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DRAFT: GUIDELINES FOR LAND DEGRADATION NEUTRALITY

Introduction

In 2015 the UNCCD introduced the new concept of Land Degradation Neutrality (LDN), which was later adopted as a target of Goal 15 of the SDGs, Life on Land: 120 countries have committed to pursue voluntary LDN targets[1].

The objectives of LDN are to:

- maintain or improve the sustainable delivery of ecosystem services;
- maintain or improve productivity, in order to enhance food security;
- increase resilience of the land and populations dependent on the land;
- seek synergies with other social, economic and environmental objectives; and
- reinforce responsible and inclusive governance of land.

The fundamental aim of LDN is to preserve the land resource base, by ensuring no net loss of healthy and productive land, at national level. This goal is to be achieved through a combination of measures that avoid, reduce and reverse land degradation. Achieving LDN requires estimating the likely cumulative impacts of land use and land management decisions, and counterbalancing anticipated losses through strategically-planned rehabilitation or restoration of degraded land, within the same land type.

In GEF-7, the GEF is supporting countries in their pursuit of LDN in the Land Degradation focal area, and the Impact Programs on Drylands, Food Systems, Land Use and Restoration, and Sustainable Forest Management.

The scientific conceptual framework for LDN (LDN-CF) provides the scientific basis for planning, implementing and monitoring LDN: the underpinning concepts are illustrated in Figure 1.

[1] https://www.unccd.int/news-events/record-number-countries-takes-target-achieving-ldn

