Land Degradation Neutrality:

implications and opportunities for conservation

Nature Based Solutions to Desertification, Land Degradation and Drought

2nd Edition, November 2015

IUCN Global Drylands Initiative

Land Degradation Neutrality:

implications and opportunities for conservation

Nature Based Solutions to Desertification, Land Degradation and Drought

Second Edition 27/08/2015

With contributions from Global Drylands Initiative, CEM, WCEL, WCPA, CEC[1]

1 Contributors: Jonathan Davies, Masumi Gudka, Peter Laban, Graciela Metternicht, Sasha Alexander, Ian Hannam, Leigh Welling, Liette Vasseur, Jackie Siles, Lorena Aguilar, Lene Poulsen, Mike Jones, Louisa Nakanuku-Diggs, Julianne Zeidler, Frits Hesselink

Copyright: ©2015 IUCN, International Union for Conservation of Nature and Natural Resources, Global Drylands Initiative, CEM, WCEL, WCPA and CEC.

The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN and CEM concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views expressed in this publication do not necessarily reflect those of IUCN, Global Drylands Initiative, CEM, WCEL, WCPA and CEC.

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage retrieval system without permission in writing from the publishers.

Citation: IUCN 2015. Land Degradation Neutrality: implications and opportunities for conservation, Technical Brief 2nd Edition, November 2015. Nairobi: IUCN. 19p.

Cover photo: Yurt among green hills, Kazakhstan. Photo credit: Vasca

Design & layout: Gordon Arara (IUCN Publications Unit, Nairobi)

Available from: IUCN, the International Union for Conservation of Nature
Global Drylands Initiative (GDI)
www.iucn.org/drylands

Table of Contents

Preamble iii
Summary iv
Land Degradation: a global threat to biodiversity and sustainable development 1
Extent of Land Degradation Worldwide 1
Causes of Land Degradation 2
Impacts of Land Degradation 2
Achieving Land Degradation Neutrality 4
Measuring Progress towards LDN 4
Sustainable Land Management (SLM) approaches 5
Landscape Restoration 5
Ecosystem Based Approaches 6
Protected Areas 6
Land Degradation Neutrality and the Conservation Sector 7
Concerns for the Conservation Sector 7
Respect biodiversity and ecosystems 7
Strengthen natural resource governance and tenure security 8
Contribute to and benefit from achievement of other multilateral agreements 8
Strengthen evidence for LDN achievement 8
Conclusion and recommendations 9
References 10

IUCN, the International Union for Conservation of Nature

IUCN was founded in 1948 as the world's first global environmental organisation and is today the largest professional global conservation network with more than 1,200 member organisations including 200+ government and 900+ non-government organisations, as well as 11,000 voluntary scientists and experts, grouped in six Commissions in some 160 countries. IUCN is a neutral forum for governments, NGOs, scientists, business and local communities to find practical solutions to conservation and development challenges. Central to IUCN's mission is demonstrating how biodiversity is fundamental to addressing some of the world's greatest challenges such as climate change, sustainable development and food security.

IUCN works in partnership with the United Nations Convention to Combat Desertification through a Memorandum of Understanding signed in 2013 and a joint Work Plan that was revised in 2015. The aim of the partnership is to support progress towards policies and programmes that deliver Land Degradation Neutrality through the application of Nature Based Solutions (at national and sub national levels). The principle targets of the Joint Work Plan are to support countries to implement Nature-Based Solutions to Desertification and Land Degradation, to strengthen the enabling environment for addressing land management challenges, including improved natural resource governance, and to strengthen the use of indicators for monitoring desertification and land degradation.

The IUCN Global Drylands Initiative (GDI) contributes to strengthening the resilience of dryland ecosystems and livelihoods and to conserving drylands biodiversity. The Initiative builds on and strengthens the local knowledge and institutions that enable people to govern their resources sustainably. This is achieved by strengthening rights and governance from local to national level as well as globally, and developing enabling conditions for sustainable investement and development.

For more information visit www.iucn.org/drylands/

Preamble

Land Degradation is a global concern for sustainable development, conservation of biodiversity and mitigating and adapting to climate change. It refers to reduction or loss of the biological or economic productivity and complexity of land, reducing carbon storage in soil and vegetation, driving the loss of biodiversity and accelerating climate change. It is vital that land degradation receives adequate attention from the nature conservation community, and is addressed pro-actively in the implementation of the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC). Land Degradation should not be solely regarded as the domain of the United Nations Convention to Combat Desertification (UNCCD), given its close links with other environmental and sustainable development challenges, including poverty, climate change and biodiversity loss.

Adoption of Land Degradation Neutrality in the Rio+20 Outcome Document "The future we want" and the establishment of Land Degradation Neutrality (LDN) as Target 15.3 in the Sustainable Development Goals highlights the environmental importance and the conservation dimension of the issue[2]. Reversing land degradation is essential if we are to achieve the goals of the UNCCD, CBD or the UNFCCC as well as to continue meeting related sustainable development targets. The translation of global targets into national ones, such as LDN, will help position the interconnected challenges of Desertification, Land Degradation and Drought at the centre of the conservation sector, and will provide impetus towards more integrated responses to climate change and the other major environmental crises of our time.

In view of the lukewarm attention land degradation has received in the past from the nature conservation community, this Technical Brief is written primarily for a conservation audience, in an effort to build the case for their engagement in LDN and to highlight potential and shared concerns over the proposed LDN target setting. The target audience includes scientists, policy makers and NGOs with a prior knowledge of environmental issues, but who may not be working directly on land degradation. Further work will be required to engage communities in LDN dialogue in order to raise their awareness and secure their buy-in to the concept. This is urgent as, although IUCN has engaged with the UNCCD process increasingly during the past decade, the UNCCD has generally received insufficient interest from the conservation sector.

The Technical Brief is the output of collaboration between the IUCN Commission on Ecosystem Management, World Commission on Environmental Law, the World Commission on Protected Areas, Commission on Education and Communication, and the IUCN Secretariat.

