

Land resources provide food, feed and fibre, and support the often-overlooked regulating and supporting services on which these provisioning services depend, as well as the cultural services delivered by healthy ecosystems. Pressure on the world's finite land resources will grow as the population grows and increases in affluence. Increased competition for land resources is likely to increase social and political instability, exacerbating food insecurity, poverty, conflict and migration. Maintaining the land's ability to deliver ecosystem services will depend on building resilience of the land resource base.

While demands on the global land resources are increasing, the overall health and productivity of land is declining. Thus, it is critical to find effective measures to address land degradation. Avoiding and reversing land degradation will have co-benefits for climate change mitigation and adaptation, and also for biodiversity conservation, in addition to enhancing food security and sustainable development.

Land Degradation Neutrality (LDN) is the new paradigm for managing land degradation, introduced to halt the ongoing loss of healthy land as a result of unsustainable management and land conversion. 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,"<sup>1</sup> 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.

The target of LDN is a major plank in the global 2030 Agenda for Sustainable Development: LDN will underpin the achievement of multiple Sustainable Development Goals (SDGs) related to food security, poverty reduction, environmental protection and the sustainable use of natural resources.

## Overview of the conceptual framework

The Scientific Conceptual Framework for Land Degradation Neutrality<sup>2</sup> provides a scientific foundation for planning, implementing and monitoring LDN. It was developed by a group of experts led by the Science-Policy Interface (SPI) of the United Nations Convention to Combat Desertification (UNCCD), and has been reviewed by technical experts and policy makers. By defining the LDN concept in operational terms, the framework is designed to create a bridge between the vision and its practical implementation. It articulates the scientific basis for the vision and logic of LDN, and, based on this, presents a strategy for achieving LDN, an approach to monitoring LDN status, and guidance on interpreting the results of monitoring.

The objectives of LDN as articulated in the conceptual framework 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.

The framework is structured around five 'modules': the *Vision of LDN*, which articulates the aspirational goal of LDN; the *Frame of Reference*, that explains the LDN baseline against which achievement is measured; the *Mechanism for Neutrality*, that describes the counterbalancing mechanism; *Achieving Neutrality*, that presents the theory of change (logic model) describing the pathway for implementing LDN, including preparatory analysis and enabling policies; and *Monitoring Neutrality*, which presents the indicators for assessing achievement of LDN. The conceptual framework is described in a report that presents the five modules, and focuses on the neutrality aspect of LDN, highlighting the features of LDN that differ from historical approaches to land degradation assessment and management.

The framework presents principles to be followed by all countries that choose to pursue LDN.

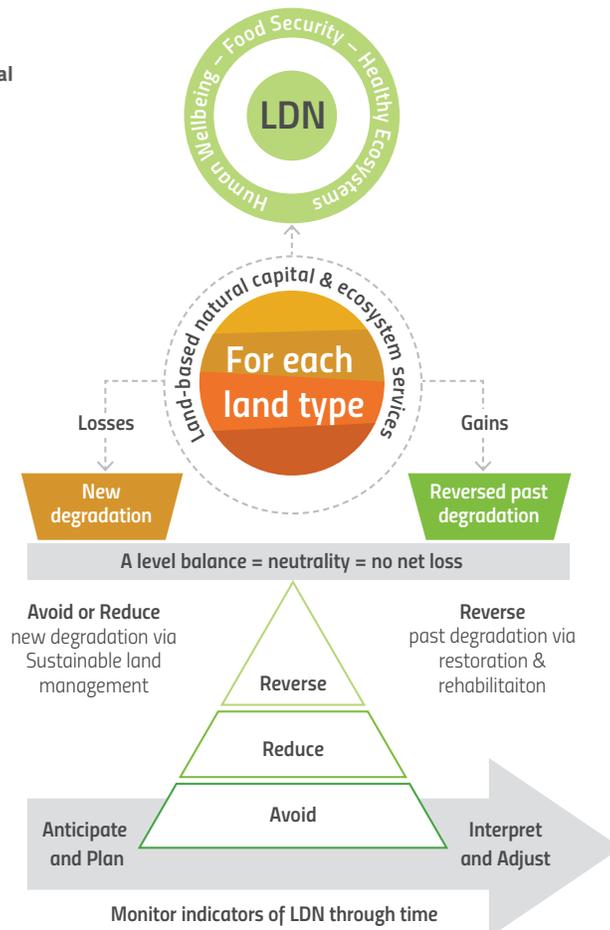
Principles govern application of the framework and help prevent unintended outcomes during implementation and monitoring of LDN.

