Sri Lanka**

Presenter: **Dr. Ajantha de Silva/ Harsha Kadupitiya**



GLOBAL SOIL  
PARTNERSHIP

# National update on Soil – Sri Lanka..

- Soil Test based fertilizer recommendation program
- Development of GN (Village level) Fertilizer recommendation for paddy cultivation covering whole Sri Lanka
- Soil assessment & Mapping
  - Preparation of Gridded digital soil properties and threats
  - SOC, pH, EC, (baseline completed) updating continuing
  - Soil erosion, salinity, flood zone mapping
  - Island wide rice soil testing program (90000) whole country
    - - All parameters, top soil, Soil analysis completed & mapping to be started
  - Conversion of local soil classification to WRB system and mapping
- Land degradation assessment
  - LADA WOCAT SLM Approach – Kandy, Nuwara Eliya & Badulla Districts completed
  - Pilot scale (Ampara District) Soil Salinity mapping through Proximal and satellite base RS for remedial interventions

# National update on Soil – Sri Lanka

- Soil conservation program
  - Watershed based SLM covering sensitive area of central highland
  - Establishment of multi-purpose soil buds in dry zone agriculture lands
  - Establishment of SLM demonstration sites and model farms
- Promotion of climate smart technologies in dry zone agriculture
  - Rain water harvesting
  - Water saving technologies
  - Weather forecast based – agro advisories
  - Issue alerts on sudden extreme weather events

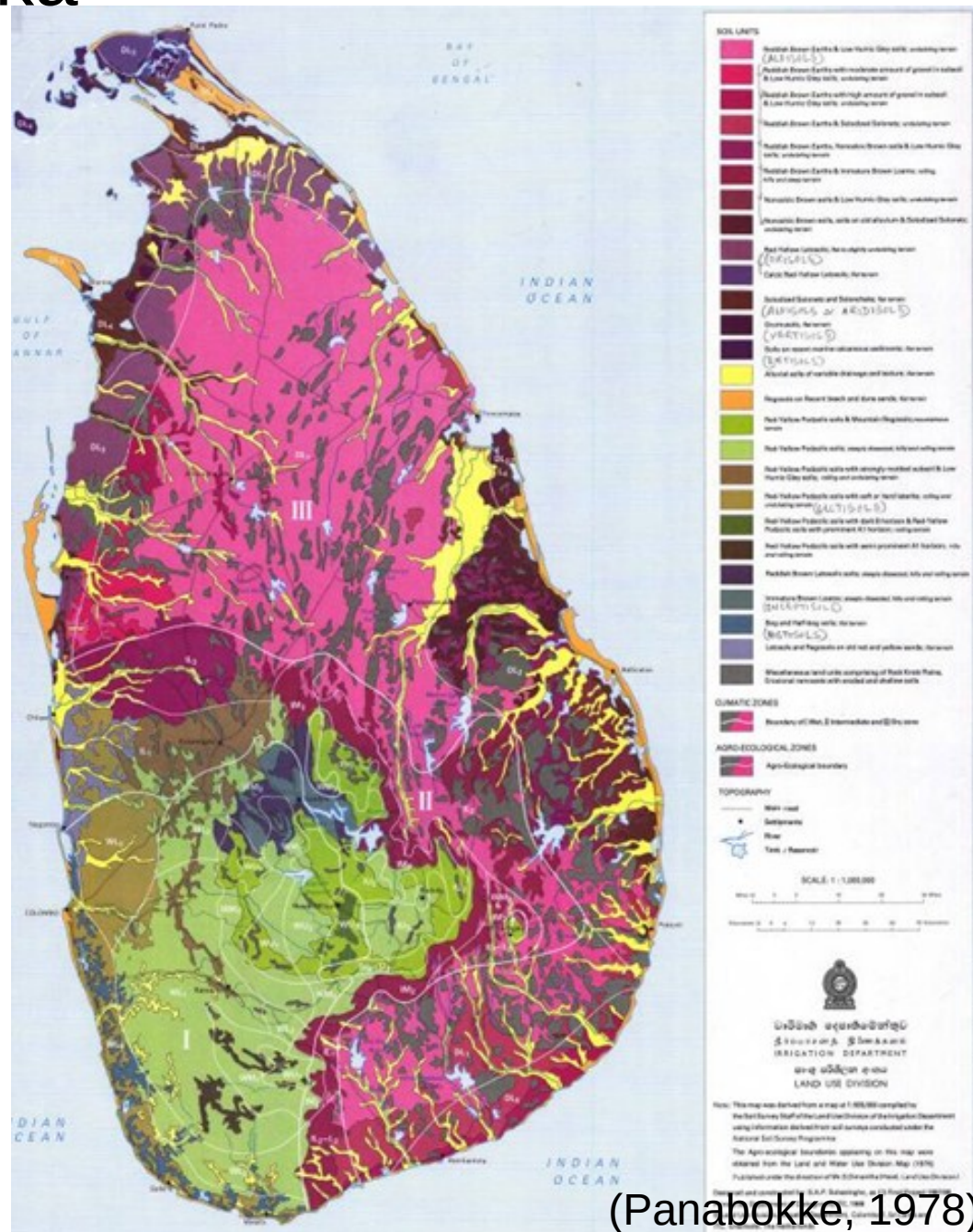
# National update on Soil – Sri Lanka

- Eco-friendly agriculture
  - Promotion of compost and organic fertilizer
  - Establish and implement quality control system for organic and bio-fertilizers
  - Promote eco-friendly nonchemical agriculture practice