2 United Nations Sustainable Development Knowledge Platform. https://sustainabledevelopment.un.org/?menu=1300

Summary

Degradation of forests, rangelands and agricultural lands is a major barrier to achieving sustainable development, to conserving biodiversity, and to climate change mitigation and adaptation. Land degradation exacerbates the impacts of climate change and natural hazards such as droughts, heat-waves and dust storms. It is one of the major contributors to habitat loss and subsequent species losses, leading to a decline in biodiversity and ecosystem services. Reduced ecosystem function, and in particular soil quantity and fertility, decreases ecosystem resilience. This in turn increases vulnerability to climate change stressors and natural hazards and reduces adaptive capacity for the women and men dependent on that land for their livelihoods. As a consequence it undermines food, water and livelihood security, human health, and energy supply, with further implications for poverty, conflict and human displacement.

Drivers of land degradation include over exploitation for agriculture and over harvesting of trees and other species, but these are often driven in turn by other societal change. Population growth and economic development, for example, are amongst a number of indirect drivers of land degradation (Geist and Lambin, 2004).

Estimates of the extent of global land degradation vary widely, ranging from 15% to 63% of all land (Safriel, 2007), although figures are gradually converging on somewhere between 25% and 30% of all land. The absence of a standardised global assessment and monitoring system contributes to this variance and leads to divergent understanding of land degradation. The related issues of Desertification, Land Degradation and Drought (DLDD) are addressed by the United Nations Convention to Combat Desertification (UNCCD), which was established to address land degradation in drylands. However, land degradation is a worldwide phenomenon that may be even more prevalent in humid and sub-humid areas (Bai et al., 2008).

To address the issue of land degradation on a global scale, a goal of Land Degradation Neutrality (LDN) was established in the Rio+20 Outcome Document, “The Future We Want”, and has now been ratified by the United Nations General Assembly’s Target 15.3 of the Sustainable Development Goals (SDGs).

In October 2015 LDN was adopted as the target of the UNCCD, where it 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” (UNCCD, 2015). The adoption of the LDN target is expected to raise the profile of Land Degradation as a global threat and help galvanise measurable action. The LDN target should support and complement existing targets of the United Nations Framework Convention on Climate Change (UNFCCC) and Convention on Biological Diversity (CBD). While LDN implicitly recognizes that eradicating land degradation is unattainable in the foreseeable future, it also stresses that land productivity and provision of ecosystem services on degraded land can be recovered or restored.

While LDN provides a tremendous opportunity to mobilize action on this important challenge, important concerns remain in relation to how LDN targets are set and how action is taken to meet such targets. It is crucial that progress towards LDN (i) respects biodiversity and ecosystems, (ii) strengthens natural resource governance and promotes equity, gender equality and human rights, (iii) contributes to and benefits from achievement of other multilateral agreements, and (iv) is based on suitable empirical evidence.

Nature conservation actors should play a leading role in ensuring the use of integrated ecosystem management approaches to achieving LDN to ensure sustainability at all levels, to optimize synergies, and to avoid unwanted trade-offs. Emphasis must be placed on stronger governance of natural resources at all levels to provide an enabling platform for sustainable land management and the full and active participation of women and men. Investments should prioritize achieving synergy between nature conservation and sustainable development. LDN should not be seen as an additional burden, but as an opportunity to leverage more integrative approaches for greater value-addition to conservation action. LDN provides a foundation for many environmental goals and should be given greater prominence within the conservation and sustainable development discourses.

Land Degradation: a global threat to biodiversity and sustainable development

Land is ubiquitous: it provides many services to humanity and is put to many different uses. Indeed not everybody views land in purely utilitarian terms. For some people land provides inspiration and connection with nature and is the key to their dignity. Land has cultural value as well as productive value, providing food and water, fuel and fibre, employment, waste purification, and many more services. As a result the desired state of land for one purpose might be considered as degraded from a different point of view. Objectively defining land degradation is challenging and in many cases a negotiated, context-specific definition is needed. However, since Land Degradation has been identified as a global environmental challenge (see the following paragraphs), a global definition is needed.

One of the more robust definitions is that of the Global Environment Facility[3]: "any form of deterioration of the natural potential of land that affects ecosystem integrity either in terms of reducing its sustainable ecological productivity or in terms of its native biological richness and maintenance of resilience." A similar definition is found in the text of the UNCCD: "land degradation means reduction or loss … of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes … arising from human activities". Land degradation in the drylands is specifically referred to as Desertification. This Technical Brief responds to the fact that Land Degradation is being recognised as a major global priority, particularly as governments start recognizing its close inter-connectedness with climate change and biodiversity loss.

Extent of Land Degradation Worldwide

A number of attempts have been made in recent decades to map the extent of land degradation globally and increasing use is being made of remote sensing technologies to generate a global overview. Although the field may be progressing rapidly, such high-level assessments face constraints due to challenges of interpreting data in climatically and ecologically distinct regions combined with the low level of relevant and up-to-date data available at national or sub-national levels. As a result a wide range of estimates of land degradation can be found, from a low of 15% to a high of 63% (Safriel, 2007). Such variation can also be partially explained by the use of divergent definitions of "degradation" as well as difference in approaches to measurement (for an overview see Caspari et al. 2014).

Measurements of Net Primary Productivity (the net flux of carbon from the atmosphere into green plants per unit time) have been used, for example, to give a global overview of vegetation changes, but such analyses assume that all increases in vegetation are qualitatively positive, and in practice this is may not be the case. Furthermore, land that is cleared for crop production may be maintained at a sustainable level of production, yet would register as degradation on such global assessments, although land that was cleared prior to the availability of satellite data would not. Nevertheless, a macro-level overview can give an approximation of the scale of the challenge.

A global land degradation analysis of the period 1981-2003 using remotely-sensed data showed that 24% of the land area had been degrading during that 22 year period. In this assessment cropland and forest land were disproportionately degraded: 19% of degrading land was cropland even though cropland only accounts for 12% of the global land area and a further 4% in mosaics; 43% of degrading land was forestland even though forest occupies only 28% of the world's land surface. The study found that 78% of degradation by area was to be found in humid regions whereas 22% was in the drylands (Bai et al 2008).

An analysis of long-term trends (25 year) using an inter-annual vegetation index as an indicator of biomass production decline or increase found that land degradation hotpots cover about 29% of global land area and occur in all agro-ecologies and land cover types. Anthropogenic declines in biomass productivity were found on 25% of croplands and vegetation-crop mosaics, 29% of mosaics of forests with shrub- and grasslands, 25% of shrublands, and 33% of grasslands, as well as 23% of areas with sparse vegetation. The study also identified improvement of biomass productivity on 2.7% of the global land mass (Le et al., 2014).

