

Land in Balance

The Scientific Conceptual Framework for Land Degradation Neutrality

The United Nations Convention to Combat Desertification (UNCCD) defines Land Degradation Neutrality (LDN) 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”. Within the UNCCD this definition is intended to apply to affected areas as defined in the text of the Convention. The LDN conceptual framework has been developed to guide countries in operationalising this definition.

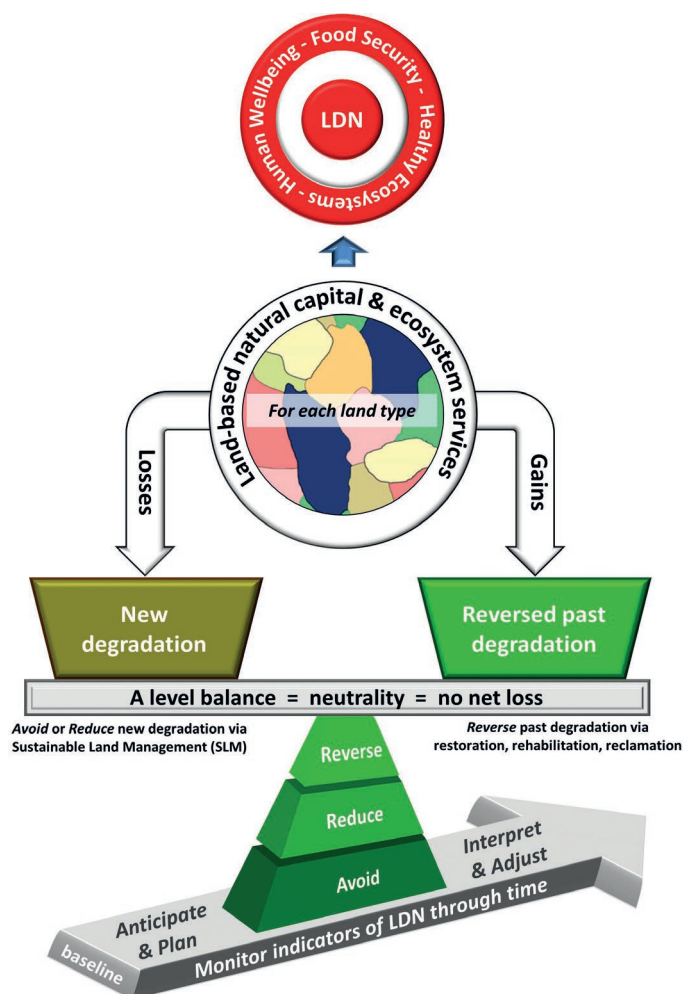
Land Degradation Neutrality (LDN) is a new initiative intended to halt the ongoing loss of healthy land through land degradation. Unlike past approaches, LDN creates a target for land degradation management, promoting a dual-pronged approach of measures to avoid or reduce degradation of land, combined with measures to reverse past degradation. The objective is that losses are balanced by gains, in order to achieve a position of no net loss of healthy and productive land.

The objectives of LDN are to:

- Maintain or improve 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 environmental objectives;
- Reinforce responsible governance of land tenure.

Conceptual Framework for Land Degradation Neutrality

Figure 1 illustrates the interrelationships among the major elements of the scientific conceptual framework for LDN. The target at the top expresses the vision of LDN, emphasizing the link between human prosperity and the natural capital of land – the stock of natural resources that provides flows of valuable goods and services. The balance scale in the centre illustrates the mechanism for achieving neutrality: ensuring that future land degradation (losses) are counterbalanced through planned positive actions elsewhere (gains) within the same land type (same ecosystem and land potential). 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. The arrow at the bottom of the diagram illustrates that neutrality is assessed by monitoring the LDN indicators relative to a fixed baseline. The arrow also shows that neutrality needs to be maintained over time, through land use planning that anticipates losses and plans gains, and applies adaptive learning (where tracking impacts permits mid-course adjustments to help ensure neutrality is maintained in the future).



What is the LDN conceptual framework?

■ The LDN conceptual framework, illustrated in Figure 1, focuses on the goal of LDN and the supporting processes required to deliver this goal, including biophysical and socio-economic aspects, and their interactions.

■ The conceptual framework is applicable to all types of land degradation, so that it can be used by countries according to their individual circumstances. Setting national targets for LDN is voluntary. Countries are invited to do so in accordance with their specific national circumstances and development priorities.