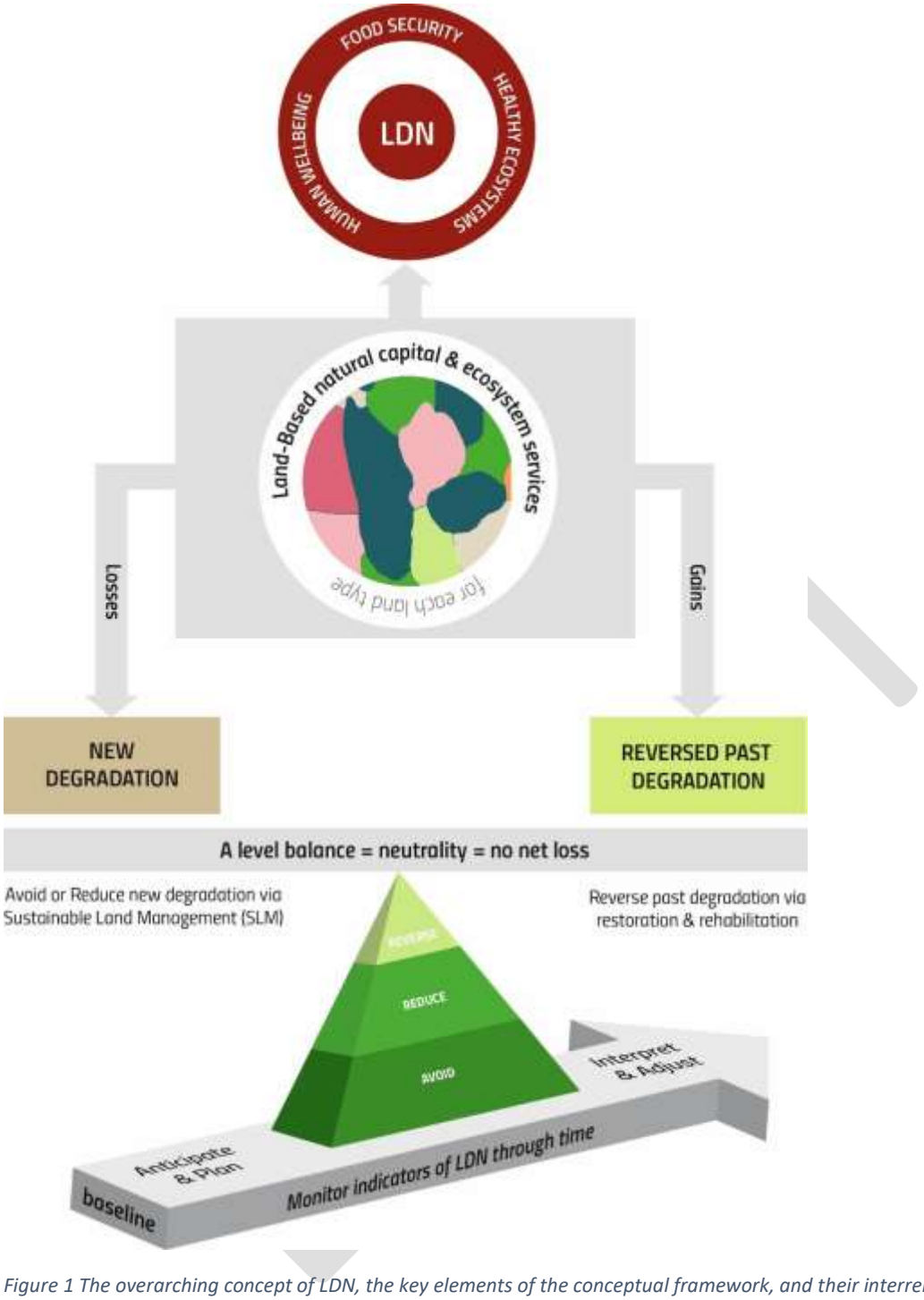


Figure 1 The overarching concept of LDN, the key elements of the conceptual framework, and their interrelationships. Source: Orr et al., 2017

Figure 1 illustrates the connection between the various elements of the conceptual framework. "The target at the top expresses the **vision of LDN**, emphasizing the link between human prosperity and land-based natural capital, which provides a range of ecosystem services. The balance scale in the centre illustrates the **mechanism for achieving neutrality**: counterbalancing future land degradation (losses) with planned positive actions elsewhere (gains) within the same land type. The

fulcrum of the scale depicts the **hierarchy of responses**: avoiding degradation is the highest priority, followed by reducing degradation and finally reversing past degradation."[2]

The framework has five modules (Figure 2):

- Module A - articulates the goal of LDN;
- Module B - explains the LDN baseline against which achievement is measured;
- Module C - how to counter balance expected losses;
- Module D - the theory of change which describes the pathway for implementing LDN; and
- Module E - monitoring, and indicators for assessing the achievement of LDN.

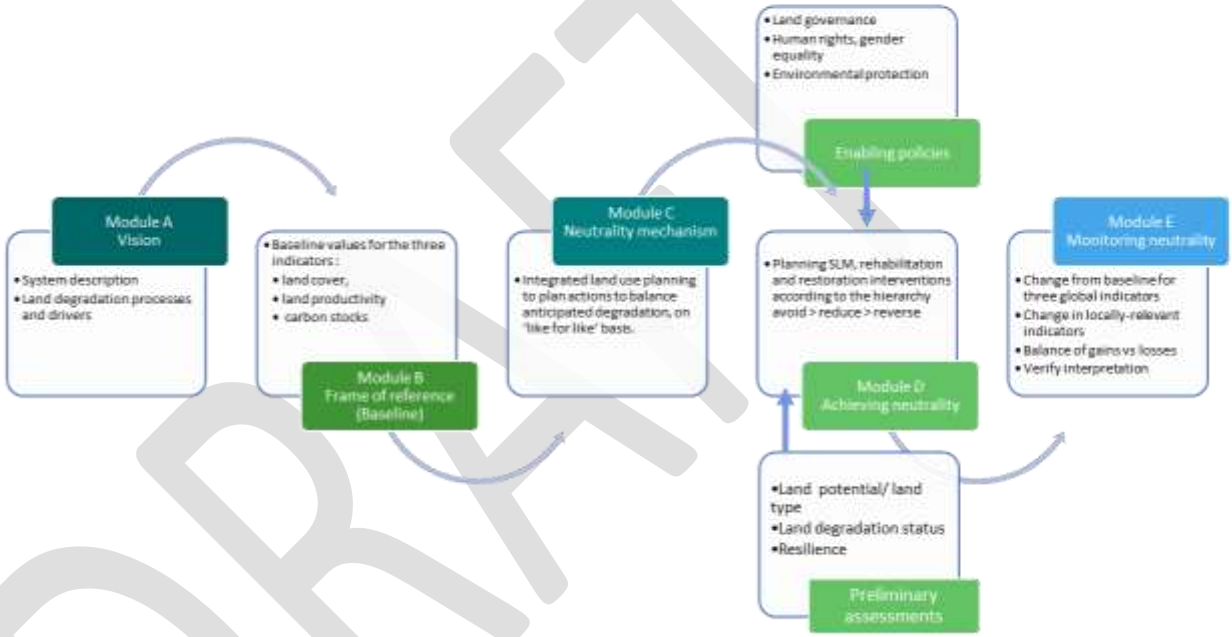


Figure 2 The five modules of the conceptual framework

The modules describe the overall approach to LDN: vision; baseline; neutrality mechanism; enabling policies, achieving neutrality, and preliminary assessments; and monitoring neutrality.

Each module presents key concepts, principles, and practical steps for implementation.

These guidelines offer practical help to those developing projects which contribute to Land Degradation Neutrality.

