GENERATING THE EVIDENCE BASE FOR TRACKING LANDSCAPE RESTORATION AND ENHANCING STAKEHOLDER ENGAGEMENT

Regreening Africa

Funded by European Union

CIFOR

World Agroforestry

World Vision

CRS CATHOLIC RELIEF SERVICES

care

Oxfam International

SAHEL ECO

ELD THE ECONOMICS OF LAND DEGRADATION

As a large scale, multi-country, multi-stakeholder restoration initiative, Regreening Africa offers a unique opportunity to generate actionable lessons on the cost-effectiveness and impact of local, national and global restoration efforts. As part of the Regreening Africa Insights Series, this brief shares key learnings and insights from programme activities and interventions that used systematic land health assessments to build stakeholder relationships and capacity for interrogating trends.

KEY INSIGHTS

In order to design appropriate and effective restoration options, **an understanding of the multiple drivers and dynamics of land degradation from social, economic and biophysical aspects is key**. From field sampling to mapping via remote sensing, monitoring a project's restoration efforts from this critical viewpoint must become an integral part of the project cycle.

Stakeholder engagement is not linear. To address this, it is necessary to build adaptive, committed relationships with key stakeholders.

The Land Degradation Surveillance Framework (LDSF) is a systematic monitoring method for biophysical indicators, as well as **a unique engagement approach to build sustainable capacity with key stakeholders at a national, district, and project level**.

The LDSF engagement approach provides **a set of structured capacity and training interactions** that enable actionable steps for landscape management.

Project teams gain critical skills across a whole bio-physical monitoring approach, from a conceptual understanding of key indicators to field level systematic data collection, and from data analysis and basic coding skills to data review and interpretation towards key decision-making.

The data generated within the LDSF is the foundation for the **co-designed decision dashboards** and other stakeholder engagement tools.

Regreening Africa

Background

The Land Degradation Dynamics is component within Regreening Africa, with a primary objective of equipping Regreening Africa programme countries with surveillance and analytical tools on land degradation dynamics, to support strategic decision-making and monitoring of restoration activities.

A key objective is to identify and assess land degradation dynamics, dimensions and indicators across the project action areas. By using the Land Degradation Surveillance Framework (LDSF) methodology, Regreening Africa project identified and measured key indicators of land and soil health in order to understand drivers of degradation, prioritise areas of intervention and monitor changes over time.

The LDSF is a comprehensive method developed by World Agroforestry (ICRAF) scientists, as a response to a lack of methods for systematic landscape-level assessment of soil and ecosystem health, using a robust and consistent indicator framework.

The LDSF provides meaningful diagnostics to unpack the complexity involved in managing ecosystem health across landscapes, including trade-offs, through:

- A science-based field protocol for measuring land and soil characteristics and vegetation composition. The field protocol measures indicators of the "health" of an ecosystem at landscape level, such as vegetation cover, structure and floristic composition, historic land use, land degradation, soil characteristics (including soil organic carbon stocks for assessing climate change mitigation potential, and infiltration capacity).

- A monitoring and evaluation framework for assessing the processes of land degradation and the effectiveness of rehabilitation measures (recovery) over time.

- A unique systematic data collection method.

- A stakeholder engagement approach to elucidate insights into land health, land use, and carbon stocks over time and place.

THE LDSF HAS BEEN APPLIED SYSTEMATICALLY ACROSS A WIDE RANGE OF ECOSYSTEMS AND LAND USES IT IS NOW ONE OF THE LARGEST GEO-REFERENCED DATABASES OF SOIL AND LAND HEALTH INDICATORS, GLOBALLY.

Regreening Africa

Stakeholder engagement and capacity building within the LDSF Process

Through capacity development and engagement, the LDSF generates evidence and learning throughout the life cycle of the programme, delivering actionable evidence for multiple decision contexts across the countries. The LDSF hands-on approach to capacity development positively influences project design and builds relationships with key people in project implementation.

STEP 1: IN-FIELD TRAINING

Along with vital stakehzolder engagement on the location of the LDSF site, LDSF provides **in-the-field training for participants on the LDSF methodology**, including:

- Navigation to randomized LDSF plots using global positional systems (GPS)
- Data entry using electronic data entry (e.g., Open Data Kit (ODK)) as well as back-up paper forms
- All aspects of the LDSF field survey such as:
  - » soil sampling;
  - » tree and shrub measurements, including biodiversity assessments;
  - » land-use history;
  - » land management practices;
  - » infiltration capacity; and
  - » soil erosion observations.

Regreening Africa

STEP 2: STAKEHOLDER WORKSHOPS

Through a series of smaller workshops, **field data are analysed** to understand the drivers of degradation, prioritise areas for implementation of interventions, and monitor changes over time. Working together with partners, data is normalized and cleaned. In this way, stakeholders are able to connect their first-hand experience of restoration activities from field data collection to programme results. The workshops build stakeholder capacity for data analysis and feed directly into the development of a dashboard or tool with which to review the data.

