Food and Agriculture Organization of the United Nations

LAND TENURE JOURNAL

REVUE DES QUESTIONS FONCIÈRES

REVISTA SOBRE TENENCIA DE LA TIERRA

2·19

LAND TENURE IN SUPPORT OF LAND DEGRADATION NEUTRALITY

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Required citation:

J. D. Unruh , S. Akhobadze , H. O. Ibrahim , B. Karapinar, B. S. Kusum , M. Montoiro , M. S. Santivane. 2019. *Land tenure in support of land degradation neutrality.* Land Tenure Journal no. 2-19. Rome. FAO. Licence: CC BY-NC-SA 3.0 IGO.

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REVISTA SOBRE TENENCIA DE LA TIERRA

LAND TENURE IN SUPPORT OF LAND DEGRADATION NEUTRALITY

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Deserted mining site next to the Blue Lake in Kara Kara, Linden, the Co-operative Republic of Guyana.

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PREFACE

LDN
DESERTIFICATION
UNCCD
LAND RIGHTS
TENURE SECURITY
POLICY
LAND RECOVERY

Land degradation neutrality (LDN) as a broad framework guiding research, policy and practice has gained considerable attention in recent years – particularly since the United Nations Convention to Combat Desertification (UNCCD) established LDN as its primary operating framework in 2015. As Target 15.3 of the Sustainable Development Goals (SDG) intends to achieve LDN globally by 2030, significant research and policy work has been accomplished on a wide spectrum of important components of LDN. Nevertheless, how land tenure intersects with LDN has not yet been examined. This article introduces tenure rights as sets of tools that can be used to robustly support LDN. The authors describe specifically how land tenure can be introduced into the existing LDN framework, implementation model, and monitoring approach so that they can contribute to land degradation prevention and recovery.

PRÉFACE

NDT
DÉSERTIFICATION
CLULCD
DROITS FONCIERS
SÉCURITÉ FONCIÈRE
POLITIQUE
RESTAURATION DES TERRES

La neutralité de la dégradation des terres (NDT) en tant que cadre général orientant la recherche, les politiques et les pratiques a fait l'objet d'une attention considérable au cours des dernières années, en particulier depuis que la Convention des Nations Unies sur la lutte contre la désertification (CLULCD) a défini la NDT comme son cadre opérationnel de base en 2015. Etant donne que la cible 15.3 des Objectifs de développement durable (ODD) a pour but d'atteindre la NDT au niveau mondial d'ici 2030, des travaux de recherche et analyses des politiques essentiels ayant été menés sur un large éventail de composantes importantes de la NDT. Néanmoins, la question de savoir comment les régimes fonciers interfèrent avec la NDT n'a pas encore été examinée. Cet article présente les droits fonciers en tant que série d'outils pouvant être utilisés pour appuyer la NDT. Les auteurs décrivent spécifiquement comment le régime foncier peut être intégré au cadre, au modèle de mise en œuvre et à l'approche de suivi de la NDT existants, afin de contribuer à la prévention de la dégradation des terres et de leur restauration.

PREFACIO

NDT
DESERTIFICACIÓN
CNULD
DERECHOS SOBRE LA TIERRA
SEGURIDAD SOBRE LA TENECIA DE LA TIERRA
POLÍTICAS
RECUPERACIÓN DE LA TIERRA

La neutralidad de la degradación de la tierra (NDT) como marco amplio que orienta la investigación, las políticas y la práctica, ha recibido especial atención en los últimos años – sobre todo, desde que la Convención de las Naciones Unidas de Lucha contra la Desertificación (CNULD) estableciera la NDT como su principal marco operativo en 2015. Dado que la Meta 15.3 de los Objetivos de Desarrollo Sostenible (ODS) pretende lograr un mundo con una NDT para 2030, se han realizado importantes investigaciones y trabajos en materia de políticas sobre un amplio espectro de componentes importantes relativos a la NDT. Sin embargo, aún queda por investigar de qué forma la tenencia de la tierra se interrelaciona con la NDT. En el presente artículo se presentan los derechos de tenencia de la tierra como una serie de herramientas que se pueden utilizar para apoyar firmemente la NDT. Los autores describen de manera específica la forma en que la tenencia de la tierra se puede incluir en el marco vigente sobre la NDT, el modelo de aplicación y el enfoque de seguimiento para que puedan contribuir a la prevención y la recuperación de la degradación de la tierra.

1. INTRODUCTION

The United Nations Convention to Combat Desertification (UNCCD) has developed the "Land Degradation Neutrality" (LDN) approach to address the pressing issues of land degradation across the globe. UNCCD defines 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" (Orr *et al.*, 2017). UNCCD has constructed a conceptual framework for LDN in order to guide country level efforts in attaining LDN, along with an implementation model and monitoring approach.