■ The conceptual framework explains the underlying scientific processes and principles that support achievement of LDN and its intended outcomes. The framework provides a scientifically-sound basis to understand LDN, to inform the development of practical guidance for pursuing LDN and to monitor progress towards the LDN target. The LDN conceptual framework emphasises the goal of LDN which is focussed on maintaining or enhancing the land resource base - in other words, the stocks of natural capital associated with land resources, in order to sustain the ecosystem services that flow from them, including food production and other livelihood benefits.

Where the natural capital has been enhanced by human activity, this augmented land resource base should be maintained or improved. The reference to food security raises the need for safeguards to ensure that vulnerable communities are not displaced when marginal lands are targeted for restoration.

■ The conceptual framework creates a common understanding of the LDN objective and consistency in approaches to achieving LDN. It has been designed to create a bridge between the vision and the practical implementation of LDN through National Action Programmes, by defining LDN in operational terms.

The principles of LDN:

The framework presents principles to be followed by all countries that choose to pursue LDN. Principles govern application of the framework and help prevent unintended outcomes during implementation and monitoring of LDN. There is flexibility in the application of many principles but the fundamental structure and approach of the framework are fixed, to ensure consistency and scientific rigour.

1. Maintain or enhance land-based natural capital.
2. Protect the rights of land users.
3. Respect national sovereignty.
4. For neutrality, the LDN target equals (is the same as) the baseline.
5. Neutrality is the minimum objective: countries may elect to set a more ambitious target.
6. Integrate planning and implementation of LDN into existing land use planning processes.
7. Counterbalance anticipated losses in land-based natural capital with interventions to reverse degradation, to achieve neutrality.
8. Manage counterbalancing at the same scale as land use planning.
9. Counterbalance "like for like" (Counterbalance within the same land type).
10. Balance economic, social and environmental sustainability.
11. Base land use decisions on multi-variable assessments, considering land potential, land condition, resilience, social, cultural and economic factors.
12. Apply the response hierarchy in devising interventions for LDN: Avoid > Reduce > Reverse land degradation.
13. Apply a participatory process: include stakeholders, especially land users, in designing, implementing and monitoring interventions to achieve LDN.
14. Reinforce responsible governance: protect human rights, including tenure rights; develop a review mechanism; and ensure accountability and transparency.
15. Monitor using the three UNCCD land-based global indicators: land cover, land productivity and carbon stocks.
16. Use the "one-out, all-out" approach to interpret the result of these three global indicators.
17. Use additional national and sub-national indicators to aid interpretation and to fill gaps for ecosystem services not covered by the three global indicators.
18. Apply local knowledge and data to validate and interpret monitoring data.
19. Apply a continuous learning approach: anticipate, plan, track, interpret, review, adjust, create the next plan.

How will LDN be implemented?

Planning for LDN

■ The concept of neutrality involves counterbalancing anticipated losses with measures to achieve equivalent gains. The scale of implementation of LDN, at which neutrality is to be achieved, is the individual land type, within the landscape – for example, a catchment.

■ To facilitate counterbalancing, LDN introduces a new proactive approach in which management of land degradation is coupled with existing land use planning. LDN promotes a long term approach in which land use planners consider the likely outcomes of land use and land management decisions, so that anticipated degradation can be counterbalanced by interventions to reverse the impacts of land degradation elsewhere, in order to achieve LDN.

■ The estimate of anticipated losses should include not only the effects of planning decisions (e.g. granting permits for open-cut mining) but also effects of passive decisions (e.g. continuation of agricultural practices known to deplete soil carbon) and natural drivers (e.g. impacts of drought, wildfire).

■ Counterbalancing is managed within the same land type. A land type is distinguished by vegetation class and land potential.

■ Efforts to reverse land degradation should be planned with the aim to achieve ‘win-win’ situations whereby gains in natural capital contribute to improved and more sustainable livelihoods.

■ The LDN conceptual framework encourages application of the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security to protect the rights of local land users.

Designing and implementing interventions

A logical framework for achieving LDN is presented in Figure 2. It illustrates the impact pathway by connecting inputs, activities, outputs and interventions with the desired outcome (LDN). Users are encouraged to adapt this figure to suit their own context.

■ In order to plan effective interventions for any specific site, several preliminary assessments should be conducted:

- Land degradation assessment: the current state and trends of land degradation;
- Land potential assessment: the inherent, long-term potential of the land to sustainably generate ecosystem services;
- Resilience assessment: the capacity of the land use system to continue to deliver the same ecosystem services in face of disturbance; its adaptive capacity, its likely trajectory under anticipated stressors and shocks, such as climate change, and proximity to known thresholds;

- Socio-economic assessment: the social and economic impacts of alternative land use options and proposed interventions, with particular attention to gender considerations and vulnerable rural communities.