LDSF's data analytics training facilitates:

- Exploration of LDSF data with R statistics
- Tidying and visualising data
- Applying mixed-effect models to assess key indicators of land and soil health
- Database development
- Data management

LDSF also provides **remote sensing (RS) training** to explore the key concepts, methods and applications of RS, including the use of open source GIS and RS software and a basic analysis of RS data.

LDSF's typical field-training workshop format is as follows:

DAY 1	Introduction to the LDSF methodology, field equipment needed, programming GPS, GPS navigation and the randomized LDSF design, setting up the plot and subplot. Using ODK and field forms.
DAY 2	• Travel to the LDSF site. • Training on LDSF field methods, soil sampling, labelling, plot and subplot measurements. • Soil infiltration measurements and recording.
DAY 3	• Training on tree and shrub biodiversity assessment, plot and subplot measurements. • Cumulative soil mass sampling. • Infiltration capacity.
FIELD WORK	• Field work starts/continues with trainers involved. • Data collection at first site.

STEP 3: DASHBOARD CO-DESIGN

Data generated with the LDSF provides valuable input into **online dashboards**. These are **co-designed with stakeholders**, and are used to review multiple data sources for enhanced evidence-based decision making.

Regreening Africa

CASE STUDY: UNDERSTANDING BIO-PHYSICAL TRAITS OF A LANDSCAPE IN RWANDA[1]

Land degradation dynamics were spatially assessed across landscapes within the Regreening Africa project. The project benefitted from existing data in the LDSF database, while at the same time contributing to these critically important global datasets through data collection in Rwanda and Senegal. There are two LDSF sites in Rwanda, co-located with Regreening Africa project activities in the Nyagatare and Kayonza districts. A total of 155 plots were sampled in The Nyagatare in October 2018, with 157 plots sampled in Kayonza in November 2018.

Earth Observation (EO) data was combined with the LDSF framework to develop the outputs for the project, including assessments of land cover changes, land use, land degradation, and soil health. Ecosystem health can be assessed through levels of soil erosion as a widespread form of land degradation, vegetation structure, average tree and shrub densities, and tree diversity. A key indicator of soil health is soil organic carbon (SOC), as it is responsive to land management and vegetation shifts. Analysing key indicators of landscape health, such as these, helped stakeholders to understand variation from landscape to farm scale.

The outputs generated formed a critical part of Regreening Africa's stakeholder engagement processes through interactive tools and maps that allowed country and continental stakeholders to explore the complex interactions between land management, regreening efforts and land health through decision dashboards.
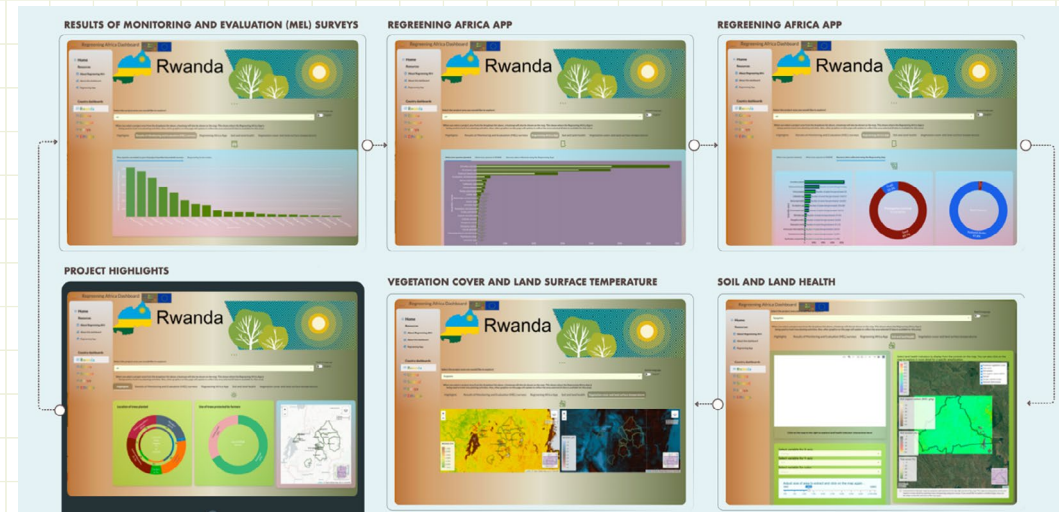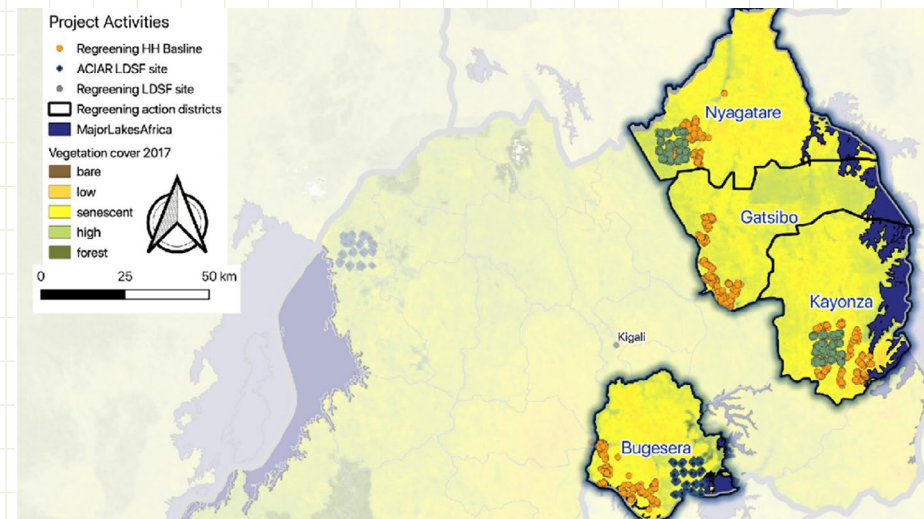