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. The conceptual framework is summarised in Figure 1.

In order to achieve the SDG target of a land degradation-neutral world, countries have been invited to commit voluntarily to LDN at the national level. While the scope of the UNCCD is limited to drylands, the LDN conceptual framework is intended to be applicable across all land types, land uses, and ecosystem services, so it can be used by countries according to their individual circumstances.

Therefore, the LDN conceptual framework is designed to apply to all land uses (i.e., land managed for production – e.g., agriculture, forestry, for conservation – e.g., protected areas, and also land occupied by human settlements and infrastructure) and all types of land degradation, across the wide variety of countries' circumstances, so that it can be implemented in a harmonized fashion by all countries that choose to pursue LDN.

Figure 1: Schematic of the scientific conceptual framework for land degradation neutrality

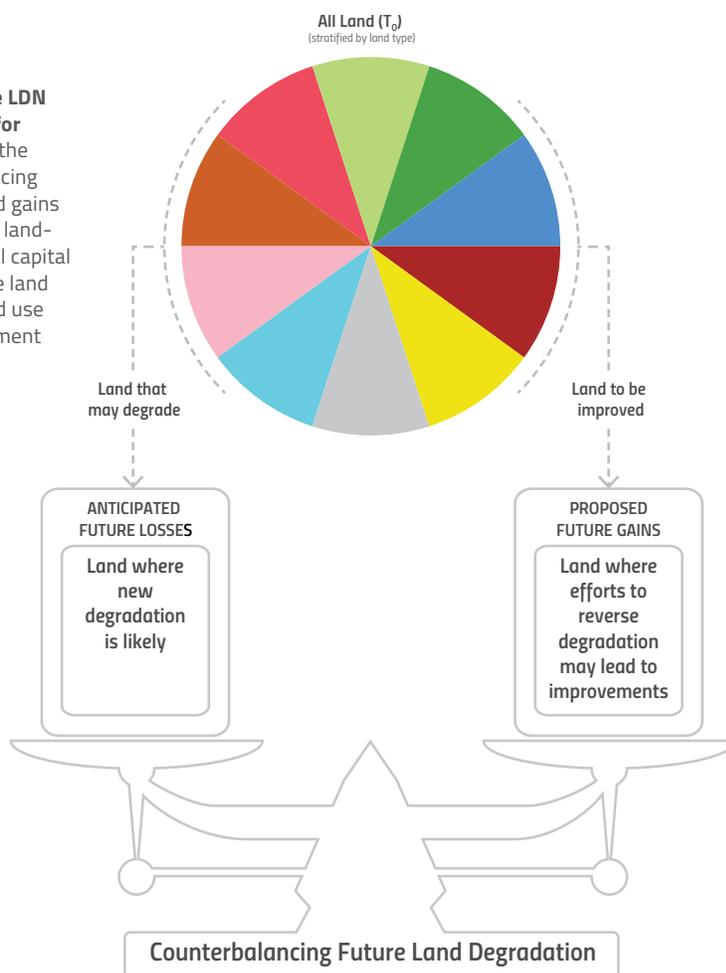


## The elements of the conceptual framework

The Vision and Baseline The aspirational goal of LDN is to maintain or enhance the natural capital of the land and associated land-based ecosystem services. Pursuit of LDN therefore requires effort to avoid further net loss of the land-based natural capital relative to a reference state, or baseline. Therefore, 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 intention is that losses are balanced by gains, in order to achieve a position of no net loss of healthy and productive land.