The various studies appear to converge on a global estimate of between one quarter and one third of all land suffering from some form of degradation. However, these analyses rely on remote sensing data that face a number of major limitations, not least of which is the reliance on gross biomass production without differentiating between desirable and undesirable land cover. Assessment of the true extent of land degradation at global, national and sub-national scales remains a major barrier to effectively prioritizing action on the ground and reversing land degradation.

3 https://www.thegef.org/gef/land_degradation

Causes of Land Degradation

Conversion of forest, wood land and rangeland for crop cultivation is one of the principal causes of desertification (MEA, 2005; Bai et al., 2008). Climate change will further exacerbate these pressures, largely due to the intensification of freshwater scarcity under a warming climate. If current population trends continue, food demand continues to increase, and consumption waste is not reduced, global food production will require increases of 70 to 100% (FAO, 2009). This is likely to drive further clearance of forests and rangelands for crop production if measures for sustainable crop production are ignored.

The most obvious drivers of land degradation, like conversion to agriculture and over-extraction of natural resources (including timber and pasture), are usually proximate causes that have a number of common roots (Geist and Lambin, 2004). Population growth and economic development are important indirect drivers of land degradation, along with insecure tenure and inappropriate policies. Addressing Land Degradation requires greater awareness of these ultimate causes and often requires a high level of political will to find solutions.

Land degradation is also driven by knowledge gaps and lack of agreement on the role of land. Land is a broad term with many interpretations; for example, as an ecosystem, as a landscape, as an administrative or planning unit, and as a social or cultural concept. Lands are complex systems operating on large spatial and temporal scales that present many challenges to effective management. As a result there are major gaps related to sustainable land management which drive land degradation through implementation of inappropriate policies and investments.

Crop production is widespread in the drylands, but it is increasingly practiced in areas of lower rainfall and poorer soil where its viability is questionable, leading to cases of land abandonment. Governments are responsible for policies that pursue greater area under production rather than greater productivity per unit area, or reduced post-harvest losses. Land management practices that were sustainable in the past, such as for forest, range and croplands, have not been replaced by equally sustainable options. Questions have been raised over moving to mechanised, fertiliser-dependent cropping to replace traditional agroforestry; switching from fallows to continuous cropping; switching from crop rotations to mono-cropping; and shifting from mobile pastoralism to sedentary livestock ranching (Mortimore et al., 2009; United Nations, 2011). Economic, technological, demographic, cultural, and policy factors all play a major role in the shift to less sustainable farming systems and currently there is insufficient policy support to reverse the trend in most countries.

Weak or declining natural resource rights and governance are major contributing factors and have led to disincentives to sustainable land management and to the loss of formerly sustainable managed lands. For example, customs of communal resource management have been lost by many pastoralist communities due to loss of traditional rights, privatisation of land, and unclear formal legal rights that exclude users from critical resource patches in certain seasons. Loss of land and other natural resources and reduced access to these lands and their natural resources have major consequences on sustainable land management, as for example when dry season grazing areas for livestock are converted to crop cultivation, incorporated in urban expansion, or removed for conservation (McGahey et al., 2008; Davies et al., 2010; Behnke et al., 1993).

Impacts of Land Degradation

Land degradation is a significant barrier to sustainable development and contributes to climate change, biodiversity loss and poverty. It contributes to loss of adaptive capacity, increased environmental risks, and food, water and energy insecurity. It can also lead to human displacement through greater impacts from natural hazards such as droughts, flash-floods, heat-waves and dust storms. Land degradation may not have the same impact on women and men because of their different activities and socio economic role. Some segments of society may be disproportionately affected by soil degradation and be the least able to address the problem. They would require particular attention, from a social/ legal (for women) as well as an economic standpoint.

Globally the cost of deforestation and land degradation has been estimated at up to €1.5-3.4 trillion or 3.3 % –7.5 % of the global GDP in 2008 (TEEB, 2008). India has estimated that it lost 5% of its GDP in 1994 (Reddy, 2003); Burkina Faso estimates annual losses of 9% of GDP and Nigeria estimates 17% (Barbier and Bishop, 1995). The challenge with measuring the costs of Land Degradation is grasping the complexity of knock-on effects. There is a tendency to under-estimate and to overlook important ecosystem services that are lost when land is degraded, such as disruption of water regulation or reduction in carbon sequestration. Such causal links are far reaching and are not factored into most estimates of the cost of land degradation.

Land degradation is a significant contributor to biodiversity and habitat loss and to changes in species abundance. It leads to a general decline in biodiversity and ecosystem services. Land Degradation leads to reduction in infiltration and ground-water recharge and to an increase in run-off and siltation, in both cases contributing to important down-stream effects of drought and flood. The UNCCD has estimated that the percentage of Earth's land area affected

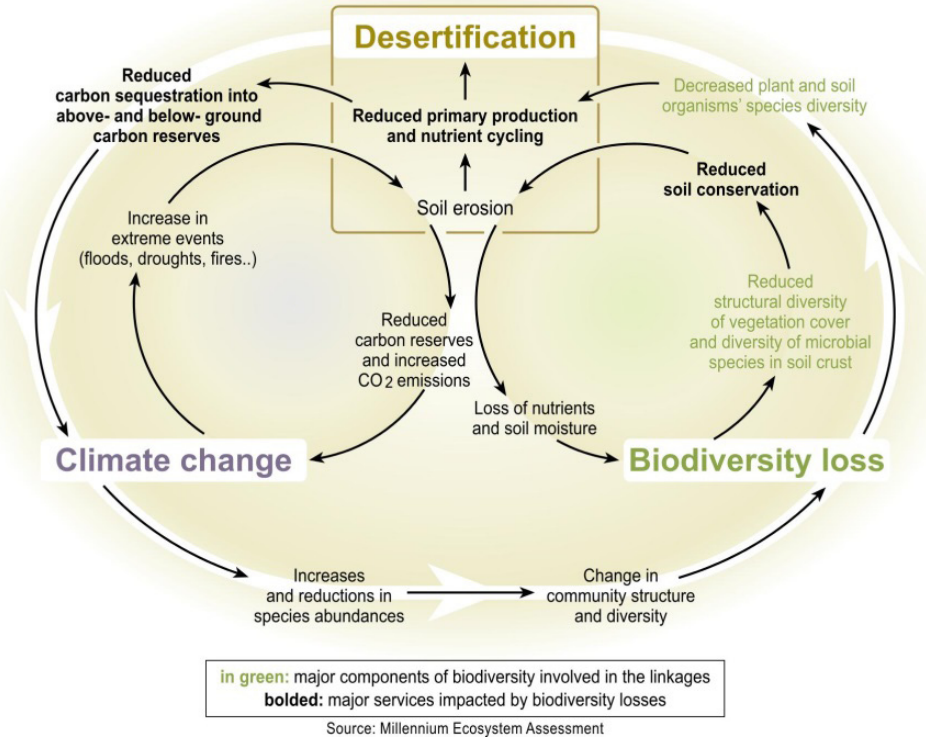

Figure 1: Feedback loop between land degradation, biodiversity loss and climate change

by serious drought has more than doubled since the 1970s and by 2030 water scarcity in some arid and semiarid places may displace up to 700 million people (UNCCD, nd). Figure 1 provides a simplified illustration how biodiversity loss and climate change reinforce the feedbacks that drive desertification.