The guidelines are not prescriptive, but offer principles for application of each module. They provide a practical interpretation of the conceptual framework, to support GEF project developers in formulating projects that contribute to achieving countries' LDN goals. The guidelines focus on laying the foundation to achieve LDN through establishing enabling policies, integrated land use planning, and preparatory assessments.

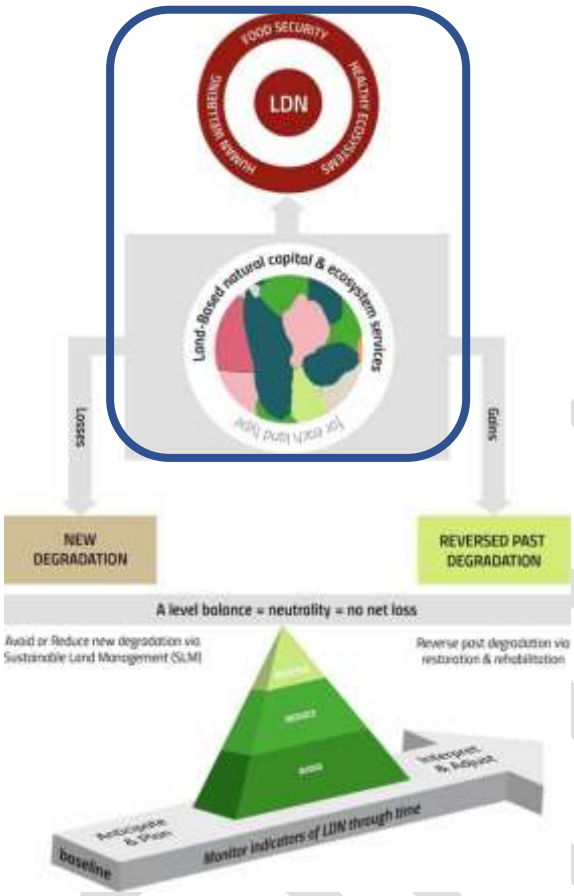
[2] Orr, et al (2017). Scientific Conceptual Framework for Land Degradation Neutrality.

A review[3] of experience in setting LDN targets and implementing LDN identified some key gaps in capacity: assessing multiple benefits, managing trade-offs; assessing resilience and socio-economic aspects of land governance especially land tenure arrangements and security of tenure; integrated land use planning; applying the neutrality mechanism. The guidelines therefore emphasise these aspects.

A summary of each module is described below. The complete guidelines will be presented in September 2019 at the UNCCD COP 14 in Delhi.

[3] UNCCD SPI, 2019 Creating an Enabling Environment for Land Degradation Neutrality and its Potential Contribution to Enhancing Well-being, Livelihoods and the Environment Objective 1.2 report

Module A: The vision and objectives of LDN



Module A lays out the goal of the LDN project, based on a system-level understanding of the project context: the key features of the human-environment system, the land degradation issues being faced, and their drivers.

Key concepts

LDN is defined as "a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems"[4]. The LDN-CF explains that the goal of LDN is to maintain the land resource base so that it can continue to supply ecosystem services such as provision of food and regulation of water and climate, while enhancing the resilience of the communities that depend on the land (Orr et al, 2017). Put simply, the goal of LDN is to maintain or increase the amount of healthy and productive land.

This goal needs to be articulated for the specific project. Articulating the goal involves identifying the features and values that must be maintained, or improved, in the project context.

Principles of Module A

P1 Maintain or enhance land-based natural capital.

P2 Protect the rights of vulnerable and marginalised land users.

P3 Set national LDN targets based on national circumstances.

Steps for Module A

1. Characterise the system
   - Ideally, co-develop the system description in a participatory process with the key stakeholders.
   - Describe the key biophysical and socio-economic features of the system including its boundaries. What are the valued ecosystem services and ecological functions provided by the land in the project context?
   - Describe the system's constituent components, their internal and external linkages and dependencies, particularly the key controlling variables and feedbacks that influence land use and land condition.

[4] Decision 3/ COP.12, UNCCD, 2015

- Identify the key relationships between variables, connections to levels above and below the level targeted by the project.

