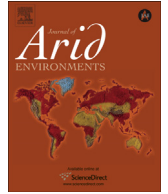




Contents lists available at ScienceDirect

Journal of Arid Environments

journal homepage: www.elsevier.com/locate/jaridenv

Is Land Degradation Neutrality feasible in dry areas?

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ARTICLE INFO

Article history:

Received 8 August 2013
 Received in revised form
 17 February 2014
 Accepted 21 May 2014
 Available online xxx

Keywords:

Controlling desertification
 Environmental monitoring
 Forest transition
 Indicator systems
 Land change science
 Land restoration
 Policy implementation

ABSTRACT

The aspirational goal of a land degradation neutral world, to be realized by reducing the rate of land degradation and increasing the rate of restoration of degraded land, was agreed at the Rio+20 Conference in 2012. This paper evaluates the feasibility of introducing a Land Degradation Neutral (LDN) scheme as an activity of the United Nations Convention to Combat Desertification (UNCCD). It concludes that national and international implementation would involve political, organizational and technological challenges. Monitoring restoration of desertified land by revegetation would be feasible immediately, but monitoring cuts in national rates of desertification would not, because no baseline rates are currently available; national and international scientific capacities to measure desertification are limited; and further scientific knowledge is required to supplement existing knowledge of desertification processes and of land use and land cover change processes generally. This paper therefore suggests introducing an LDN scheme in phases. Phase 1 would focus on restoring degraded lands, improving national land use planning systems, and establishing international and national monitoring capacities. Phase 2 would reduce desertification rates with the help of fully integrated land use planning and monitoring systems. Phase 3 would set a target year for realizing an LDN goal, based on experiences in Phases 1 and 2. All three phases would be informed by accessing existing scientific knowledge, and gaining new knowledge by launching a scientific LDN process that can evolve in parallel with the political process.

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1. Introduction

Since the Plan of Action to Combat Desertification (PACD) was agreed at the United Nations Conference on Desertification in 1977 the world's governments have been publicly committed to reducing the rate of degradation of land in dry areas (UN, 1977). This commitment was strengthened in 1994 with agreement on the UN Convention to Combat Desertification (UNCCD) (UN, 1994). Yet little progress was made in implementing the PACD (Darkoh, 1998), and so far the performance of the UNCCD is not much better (Grainger, 2009; Ortiz and Tang, 2005).

However, a new initiative to tackle land degradation worldwide could re-energize international action on desertification. An aspirational goal of a “land-degradation-neutral world in the context of sustainable development” was approved by the UN Conference on Sustainable Development (“Rio+20”), held in Rio de Janeiro in June 2012. This followed a proposal for a goal of ‘Zero Net Land Degradation’, made by the African Union (AU, 2012; ECA, 2011; UN, 2012) with strong support from the UNCCD Secretariat (UNCCD, 2012). It could be achieved by: (a) managing land more

sustainably, which would reduce the rate of degradation; and (b) increasing the rate of restoration of degraded land, so that the two trends converge to give a zero net rate of land degradation. For convenience, unless stated otherwise, the terms ‘Land Degradation Neutrality’ and ‘land degradation neutral’ are used throughout this paper, encompassing the earlier term of zero net land degradation.

The Conference of the Parties of the UNCCD has not yet formally adopted either Zero Net Land Degradation (ZNL) or Land Degradation Neutrality (LDN) as a goal. However, in response to a document prepared by its Secretariat after the Rio+20 Conference (UNCCD, 2013), the Conference of the Parties of the UNCCD established an intergovernmental working group to examine all the options that are available to the UNCCD for achieving LDN in dry areas (COP, 2013). A goal of LDN would give a welcome focus to the work of the UNCCD. Moreover, setting a target of achieving LDN by a given year would give the UNCCD an activity to match the Aichi 2020 Targets of the Convention on Biological Diversity (CBD, 2010), and the target of the UN Framework Convention on Climate Change to keep the rise in mean global temperature below 2 °C, facilitated by, among other actions, the Reducing Emissions from Deforestation and Degradation (REDD+) scheme (UNFCCC, 2014). There is keen interest within the UNCCD in having a target to match that of

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the other two 'Rio Conventions'. The UNCCD Secretariat also urged the Rio+20 Conference to support LDN as one of the new Sustainable Development Goals that are expected to replace the Millennium Development Goals in 2015 (UNCCD, 2012).

LDN therefore appears to have great potential, but is it really a feasible goal for dry areas, and how does it relate to current scientific knowledge of desertification, and of land use and land cover change generally? The emergence of LDN within the political sphere is not unusual. It is merely the latest in a series of *hybrid lay-scientific concepts*, which may arise in the lay or science domains and can then be developed in parallel processes in both of them (Grainger, 2010). Desertification and sustainable development are two other examples of this class of concepts. Initiating scientific analysis of LDN could lead to findings that will help policy makers, just as the emergence of the scientific process for sustainable development (e.g. Pearce, 1993) brought greater clarity to the vague definition of "sustainable development" in the report of the Brundtland Commission that launched the original political process for that concept (World Commission on Environment and Development, 1987).