The impacts of land degradation are not confined to national boundaries but can be regional and global. These costs can include dust storms, floods and greenhouse gas emissions. Carbon stored in soil is higher than the combined total of the worlds' biomass and atmosphere making land degradation one of the most important factors in climate change. Almost two thirds of terrestrial stored carbon in soils and vegetation have been lost since the 19thcentury through land degradation processes, contributing significantly to global warming (Houghton, 1995). Roughly one-quarter of all anthropogenic greenhouse gas emissions come from the agriculture, forest and other land use sector (IPCC, 2014).

Recent studies have suggested that soil carbon management presents one of the most cost-effective climate change mitigation options (McKinsey, 2009). Rangelands, for example, contain more than a third of all the terrestrial above and below-ground carbon reserves (Allen-Diaz 1996) and with improved rangeland management they could potentially sequester a further 1300-2000 MtCO2e by 2030 (Tennigkeit and Wilkes, 2008). Restoring or rehabilitating degraded land and managing it sustainably may provide an effective way to ensure effective carbon sequestration, or avoided land degradation, considering the central role that soil organic carbon plays in both soil fertility and soil moisture management.

Achieving Land Degradation Neutrality

Halting and reversing Land Degradation is a high priority for transitioning to a more sustainable society. This is clearly reflected in the Rio+20 Outcome Document, "The Future We Want", where paragraph 206 states "We recognize the need for urgent action to reverse land degradation. In view of this, we will strive to achieve a land-degradation neutral world in the context of sustainable development". The concept of Land Degradation Neutrality (LDN) has been adopted as part of the 2030 Agenda for Sustainable Development and is enshrined in Target 15.3: "by 2030, combat desertification, and restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation neutral world". 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" (UNCCD, 2015).

Adoption of the LDN target by Member States is expected to raise the profile of Land Degradation as a global threat and help galvanise measurable action. As explained above, an LDN world is critical to conserving biodiversity and species and contributes to climate change adaptation and mitigation. LDN should hence be complementary and is instrumental to achieve the 2°C target of the United Nations Convention on Climate Change (UNFCCC) and the Aichi Biodiversity Targets of the Convention on Biological Diversity (CBD).

LDN is a globally agreed target that can be used to galvanize action to address land degradation. At national level LDN can provide clear targets that facilitate tracking progress, or the lack of it. Countries would be required to map the extent and location of land degradation and develop strategies to ensure neutral, or net positive, outcomes through a combination of restoration and sustainable land management interventions. Agreeing on standard indicators will facilitate cross-country comparison and will help in objectively identifying priorities for intervention. Establishing LDN targets at the appropriate scale – for example at the scale of a watershed or other ecosystem – will allow a more informed approach to balancing localised investments against larger-scale externalities.

National voluntary target setting for LDN has been adopted by the 12th Conference of the Parties of the UNCCD in October 2015. Setting of targets can help Parties to the Convention assess their progress towards meeting the expectations of the UNCCD and allow appropriate action to be taken to address land degradation. A target of Land Degradation Neutrality may provide incentives for more coordinated action, for justifying financial (PES) flows for investments in SLM, and for better monitoring, assessments and solutions.

Measuring Progress towards LDN

At COP12 the UNCCD adopted a set of three land-based progress indicators which will become central to reporting on progress towards LDN.

- Tier 1: trends in land cover;
- Tier 2a: Trends in land productivity or functioning of the land;
- Tier 2b: Trends in carbon stock above and below ground.

While these indicators provide a simple set of comparable indicators that can be informative when used in combination, they also have considerable limitations. Trend in land productivity, for example, is typically measured using earth observation data and is an estimate of Net Primary Productivity (NPP). Loss of NPP is generally associated with land degradation, and there is a tendency to assume that increasing NPP is an indicator of land improvement. In practice this is not always the case, particularly in drylands where invasive species and bush-encroachment are widespread forms of degradation; these forms of degradation can appear as an increase in NPP. Trends in carbon stocks, particularly below ground, can be highly informative but they can be costly to measure and are not regularly updated. In practice it is essential that these high-level indicators are complemented with local-level indicators and assessments to provide a much more informed insight into the actual situation.

Existing data sets may offer a low-cost way of improving monitoring progress towards LDN. The IUCN Red List of Ecosystems (RLE), for example, provides a repeatable and consistent method for assessing the risk of ecosystem collapse worldwide. RLE uses five criteria for assessment, two of which are spatial (declining distribution and restricted distribution), two assess functional symptoms of ecosystem collapse (environmental degradation and disruption of biotic processes and interactions) and the fifth integrates multiple threats and symptoms in a model of ecosystem dynamics to produce quantitative estimates of the risk of collapse (IUCN, 2015).