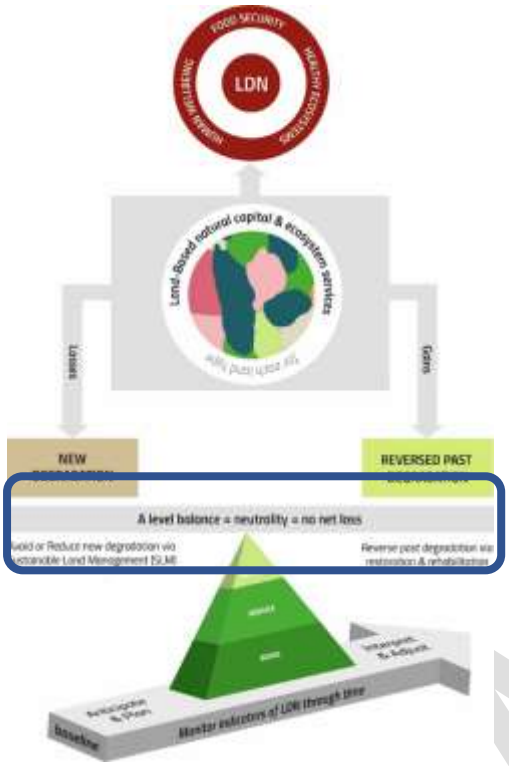
The system model can be expressed in diagram or narrative form, that describes the processes that sustain land-based ecosystem services in the project context.

2. Identify the causes and effects of land degradation:
   - Identify the land degradation processes – what forms of land degradation are affecting productivity and natural ecosystems? (Examples: soil erosion including loss of topsoil, gullying; soil salinization; coastal inundation)
   - Identify the drivers of land degradation, that is, external influences that lead to land degradation (drought, migration, market forces), and the pressures, such as land use change (e.g. forest conversion to agriculture, urban expansion) and unsustainable land use practices (e.g. overgrazing, burning crop stubble, intensive cultivation on slopes, that leave soil bare and vulnerable to erosion).

Resources:

- RAPTA (O'Connell et al 2016): Component 4, guidance on development of system description Section 3.4 pp 56-62
- LDN-CF (Orr et al 2017) Figure 2: Generic driver-pressure-state-impact-response (DPSIR) framework. Adapt for the project context.
- LDN-CF (Orr et al 2017) Figure 3: Lists a wide range of land degradation drivers, processes, inherent and responsive soil /site properties, and illustrates their relationships with ecosystem services
- Henry et al, 2018 Tables 3 and 4: land degradation drivers and processes
- ITPS Status of the World's Soil Resources.

Module B: The baseline



The purpose of Module B is to establish the values for the indicators in the baseline year.

Key concepts and elements

- Neutrality is achieved when losses are balanced by gains so there is no net loss of the land-based natural capital relative to a reference state, or baseline. This means that the baseline is also the target.
- The target of neutrality aligns with the aims of the GEF programme for the Land Degradation Focal Area, the Food Systems and Land Use Restoration Integrated Program, and the Sustainable Forest Management Integrated Program, that seek to maintain, or improve, natural capital and land resources, restore productive landscapes, and deliver environmental benefits.
- The baseline is the land-based natural capital as measured by the three global LDN indicators at the time of the decision to commit to LDN. The LDN indicators (and metrics) are land cover (land cover change, LCC), land productivity (Net primary productivity, NPP) and carbon stocks (soil organic carbon, SOC). Each of these measures a different aspect relevant to LDN: LCC detects the human actions that drive land degradation and its reversal; NPP reflects the impacts of those drivers on plant production as a measure of ecosystem function; and change in SOC stocks, which responds more slowly, indicates the change in productive capacity.
- The baseline values do not show land degradation status. For example, low SOC may occur in low rainfall sites with sandy soil, or in degraded sites in productive environments. Land degradation status is assessed in Module D.

Note: "LDN baseline" is the baseline as described in the LDN-CF and LDN Target Setting Process, and is different from the "project baseline" in GEF terminology (which specifies the activities/existing systems/current projects that the GEF project seeks to build on).

Principles of Module B:

P4 For neutrality, the LDN target equals (is the same as) the baseline.

P5 Neutrality is the minimum objective: countries may elect to set a more ambitious target.

Note: For some countries, neutrality may be unachievable because it is inconsistent with their agreed development objectives. In these circumstances a country may set its LDN target acknowledging that losses may exceed gains, if they forecast that some portion of future land degradation associated with past decisions/realities is not currently possible to counterbalance. Justification for this reduced target needs to be provided.

Steps for Module B

1. Identify data sources for the three indicators. Trends.Earth (see "Resources") provides access to default global data sets for the three indicators. It is preferable to use national data where available.
2. Determine the baseline year: If the project takes place within a country that is committed to LDN, then the baseline of the project is the country baseline. The baseline year for many national LDN targets is 2015. If the country has not committed to LDN, then the baseline year is the time of commencement of project planning.
3. Determine the baseline value for each indicator: The values of the indicators fluctuate over time, between seasons and between years, largely due to climatic variability, so the values of the indicators must be averaged over a multi-year period (ideally 10-15 years) to establish the baseline value.
4. It is important to determine the baseline precisely (i.e. minimise the error) to make it easier to detect change over time.
5. The baseline becomes the target to be achieved in 2030.