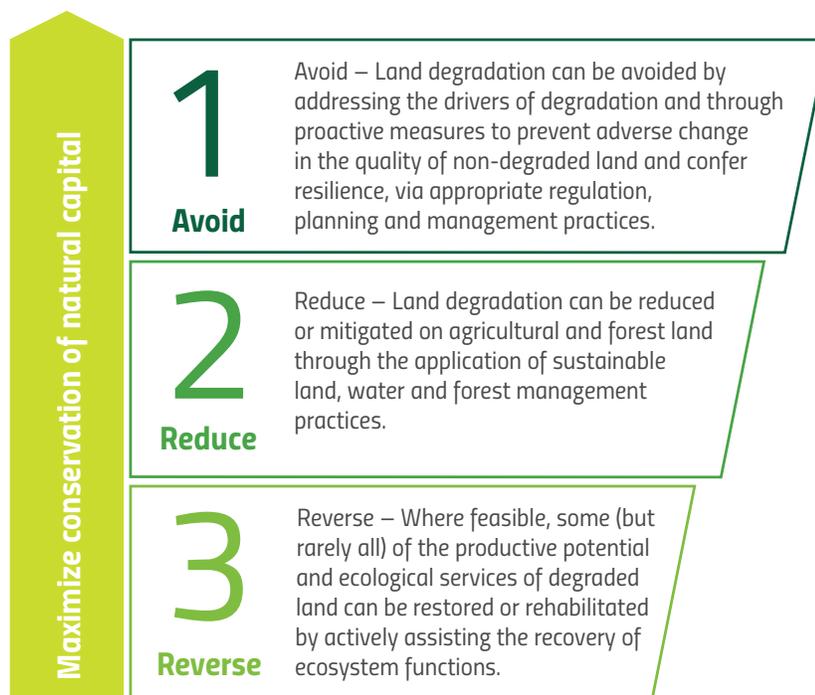
Integrated land use planning and the counterbalancing mechanism Achieving LDN will require tracking land use changes where degradation is anticipated so that cumulative negative impacts can be estimated, and implementing an optimal mix of interventions designed to avoid, reduce or reverse land degradation, with the intent of achieving neutrality at national scale. Therefore, the conceptual framework introduces a new approach in which land degradation management is coupled with land use planning. Decision-makers are encouraged and guided to consider the cumulative effects on the health and productivity of a nation's land resources caused by the collective impact of their individual decisions that influence management of particular parcels of land. LDN thus promotes integrated land use planning, with a long-term planning horizon including consideration of the likely impacts of climate change. The counterbalancing mechanism requires implementation of interventions that will deliver gains in land-based natural capital equal to or greater than anticipated losses due to degradation elsewhere (see Figure 2).

**Figure 2: The LDN mechanism for neutrality** is the counterbalancing of anticipated gains and losses in land-based natural capital within unique land types via land use and management decisions.



Achieving neutrality Actions to achieve LDN include sustainable land management approaches that avoid or reduce degradation, coupled with efforts to reverse degradation through restoration or rehabilitation of degraded land. The response hierarchy of Avoid > Reduce > Reverse land degradation (see Figure 3) expresses the priorities in planning LDN interventions: most effort should be applied to avoiding land degradation, on the basis that "prevention is better than cure", because restoring degraded land is time-consuming and expensive. The implementation of LDN is managed at the landscape scale. Counterbalancing anticipated losses with measures to achieve equivalent gains is to be undertaken within each land type. Land types are defined by land potential, which is a reflection of inherent properties such as soil type, topography, hydrology, biological and climatic features.