# Soil map of Sri Lanka

■ National/ local classification system

■ 31 soil classes

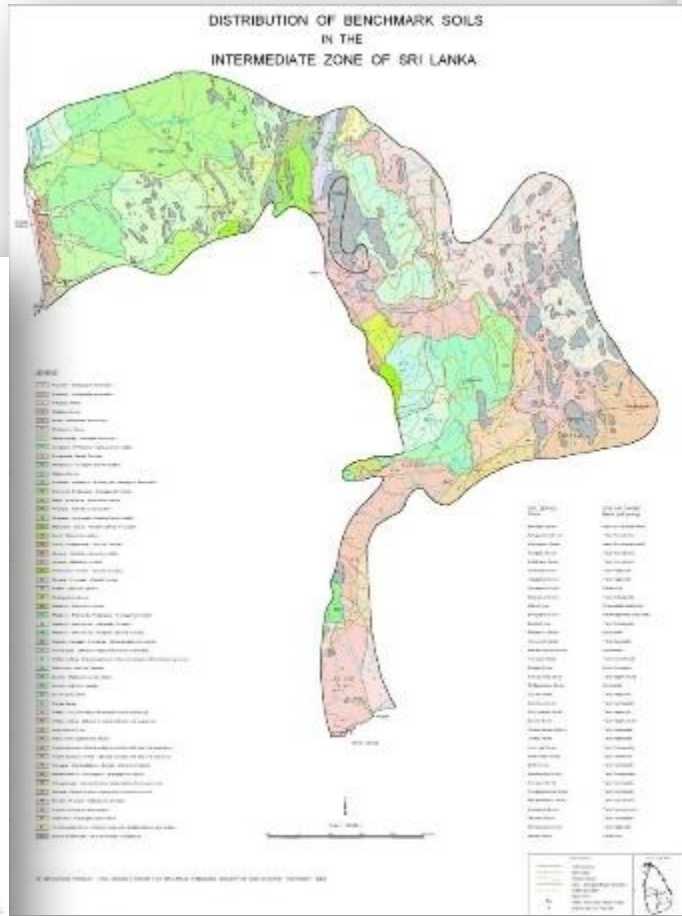
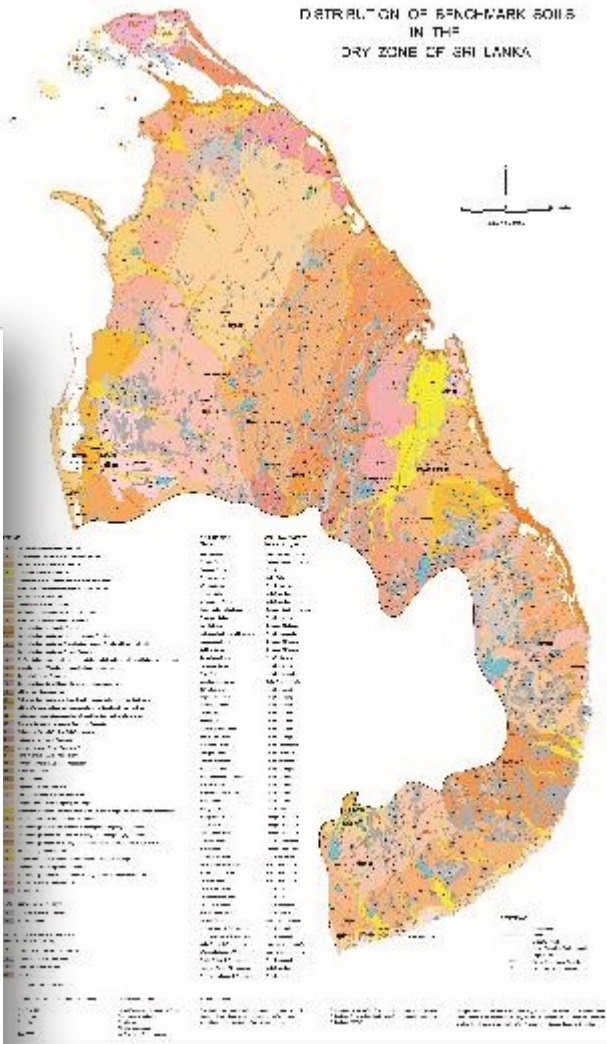


(Panabokke, 1978)

# Series level soil map of Sri Lanka

## Intermediate zone

## Wet zone



## Dry zone

SRICANSOL PROJECT  
SOIL SCIENCE SOCIETY OF SRI LANKA

FACT SHEET NO: 01

Soils of the Dry Zone

Benchmark Site No: DZPU 06 – TONIGALA Series

SITE DESCRIPTION

LOCATION	: Lat: 8 <sup>o</sup> 03" Lon: 79 <sup>o</sup> 59"; 315.65 km N, 112.4 km E; Near 5 <sup>th</sup> km, post Karuwalagaswewa-Nawagattagama Road; Puttalam 1: 50000 scale topographic sheet.
ELEVATION	: Approximately 30 meters above mean sea level
LANDFORM	: Undulating
DRAINAGE	: Well drained
PARENT MATERIAL	: Derived from biotite gneisses and feldspathic gneisses (Tonigala granites)
LAND USE	: Shrub jungle, homestead gardens
AGRO-ECOLOGICAL REGION	: Dry Zone – Low Country (DL3)
CLASSIFICATION	
SRI LANKA	: Reddish Brown Earths
SOIL TAXONOMY	: Typic Ustrothents
FAO	: Eutric Cambisols



SOIL PROFILE DESCRIPTION

This is well drained moderately shallow to moderately deep soil derived from feldspar and quartz rich decomposing parent material. Occurrence of the soil is confined to crest and upper slopes of the undulating plain around, Karuwalagaswewa-Anamaduwa area. Texture of the soil is gravelly sandy clay loam. Structure of the sub surface soil is weakly developed subangular blocky. Colour of the soil varies from brown to reddish brown with increasing depth.

**Ap 0 –25 cm.** Brown (7.5YR 4/6) moist; gravelly sandy clay loam; weak to moderate, fine to medium subangular blocky; 20-25% (v/v) very fine quartz gravel; non sticky and non plastic wet, friable moist; common, very fine pores; common very fine and fine rocks; clear smooth boundary.

**B1 25-55 cm.** Reddish brown (5YR 4/4) moist; gravelly, sandy clay loam; weak, fine subangular blocky; non sticky and non plastic wet, very friable moist, common very fine, few fine pores; about 30-35% (v/v) decomposing feldspathic gravel; common fine, few fine roots; clear smooth boundary.

**BC 55-105 cm.** Yellowish red (5YR 4/6) moist; structureless; common fine pores; about 50% (v/v) decomposing feldspathic gravel with hornblend and micaceous minerals; common ferrow-manganese stains; few fine roots.



