Development of a SOC Baseline: Experiences from Otjozondjupa, Namibia

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Themes

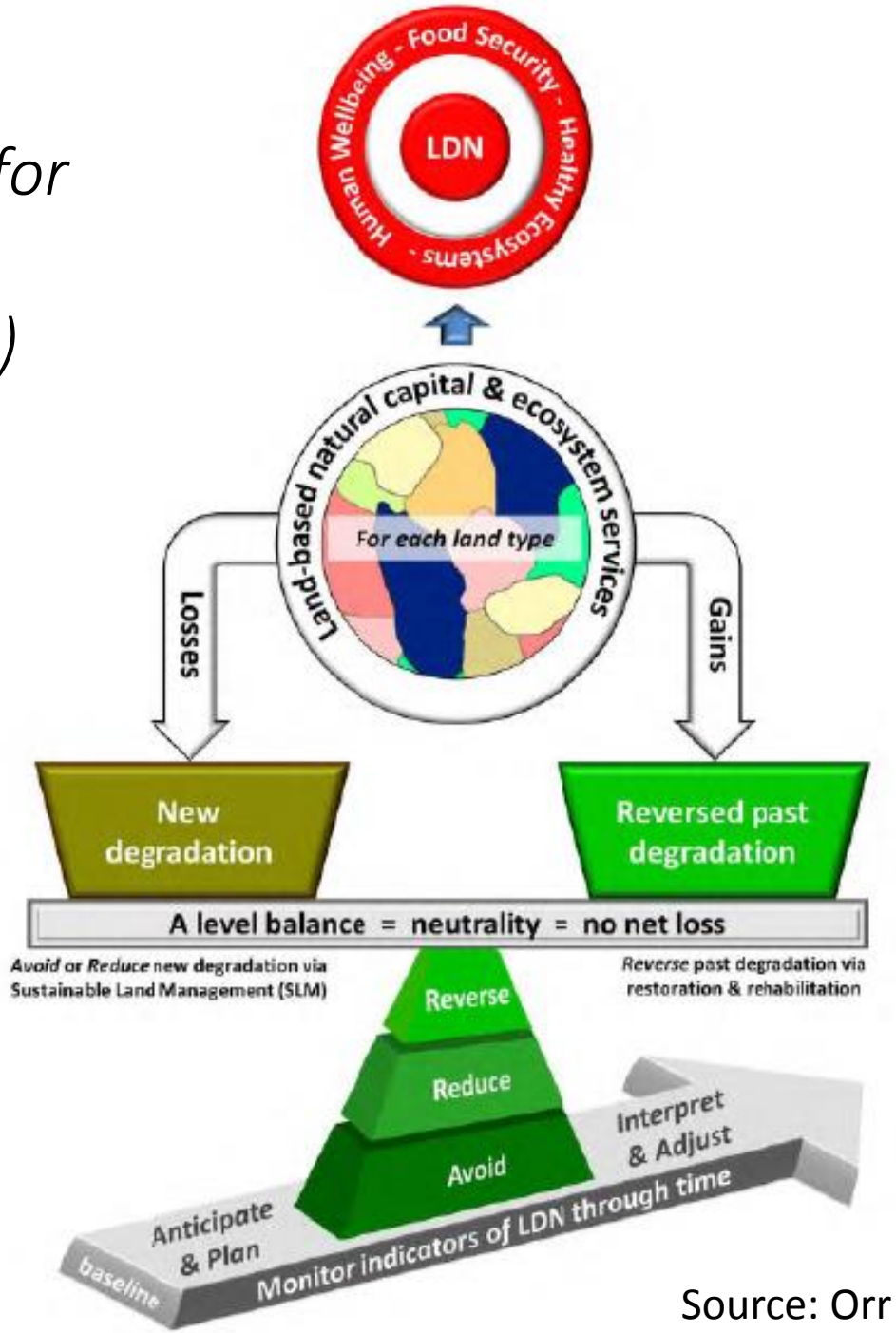
Situating the Problem

developing the baseline

Contextualizing SOC

making the baseline relevant

Scientific Conceptual Framework for Land Degradation Neutrality (UNCCD Science Policy Interface)



LDN Indicators:

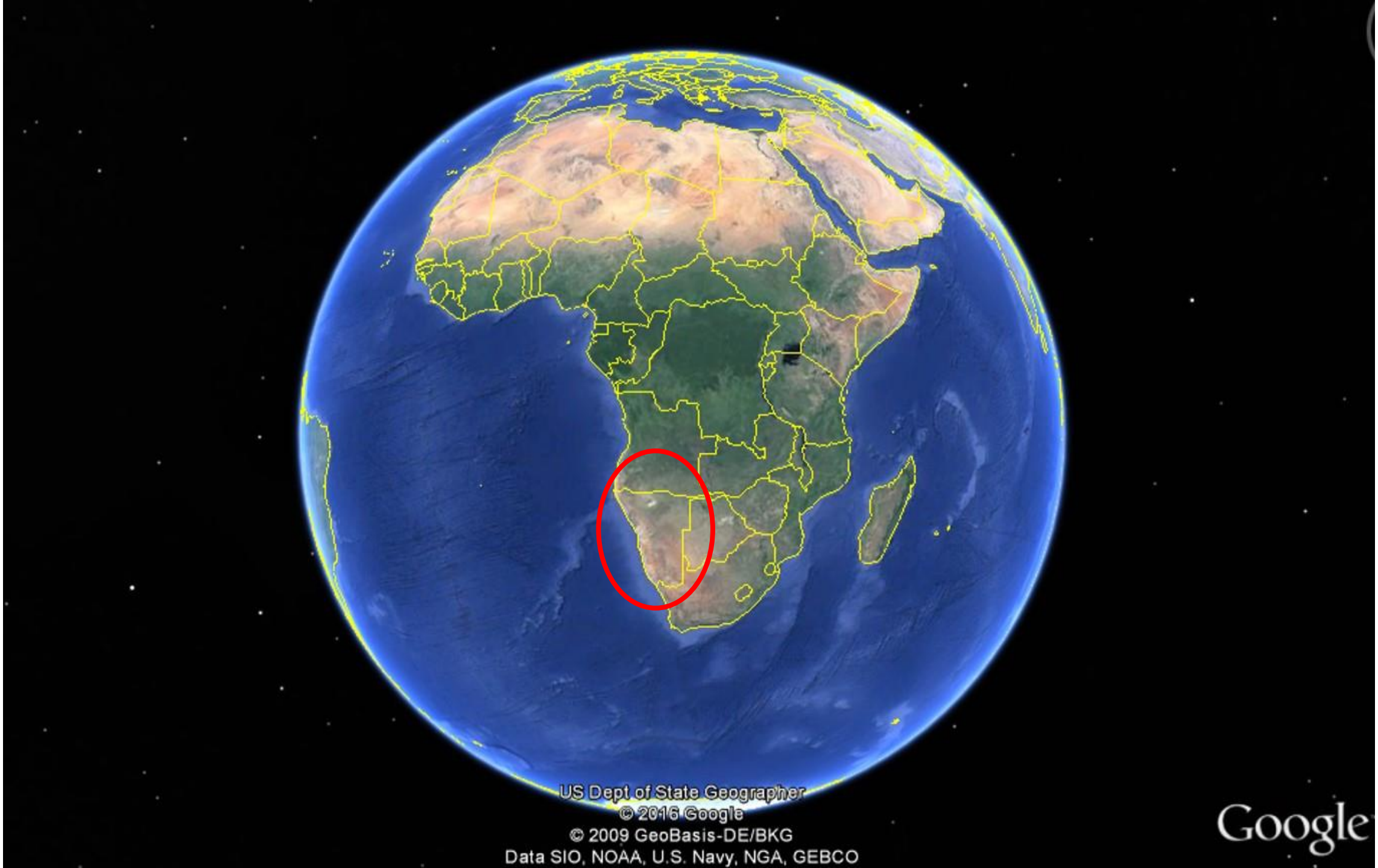
Land Cover (land cover change)

Land Productivity (net primary productivity)

Carbon Stocks (soil organic carbon)

Bush Encroachment (bush density)

Source: Orr and Cowie, 2017


US Dept of State Geographer
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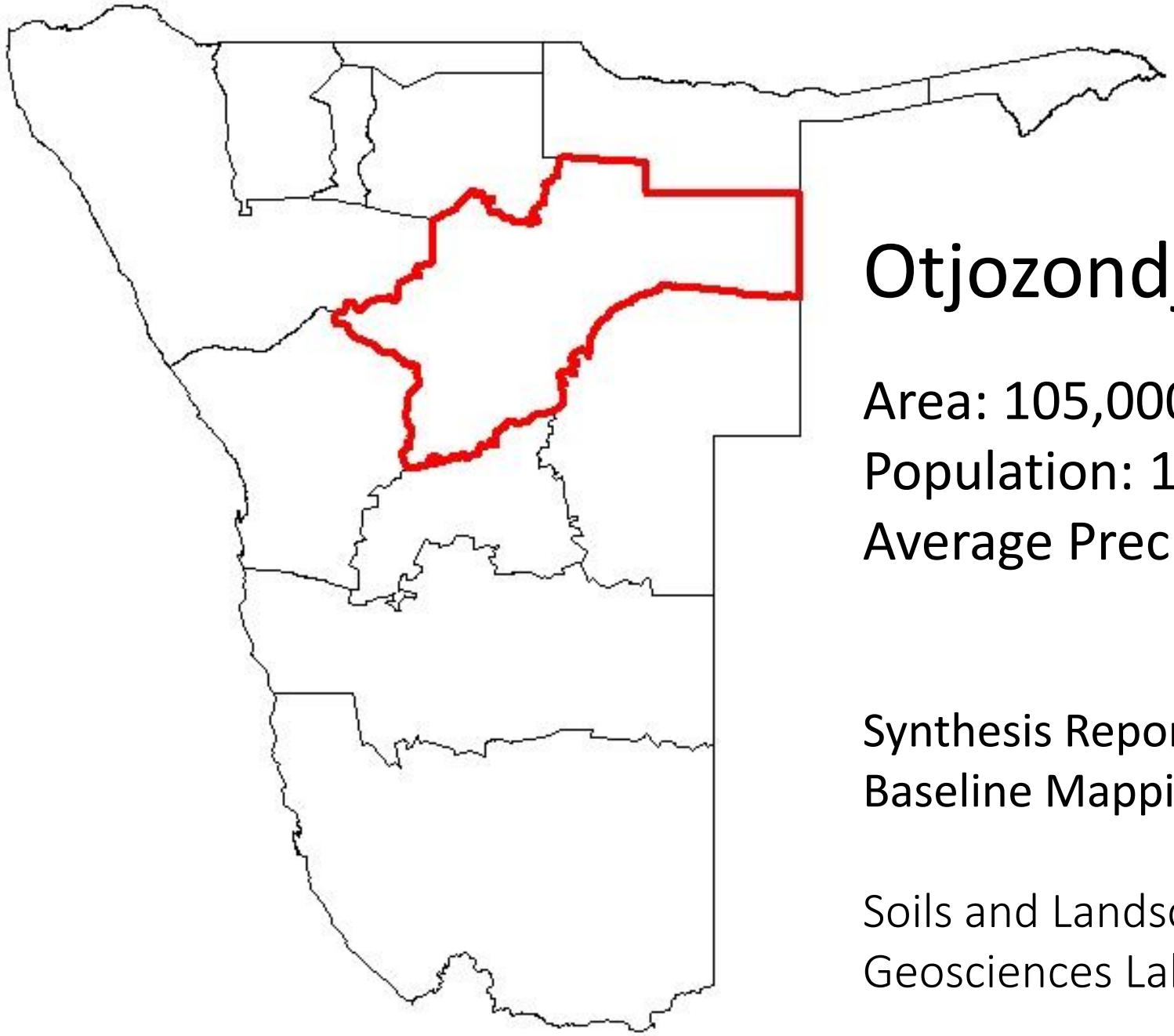