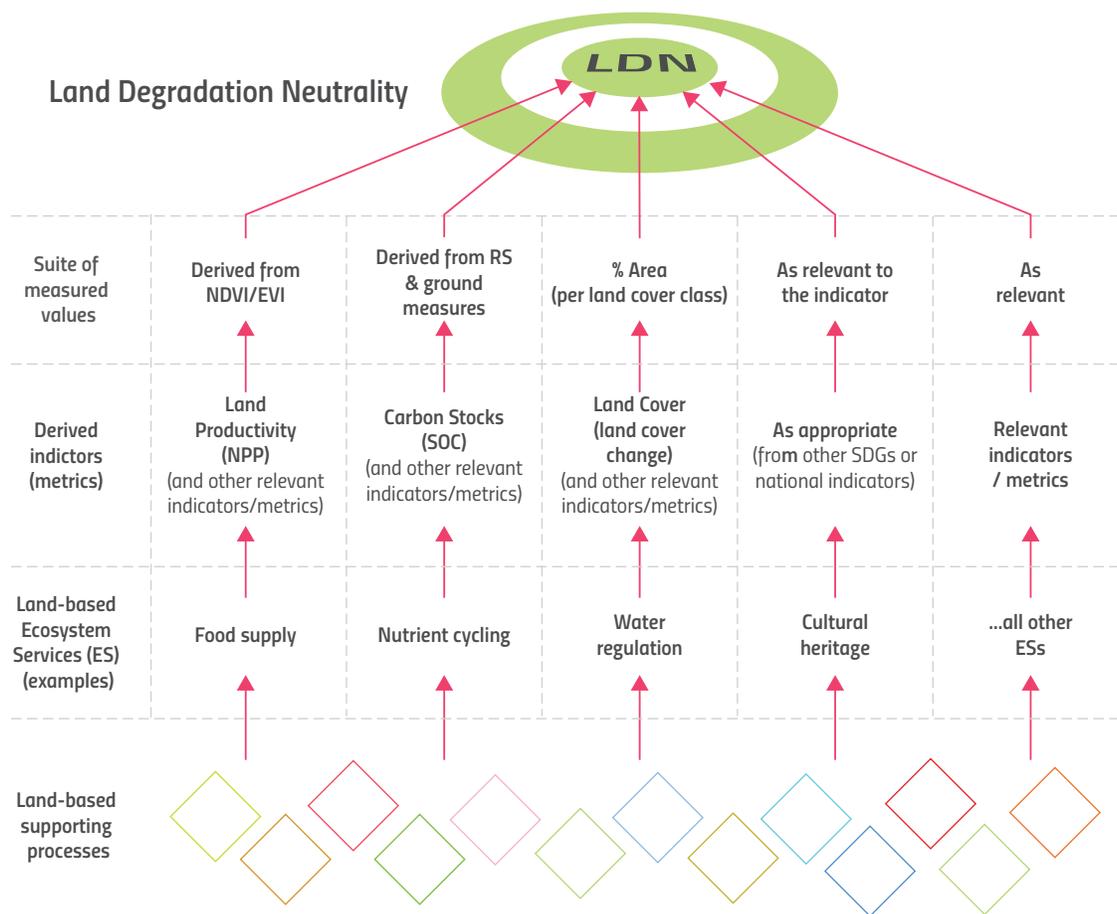
**Figure 3: The LDN response hierarchy** encourages broad adoption of measures to avoid and reduce land degradation, combined with localised action to reverse degradation, to achieve LDN across each land type.



Land potential influences vegetation community composition and productivity, and determines suitability for uses such as cropping, grazing, forestry, infrastructure or urban development. Counterbalancing will generally not occur between different land types, to ensure “like for like,” when assessing and managing the counterbalancing between losses and gains. In other words, a gain in one land type cannot counterbalance a loss in a different land type. Also, the counterbalanced land should have as high or higher natural capital value than that which is anticipated to be lost. Note also that land with the same biophysical characteristics may have different value with respect to human well-being and livelihoods depending on where it is located. Counterbalancing losses in land types managed for conservation with gains in land types managed for production should be avoided.

To achieve the broader development objectives of the UNCCD and the Sustainable Development Goals, LDN activities should seek to deliver ‘win-win’ outcomes whereby land restoration and rehabilitation contribute to broader environmental goals and more sustainable livelihoods. Planning of LDN measures should therefore consider the full environmental, social and economic implications of alternative options. Resilience of the measures should be assessed, to ensure that restoration activities undertaken will provide counterbalancing of degradation in the longer term.

