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5. Strategies and policies to reach a land-degradation neutral world

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Despite the difficulties in quantifying the extent and degree of land degradation or restoration, evidence shows that continued land degradation will be an impediment to meeting several SDGs. The United Nations states that it aims for land degradation neutrality (LDN) which in 2015 became firmly established as an agreed-upon objective in the realm of international environmental politics. First, as part of the SDGs whose Target 15.3 calls to "combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world" by 2030 (UNGA, 2015). The Conference of Parties (COP) of the United Nations Convention to Combat Desertification (UNCCD) took the decision to align the implementation of the Convention with SDG 15.3 and invited its Parties to set voluntary LDN targets (UNCCD, 2015). From that point onwards, the key question is how to implement these global aspirations at the national level and what is needed to operationalize the LDN concept and translate it into concrete strategies to meet LDN at scale.

5.1 Strategies to meet land degradation neutrality

The interpretation and operationalization of LDN is still in its early stages. The idea of a "land degradation neutral world" (UNCCD, 2012) was first introduced to the international environmental arena at the Rio+20 conference. Several scholars and organizations have since discussed possible interpretations and implications of this topic (e.g. Welton et al., 2014; Altvater et al., 2015; Chasek et al., 2015; IUCN, 2015; Tal, 2015; Akhtar-Schuster et al., in press). The interpretation of neutrality in the context of LD is challenging and will require further elaboration to provide guidance for its implementation. An essential step in this direction was the establishment of a definition of LDN by an Intergovernmental Working Group (IWG) under the UNCCD. The IWG defined 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." (UNCCD 2015, dec.3/COP.12). Based on this definition, the Science-Policy Interface (SPI) of the UNCCD was requested to develop a scientific conceptual framework for LDN that aims to provide guidance for implementing LDN at the country level (UNCCD, 2016a, b).

Starting with the vision of what LDN is expected to achieve, the conceptual framework focus is "on maintaining or enhancing the land resource base, (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" (UNCCD, 2016b). The year 2015 was accepted as the baseline year. Following the neutrality logic, the target state should be equivalent to the baseline.

To translate the LDN target into strategies for implementation, the so-called LDN response hierarchy plays a central role and is proposed as a guiding principle for land-use planning. Following the recognition that 'prevention is better than cure', the response hierarchy prioritizes avoiding degradation, followed by reducing ongoing degradation. Once the possibilities for avoiding and/or reducing LD have been sufficiently used, reversing land degradation through restoration and rehabilitation or reclamation of already degraded land should be an option to counterbalance the remaining part of what might be termed 'unavoidable degradation'. The LDN lens acknowledges that land degradation cannot be stopped completely and everywhere, and it suggests that a balance can be reached through the restoration and rehabilitation of already degraded lands: "counterbalancing anticipated losses with measures to achieve equivalent gains" (UNCCD 2016b). However, given the vast heterogeneity of land and its associated ESSs, the great challenge is in ensuring equivalence between losses and gains.

Recognizing this challenge and the associated risks, UNCCD suggests several principles to ensure positive and prevent unintended negative outcomes. A key principle is 'like for like', in terms of quantity (area) and quality (ecosystem services) (UNCCD, 2016a). These considerations are expected to be integrated into existing policies and plans at the national and sub-national level. Land-use planning is the key entry point for implementing LDN. If land-use plans exist and correspond with actual changes in land use and management, they allow for anticipating 'losses' and planning of corrective measures (UNCCD, 2016b). Thus, the conceptual framework proposes a comprehensive and systematic approach for LDN implementation. It fully embraces the notion of neutrality and aims at operationalizing the various implications of a no net loss approach with a view to integrate them into land use planning.