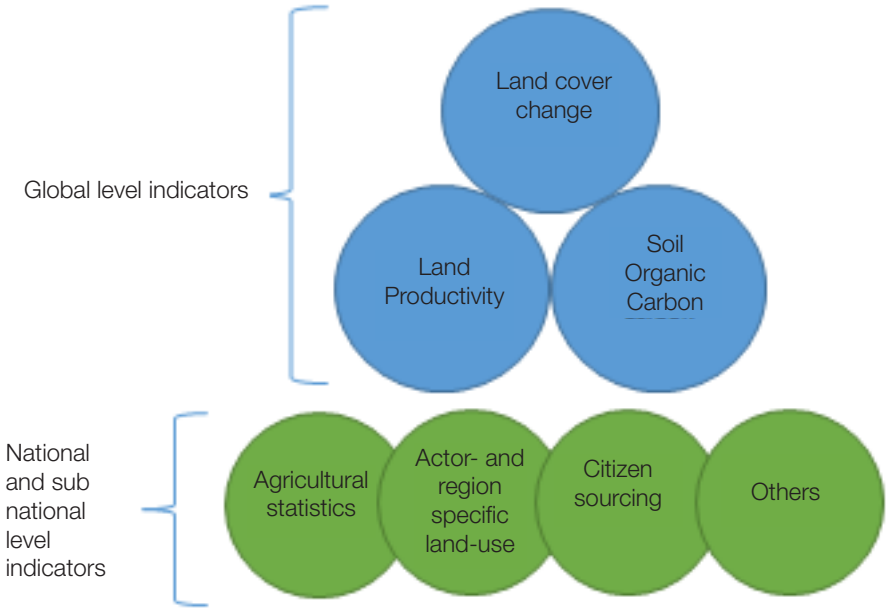

Figure 2. Proposed land and soil indicators to monitor the achievement of the Sustainable Development Goals (IASS, 2015)

Sustainable Land Management (SLM) approaches

Land Degradation Neutrality is essentially an equation between three processes: degradation, restoration and sustainable land management. Different approaches have been formulated and implemented to restore and sustain land resources (i.e. soil, water and biodiversity), such as Sustainable Land Management, Landscape Restoration and/or rehabilitation, and Ecosystem-based Approaches and Area-based Conservation. Sustainable Land Management (SLM) has been a central pillar of the UNCCD and the CBD since their inception and most of the above approaches contain or incorporate SLM elements. SLM has been defined as "a knowledge-based procedure that aims at integrating the management of land, water, biodiversity, and other environmental resources to meet human needs while sustaining ecosystem services and livelihoods" (World Bank, 2006). In simple terms this primarily means managing land in a way that enhances and preserves biodiversity, the productivity of land and the resilience of livelihoods and ecosystems. SLM is therefore highly consistent with IUCN's approach to "nature based solutions".

Hundreds of SLM practices have been documented around the world, many of them traditional practices that have endured for centuries, although in some cases they have needed reviving and adapting to changing socio-economic, climatic and institutional environments (WOCAT, 2007). The drive for agricultural intensification in some countries has fuelled the decline of these practices, although there are other contributing factors, including the loss of tenure security and breakdown in local governance arrangements. Well-known SLM practices include agroforestry, Low-External-Input and Sustainable Agriculture (LEISA), summer fallows, mobile pastoralism, pasture leys, and a wide range of methods to locally boost soil organic carbon and moisture (Schwilch et al., 2012).

In many cases SLM contributes not only to sustainability but also to higher levels of production. Productivity gains can also be achieved by closing the gender gap in agriculture. Female farmers produce less than male farmers, not because they are less-efficient farmers but because they make lower use of inputs. It has been estimated that if women had the same access to productive resources as men they could increase yields on their farms by 20–30 percent. This could raise total agricultural output in developing countries by 2.5–4 percent. Production gains of this magnitude could reduce the number of hungry people in the world by 12–17 percent (FAO, 2011).

Landscape Restoration

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. It has been defined as "an intentional activity that initiates or accelerates the

recovery of an ecosystem with respect to its health, integrity and sustainability" (SER, 2004). Ecological restoration includes improving, to the extent possible, biodiversity and indigenous species to support ecosystem functionality.

Restoring degraded land requires a range of approaches according to the type, extent and degree of degradation. Some forms of degradation, such as soil contamination with heavy metals or extreme salinization, can be prohibitively costly to restore, and remediation approaches may be viable alternatives (Bradshaw, 1997). Other forms of degradation can be reversed with more modest interventions, often using the approaches discussed above under SLM. Natural regeneration may often be the most cost-effective approach and can be achieved through simple forms of protection, such as development of community grazing plans that include seasonal rest. In other cases however more intensive intervention is required, for example using heavy equipment for terracing and restoring hydrology.

Since many ecosystems are part of a larger landscapes that need be managed productively (e.g. wetlands within a broader landscape of rangelands) and have been significantly modified by that management, the term "landscape restoration" is increasingly used to imply restoration of ecosystem functions to a level that sustains human activity. Forest Landscape Restoration (FLR) for example has been described by IUCN as a process to regain ecological integrity and enhance human well-being in deforested or degraded forest landscapes.

Ecosystem Based Approaches

A number of ecosystem based approaches are employed for both restoration and sustainable management of land and ecosystems. Ecosystem based approaches work with nature to provide solutions to environmental and development challenges. Ecosystem-Based Adaptation (EBA), for example, involves a wide range of ecosystem management activities to increase resilience and reduce the vulnerability of people and the environment to climate change (Colls et al., 2009). EBA can include approaches like integrated water resource management (IWRM) and Forest Landscape Restoration (FLR) and interventions that use nature-based solutions to enhance adaptive capacity of both women and men to climate change impacts. Ecosystem-based approaches to Disaster Risk Reduction similarly build on and reinforce the role of ecosystem services in supporting communities to prepare for, cope with, and recover from disaster situations. This involves strengthening decision-making to factor in current and future human livelihood needs and the bio-physical requirements of ecosystems. In areas affected by land degradation this can include, for example, using sustainable land management and landscape restoration to reduce the risk of, and vulnerability to, drought and flood shocks.

Protected Areas

Protected areas as defined by IUCN are unfortunately seldom considered as a tool to combat desertification or move towards LDN, and yet the total area of land that is currently protected worldwide is around 12%, and significantly higher in some countries. Protected areas can play a key role in land and water management to address and mitigate desertification and drought. As climate change increases drought frequency and severity, protected areas provide a proven way to mitigate its impacts. Protected areas lead to improved forest, watershed and range management in Drylands, conserving natural habitats, biodiversity and the ecosystem services that they provide. Protected areas and the management regimes within them can help to address land degradation by zoning for different and appropriate land uses, implementing sustainable grazing regimes, and maintaining healthy ecosystems that protect vital water sources and slow the spread of invasive species (IUCN, 2011). Under the strategic goal to improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity, the Aichi target 11 of the CBD proposes to increase to at least 17% the global amount of protected land, which would make a significant contribution to reducing land degradation.