Otjozondjupa

Area: 105,000 km2
Population: 142,000 people
Average Precipitation: ~450 mm yr^{-1}

Synthesis Report of Methodologies for LDN Baseline Mapping (2016)

Soils and Landscapes for Sustainability (CIAT) and Geosciences Lab (ICRAF)

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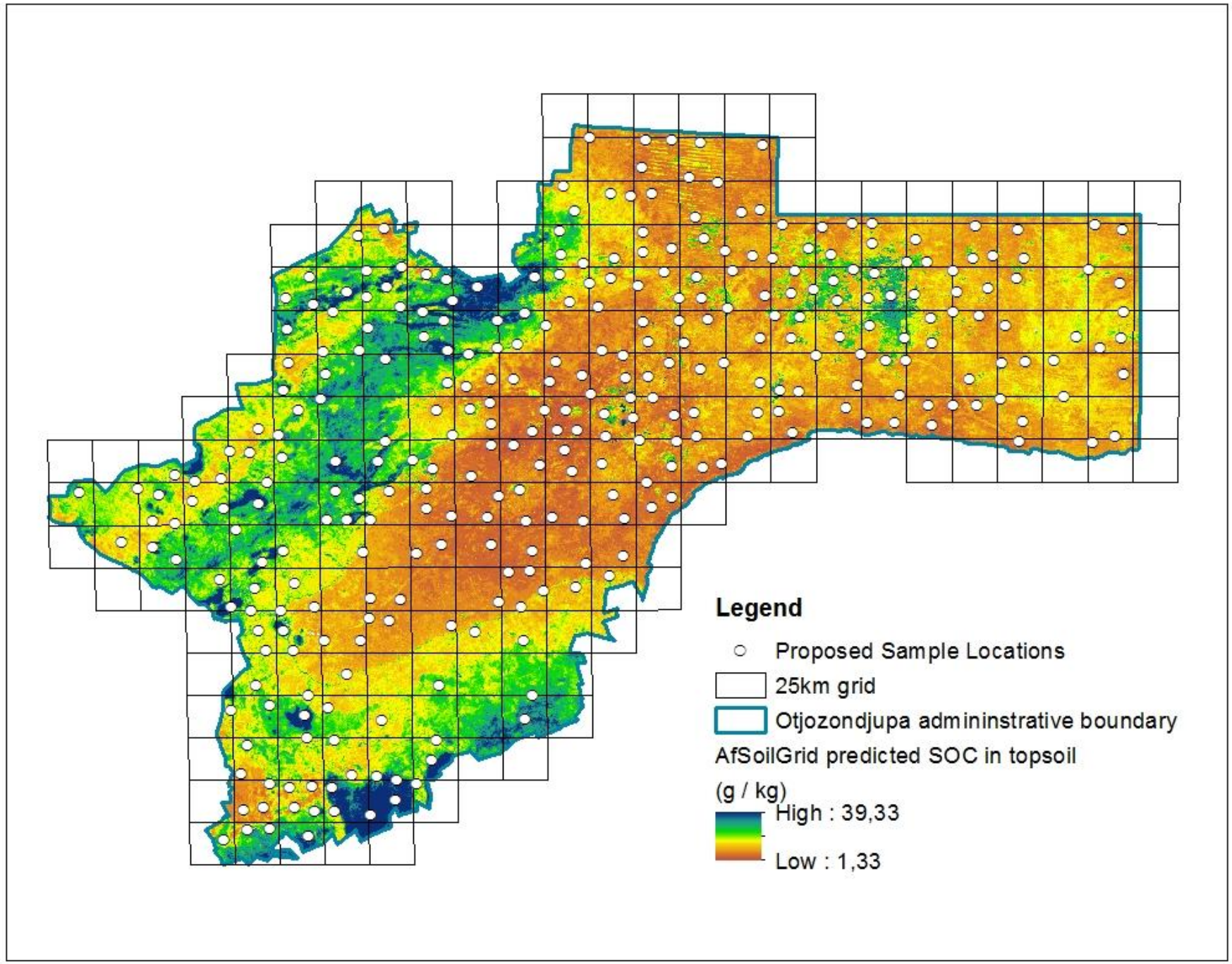