Resources and Data sources:

Trends.earth Provides Tier 1 (global default) data, with LCC and NPP from earth observation, and SOC estimated using IPCC Tier 1 methods based on LCC and NPP. http://trends.earth/docs/en/
Available in English, French, Spanish, Swahili, Portuguese.
Allows input of national data, to build improved capacity for mapping and monitoring LDN indicators.

Sims et al 2017 Good Practice Guidance for SDG Indicator 15.3.1, Proportion of Land That Is Degraded Over Total Land Area (p. 115). UNCCD.
http://www2.unccd.int/sites/default/files/relevant-links/2017-10/Good%20Practice%20Guidance_SDG%20Indicator%2015.3.1_Version%201.0.pdf.
Detailed description of the methodology and data sources for quantifying the three global indicators.

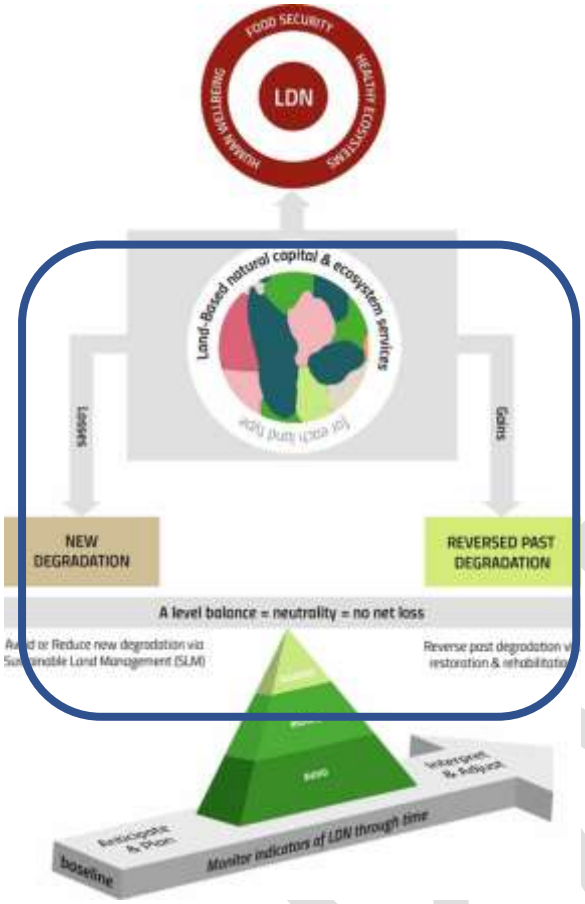
UNCCD 2017 Methodological note to set national voluntary Land Degradation Neutrality (LDN) targets using the UNCCD indicator framework
Describes the global data sets available for quantifying the indicators
https://knowledge.unccd.int/sites/default/files/2018-08/LDN%20Methodological%20Note_02-06-2017%20ENG.pdf

EO4SD

National greenhouse gas inventory methods and data used for UNFCCC reporting: The national body responsible for reporting to the UNFCCC is a potential source of national data for the indicators, especially if the country is using IPCC Tier 2 or Tier 3 methods for soil carbon stocks and stock change.

IPCC 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol 4 Ch 3 Table 3A.1.1: table of global land cover datasets

Module C: Mechanism for neutrality



The aim of Module C is to estimate the likely area of degradation for each land type, as a result of land use decisions and ongoing degrading land use practise, so that an equal area of land can be restored/rehabilitated to counteract the anticipated loss.

Key concepts

- In order to achieve neutrality, action must be taken to reverse degradation, to balance any losses due to ongoing land degradation. Therefore, achieving LDN requires land managers to monitor land use decisions that may impact LDN, and estimate their likely cumulative impacts, so that these can be balanced by reversing land degradation on the same land type, elsewhere.
- Land that is already degraded in the baseline and remains degraded does not count as a loss.
- Land degradation can occur quickly – such as when land is cleared, wetlands are drained, land is converted to settlements, floods wash away topsoil- or can develop gradually, such as when acidification gradually reduces productivity. Reversing degradation is usually a slow process.

Note: Protecting an existing area does not generate gains because the value of the indicators will remain constant, so this cannot count towards counterbalancing degradation. Nevertheless, the objective in Module C is to anticipate losses, and plan action to ensure neutrality is achieved: this means that taking action to avoid losses – protecting an area that would have been cleared – is a legitimate LDN intervention. Therefore, funding such actions is important, as part of the response hierarchy (see Module D).