TONIGALA SERIES DZPU – 06

SOIL PHYSICAL PROPERTIES

Horizon Depth (cm)	Sand (%)					Total Sand (%)	Silt (%)	Clay (%)	Bulk Density (Mg m <sup>-3</sup> )
	Very Coarse	Coarse	Medium	Fine	Very Fine				
0 – 25	11	19	17	16	14	76	12	12	1.73
25 – 55	9	21	17	14	11	73	12	15	1.47
55 – 105	12	24	19	15	11	80	10	10	1.53

Horizon Depth (cm)	Dry Aggregate Stability		Wet Aggregates % Remaining >15min	Soil Moisture Retention % (m <sup>3</sup> m <sup>-3</sup> )			Sat. Hydraulic Conductivity (cm h <sup>-1</sup> )
	Mean wt. Dia. (mm)	Log SD		0.1 bar	0.33 bar	15 bar	
0 – 25	0.85	ND	17	26.9	24.2	13.7	1.7
25 – 55	ND <sup>+</sup>	ND <sup>+</sup>	ND <sup>+</sup>	11.3	10.2	7.0	1.3
55 – 105	ND <sup>+</sup>	ND <sup>+</sup>	ND <sup>+</sup>	9.7	8.8	5.4	6.7

SOIL CHEMICAL PROPERTIES

Horizon Depth (cm)	pH			EC (mS cm <sup>-1</sup> )	CEC* (cmol. kg <sup>-1</sup> )	Exchangeable Bases * (cmol. kg <sup>-1</sup> )				Base Sat.* (%)	Organic Carbon (%)	P <sub>2</sub> O <sub>5</sub> (ppm)	Total N (%)
	H <sub>2</sub> O		KCl			Ca <sup>+2</sup>	Mg <sup>+2</sup>	K <sup>+</sup>	Na <sup>+</sup>				
	1:1	1:2.5	1:2.5										
0 – 25	5.7	5.8	5.4	0.38	6.8	3.02	1.27	0.50	0.98	85	0.44	7.0	0.076
25 – 55	6.1	6.4	5.4	0.20	11.4	4.86	1.67	0.22	0.75	66	0.30	5.5	
55 – 105	6.0	6.4	5.4	0.32	10.4	5.19	1.36	0.19	0.87	73	0.23	6.5	

Prepared by: A.R. Dassanayake, G.G.R. de Silva, R.B. Mapa & D. Kumaragamage, Soil Science Society of Sri Lanka, 2005.

\*In NaOAc at pH 7; ND - Not Determined / Not Applicable (sandy / poorly drained soil)

<sup>+</sup> Containing high amount of gravel. Aggregate stability cannot be determined.

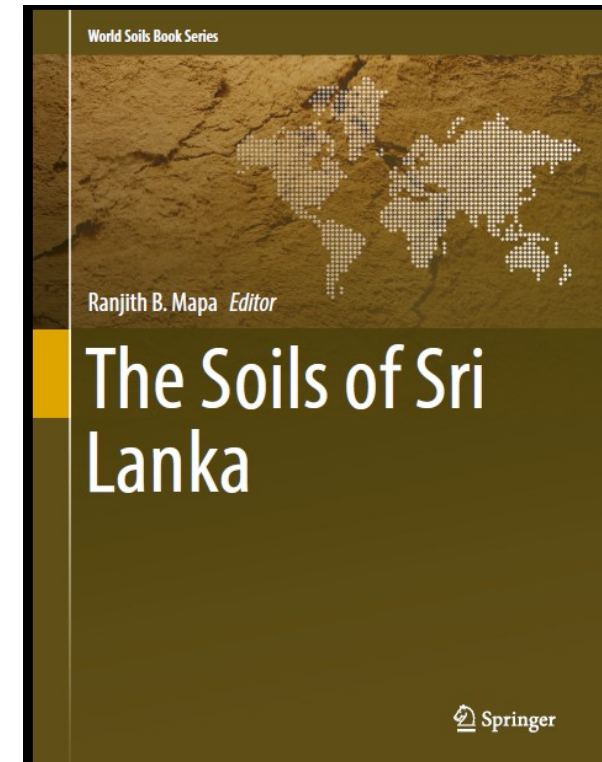


# Converting Local Soil Units to WRB

- The WRB Legend for all mapping units has been published in *The Soils of Sri Lanka (2020)* by R.B. Mapa *et al* (SSSSL)
- The WRB map will be developed through AFACI Project in collaboration with Prof Mapa (SSSSL), Department of Soil Science, Faculty of Agriculture, Peradeniya University

**Table 5.3** The soil series formed in the five physiographic regions of the coastal plains, Great Soil Groups, and their equivalents of Soil Taxonomic and WRB legends (Dassanayake and De Silva 2010a)