Protected areas and other conservation areas can be owned or managed by State authorities, private land owners or community groups. These areas may be protected against exploitive use, or protected from certain uses. For example, an estimated two thirds of the 27,000 Natura2000[4] sites in Europe are managed pastoral landscapes; protected as a livelihood system that is inherently environmentally friendly. Many of today's key crops originated in drylands: wild grasses that would become wheat and barley in south-west Asia; maize, squashes and beans in Mexico and wild potatoes in Peru. Today protected areas are important for conservation of natural habitats which retain wild crop relatives, important for crop breeding. Protected areas are often established in critical resources area, such as mountain water towers or riparian zones. This protection is in fact an important component of Land Degradation Neutrality (IUCN, 2011).

4 Natura2000 is an EU network of protected areas: http://ec.europa.eu/environment/nature/natura2000/

Land Degradation Neutrality and the Conservation Sector

Land Degradation Neutrality can contribute to and benefit from other existing environmental targets. To ensure that countries can make progress towards LDN it is crucial that these synergies are identified and exploited. Establishing LDN as a target, even through voluntary target setting, can facilitate efforts to address land degradation, biodiversity conservation, sustainable management of resilient ecosystems, equitable and sustainable development, and climate change adaptation, mitigation and risk reduction. There is little doubt that Land Degradation is a major conservation challenge, however to date the issue has not received the same attention from the conservation community as have biodiversity, loss of species or climate change.

LDN specifically contributes to achieving several of the Aichi Biodiversity Targets. Target 5 aims to reduce habitat loss close to zero and to significantly reduce habitat degradation. Target 7 aims for sustainable management of areas under agriculture and forestry. Aichi target 14 safeguards ecosystems that provide essential services, including services related to water, health livelihoods and well-being. Target 15 aims to strengthen ecosystem resilience, increase carbon stocks and restore degraded ecosystems[5].

LDN contributes to the goals of the UNFCCC, including the Nairobi Work programme on climate change adaptation (UNFCCC, 2006). Land based measures are considered among the most important to enable vulnerable and at-risk rural communities adapt to climate change. Sustainable Land Management practices reduce emissions and the risks associated with climate events and strengthen resilience of societies (IPCC, 2014). LDN also contributes to the Sendai Framework for Disaster Risk Reduction 2015-2030, in particular Priorities 2 and 3, respectively "Strengthening disaster risk governance to manage disaster risk" and "Investing in disaster risk reduction for resilience" (UN, 2015).

Concerns for the Conservation Sector

A number of concerns have been raised over LDN during the dialogue between 2012 (Rio+20) and 2015 (adoption of the SDGs). While LDN is valuable goal, safeguards are needed to ensure that targeting setting processes do not lead to unforeseen, or undesirable, consequences. In view of the following concerns, it is urgent that both the nature conservation and sustainable development communities collaborate through relevant fora to establish strict criteria for the setting of LDN targets by individual countries.

Respect biodiversity and ecosystems

There is a risk that targets set at an inappropriate scale, for example nationally rather than at individual ecosystem level, could encourage trade-offs between similar and dissimilar ecosystems, or could lead to unsustainable outcomes. For example, degradation in one wetland should not be off-set by restoration of another wetland or degradation in a forest ecosystem should not be off-set with restoration in a grassland ecosystem. To mitigate these risks, LDN targets should be set at the individual ecosystem or watershed scale. There are occasions when this will require LDN target setting to consider the interconnectedness of transboundary resources (e.g. freshwater systems) and targets may need to be considered for transboundary management.

Drylands present a specific concern in this regard. The Millennium Development Goals, while generally seen to be successful, were not achieved equally and the drylands were particularly left behind (Middleton et al., 2012). A similar outcome is not acceptable under the new Sustainable Development Goals and efforts are needed to ensure that drylands are placed centre-stage in achieving Target 15.3, particularly since the Target has been adopted by the UNCCD.

LDN targets must not be interpreted as a "licence to degrade" whereby the restoration of one ecosystem is used to justify the degradation of another. It is preferable to adopt a mitigation hierarchy for biodiversity and ecosystem impacts with priority placed first on prevention or avoidance of land degradation, followed by minimization through improved land management practices, and then restoration. Nevertheless it is anticipated that land degradation will continue, and for the foreseeable future is an unavoidable consequence of development. With regard to biodiversity, achieving LDN should take a "no net loss" approach as a minimum standard. Ideally countries would achieve net positive impacts focusing on ecosystem and species functioning, viability and diversity. Particular care should be taken with regard to mitigating the risk of Invasive Alien Species. LDN measures in most countries will require components of invasive species management (prevention, control or eradication).

5 CBD Strategic Plan for Biodiversity 2011-2020: https://www.cbd.int/sp/targets/

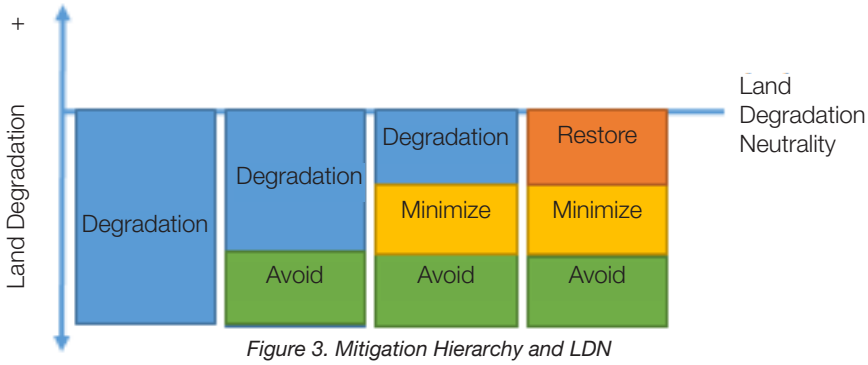

Figure 3. Mitigation Hierarchy and LDN

Strengthen natural resource governance and tenure security

While setting LDN targets explicit attention should be given to the strengthening of natural resource governance and tenure security. Secure land tenure and effective governance over natural resources are vital for achieving LDN. The rights of men and women and indigenous peoples to access and to manage land must be upheld, paying particular attention to lands that are not legally titled, including communal lands and land to which indigenous peoples or ethnic minorities hold customary rights. Efforts are also needed to ensure environmental justice and social protection to address the risk of people losing out to LDN. Governments should adhere to the principle of Free, Prior and Informed Consent when setting targets and implementing actions to achieve LDN.