Principles of Module C

P6 Integrate planning and implementation of LDN into existing land use planning processes.

P7 Counterbalance anticipated losses in land-based natural capital with interventions to reverse degradation, to achieve neutrality.

P8 Manage counterbalancing at the same scale as land use planning.

P9 Counterbalance "like for like" (within the same land type).

Steps for Module C

1. Apply integrated land use planning that embeds the neutrality mechanism in land use planning, enabling categorizing and accounting for land use decisions and the impacts of land use and management.

2. Quantify projected land degradation: estimate cumulative losses resulting from individual land use and management decisions e.g. due to anticipated land use changes such as planned urban expansion, and due to anticipated ongoing unsustainable management.
3. Plan gains to counteract anticipated losses:
   3.1. Manage counterbalancing at the same scale as land use planning, i.e. using the biophysical or administrative domains at which land use decisions are made.
   3.2. Counterbalance "like for like": because each land type has different potential to deliver ecosystem services, losses must be balanced with gains on the same land type (see preparatory assessment: land potential), over the same land area. Each land type must be managed for neutrality, to achieve neutrality at national level. However, counterbalancing may occur across land type boundaries where there is a demonstrated net gain.
4. Ensure that counterbalancing does not occur between protected areas and land managed for productive uses.
5. Ensure that counterbalancing measures do not diminish the wellbeing of land users: Ensure that all stakeholders, public and private, pursue LDN responsibly by working in partnership with relevant levels of government and local land holders, doing no harm, ensuring that planning processes are transparent and participatory, providing spatial systems to record individual and collective tenure rights, and safeguarding against dispossession of legitimate tenure right holders, environmental damage, and other threats and infringements.

Resources:

LDN-CF Table 2 and Figure 6 Theoretical examples of anticipating losses and gains based on land use decisions and current land management.

Module D: Elements necessary to achieve neutrality (Overview)

Module D focuses on the elements required to underpin LDN planning and implementation, that is, creating the enabling environment, especially with respect to required policies, and undertaking preparatory assessments to obtain the required information.

Key concepts

- Achieving LDN requires landscape perspective, system-level holistic action, and a long term view.
- LDN interventions comprise a mix of actions according to the hierarchy reduce, avoid and reverse land degradation, with sustainable land management.
- Successful implementation of LDN interventions requires enabling environment – combination of Institutional capacity, Financial resources, Policy and regulatory mechanisms, and Science-Policy interaction.
- A key enabler is responsible land governance, including measures to secure access to land, because land managers are more likely to invest time and financial resources in land management if their livelihood assets are sufficient and secure. Land governance is the process by which decisions are made regarding the access to and use of land, the manner in which those decisions are implemented and the way that conflicting interests in land are reconciled (GLTN, 144 2018). Providing individual freehold title is not always the optimal solution; formalising communal land governance may be more effective in some cases.
- Policy coherence is critical – between institutions, sectors, levels of governance – resolve fragmentation, lack of connectivity, conflicting interests.
- Integrating LDN planning and implementation with other relevant processes will increase efficiency in achieving multiple environmental and development objectives, and minimise trade-offs and unintended adverse impacts. Ensuring that co-benefits are realised requires advance planning, integration of sectors, and participation of multiple stakeholders.
- Preparatory assessments provide the knowledge base to inform planning of interventions: assessments of land potential, resilience of current and proposed land use.
- Choosing the right intervention to apply in the right place requires biophysical data, socio-economic data and methods/tools to predict outcome – e.g. soil organic carbon (SOC) modelling.
- Different policy approaches to facilitate adoption will be applicable in different jurisdictions, based on different land governance systems; in countries where landholders have few restrictions, this may require incentives and training; in others regulation may be applicable and effective.
- Besides agriculture and forestry, other land uses should be included in LDN planning: mining, settlements.

Principles of Module D

P10 Seek solutions that provide multiple environmental, economic and social benefits, and minimise trade-offs.

P11 Base land use decisions on multi-variable assessments, considering land potential, land condition, resilience, social, cultural and economic factors.

P12 Apply the response hierarchy in devising interventions for LDN: Avoid > Reduce > Reverse land degradation.

P13 Apply a participatory process: include stakeholders, especially land users, in designing, implementing and monitoring interventions to achieve LDN.

P14 Reinforce responsible governance: protect human rights, including tenure rights; develop a review mechanism; and ensure accountability and transparency.

Under development:

D1 Steps to develop and support an enabling environment

D2 Preparatory assessments

- Resilience assessment
- Land potential assessment and land stratification
- Land degradation status
- Planning interventions

Module E: monitoring achievement of neutrality

Module E describes the requirements for monitoring the LDN indicators to determine whether LDN has been achieved.