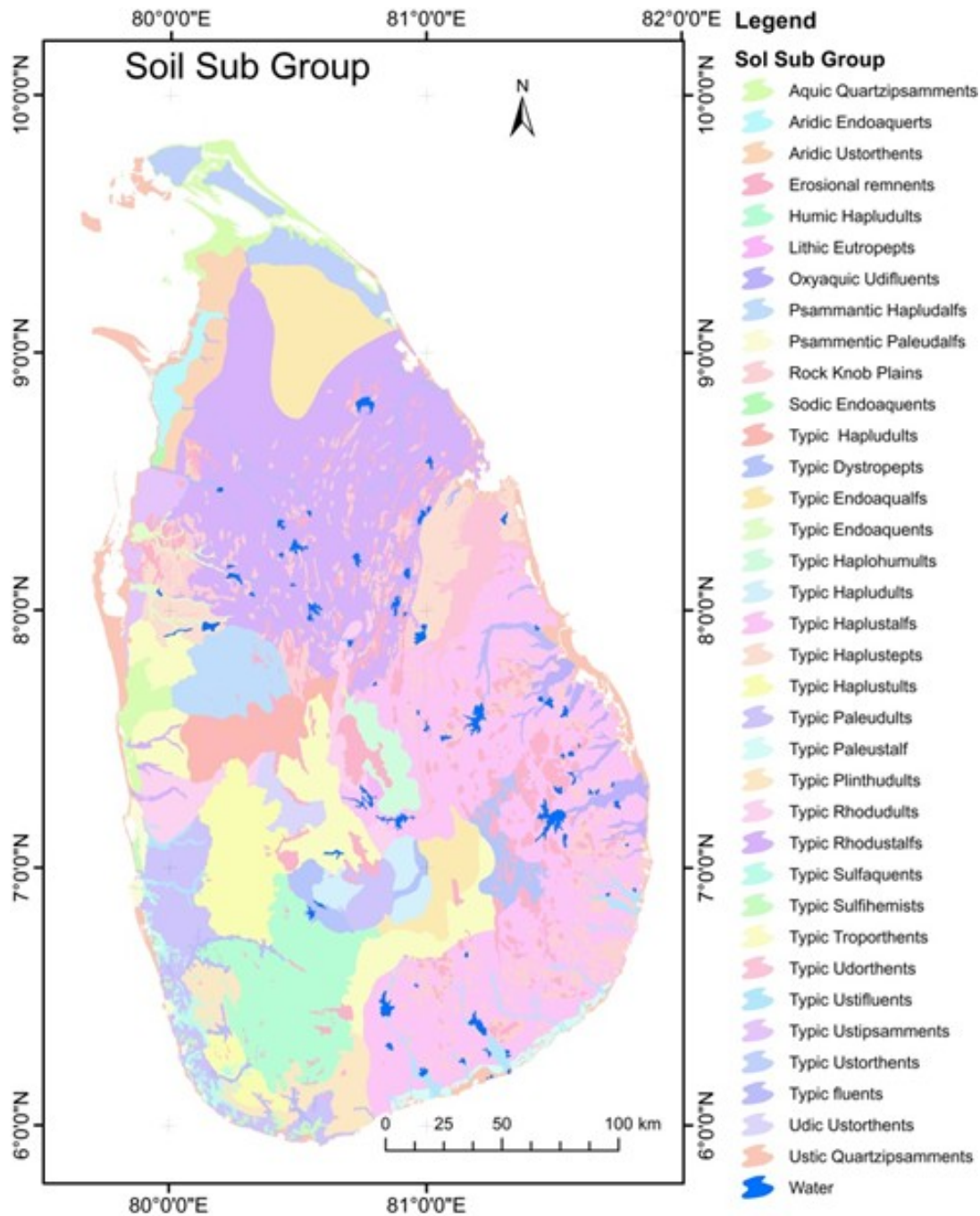
Soil series	Great soil group	Soil taxonomic equivalent	WRB (FAO) legend
<i>Soils in recent sand beach deposits</i>			
Negombo (Dry zone subgroup)	Sandy Regosols	Ustic Quartzipsamments	Haplic Arenosols
<i>Recent sand dunes</i>			
Mirpuri Nilaweli	Sandy Regosols	Typic Quartzipsamments Ustic Quartzipsamments	Haplic Arenosols (Eutric, Greyic) Haplic Arenosols (Calcaric, Eutric)
<i>Lagoon deposits or soils adjacent to lagoons</i>			
Puttalam Siyambala	Solodized Solonetz Solodized Solonetz	Sodic Endoaquents Typic Natraqualfs	Haplic Solonchaks (Sodic) Salic, Gleyic, Solonetz (Oxyaquic)
<i>Older sand deposits of the coastal plain: crest and upper slopes</i>			
Gambura Wilpattu Vallachchani	Red Latasols Red Latasols Sandy Regosols	Typic Ustrothents Typic Ustipsamments Ustic Quartzipsamments	Haplic Arenosols (Eutric) Haplic Arenosols (Eutric) Dystric Regosols
<i>Older sand deposits of the coastal plain: lower slopes</i>			
Mawillu Borupana Illuppaidichenai	Yellow Latasols Yellow latasols Sandy Regosols	Oxiaquic Udorthents Oxiaquic Quartzipsamments Oxiaquic Quartzipsamments	Haplic Arenosols (Eutric) Haplic Arenosols (Eutric, Greyic) Haplic Arenosols (Eutric)



Publication Year 2020  
Springer

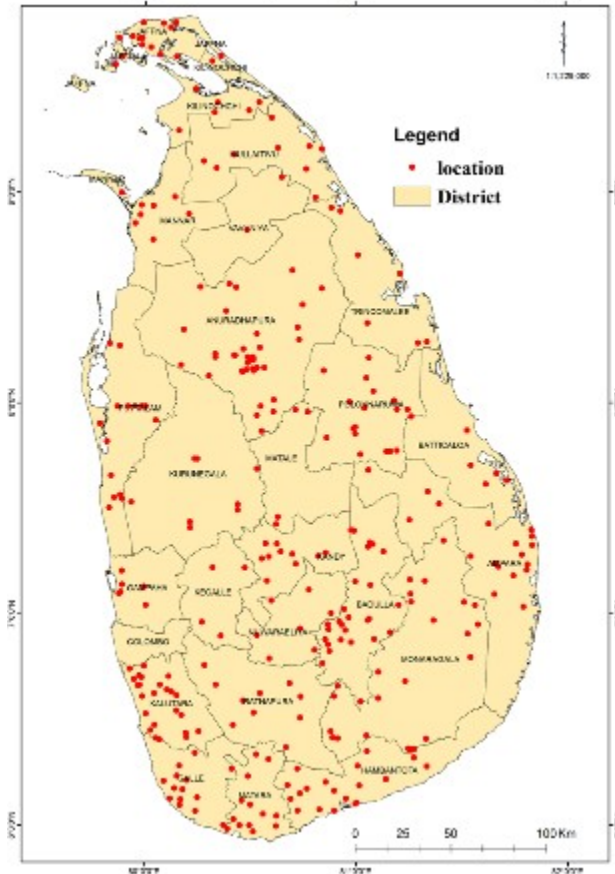
ISSN 2211-1255  
World Soils Book Series  
ISBN 978-3-030-44142-5  
<https://doi.org/10.1007/978-3-030-44144-9>

ISSN 2211-1263 (electronic)  
ISBN 978-3-030-44144-9 (eBook)