First steps are now being taken in implementing LDN at country level. In 2015, the UNCCD ran a LDN pilot project together with 14 countries to test a monitoring approach for LDN, which was followed by the LDN Target Setting Program (TSP) implemented by the UNCCD's Global Mechanism. So far, more than 100 countries have expressed their interest in participating in the TSP, setting LDN targets, identifying strategies and measures to achieve these targets and establishing a corresponding monitoring scheme (UNCCD 2016c, d). It is expected that countries wishing to engage in the LDN process will present their targets at the COP in late 2017 (UNCCD, 2015). The TSP covers many of the ideas of the LDN conceptual framework, but is more flexible in the setting of targets (Minelli et al., 2016). While it pursues comprehensive national LDN targets, it also accepts that LDN targets might be defined for sub-national territories or, with a more limited scope as steps towards an LDN state. Thus, targets may be defined for specific land-cover classes, as commitments to restore a certain area of degraded land or activities to incentivize the adoption of practices for sustainable land management in each region or watershed.

Establishing a monitoring scheme that allows for tracking progress towards LDN targets is critical. UNCCD has developed a tiered monitoring scheme based on the Convention's progress indicators: land cover (metric: land-cover change), land productivity (metric: NPP) and carbon stocks above/below ground (metrics: organic carbon). Other relevant indicators can complement these basic indicators. This scheme is also proposed as the official methodology for monitoring SDG 15.3. UNCCD is exploring synergies with the reporting mechanisms of the other Rio Conventions UNFCCC and the Convention on Biological Diversity (CBD) (Akhtar-Schuster et al., 2016; Minelli et al., 2016; UNCCD, 2016c, d).

5.2 The management of landscapes in meeting the SDGs

As LDN has been designated a prerequisite for meeting the SDGs, the development community is increasingly recognizing that this issue needs to be addressed at different scales with a spectrum of stakeholders that seek concepts to achieve sustainable landscapes. Restructuring landscapes offers opportunities to capture synergies where possible and minimize trade-offs among economic, social and environmental goals where these objectives compete (Denier et al., 2015). Approaches to achieving sustainable landscapes, that prioritize collaboration among multiple stakeholders from different sectors and social groups, are often referred to collectively as 'integrated landscape management' (ILM). Thus, ILM is an important component of sustainable land management and LDN.

ILM can take a wide array of forms depending on the governance structure, size and scope of the landscape in question, number and types of stakeholders involved (e.g. producer and community organizations, private companies, civil society, government agencies) and the intensity of cooperation. In some cases, there may be simply information sharing and consultation; in others there are more formal arrangements with shared decision making and joint implementation of activities. While there are numerous communities of practice for ILM, a decade of experience, observation and comparative analysis identified five common core features. They include: (1) shared or agreed management objectives; (2) land-use practices contributing to multiple objectives; (3) interactions among land uses and land users in different parts of the landscape; (4) collaborative, community-engaged processes for dialogue, planning, negotiating and monitoring decisions; and (5) markets and public policies that are shaped to achieve agreed landscape objectives.

Reviews in sub-Saharan Africa (Milder et al., 2014), Latin America and the Caribbean (Estrada-Carmona et al., 2014), South and Southeast Asia (Zanzinaini et al., 2015) and Europe (Martin et al., 2016) documented more than 420 established ILM initiatives. Of those in the first three regions, land degradation was a frequent motivation for landscape partnerships – to reduce the environmental impacts of agriculture (78%); to conserve soil/increase soil fertility (83%); to stop or reverse natural resource degradation (86%); and to enhance sustainable land management and ecosystem rehabilitation, restoration and/or maintenance (70%). More than 40% of countries reported that they achieved: reduced environmental impacts from agriculture, improved water quality, quantity or regularity and ecosystem service restoration or protection. ILM can thus be an effective means of achieving LDN in the quest of reaching the SDGs for several reasons.

There is an emergent literature documenting the important role of an enabling policy environment for the effective implementation of ILM in areas such as as sustainable land management, forest and landscape restoration, territorial development, and watershed management. Shames et al. (2016) synthesizes key policy guidelines for ILM. The key roles for government include establishing norms, policies, markets and financial conditions to support ILM. The importance of shifting from reactive to proactive policies to address land and resource degradation was highlighted in Scherr et al. (2015), illustrated with cases from intensive commercial agriculture in South and Southeast Asia. The wide variety of products and services that can be derived from sustainable landscapes are often not properly valued in markets, increasing the likelihood of land-use decisions that lead to negative or suboptimal outcomes.