Legend
Proposed Sample Locations
25km grid
Otjozondjupa admininstrative boundary
AfSoilGrid predicted SOC in topsoil
(g / kg)
High : 39,33
Low : 1,33

Digital Soil Mapping

Method	Complexity
Inverse Distance Weighting (IDW)	Medium
Kriging	Medium-High
Regression Kriging with SoilGrids	High
Regression Kriging with small covariate stack	High
Random Forest with large covariate stack	Very High

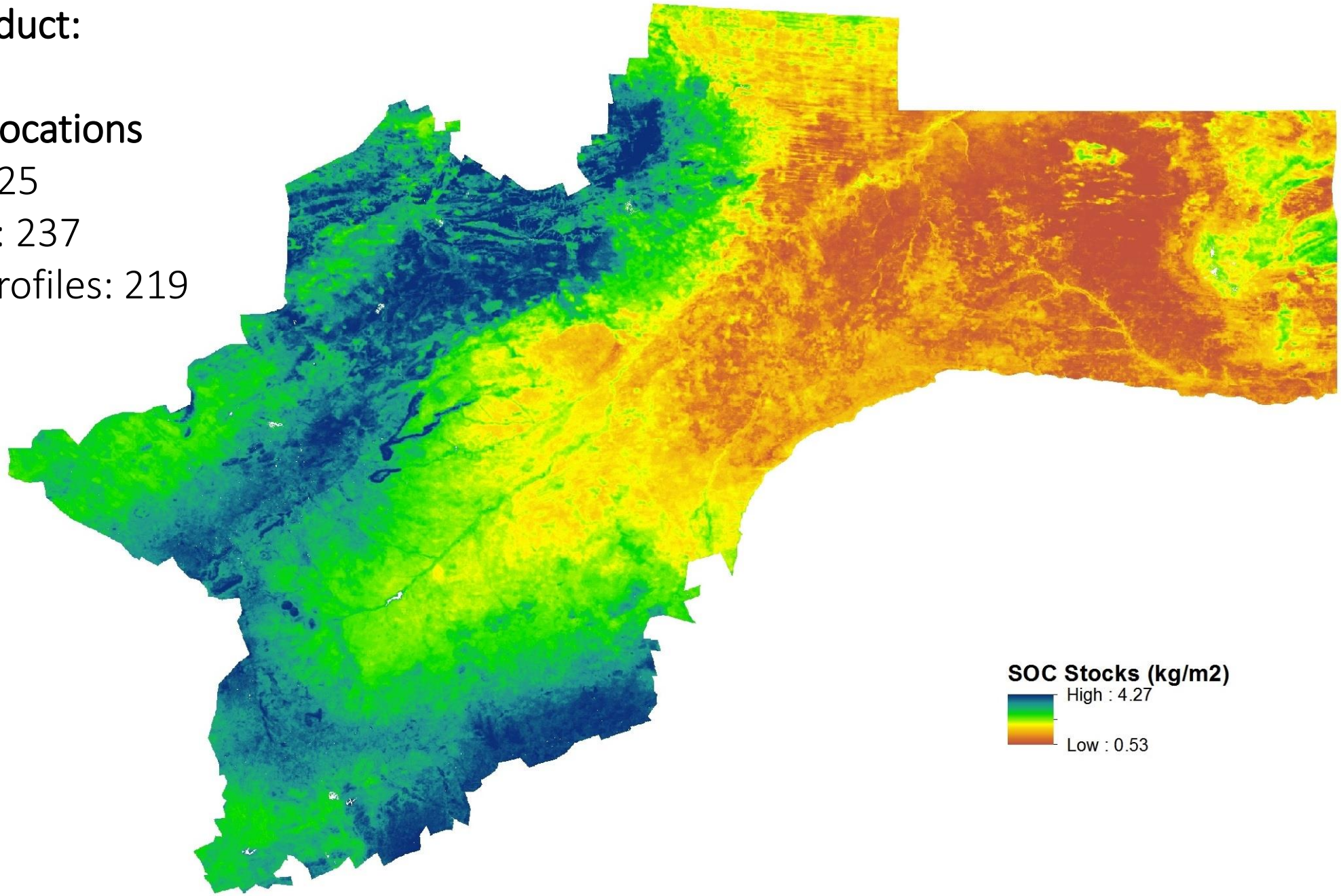
Final Product:

Sample Locations

Target: 325

Reached: 237

Usable profiles: 219



Contextualizing the SOC Baseline

Contextualizing the SOC Baseline

1. “ … we know the criteria for MRV.”
– Martial Bernaux

- Consistency
- Completeness
- Accuracy
- Transparency
- Comparability

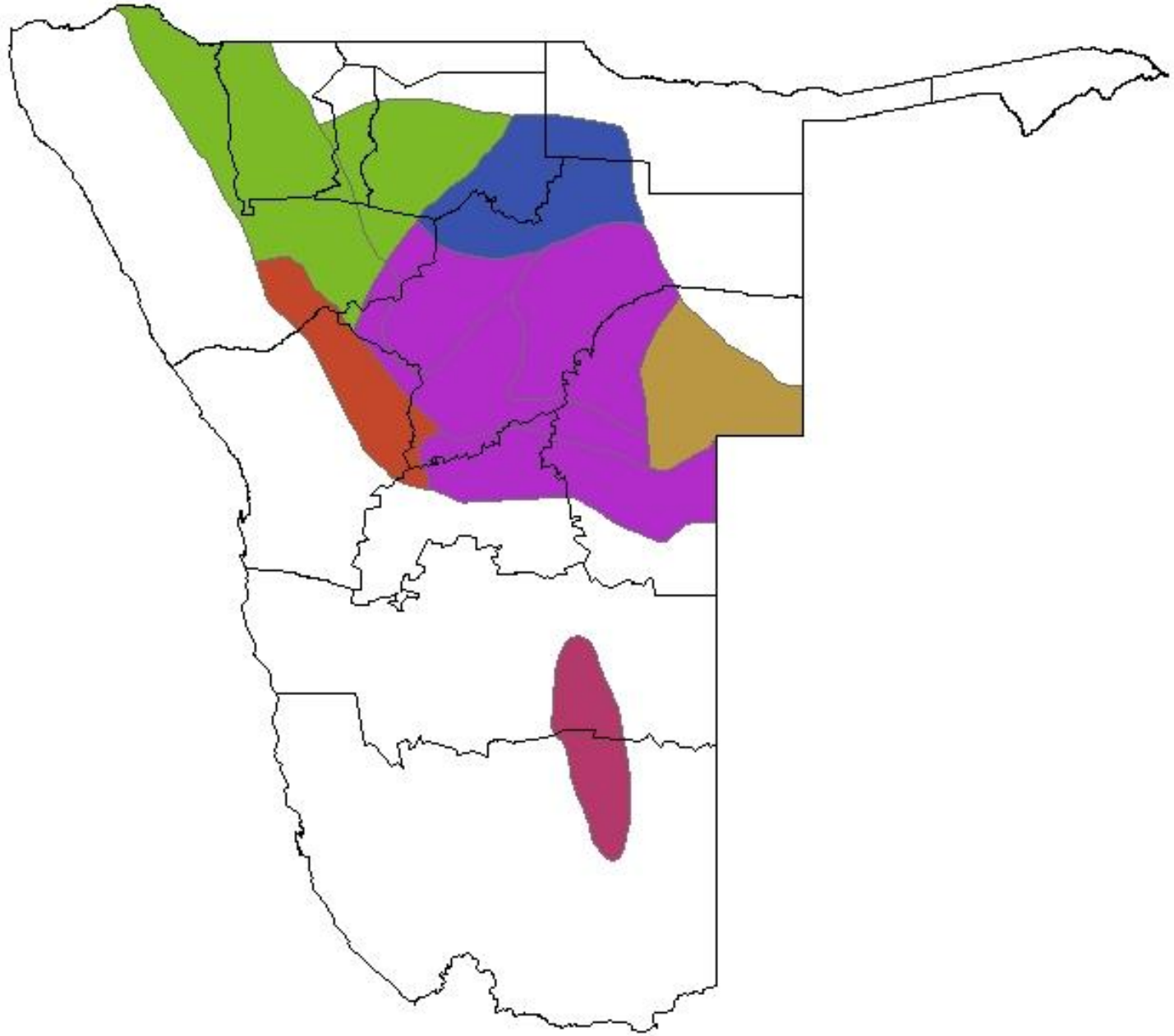
Local Concerns:

1. LDN must be locally owned including data collection, data analysis, and baseline production.
2. LDN must be integrated with ongoing policies and activities.

Contextualizing the SOC Baseline

2. “ … the approach embraces integrated landuse planning.”
– Barron Orr

Two ongoing national projects and policies:
1. Integrated Regional Landuse Planning (IRLUP)
2. Debushing Program



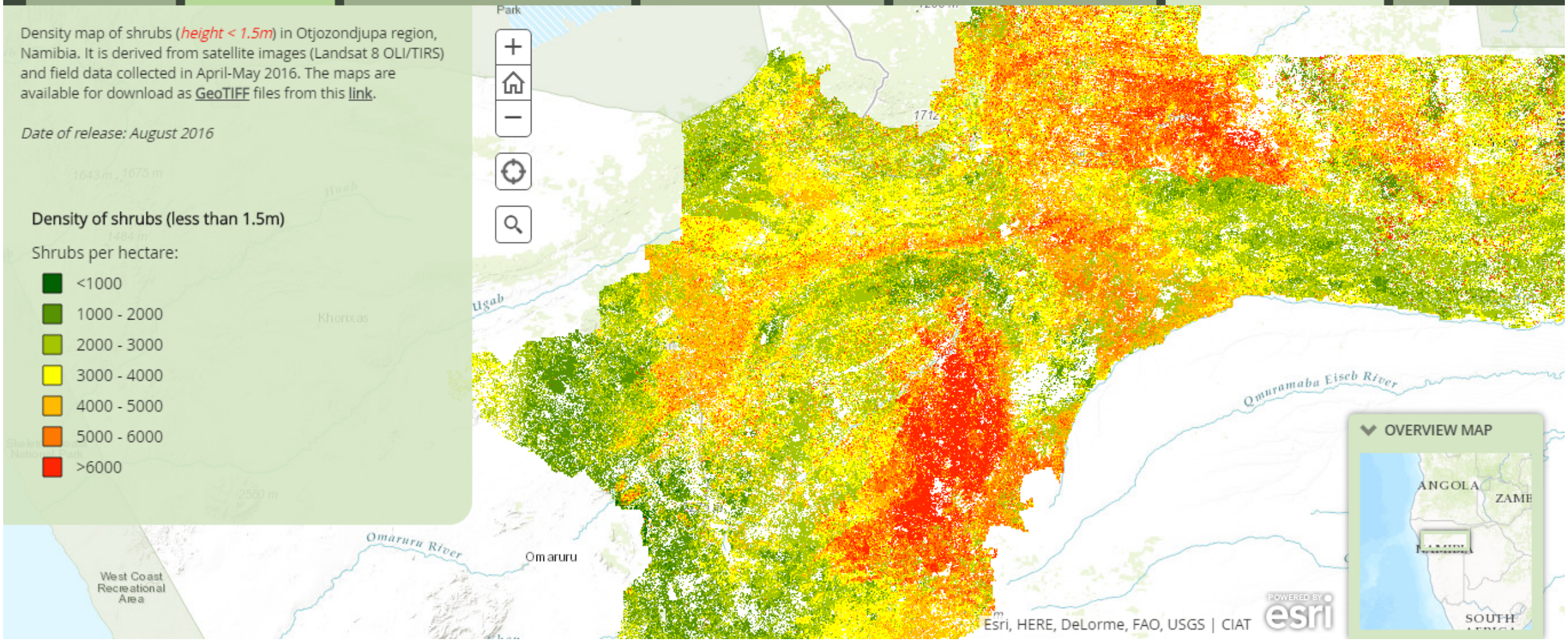
Land Degradation Neutrality in Otjozondjupa, Namibia