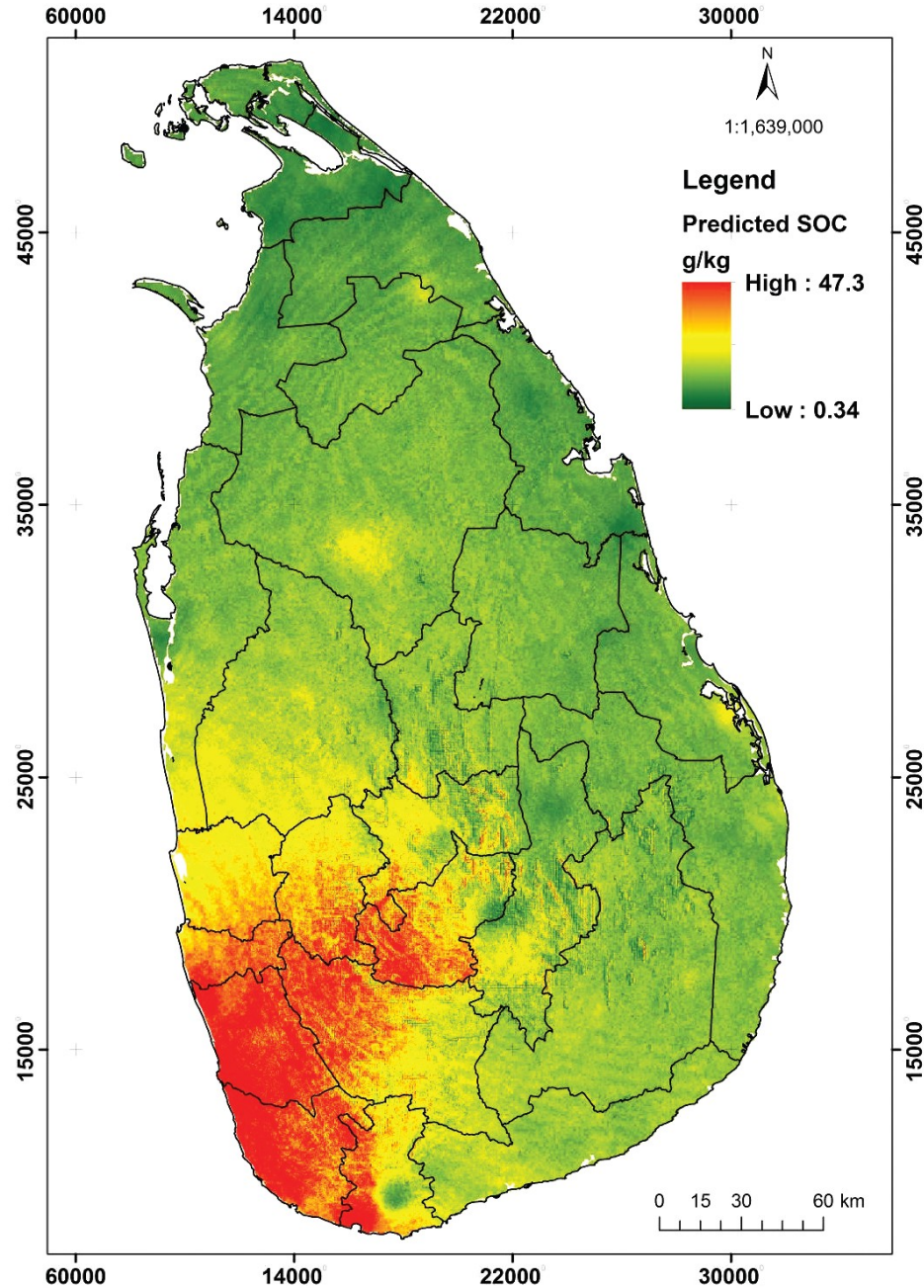


# Soil Organic Carbon map of Sri Lanka

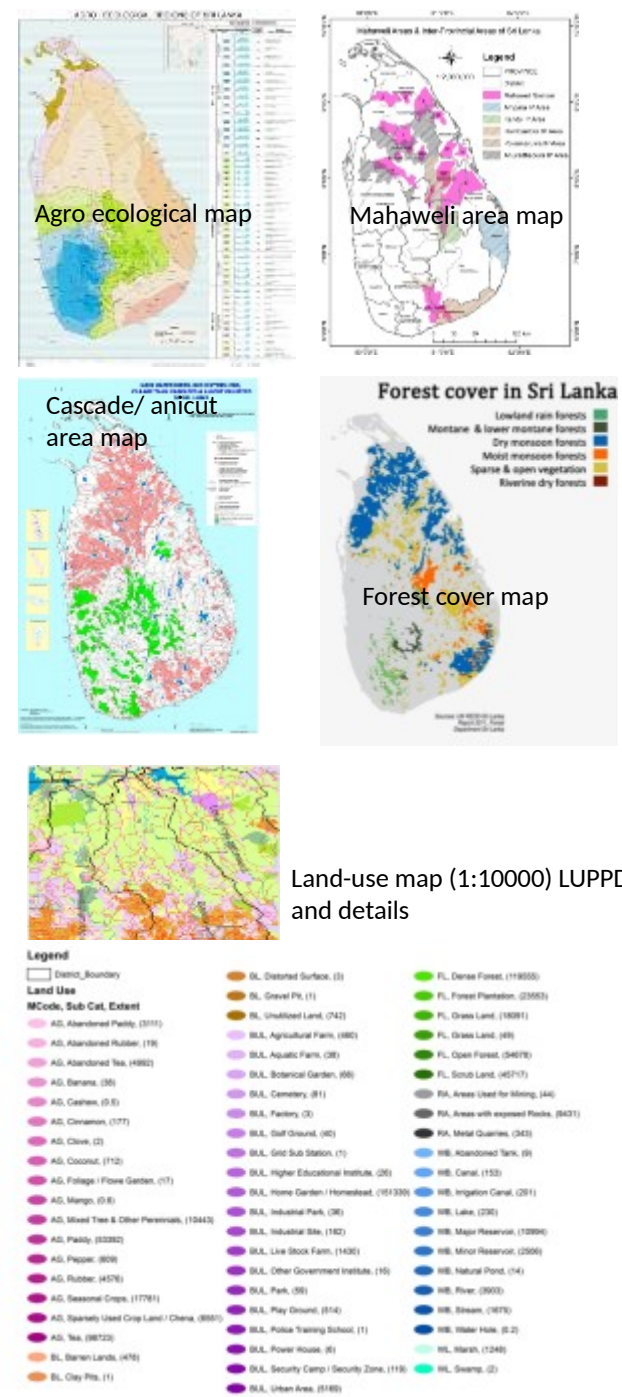
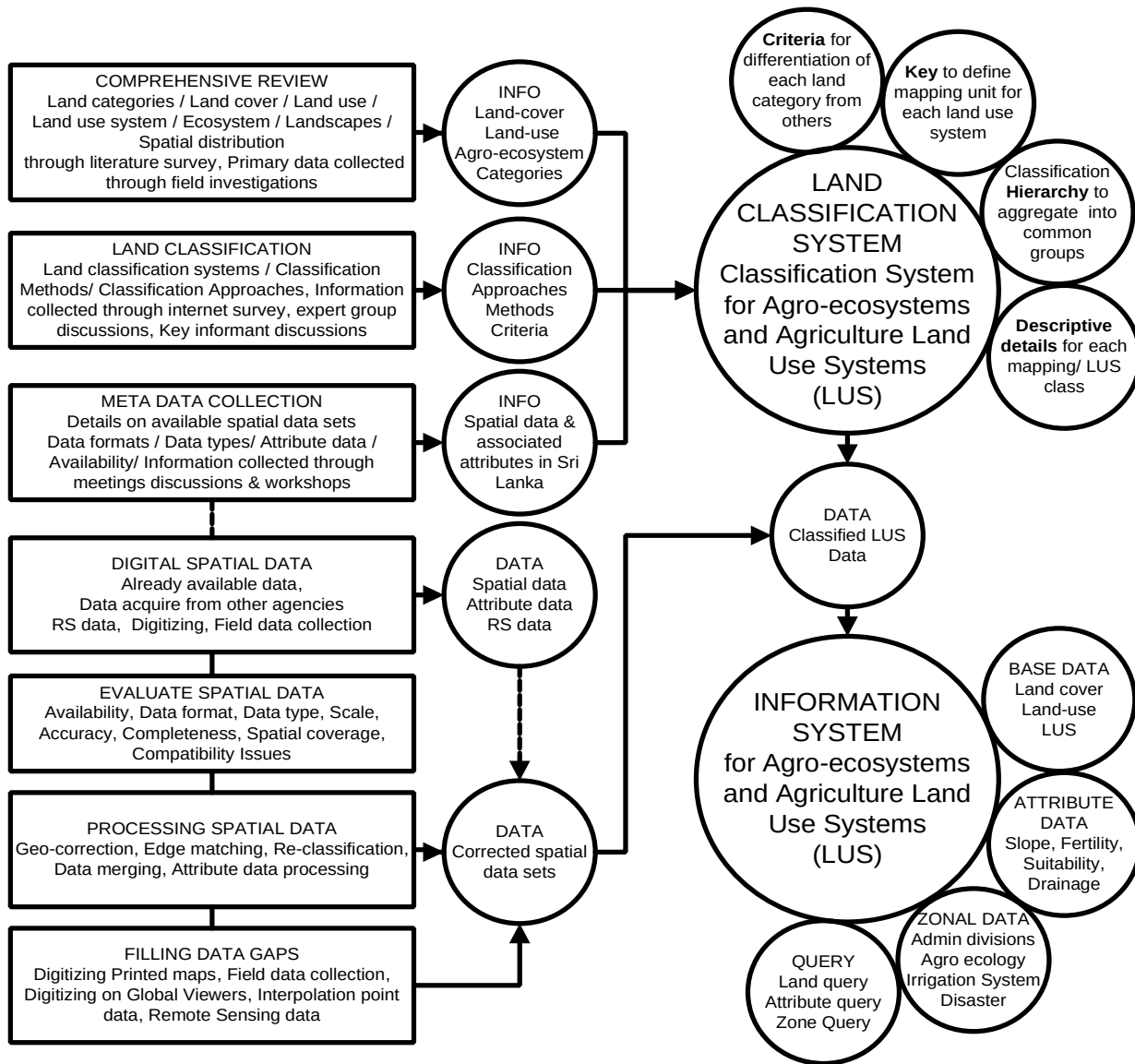
## SOC Point map