A variety of market barriers constrain producers from adopting ILM practices or investing in them. For individual farmers or operations, degrading practices may be more profitable in the short term; financial resources may be inadequate for them to transition to more sustainable practices; or land managers and businesses may have inadequate technical know-how. Other barriers arise at community or landscape levels, such as the need for collective action, weak connections between land managers and beneficiaries of good practice, weak disincentives or enforcement, insecure tenure; weak market demand, as well as cultural or social barriers. Numerous market innovations are emerging to incentivize sustainable land management and restoration for different niches in the landscape. These include: product certification, payments to farmers or farming communities for ecosystem services, cooperation to reduce marketing costs; sustainable procurement policies by companies and governments, and others (Thomas et al., 2017).

Sustainable landscapes require both asset and enabling investments by a wide range of land managers. Asset investments create tangible value that is returned to the investor, and enabling investments lay the institutional and policy foundation for asset investments. All integrated landscape investments require some degree of strategic planning or coordination through a landscape stakeholder platform and/or a landscape investment facilitator (Shames and Scherr, 2015). There are now a wide variety of public and private actors who are interested in investing in sustainable landscapes and landscape restoration or rehabilitation (Shames et al., 2014; FAO and Global Mechanism of the UNCCD, 2015).

5.3 Landscape restoration and rehabilitation

Once a landscape has been altered to the point that ecosystem services delivery is impaired, communities or governments may intervene to restore a landscape to its pristine state or to rehabilitate it to a healthy and productive state to provide multiple benefits to society and the environment with limited trade-offs and best possible synergies (SER, 2004; IUCN and WRI, 2014). These efforts will be collectively referred to as 'restoration' in this chapter. Restoration efforts planned at the landscape level require an integrated approach to assess various land uses and processes, their connections, and interactions in relation to a mosaic of interventions rather than focusing on a single entity (Maginnis and Jackson, 2003; GLF, 2014).

Restoration starts with defining clear goals that consider all land-use types and stakeholders. Goals may involve aesthetics, habitat recovery, ecosystem services delivery or strengthening of resilience (Suding, 2011). While aiming to achieve any of these, it is also important to ensure that multifunctionality is maintained or restored, including biodiversity at all relevant levels (Aradottir and Hagen, 2013). Site and socio-culturally acceptable and environmentally adaptable interventions to meet a set restoration goal should be identified in a participatory manner (Burke and Mitchell, 2007; Reed et al., 2009; Reyes, 2011). These technologies or policies should undergo an ex-ante trade-off analysis to evaluate their impact and the interactions and feedback between options (over time and space). The success of any restoration project depends on the availability of adequate resources to support its implementation and the returns on these investments should be monitored and evaluated. Additionally, learning from successes and failures is invaluable for subsequent restoration efforts (Suding, 2011; Aradottir and Hagen, 2013). Figure 5.1 depicts the possible effects of restoration interventions over time.