■ The LDN response hierarchy guides decision-makers in planning measures to achieve LDN. The response hierarchy of *Avoid > Reduce > Reverse* land degradation is based on the recognition that “prevention is better than cure” i.e. avoiding or reducing further land degradation, such as through sustainable land management practices, will maximize long-term benefits and is more cost-effective than efforts to reverse past degradation.

■ Informed by the assessment of land potential, priority for intervention is placed first on lands where prevention or avoidance of land degradation is possible, followed by land where mitigation through improved land management practices is suited, and lastly on reversing degradation through restoration, rehabilitation or reclamation on land that has lost productivity.

■ The implementation of LDN will be managed at the landscape scale. However, implementing LDN requires multi-stakeholder engagement and planning across scales and sectors, supported by national-scale coordination that should work with and incorporate any existing local and regional governance structures.



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How will LDN be monitored?

The LDN frame of reference

■ The novel aspect of LDN, that sets it apart from earlier efforts to tackle land degradation, is the specific adoption of neutrality as the goal. To assess whether this goal has been met, a reference (baseline) must be established, against which performance can be assessed. Neutrality means no net degradation, compared with this baseline. So the baseline becomes the (minimum) target to be achieved.

■ Monitoring achievement of neutrality is based on quantifying the baseline and then assessing the balance between the area of "gains" (significant positive changes/improvements) and area of "losses" (significant negative changes/degradation) relative to the baseline, within each land type, at the target date.

Indicators for LDN

■ The LDN conceptual framework specifies what to measure (the indicators) and how it is assessed (the metrics). Indicators are chosen that reflect the key processes that underpin land-based natural capital. Metrics are chosen to be universally applicable and interpretable, and quantifiable with available data sets.

■ The indicators for LDN are the UNCCD progress reporting indicators (and associated metrics):

- Land cover (land cover change)
- Land productivity (net primary productivity)
- Carbon stocks (soil organic carbon)

These can be supplemented as needed by other sustainable development goal (SDG) indicators and national indicators.