## SOC Grid map



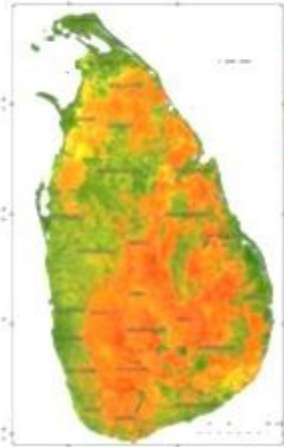
# Methodology - Classification and mapping of agro-ecosystems



# GIS for Erosion mapping

Assessment, characterize and mapping soil erosion hazards

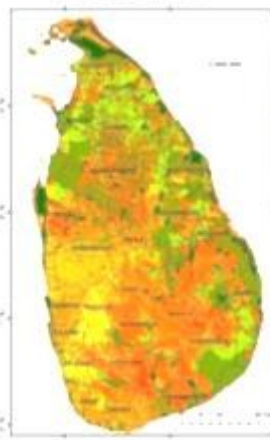
## LADA-WOCAT Approach



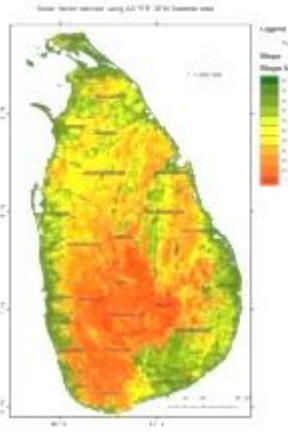
Cover Factor



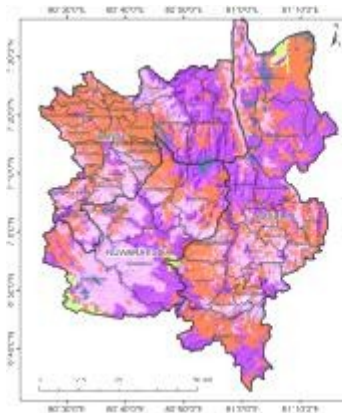
Erodibility



Erosivity



Slope Factor

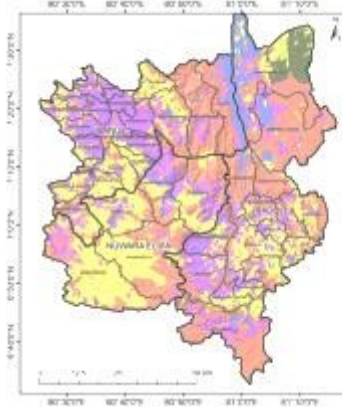


### Most Prominent Degradation

- Loss of topsoil/surface erosion
- Fertility decline and reduced organic matter content
- Reduction of vegetative cover
- No Degradation
- Change in groundwater/aquifer level
- Offsite degradation effects: deposition of sediments, downstream flooding, siltation of reservoirs and waterways, and pollution of water bodies with eroded sediments

DS Divisions

District Boundary

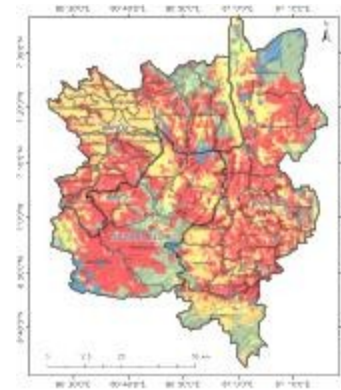


### 3rd Prominent Degradation

- No
- Loss of habitats
- Change in groundwater/aquifer level
- Reduction of the buffering capacity of wetland areas
- Gully erosion/gullying
- Mass movements/landslides

DS Divisions

District Boundary

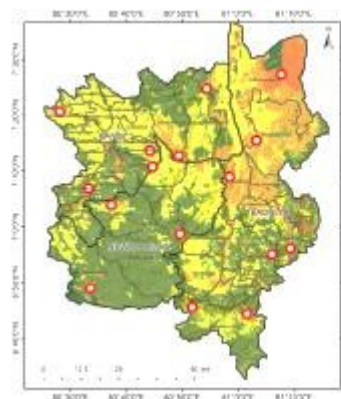


### 2nd Prominent Degradation

- No
- Reduction of vegetative cover
- Loss of habitats
- Increase of pests/diseases, reduction of biological control
- Fertility decline and reduced organic matter content
- Waterlogging
- Riverbank erosion
- Loss of topsoil/surface erosion