Figure 1 (top): *Locations of the two LDSF sites (green) and the previously sampled LDSF site within the ACIAR project (blue), overlaid on a vegetation cover map of Rwanda. The four project districts are highlighted. The orange circles are the locations of the baseline survey.*

Figure 2 (above): *Regional assessments of land degradation for targeting land restoration options*

1. Winowiecki, L. A., Bargués-Tobella, A., Mukuralinda, A., Mujawamariya, P., Ntawuhiganayo, E. B., Mugayi, A. B., Chomba, S., and Vågen, T.-G. 2021. Assessing soil and land health across two landscapes in eastern Rwanda to inform restoration activities, SOIL, 7, 767–783, https://doi.org/10.5194/soil-7-767-2021

Conclusion

Globally, the LDSF fill critical gaps in terms of consistent and reliable information on land degradation status and trends over time. It is critical that projects invest in collecting data to build the evidence base, in order to inform and adapt project implementation in real time, so that project design is not wasted.

Filling these gaps is of particular importance for not only understanding land degradation processes and predicting changes in climate, but also in prioritising **site-specific land management options** and tracking the **impact of restoration interventions** on the ground.

LDSF addresses this need by not only enabling stakeholders to target land management interventions in landscapes but also allowing for the consistent and robust tracking of interventions over time, so that projects may engage in **evidence-based decision making and interrogate trends** to adapt their project activities accordingly.

TO LEARN MORE ABOUT THE LDSF:

http://landscapeportal.org/blog/2015/03/25/the-land-degradation-surveillance-framework-ldsf/

Tor Vagen, Principle Scientist and Head of SPACIAL at CIFOR-ICRAF, T.Vagen@cifor-icraf.org or tvagen@gmail.com

Leigh Ann Winowiecki, Soil Scientist, Global Research Lead of Soil and Land Health at CIFOR-ICRAF, L.A.Winowiecki@cifor-icraf.org

LDSF BUILDS CAPACITY IN BETTER UNDERSTANDING THE VARIABILITY OF ECOLOGICAL INDICATORS AND THE DRIVERS OF LAND DEGRADATION, AND PROVIDES OPPORTUNITIES FOR CONTINUED STAKEHOLDER ENGAGEMENT BETWEEN FARMERS, COMMUNITIES, GOVERNMENTS, DONORS AND INVESTORS.

Regreening Africa

ABOUT REGREEENING AFRICA

Regreening Africa is an ambitious five-year project that seeks to reverse land degradation among 500,000 households, and across 1 million hectares in eight countries in Sub-Saharan Africa. By incorporating trees into croplands, communal lands and pastoral areas, regreening efforts make it possible to reclaim Africa's degraded landscapes.

As part of a larger global and regional effort to halt and reverse land degradation, the European Union-funded project, Regreening Africa, aims to improve smallholder livelihoods, food security and resilience to climate change in eight African countries. More specifically, it seeks to reverse land degradation over at least one million hectares and benefit 500,000 households, while also catalyzing an even larger scaling effort to restore tens of millions of hectares of degraded land across Africa.

With an initial phase over 2017-2022, this unique research in development is led by World Agroforestry (ICRAF) and implemented by consortium of international non-governmental. The consortium includes World Vision, Catholic Relief Services, Cooperative for Assistance and Relief Everywhere and Oxfam, as well as national NGO Sahel Eco. The eight countries that it is active in are Ethiopia, Kenya, Rwanda, Somalia, Ghana, Mali, Niger and Senegal, with a light touch in Burkina Faso.

Regreening Africa focuses on the incorporation of trees into many land-use types, including croplands, communal lands and pastoral areas, with complementary soil and water conservation and soil improvement practices. It leverages science and research to track the impact of implementation and enhance concurrent social inclusion and livelihood-enhancing efforts as well as creating a sustainable enabling policy environment for land restoration at national and sub-national levels.

regreeningafrica.org
twitter.com/RegreenAfrica
www.facebook.com/RegreenAfrica

Mieke Bourne Ochieng, Programme Manager
RegreeningAfrica@cgiar.org