The focus of governance should be at the lowest practical and accountable level. Efforts are needed to harness the knowledge of land users in order to support better informed decision-making processes. At the same time greater efforts may be needed to raise awareness of land users of the risks of land degradation and scenarios of related stresses and the opportunities of LDN.

Contribute to and benefit from achievement of other multilateral agreements

There is a great overlap between the goal of LDN and the goals of other conventions, as discussed earlier. This offers a number of high-value options through which synergy can be achieved in a cost effective way. In most if not all cases, measures to achieve LDN will also benefit biodiversity conservation and climate change adaptation and mitigation. One important example is carbon sequestration. Through LDN and related SLM measures an important contribution can be made to store above and below ground carbon and hence contribute to climate change mitigation. Similarly LDN and SLM measures reduce emissions and in most cases will also contribute to restore or conserve biodiversity. Nevertheless, efforts will be needed to ensure that initiatives throughout the conservation sector are reported according to their contribution to LDN. Deeper analysis is also needed to strengthen the evidence for the synergies and their relative economic merits.

The full range of sustainable land management and restoration approaches should be considered as contributing to LDN, thereby leveraging other sectors and stakeholders as implementation actors. This includes Forest Landscape Restoration, Integrated Water Resources Management, Protected Areas (including Indigenous and Community Conserved Areas), Sustainable Rangelands Management, Community Based natural Resource Management, Ecosystem-Based Adaptation and Disaster Risk Reduction, and many more.

LDN target setting should be carried out through a multi-sectoral approach, involving the environment, agriculture, water and other natural resource sectors. LDN targets should be mainstreamed in economic planning and overall land use plans, including cross-referencing in action plans to conserve biodiversity and to address climate change. A concerted effort must be made to mobilise appropriate resources to implement priority actions in pursuit of LDN targets.

Strengthen evidence for LDN achievement

Many countries lack current data on the state of land degradation or the opportunities for restoration and sustainable management. This gap must urgently be addressed to ensure that target setting and monitoring are evidence-based. Restoration opportunities need to be assessed to know the existing state of land, the potential for restoration (e.g. Land Potential), and the costs and benefits of all actions. Appropriate monitoring and evaluation systems should be put in place to measure progress towards achieving LDN targets and to facilitate action learning and adaptive management. This includes appropriate biodiversity indicators (not restricted to flora) in all assessment and monitoring systems as well as analysis of multiple ecosystem services. Adoption and scale-up of good practices should be based on appropriate evidence, taking into account the cost and benefit of interventions on the full range of ecosystem services, including for example hydrological and carbon cycles.

Conclusion and recommendations

Land Degradation Neutrality provides a great opportunity for the IUCN conservation and development sectors to address one of the most fundamental challenges to conservation and sustainable development. It is an ambitious target that will allow countries to track progress towards environmental sustainability across their entire terrestrial area. LDN is an aspiration that all conservation actors should support.

1. Integrated ecosystem management approaches should be central to achieving LDN. The conservation sector already provides a wide range of options to deliver LDN, through restoration, sustainable management, and conservation approaches which are gender-responsive . Integrated ecosystem management approaches must be central to achieving LDN to ensure sustainability at all levels and to avoid unwanted trade-offs.

2. Natural resource governance should be strengthened to enable equitable LDN outcomes. This includes governance by resource users at a local level, governance by the state at local and national levels, and international agreements to govern issues at the transboundary, regional and global levels. It is important to recognise that not all resource users are in an equal position to participate fully and actively in the governance process and efforts will be needed to promote the empowerment of women, indigenous peoples, and other marginalised groups.

3. LDN should proceed on the basis of adequate evidence and monitoring, without evidence-collection becoming a barrier to attaining the LDN goals. An appropriate balance is required to ensure that LDN progress can be tracked, unwanted externalities can be monitored, and the impact of actions in restoration and sustainable management can be assessed for their impact on biodiversity and on social outcomes.

4. Achieving LDN should build on the synergy with other conservation approaches and targets. LDN should not be seen as an additional burden, but as an opportunity for greater value-addition through the most integrative approaches. LDN should be recognised as a crucial framework for many environmental goals and should be given much greater prominence at the centre of conservation, sustainable development and climate change discourse. It is recommended that LDN build on existing National Action Programmes to Combat Desertification, which have been revised in line with the UNCCD 10 Year Strategy, which in turn has ensured greater alignment of the Convention with the UNFCCC and the CBD.

5. Innovative funding should be developed to support implementation of action towards LDN. Important efforts are needed to explore how synergies between conservation and sustainable development LDN actions can be financed through national and international financial flows, justified by ecosystem benefits that accrue to society at the national and global levels, in the form of Payment for Ecosystem Services.

References

Adeel, Z., Safriel, U. Niemeijer, D. and White, R., 2005. Ecosystems and Human Well-Being: Desertification Synthesis, World Resource Institute, Washington, D.C.

Allen-Diaz, B., 1996. Rangelands in a changing climate: impacts, adaptations and mitigation. pp. 131-158.In: Watson, R.T., Zinyowera, M.C., Moss, R.H. (eds.), Climate Change 1995. Impacts, Adaptations, and Mitigation of Climate Change: Scientific-Technical Analyses. Published for the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK

Bai, Z.G., Dent, D.L., Olsson, L. and Schaepman, M.E., 2008. Proxy global assessment of land degradation. Soil Use and Management, 24, 223–234

Barbier E.B., and Bishop J.T., 1995. Economic values and incentives affecting soil and water conservation in developing countries. Journal of Soil and Water Conservation 50:133-137.

Behnke, R.H., Scoones, I. and Kerven, C. (eds.), 1993. Range Ecology at Disequilibrium: New Models of Natural Variability and Pastoral Adaptation in African Savannas. London, UK, Overseas Development Institute.

Bruinsma J. (ed.), 2003. World Agriculture: Towards 2015/2030: An FAO Perspective. http://www.fao.org/DOCREP/005/Y4252E/y4252e00.htm#TopOfPage

Colls, A., Ash, N. and Ikkala, N., 2009. Ecosystem-based Adaptation: a natural response to climate change. Gland, Switzerland: IUCN. 16pp.

Davies, J., Niamir-Fuller, M., Kerven, C. and Bauer, K., 2010. Extensive Livestock Production in Transition: The Future of Sustainable Pastoralism. In: Steinfeld et al. (eds.), Livestock in a Changing Landscape, Volume 1: Drivers, consequences and responses. Island Press.