Share online

Land cover 2000 | Land cover 2016 | Soil Organic Carbon stock (0-30cm) | Soil Organic Carbon (0-30cm) | Soil Organic Carbon (30-100cm) | Density of shrubs (<1.5m)

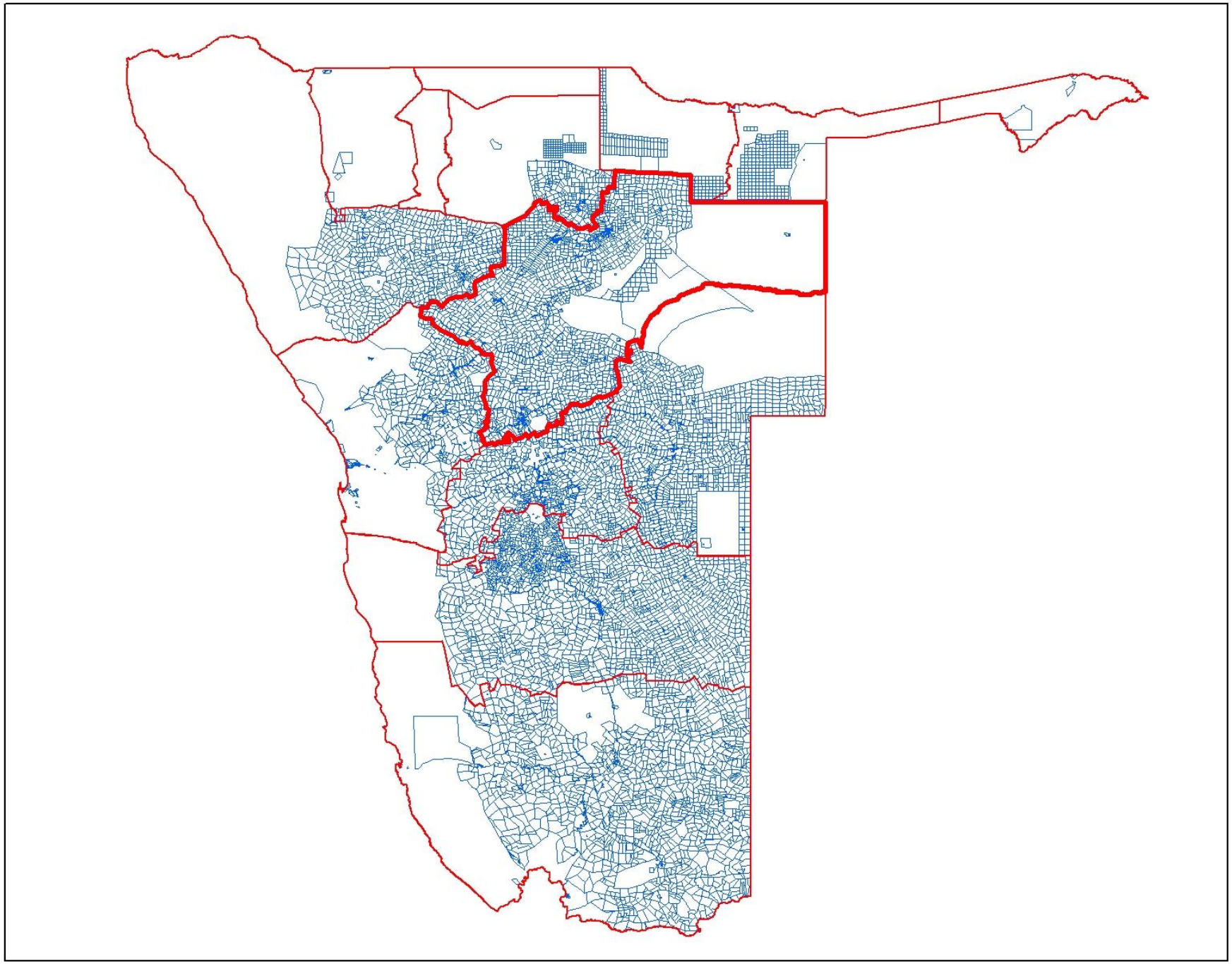
Density map of shrubs (*height < 1.5m*) in Otjozondjupa region, Namibia. It is derived from satellite images (Landsat 8 OLI/TIRS) and field data collected in April-May 2016. The maps are available for download as GeoTIFF files from this link.