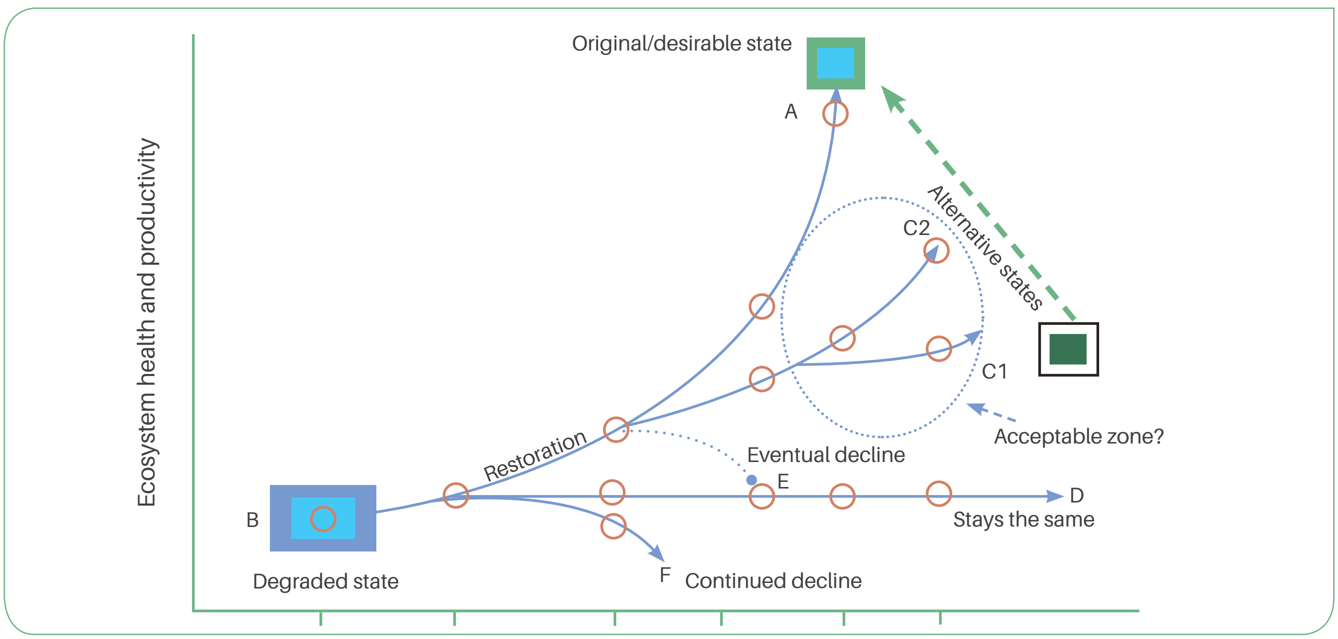

Figure 5.1 Possible trajectories or scenarios that can be pursued or achieved when restoring a degraded system.
Source: Modified from Lugo (1988); Meffe et al. (1994).

Following degradation that has moved the system from its original state (A) to a degraded state (B), it may continue to degrade (F) or recover naturally after it has been abandoned. Restoration to full recovery is rare and may not be desirable. Instead, the recovery goal may be at the C level, dependent on the stakeholder priority, e.g. (C2) where most structure and productivity can be improved or (C1) where most of the former biodiversity but less of the structure and productivity can recover. Monitoring progress towards the desired state and projecting the outcome will provide early insights with respect to the set needs of the stakeholders and the community and to a well-defined base situation. An integrated systems approach may help in this assessment and identify the causes of success and/or failure along the desired pathway (i.e. red circles in Figure 5.1). Such an analysis should include gains in terms of biomass, biodiversity or other associated ESSs and the overall functioning of the system (Costanza and Mageau, 1999; Suding et al., 2004; Stone and Haywood, 2006). A comprehensive 'ecosystem health' index that can assess the overall impacts of restoration efforts at various scales and social dimensions would be helpful (Rapport, 1989; Rapport et al., 1999; Lu et al., 2015).

Experiences in restoration efforts in various regions (including the highlands of Ethiopia) have offered us key lessons on the necessary ecological, social, economic and institutional conditions that must be fulfilled successful restoration (e.g. Hanson et al., 2015). They include: (i) conducive policies and institutional set ups; (ii) site and context specificity (including gender sensitivity) while considering the landscape continuum; (iii) direct economic benefits to the community at large; and (iv) synergies facilitated and trade-offs minimized.

In summary, landscape restoration involves an inter-sectoral and comprehensive analysis of the main agents and drivers of degradation. It should weigh up restoration options, promote enabling environments (policies, regulations and laws) and understand and deal with institutional settings and governance issues (e.g. tenure, right to use of natural resources, local community and its involvement, etc.). Only then should the steps be taken to identify and develop appropriate technologies and approaches and mobilize resources (including private-sector investment, capacity development for implementation, monitoring and evaluation and dissemination) (Hobbs et al., 2011; Sabogal et al., 2015).