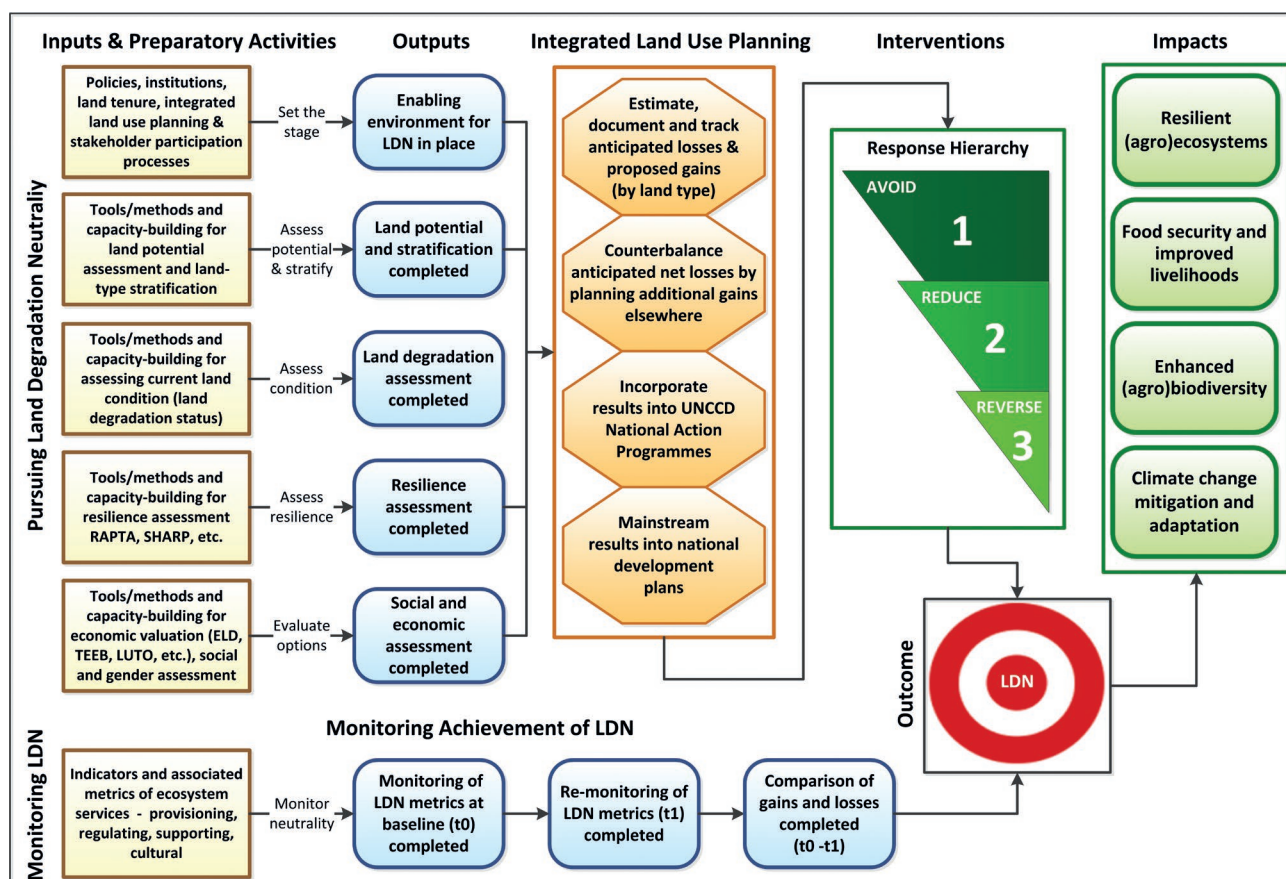
The "one-out, all-out" approach

■ The "one-out, all-out" approach is used to interpret the results of the three global indicators: if any of the three indicators/metrics shows significant negative change, it is considered a loss (and conversely, if at least one indicator/metric shows a significant positive change and none shows a significant negative change it is considered a gain).

■ A simplified example, provided in Figure 3, illustrates how LDN is monitored using the metrics to identify areas of change, and the one-out, all-out approach to identify gains and losses.

The goal of LDN: no net loss of land-based natural capital.

Figure 2. Logic model for the effective implementation of LDN.