DS Divisions

District Boundary



### Degradation Hotspots

(Sum of area \* Deg / Sum of area)

- Extremely low
- Very low
- Moderate
- High
- Very high
- Extremely high

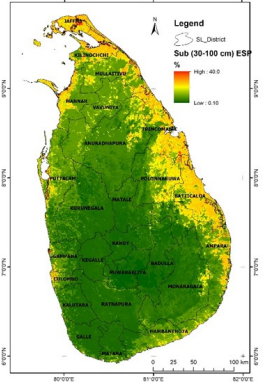
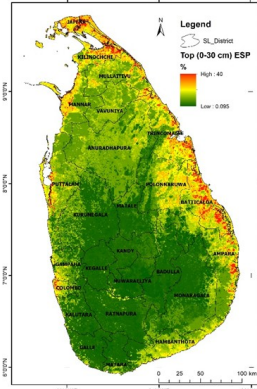
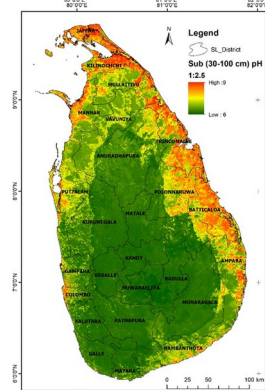
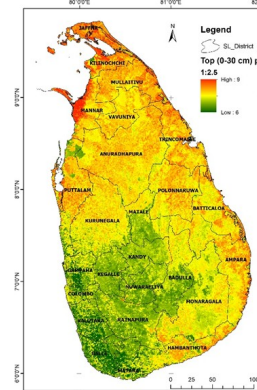
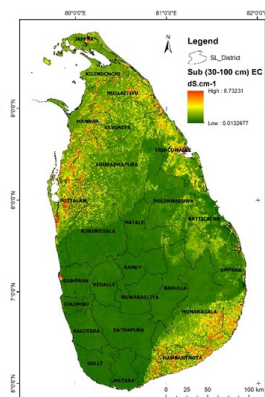
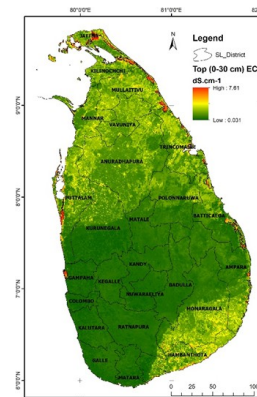
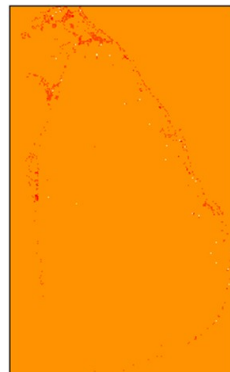
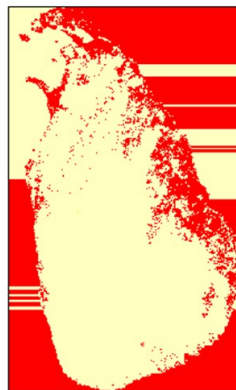
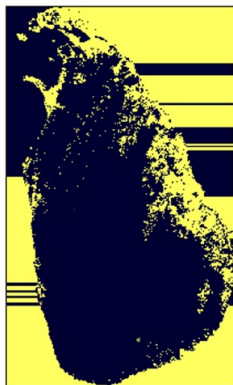
DS Divisions

District Boundary

# Project outputs and outcomes (achievements)

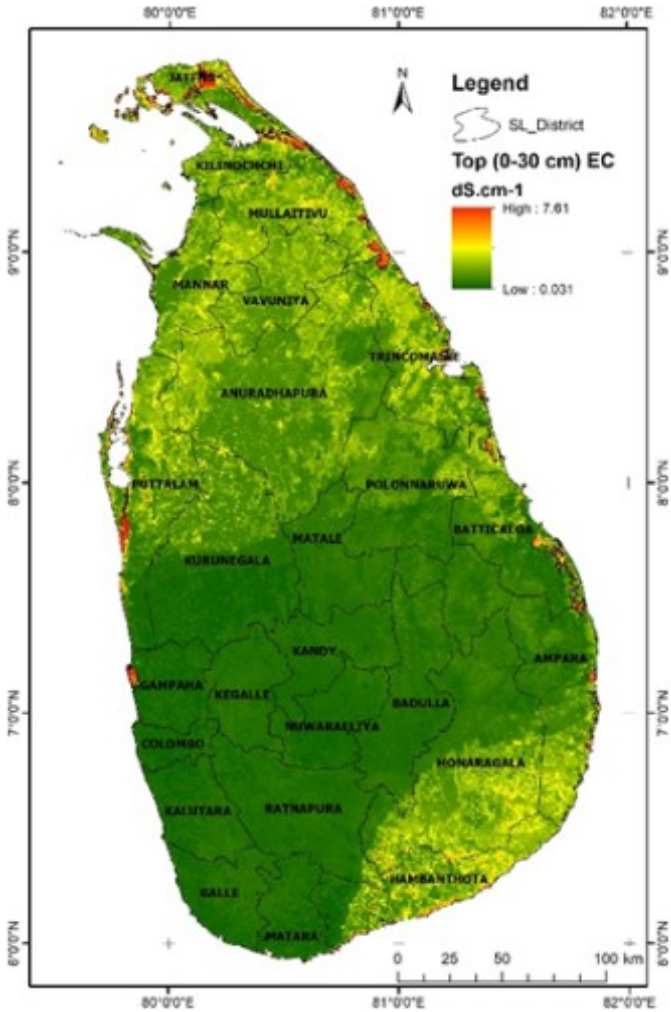
- Salinity mapping

- pH, EC & ESP maps were developed for top soil (0-30cm) and sub soil (30-100cm)
- Salinity maps were developed after the online training session