5.4 The institutional realm for LDN

Land degradation neutrality requires strategies that will create an enabling environment and incentives for acting against land degradation at the farm, community, sub-national, national, and in some cases, regional or global levels. For example, restoration of eroded soils requires the use of soil and water conservation (SWC) structures and other strategies at farm and watershed levels to ensure effective control of soil erosion. Adoption of SWC by only a few farmers may not be as effective as erosion from upstream farms could wash away the SWC structures downstream. Regulations and disincentives to prevent land-degrading practices such as forest fires should be enacted and enforced at community or higher administrative levels as a forest fire from one farm could spread to a much wider area. Incentives play a key role in convincing land users to use sustainable land management practices. Depending on governance and other mediating factors, access to market could improve access to inputs and markets for land-based products and services (Laurance et al., 2009). Using empirical results, this section discusses the role of laws and incentives that create the enabling environment for achieving the LDN goal.

The key components of an enabling environment for appropriate land user behavior include: laws and governance, structured governmental coordination and secure land and property rights (Lawry et al., 2014). In an environment where these conditions are met and effectively enforced, deforestation and other land degrading practices will be prevented – if certain conditions, such as incentives and disincentives – are held constant. A global study by Nkonya et al. (2016a) showed that land improvement in developing countries was related to an improvement in government effectiveness while continued land degradation was observed where government effectiveness had declined. In sub-Saharan Africa, between 1996 and 2015, the rate of deforestation decreased consistently in countries that experienced improvement in government effectiveness (Figure 5.2). In fact, these countries experienced net forest area gain in the period 2010–2015. For countries that experienced worsening government effectiveness, deforestation rate increased between 1996 and 2010 and fell only in the period 2011–2015. The Government of Niger enacted the Rural Code in 1993 and Forest Law in 2004, which provided tree tenure which in turn incentivized farmers to plant or protect trees on their farms (Stickler, 2012). This led to the success story of the regreening of the Sahel in Niger. The government's commitment to public policies (Kaufman et al., 2010) improved Niger Government's effectiveness (GE) index by about 43% in the period 1996–2012, while it fell in sub-Saharan and West Africa during the same period. Without tree tenure, the regreening of Niger might not have been realized. In most of sub-Saharan Africa, the lack of rights to land and natural resources are serious impediments to land restoration (Mennen, 2015).

Policy making, planning and decision making should be coordinated across technical sectors (horizontal integration) and between levels of government (vertical integration). Most government administrations are organized according to individual sectors (e.g. agriculture, environment, rural development, water, etc.) and jurisdictions. This is a significant barrier for sustainable land management, particularly in landscape management, in which stakeholders seek to achieve multiple, cross-sectoral objectives that do not conform to administrative boundaries. This institutional and policy harmonization at the national, sub-national and landscape levels can help to eliminate unintended negative interactions that arise in landscapes when multiple laws and regulations are adopted and implemented independently of each other. Meanwhile, cross-sectoral collaboration can help policy makers recognize multiple benefits at landscape scale.

Economic theory posits that incentives play a big role in decision making by rational investors (Baiman, 1982). This theory has been shown to apply to restoration of degraded lands. The well-documented empirical result "more people, less soil erosion" in Machakos (Kenya) is attributed to high market access that allowed farmers to benefit from SWC investment (Tiffen et al., 1994; Boyd and Slaymaker, 2000). Using a 60-year (1930–1990) data set, this study showed that population density in the district increased from less than 100 people/km2 in the 1930s to 400 people/km2 in the 1990s, yet the previously severely degraded semiarid areas of Machakos, Kenya recovered due to high adoption rate of SWC (Tiffen et al., 1994). The adoption of SWC was motivated by improved market access and attractive producer prices (Tiffen et al., 1994; Boyd and Slaymaker, 2000). In sub-Saharan Africa, countries with improved government effectiveness combined with high market access experienced land improvement, while those with even poor market access experienced LD in cases where government effectiveness had improved (Nkonya et al., 2016b).