Key concepts

- Monitoring LDN involves tracking the change in the indicators relative to the baseline value, for each land unit.
- The indicators and associated metrics are: land cover (assessed as land cover change), land productivity (assessed as NPP) and carbon stocks (assessed as SOC).
- These are also the indicators used for Parties' reporting to the UNCCD.
- The indicators are applied using the "One out - all out" approach, such that a negative change in any of the three is interpreted as a loss. This is a conservative approach to integrate and interpret results for the three indicators
- Negative change counts as a loss, irrespective of whether it is due to direct human action or indirect (e.g. climate change) or natural factors; non-anthropogenic losses cannot be ignored, as this would prevent achievement of the goal of LDN to maintain the land-based natural capital and capacity to supply ecosystem services.
- However, it is important to analyse the data and identify whether the changes in indicators result from climatic variation rather than land degradation, in order to focus interventions where most needed. land degradation equates to loss of productive potential; a decline in NPP may result from dry conditions. If a rangeland area does not respond by regreening after rainfall this suggests land degradation, and should trigger closer investigation.
- The three global indicators may not capture all relevant issues – they should be supplemented with locally-relevant indicators.

Principles of Module E

P15 Monitor using the three UNCCD land-based global indicators: land cover, land productivity (net primary productivity, NPP) and carbon stocks (soil organic carbon, SOC).

P16 Use the "one-out, all-out" approach to interpret the result of these three global indicators.

P17 Use additional national and sub-national indicators to aid interpretation and to fill gaps for ecosystem services not covered by the three global indicators.

P18 Apply local knowledge and data to validate and interpret monitoring data.

P19 Apply a continuous learning approach: anticipate, plan, track, interpret, review, adjust, create the next plan.

Steps for Module E

(Overlap with Module B for the first 2 steps)

1. Identify data sources for the three global indicators. Land cover change and NPP can be assessed by remote sensing. Soil carbon change can be estimated using LCC and soil carbon models, or by direct measurement. Direct measurement is expensive and time-consuming, as it requires collection of soil cores, sample processing and laboratory analyses. Therefore, direct measurement should be focussed on those sites where accurate information on change in soil carbon stock is necessary: where the LDN interventions are not likely to change the other LDN indicators; where the stakeholders wish to participate in emissions trading (Figure 3).
2. Determine baseline values for LDN metrics. Under the UNCCD Target Setting Process and for SDG 15.3 the baseline year is usually 2015, the time that LDN was agreed as a goal by UNCCD and for the SDGs.
3. Identify key sites for soil carbon monitoring, that is, where LCC and NPP are not likely to be affected by interventions, such as where the SLM practices are introduced into an existing cropping system.
4. Decide the interpretation of land cover change. Some land cover transitions are universally agreed to be negative (e.g. conversion of tropical peatland forest to cropping or settlements) whereas some are ambiguous: e.g. conversion of pasture to forest in rangelands: this could result from woody shrub encroachment, which is often considered to be a negative transition due to adverse impacts on livelihoods, however it is likely to have higher NPP and carbon stock in vegetation and possible also soil. Such "false positives" point for the need for verification (see below). Some stakeholders may view the same transition as a positive change; in such circumstances where the interpretation is somewhat subjective, and/or trade-offs are involved, a participatory process involving local stakeholders will be required to reach a decision on how this will be interpreted for LDN monitoring.
5. Verify interpretation using on-ground observation or high-resolution imagery (e.g. proximal sensing with drone). Crowd-sourcing could be used for verification of imagery; citizen science could be helpful to engage the community in on-ground verification of aspects such as weed incursions or monitoring water quality.
6. Consider the need for additional indicators: Are there important land degradation processes that are not captured? Examples could include heavy metal contamination from mining, salinization from inefficient irrigation, surface sealing from urban expansion and densification, loss of habitat of threatened species. Where necessary, determine appropriate indicators for monitoring these additional issues.
7. The Red List should be applied as a safeguard in planning interventions, and also in monitoring outcomes).
8. Because gains are often slow to accumulate to detectable magnitude, include process-based indicators to record activity expected to deliver gains. For example, the proportion of landholders retaining crop stubble, ploughing along contour.
9. Establish plan for regular monitoring of the global and local indicators, at approximately 4-year intervals.
10. Establish KM platform as repository and mechanism for sharing and verification of monitoring data
11. LDN is achieved if the area of gains and losses, within a soil type, are equivalent.
12. Be aware that the "area for area" exchange may not fully compensate losses, over the timeframe of the target, as soil carbon is slow to accumulate.