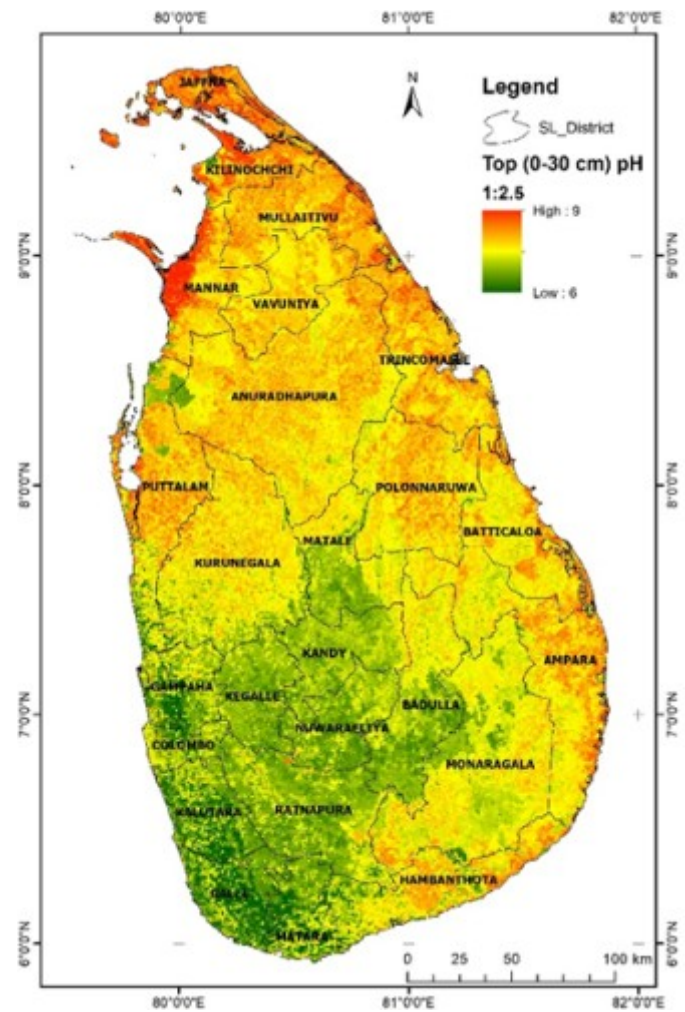


# Gridded Soil Maps

- Electrical Conductivity

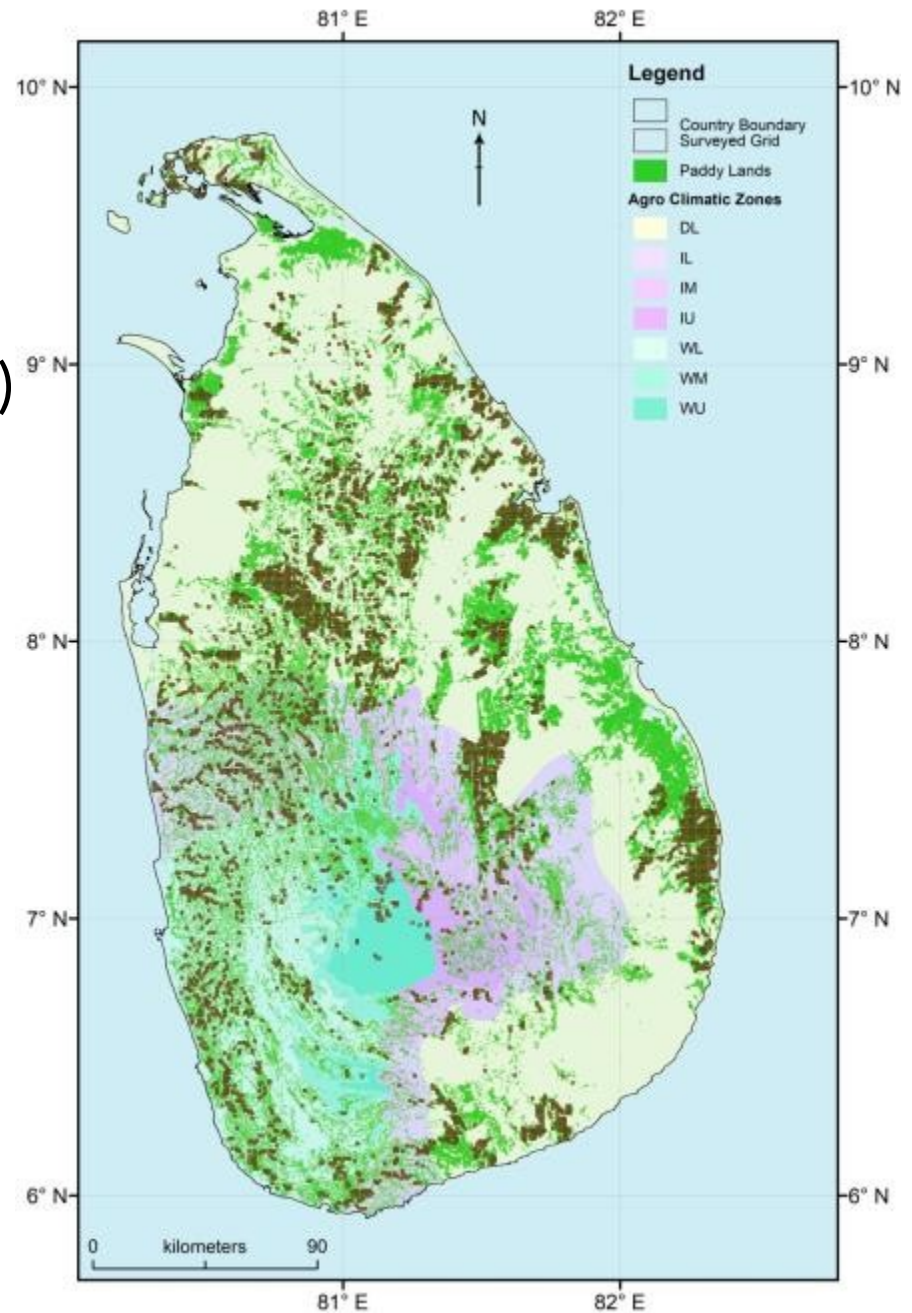


- pH



# Rice soil testing program

- Sampling grid (9000 locations)





# Conducting farmer participatory soil conservation programs & trainings in collaboration with PDOA- Uva, Sabaragamuwa, Central provinces

## Uva Province- Badulla District



Perahattiya

## Uva Province- Monaragala District



Nallagama



Pitadeniya

Training for field officers and farmers at Kudaoya AI Range (Uva province) on 2021-03-31



## Sabaragamuwa Province- Rathnapura District



Palmadulla



Damana

## Sabaragamuwa Province- Kagalle District



Ruwanwella



Aranayaka



Dadigama

## Central Province- Kandy District



Marassana

# Promote rainwater harvesting for agricultural purposes

Micro irrigation



Multi purpose earth bunds



Rainwater harvesting

Percolation pits



Thank you for  
your attention