FAO, 2009. Global Agriculture Towards 2050. Paper presented to High-level Expert Forum on "How to feed the world in 2050", Rome, 12-13 October 2009. FAO, Rome.

FAO, 2011. The State of Food and Agriculture 2010-2011. Women in Agriculture: Closing the gender gap for development. Food and Agriculture Organization of the United Nations. Rome, 2011. http://www.fao.org/docrep/013/i2050e/i2050e00.htm

Geist, H.J. and Lambin, E.F, 2004.Dynamic Causal Patterns of Desertification. BioScience 54(9):817-829. 2004 doi: http://dx.doi.org/10.1641/0006-3568(2004)054[0817:DCPOD]2.0.CO;2

Houghton, R.A., 1995. Changes in the storage of terrestrial carbon since 1850. In: Lal R, Kimble J, Levine E, Stewart BA (Eds): Soils and Global Change. Boca Raton.

IASS, 2015. Proposal for land and soil indicators to monitor the achievement of the Sustainable Development Goals (SDGs). Report of an Experts Group Meeting, for the Global Land Indicators Initiative. Copenhagen, Denmark,February, 2015. http://www.iass-potsdam.de/sites/default/files/files/land_and_soil_indicators_proposal.pdf

IPCC, 2014. Climate Change 2014: Mitigation of Climate Change. Cambridge.

IUCN, 2011. Protected areas helping people deal with desertification and drought. Natural Solutions Technical Brief, the World Commission on Protected Areas. https://cmsdata.iucn.org/downloads/desertificationnopclogosmall.pdf

IUCN, 2015. IUCN Red List of Ecosystems Guidelines: Categories, Criteria and Application. Version 2.1. Bland, L. M., Keith, D. A., Murray, N. J.,Rodríguez, J. P. (eds). IUCN Gland, Switzerland. xxx pages.

Lagi, M., Bertrand, K.Z. and Bar-Yam, Y., 2011. The Food Crises and Political Instability in North Africa and the Middle East. arXiv:1108.2455v1 [physics.soc-ph]: http://arxiv.org/abs/1108.2455

Le, Q.B., Nkonya, E. and Mirzabaev, A., 2014. Biomass Productivity-Based Mapping of Global Land Degradation Hotspots. ZEF-Discussion Papers on Development Policy No. 193. Bonn, July 2014

McGahey, D., Davies, J. and Barrow, E., 2008. Pastoralism as Conservation in the Horn of Africa: Effective Policies for Conservation Outcomes in the Drylands of Eastern Africa. Annals of Arid Zones 46: 353-377

McKinsey 2009. Pathways to a Low Carbon Economy: Version 2 of the Global Greenhouse Gas Abatement Cost Curve. McKinsey & Co., London, UK

MEA, 2005. Ecosystems and Human Well-being: Desertification Synthesis. Millennium Ecosystem Assessment. World Resources Institute, Washington, DC.

Qadir, M., Quillérou , E., Nangia, V., Murtaza, G., Singh, M., Thomas, R.J., Drechsel, P., Noble, A.D.,

2014. Economics of Salt-induced Land Degradation and Restoration. Natural Resources Forum, A United Nations Sustainable Development Journal, forthcoming.

Reddy R., 2003. Land degradation in India: extent, costs and determinants. Economic and Political Weekly 38: 4700-4713.

Safriel, U., 2007. The Assessment of Global Trends in Land Degradation. In Sivakumar, M.V.K. and Ndiang'ui, N. "Climate and Land Degradation". Springer Berlin Heidelberg

Schwilch, G., Hessel, R. and Verzandvoort, S. (Eds), 2012. Desire for Greener Land. Options for Sustainable Land Management in Drylands. Bern, Switzerland, and Wageningen, The Netherlands: University of Bern - CDE, Alterra - Wageningen UR, ISRIC - World Soil Information and CTA - Technical Centre for Agricultural and Rural Cooperation.

SER, 2004. SER International Primer on Ecological Restoration. Society for Ecological Restoration, Science & Policy Working Group (Version 2, October, 2004)

TEEB, 2008. The Economics of ecosystems and Biodiversity, An Interim Report: . European Communities. http://www.teebweb.org/publication/the-economics-of-ecosystems-and-biodiversity-an-interim-report/

Tennigkeit, T. and Wilkes, A., 2008. Carbon Finance in Rangelands: An assessment of potential in communal rangelands, WISP, IUCN, Nairobi.

The World Bank, 2006. Sustainable Land Management. Challenges, Opportunities, and Trade-offs. Washington, DC

UN, 2015. Resolution adopted by the General Assembly on 3 June 2015. 69/283. Sendai Framework for Disaster Risk Reduction 2015–2030. A/RES/69/283. http://www.preventionweb.net/files/resolutions/N1516716.pdf

UNCCD, 2015. "Integration of the Sustainable Development Goals and targets into the implementation of the United Nations Convention to Combat Desertification and the Intergovernmental Working Group report on land degradation neutrality". Draft decision submitted by the Chair of the Committee of the Whole. ICCD/COP(12)/L.4. http://www.unccd.int/Lists/SiteDocumentLibrary/COP/COP12/L%20documents/COP/copL4%20-%20final.pdf

UNCCD, 2014. Provision of metadata – Indicator 15.3.1: Trends in land degradation. UNCCD, Sept 4th, 2015

UNCCD, n.d. Desertification Land Degradation and Drought – Some Global Facts and Figures. http://www.unccd.int/Lists/SiteDocumentLibrary/WDCD/DLDD%20Facts.pdf

UNEP, 1997.World Status of Desertification. United Nations Environment Programme. https://na.unep.net/siouxfalls/des/uncedp1.php

UNFCCC, 2006. Report of the Conference of the Parties on its eleventh session, held at Montreal from 28 November to 10 December 2005. FCCC/CP/2005/5/Add.1, 30 March 2006. http://unfccc.int/resource/docs/2005/cop11/eng/05a01.pdf

WOCAT, 2007. Where the Land is Greener: case studies and analysis of soil and water conservation initiatives worldwide. https://www.wocat.net/fileadmin/user_upload/documents/Books/WOOK_PART1.pdf

INTERNATIONAL UNION
FOR CONSERVATION OF NATURE

Global Drylands Initiative

Mukoma Road (off Magadi Rd)
P. O. Box 68200 - 00200
NAIROBI, Kenya
Tel: +254 20 249 3561/65
+254 724 256 804
+254 734 768 770
www.iucn.org/drylands