Some market issues are unique to larger companies and are beginning to play a more significant role in integrated land management. Consumers, shareholders and other stakeholders expect that companies can trace their supply chain all the way to the natural resource extraction or production level, and manage the environmental and social risks and impacts associated with each stage of the chain. Risks such as water scarcity, land degradation, climate change impacts, or competition for natural resources and energy can only be effectively addressed at scales beyond the site level. Hence, solutions to effectively mitigate and adapt to such risks depend on collective or shared approaches at landscape or watershed scales. To retain their long-term license to operate and manage regulatory, reputational and operational risks, many businesses are making commitments to halt deforestation, improve water management practices and generate positive social and environmental impacts (Kissinger et al., 2012). Such actions to reduce degradation and restore land in the context of sustainable development should not ignore poor populations and marginalized groups within communities.

In addition to market access, direct monetary and nonmonetary incentives are critical drivers of restoration (de Groot et al., 2007; McGhee et al., 2007). Payment for EESs for targeted gains in terms of biodiversity conservation, carbon sequestration and storage, watershed protection, and landscape beauty and recreation, is a growing source of income for rural societies which can incentivize communities to invest in restoration (Kleijn and Sutherland, 2003; Wade et al., 2008; Wunder and Alban, 2008; Milder et al., 2010).

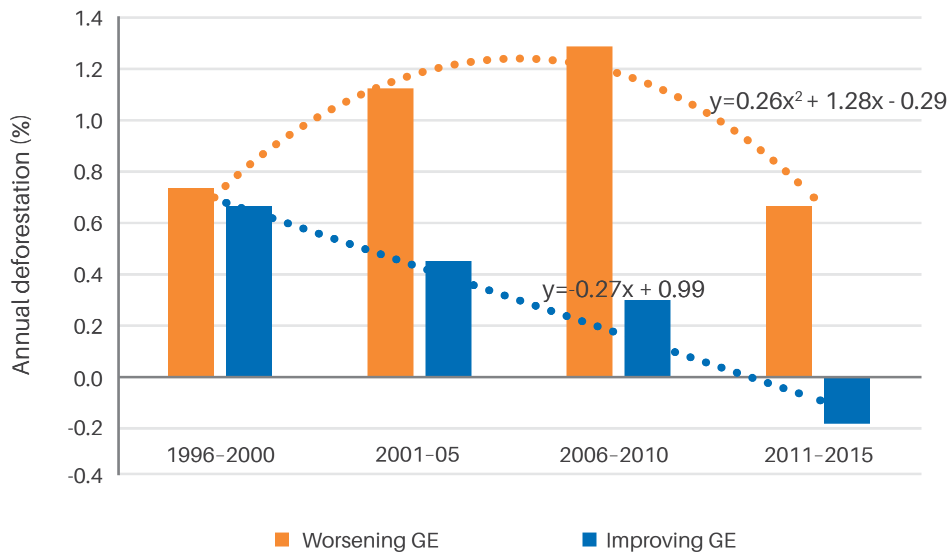

Figure 5.2 Relationship between government effectiveness and annual deforestation trends in sub-Saharan Africa.

Note: Government effectiveness index (GEI) Scale: −2.5 weak to 2.5 Strong.

Worsening GE

$$\Delta GE = \frac{\overline{GEI_2} - \overline{GE_1}}{\overline{GEI_1}} * 100$$

Where ΔGE = Change in Government effectiveness, $\overline{GE_1}$ = Average GE, 1996–2000, $\overline{GE_1}$ = Average GE, 2010–15. GE improving if $\Delta GE > 0$; Worsening GE if $\Delta GE < 0$

Sources: Deforestation rate: FAO (2015); Government effectiveness: Kaufmann et al. (2010).