**Figure 4: Selection of indicators** based on ecosystem services to be monitored



Monitoring LDN Monitoring achievement of neutrality will quantify the balance between the area of gains (significant positive changes in LDN indicators=improvements) and area of losses (significant negative changes in LDN indicators=degradation), within each land type across the landscape. The LDN indicators specify what to measure, while the metrics state how each of the indicators is assessed. Indicators for LDN were selected to reflect the land-based ecosystem services the LDN seeks to support. The relationship between ecosystem services, indicators and metrics is illustrated in Figure 4.

The global LDN indicators (and associated metrics) are land cover (land cover change), land productivity (net primary production) and carbon stocks (soil organic carbon stocks). These indicators are applied in a "one out, all out" approach: where any of the indicators shows significant negative change, it is considered a loss, and conversely, if at least one indicator shows a positive trend and none shows a negative trend, it is considered a gain. Countries are encouraged to supplement the three global indicators with additional indicators for the ecosystem services not covered by the three global indicators, which may include other SDG indicators and/or national indicators that are relevant to their context, such as measures of land contamination or biodiversity impacts. A participatory review of monitoring results will help ensure their accuracy and local relevance, allowing for refinements to account for false positives, such as invasive shrub encroachment.

## Governance, stakeholder engagement and learning

Governance of LDN is a critical element. Suitable policies should be enacted to support the implementation of LDN. Safeguards should be introduced to ensure that vulnerable communities are not displaced when lands are targeted for restoration activities. The conceptual framework recommends adoption of the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGTs), which provide practical guidance on how to protect the rights of local land users, especially those individuals and communities that have no advocate in land use decision-making.

Stakeholders should be involved in the planning and implementation of LDN, and in the verification and interpretation of the results of monitoring.

There are many relevant stakeholder groups, including land users, policymakers and regulators at local, regional and national levels involved in land use planning, resource management; experts in land assessment, restoration, and agricultural extension officers. Where available and effective, stakeholder engagement for LDN should utilise existing local and regional networks.

Learning is a key cross-cutting element of the LDN conceptual framework. Knowledge from monitoring should be verified through stakeholder consultation, and lessons learned should be used for adaptive management, that is, applied to adjust plans for the implementation of LDN, and for future management of land degradation.

## Principles to govern LDN

The conceptual framework proposes the following principles to govern the implementation of LDN:

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” (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.

## CONCLUSION

Land degradation neutrality is a new approach to management of land degradation that is intended to encourage action to avoid or reduce degradation, and also to restore degraded land, in order to achieve the goal of no net loss in healthy, productive land, at national level. The scientific conceptual framework for LDN provides scientifically-based guidance in planning, implementing and monitoring LDN.

To achieve LDN countries will need to assess the cumulative effect of land use decisions, and then undertake measures to restore degraded land, to counterbalance anticipated losses. Linking LDN objectives with existing land use planning mechanisms will facilitate the implementation of LDN. Countries should consider the social and economic as well as environmental outcomes of alternative options when planning LDN measures, and should engage relevant stakeholders.

Counterbalancing anticipated losses with measures designed to achieve gains should occur on a “like for like” basis, and should be managed within each land type.

Three indicators that reflect the land-based ecosystem services have been selected to report on LDN: land cover change, primary productivity and carbon stocks. The conceptual framework provides practical guidance including theoretical examples of how the indicators are assessed. The practical approach presented in the conceptual framework has led to significant country buy-in: in September 2016, the Global Mechanism (GM) of the UNCCD announced that 100 countries – over half of all UNCCD signatories – had embarked on the process of establishing national targets for LDN.

### Further information

UNCCD/Science-Policy Interface (2016). Land in Balance: Scientific Conceptual Framework for Land Degradation Neutrality. Science-Policy Brief 02- September 2016. [http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/10\\_2016\\_spi\\_pb\\_multipage\\_eng.pdf](http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/10_2016_spi_pb_multipage_eng.pdf)

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## REFERENCES

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- 2 Orr, B, A Cowie, V Castillo, P Chasek, N Crossman, A Erlewein, G Louwagie, M Maron, G Metternicht, S Minelli, A Tengberg, S Walter, S Welton. (2017). Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. UNCCD/Science-Policy Interface. <http://www2.unccd.int/publications/scientific-conceptual-framework-land-degradation-neutrality>