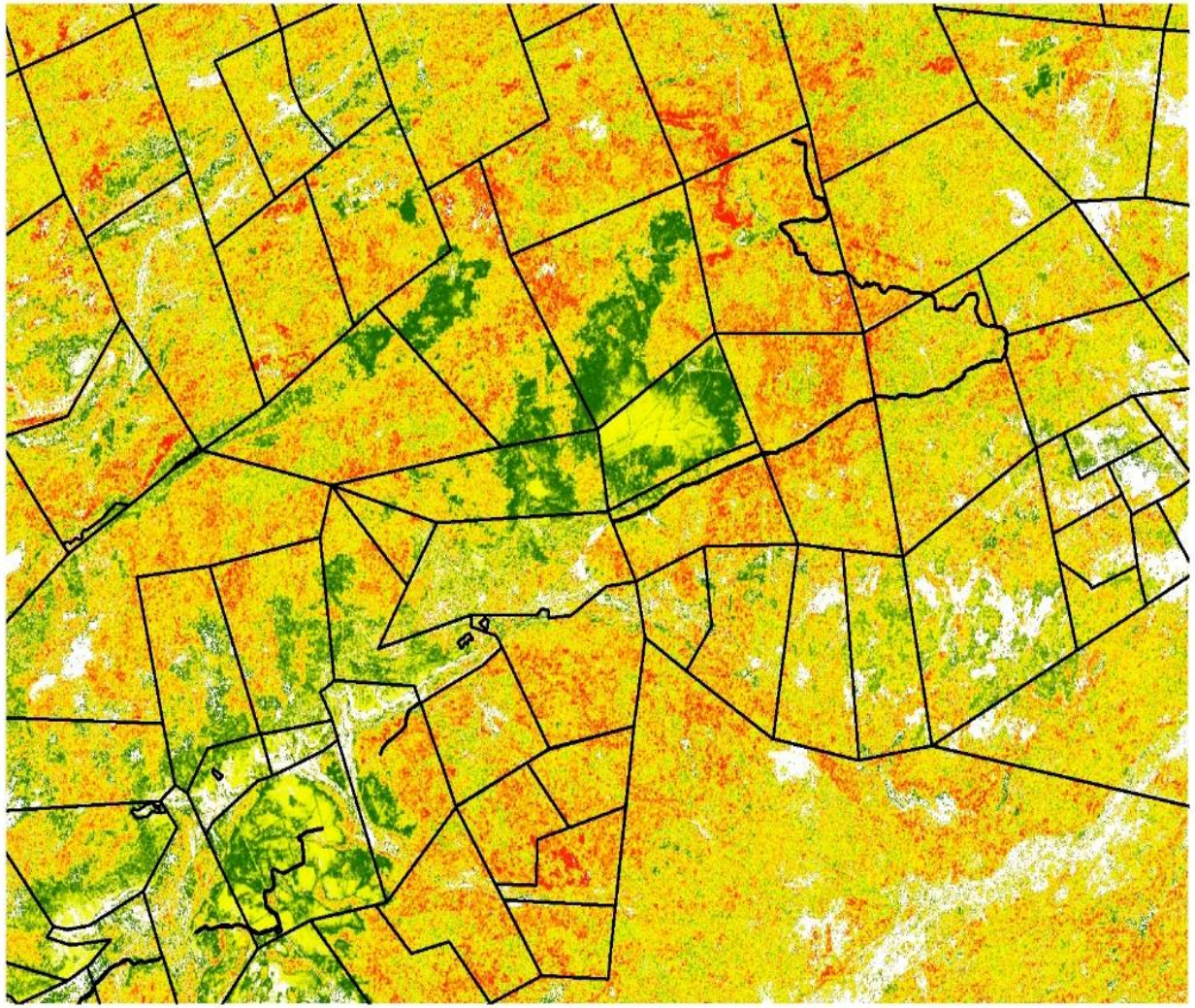
Date of release: August 2016

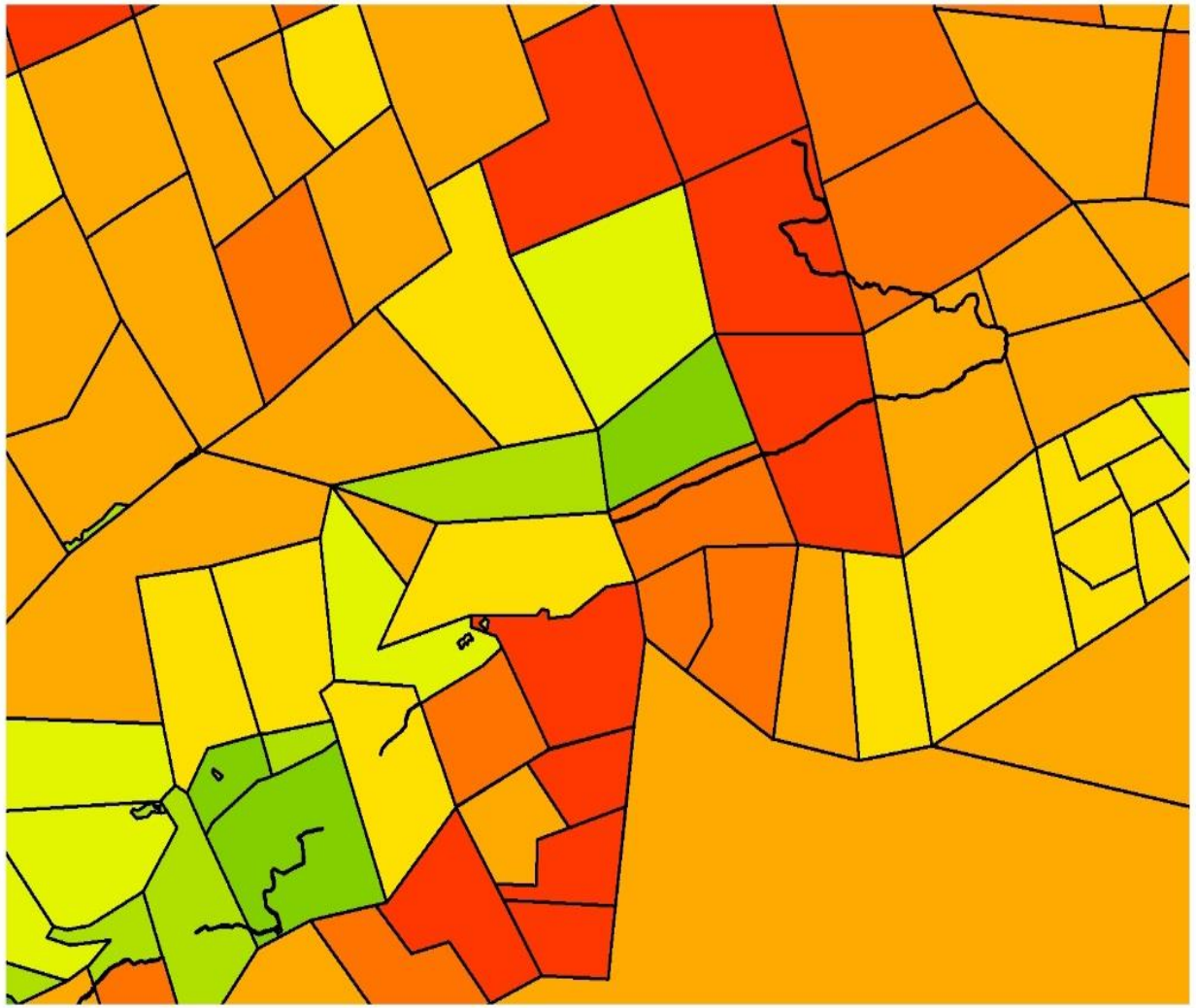


Land cover change type 2000 to 2016	Total SOC stock (kg)	Average SOC stock (kg/m2)
Bush land to Grassland	224,835	1.59
Grassland to Bush land	152,676	1.28
Grassland to Grassland	55,817	1.67

We have Land Cover, what about **Land Use**?







Contextualizing the SOC Baseline

3. “Socio-economics was the main driver”

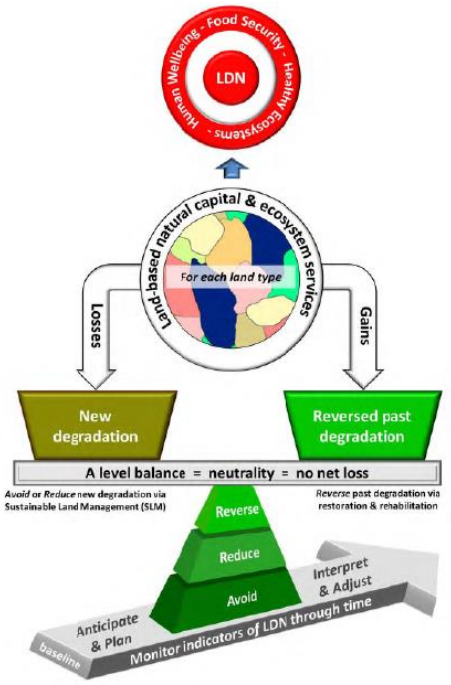
- Johan Six

"… until a theoretical explanation – based on human choice – for **self-organized and self-governed** enterprises is fully developed and accepted, **major policy decisions** will continue to be undertaken with a presumption that individuals cannot organize themselves and always **need to be organized by external authorities**."

— Elinor Ostrom, *Governing the Commons*, p.25

Section 6.7.5: The role of stakeholder engagement

- “For any LDN project to be effective, **governments must**:
  - Develop inclusive, participatory consultation and outreach programmes
  - to engage stakeholders in the co-production of knowledge and mutual learning
  - at both the national and local levels, … accomplished through
  - the establishment or leveraging of multi-stakeholder platforms
  - at each relevant scale, with established links across scales” (p. 67).



Conclusions

- We have enough tools to develop SOC baselines
  - Build on existing freely available data such as SoilGrids
- Contextualize SOC - make the data relevant!
  - Integrated Landuse Planning

Understanding how farmers and communities transition to self-governance (as opposed to centralized control and management) requires more attention by the SOC community in order to achieve soil carbon sequestration.

“Time is the natural resource in shortest supply.”

— Elinor Ostrom