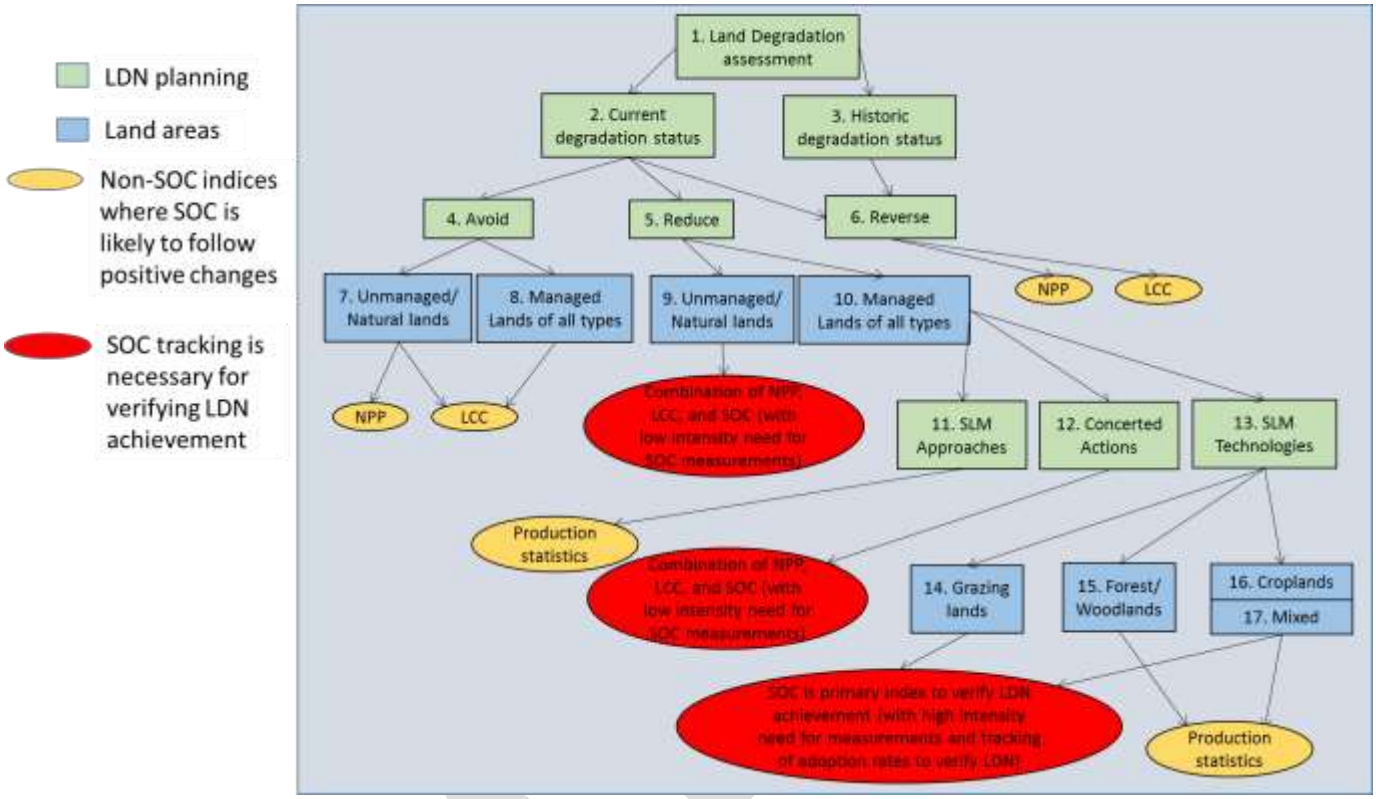


Figure 3 Key sites for monitoring SOC (red) in the context of other indices of tracking LDN (yellow), as distributed across degradation status following land degradation assessment and response actions (green) by land types (blue). intensive SOC monitoring is needed in lands that are more variable and where SOC is the key indicator for LDN. Production statistics are related to NPP and can be valuable as an indicator of LDN. Source Campbell and Vlek 2019

Resources:

- Trends.Earth: Data source for the three indicators, designed to support national-level assessment of land degradation, and including IPCC Tier 1 methods to estimate SOC based on land cover and land productivity spatial datasets. Can also be used for separating the climate signal, to distinguish sites that have lost productive capacity.
- Collect Earth: high resolution imagery, could be used for verification

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UNCCD SPI 2019a Creating an Enabling Environment for Land Degradation Neutrality and its Potential Contribution to Enhancing Well-being, Livelihoods and the Environment.

UNCCD SPI 2019b Soil carbon benefits of Sustainable Land Management Practices.