This paper therefore has two aims. First, to evaluate the feasibility of an LDN scheme and contribute to ongoing UNCCD deliberations by identifying what refinements are needed to make it more feasible. Second, to catalyse the development of an LDN scientific process that can proceed in parallel with the evolving political process. The paper finds that an LDN scheme will present major challenges in implementation and monitoring, and that overcoming these will need inputs from this scientific process.

The remainder of the paper is in six parts. Section two defines key terms and critically reviews an initial UNCCD study of LDN in dry areas. Section three describes the methodology that frames the analysis in this paper. Sections four and five evaluate the feasibility of implementing and monitoring an LDN scheme, by referring to relevant historical evidence. Section six reviews existing theories to show how these could contribute to a conceptual framework for LDN. Section seven uses the findings of this paper to make suggestions for putting the concept of LDN into practice.

2. Background

2.1. Land degradation and desertification

Land degradation involves a reduction in "the physical, chemical or biological status of land ... which may also restrict the land's productive capacity (Chartres, 1987). It encompasses not only soil degradation, but also vegetation degradation, which has been defined generically as "a temporary or permanent reduction in the density, structure, species composition or productivity of vegetation cover" (Grainger, 1996).

Land degradation may also be treated as involving a reduction in *ecosystem services*. The provisioning services of a landscape, e.g. in the form of timber, food etc., and cultural services, such as recreation, are underpinned by regulating services, such as carbon cycling, and also by supporting services, such as nutrient cycling (Millennium Ecosystem Assessment, 2005).

Desertification is that part of land degradation which occurs in dry areas, where changes in land use and land cover are complicated by close links to long- and short-term climatic variations. It is defined in the text of the UNCCD as "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities" (UN, 1994). Soil degradation in dry areas occurs through various processes, including wind erosion, water erosion, compaction, waterlogging, salinization and alkalinization (Grainger, 1990).

2.2. Earlier analysis

An initial evaluation of the feasibility of achieving zero net land degradation in dry areas was prepared for the UNCCD Secretariat (UNCCD, 2012) and presented to the Rio+20 Conference, to fulfil a request by the Conference of the Parties to the UNCCD (COP, 2012). The report argued that zero net land degradation was a modest *intermediate* step towards halting desertification, for "while completely halting [land degradation and desertification] by 2030 may be difficult, setting a target of Zero Net Land Degradation by 2030 is realistic."

The implementation strategy proposed in the report had four key principles:

1. Adopting sustainable land management practices that also enhance resilience to climatic variation.
2. Avoiding degradation on non-degraded lands by using existing farmlands more intensively.
3. Community-based implementation.
4. Introducing payments for increasing ecosystem services through land restoration.

The report also proposed specific actions which governments, the private sector, farmers, pastoralists and international organizations could undertake to implement a zero net land degradation scheme. For example, the Parties to the UNCCD could add a Protocol to the Convention, just as the Kyoto Protocol was added to the UNFCCC to make it operational (UNCCD, 2012).

The first principle is non-controversial. The second could prove risky if not applied selectively, since intensifying agriculture on land of low fertility could cause more desertification (Grainger, 1990). The third is also non-controversial, as long as local communities can devise solutions appropriate to their own contexts. The fourth principle should be feasible too, though payments for increasing ecosystem services may not be as high as they would be in more humid areas.

However, the report had two key limitations. First, it assumed that it would be straightforward to implement a zero net land degradation scheme by scaling up to national and international scales our existing knowledge of techniques and policies for controlling and reversing desertification at sub-national scales. Desertification was understood in the UN Plan of Action to Combat Desertification to be reversible up to its most extreme form (UN, 1977). While approaches for controlling and reversing desertification at local scale have been known for decades (Goudie, 1990; Grainger, 1990; UN, 1977) (Tables 1 and 2), and continue to be refined today (e.g. Lee and Schaaf, 2008), there is a big difference between local success stories and being successful at higher scales. Second, it gave an over-optimistic evaluation of the state-of-the-art of using satellite imagery to monitor changes in the rate of desertification over large areas. These two limitations are examined in Sections 4 and 5 of this paper.

A post-Rio+20 Conference report by the UNCCD Secretariat made an equally compelling case for a land degradation neutral world, and for a target-based approach. It was consistent with the wording of the Rio+20 Conference report in mentioning the earlier target year of 2030 only once, and called for a "paradigm shift from 'degrade-abandon-migrate' to 'protect-sustain-restore' " (UNCCD, 2013).

3. Methodology

The feasibility of any policy can, following Mitchell (1989), be evaluated by looking at the different components into which the associated *policy process* can be divided. These components

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