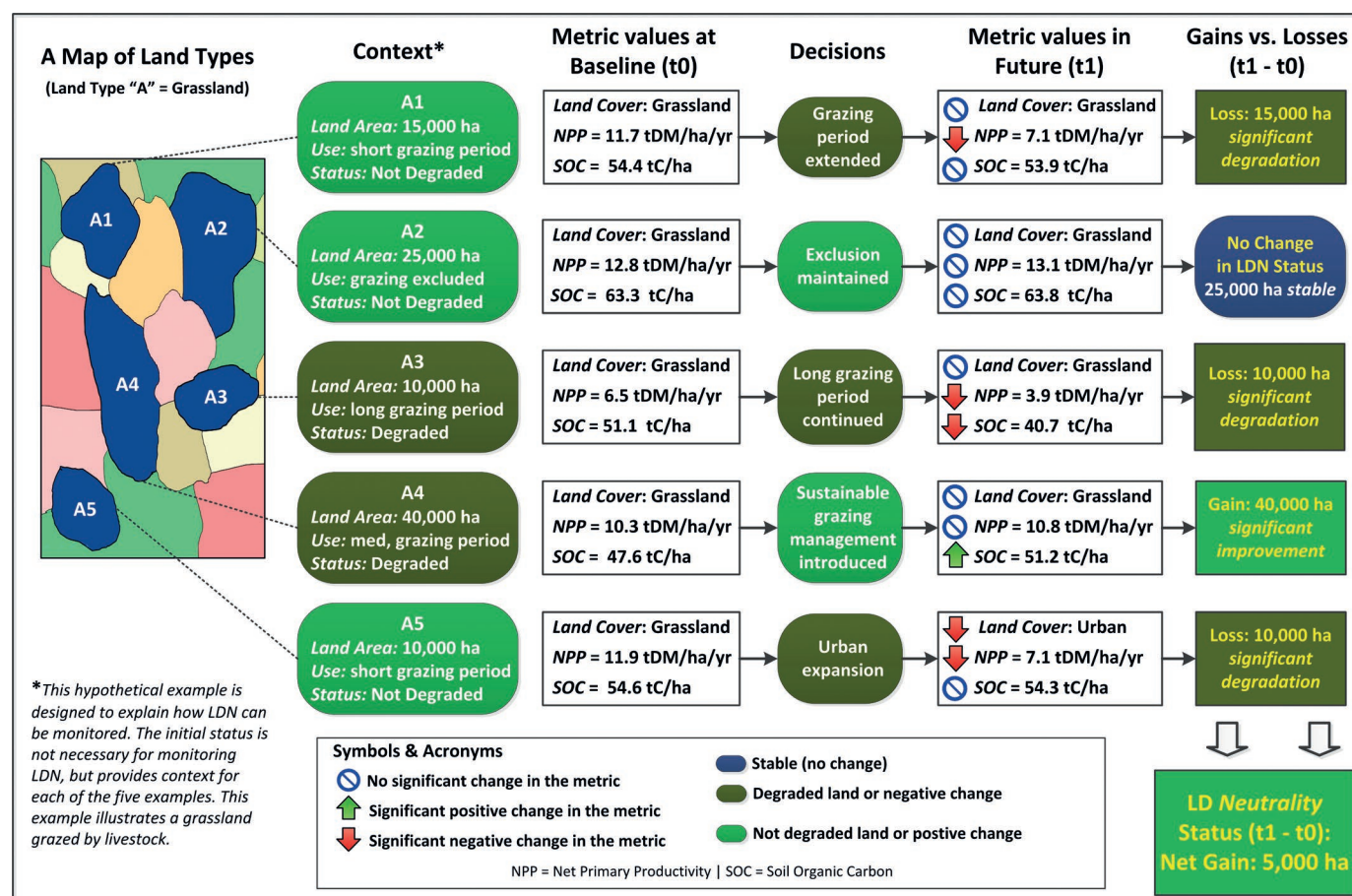


How does LDN contribute to sustainable development?

- Managing land degradation can contribute simultaneously to climate change mitigation, climate change adaptation, and protecting biodiversity.
- Interventions for LDN (sustainable land management practices and land rehabilitation/ restoration/ reclamation) enhance soil organic matter levels and often increase biomass, sequestering carbon from the atmosphere.
- Reducing land clearing is a key component of LDN, contributing to protection of carbon stocks and forest biodiversity.
- Building soil organic matter in agricultural systems supports soil biodiversity, and enhances the resilience of ecosystems, through improved retention of nutrients and water.
- LDN addresses the key environmental concerns that threaten ecosystem functions. Avoiding, reducing and reversing land degradation thereby underpin the maintenance and enhancement of land-based ecosystem services, key to meeting the sustainable development goals.
- The land-based indicators identified for LDN monitoring are relevant to the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity. There is potential for synergies through coordinated monitoring and reporting to the three Rio conventions.
- LDN monitoring can also contribute to reporting on SDG target 15.3: the same indicators are applicable for monitoring SDG indicator 15.3.1 "Proportion of land that is degraded over total land area".

Neutrality is monitored through change in values of a specific set of consistently measured indicators of land-based natural capital and ecosystem function.

Figure 3. Monitoring LDN based on changes in value of the metrics, using the one-out, all-out approach.



What can policy makers do now?

Ensure an enabling environment

- Responsible governance of land resources including tenure.
- Mechanism for integrated land use planning.
- Multi-stakeholder platforms and frameworks at local, national and regional levels to collaborate in planning, implementing, monitoring and evaluating LDN interventions.
- Policies that incentivize Sustainable Land Management (SLM).

Set voluntary targets

- Through the LDN Target Setting Programme of the UNCCD's Global Mechanism.

Integrate and leverage

- Integrate LDN targets and policies with broader sustainable development strategies.
- Leverage ongoing activities of all the Rio conventions in order to maximize efficiency and deliver effective solutions.

Initiate preliminary assessments

- The key to achieving LDN is in making the most effective land use planning decisions. Assessments of land potential, land degradation status and the resilience of the land use system, followed by a socio-economic assessment of alternative options, create a strong foundation for land use decision-making.



Brazil. Photo by Annette Cowie©



Indonesia. Photo by Annette Cowie©



Namibia. Photo by Niels Dreber©

Further reading:

1. UNCCD/Science-Policy Interface (2016). Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. Barron J. Orr, Annette L. Cowie, Victor M. Castillo Sanchez, Pamela Chasek, Neville D. Crossman, Alexander Erlewein, Geertrui Louwagie, Martine Maron, Graciela I. Metternicht, Sara Minelli, Anna E. Tengberg, Sven Walter, and Shelly Welton. (Forthcoming). United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany, ISBN 978-92-95110-42-7 (hard copy), 978-92-95110-41-0 (electronic copy)
2. UNCCD/The Global Mechanism (2016). Achieving Land Degradation Neutrality at the country level, Building blocks for LDN target setting.

The mission of the UNCCD Science-Policy Interface (SPI) is to facilitate a two-way dialogue between scientists and policy makers in order to ensure the delivery of science-based, policy-relevant information, knowledge and advice.

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