The "Scientific conceptual framework for land degradation neutrality" (Cowie *et al.* 2018; also Orr *et al.*, 2017; Kust *et al.*, 2017; UNCCD, 2016a; 2014; 2013a) has built upon the concept and established the scientific basis for LDN. Additional researchers have examined its implementation (Chasek *et al.*, 2015; Pacheco *et al.*, 2018; Stavi and Lal, 2015; Grainger 2015; UNCCD, 2016b); and Akhtar-Schuster *et al.* (2017) have unpacked the LDN approach with regard to the Rio Conventions; while Willemen *et al.* (2017) and Sietz *et al.* (2017) have intersected LDN with ecosystem dynamics and services. In addition, Okpara *et al.* (2018) examine the environmental governance aspects of LDN; Quatrini and Crossman (2018) look at financial investments; Tal (2015) and Safriel (2017) compare LDN with other offsetting schemes; and Welton *et al.* (2014) examine the legal integrity of LDN. Thus while the LDN approach has gained considerable attention and different aspects of the approach have advanced, how land tenure intersects with LDN has not yet been examined and is not presently part of its implementation. This article looks at the important relationships between tenure rights and LDN, and describes how land tenure as a set of "tools" can be introduced to support the LDN framework to prevent and avoid land degradation and assist in the recovery of degraded lands. The term "tools" in the sense used in the paper is intended to include tenure-related requirements (institutions, laws, etc.), processes (amending tenure security, dispute resolution, the involvement of local communities), as well as use of specific instruments (assessments, legal review, arrangements for multiple land uses) as these act together as tools. In this context tenure rights are placed within the existing LDN framework (Figure 1), logic model (Figure 2), and monitoring structure (Figure 3). This effort draws on the expertise and experience of the UNCCD Civil Society Organization Panel which works to advance LDN in Africa, Latin America, Asia and Eastern Europe. In addition, the current scientific, policy and practitioner literature on land tenure and degradation was reviewed.

2. LAND TENURE AND LAND DEGRADATION

Past research has established the direct and robust linkage between land tenure and land degra-dation. Of the 1.5 billion people who exist on land that is undergoing degradation, most are small-scale farmers (UNCCD, 2014). The land degradation – land tenure relationships for small-scale farmers have been examined with regard to the functioning of tenure security (*e.g.* Uitamo, 1999; Delville, 2003; Fearnside, 1986); institutions (*e.g.* Berry, 1990; Pfeifer *et al.*, 2012; Delville, 2003); women's tenure rights (*e.g.* ELD, 2015; Nkonya *et al.*, 2006); and development ef-forts (*e.g.* World Bank, 2007). In addition, the widely reviewed and agreed upon Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security makes explicit the linkages between tenure, land degradation and food security (VGGT) (FAO/CFS, 2012).

The intersection of climate change and land degradation in the context of land tenure is a scenar-io of particular concern. Climate change and land degradation are closely associated in many parts of the world (*e.g.*, Raleigh and Urdal 2007; Meadows and Hoffman 2003), as are land tenure insecurity and land degradation (*e.g.*, Gebremedhin and Swinton, 2005; Bugri, 2008). This reveals a problem of compounding effects, such that the repercussions of climate change acting together with tenure insecurity over large areas, push landscapes more quickly and severely in the same direction – toward greater degradation. The result is more pronounced land degradation than if either of these two factors were acting alone. In a similar way however, providing the necessary legal and institutional means by which tenure security can be strengthened, can miti-gate the land degradation effects of climate change to a certain degree, by encouraging land resource conservation and adaptation. In addition, secure tenure rights play a direct role in increas-ing the biotic storage of atmospheric carbon. Large areas that were once forested but currently degraded can be seen as having a significant potential for large-scale tree planting in order to store carbon, and this approach has been included in many climate change mitigation calculations. Similarly, the prospect for small-scale farmers to plant trees on their own land (depending on the nature of the tenure rights) and the carbon storage potential of this form of tree planting, is also quite substantial. Both approaches however are only possible with significant tenure security, because the benefits of tree planting for any reason are long-term. Such interactions between the social and ecological aspects of land degradation highlight the relevance of examining the land tenure – degradation nexus from a socio-ecological approach (*e.g.*, Ostrom, 2009; Folke, 2005).

3. LAND TENURE WITHIN THE LDN APPROACH: TOOLS FOR PREVENTION AND RECOVERY

Positioning land tenure within LDN: framework, implementation model and monitoring

In order to position tenure rights within the LDN approach, this article first proposes how land tenure, viewed as sets of tools, can be specifically integrated into the LDN framework (Figure 1), implementation model (Figure 2), and monitoring approach (Figure 3). These three figures build upon the schematics established by UNCCD for LDN (UNCCD, 2016a; 2014; 2013b) and used subsequently in examinations regarding how LDN intersects with the variety of topics noted above. The land tenure additions to these schematics in Figures 1 - 3 are made by the present ar-ticle with regard to how they contribute to the avoidance of land degradation, and for the recovery of degraded areas – the two overarching priorities for LDN. While certainly the relationships between land tenure and LDN, and between land tenure security and land degradation are quite complex, the point of the paper is to examine broadly how land tenure concepts, tools, and approaches can be inserted into the LDN framework, as opposed to attempting an exhaustive review of all the possible complexities.

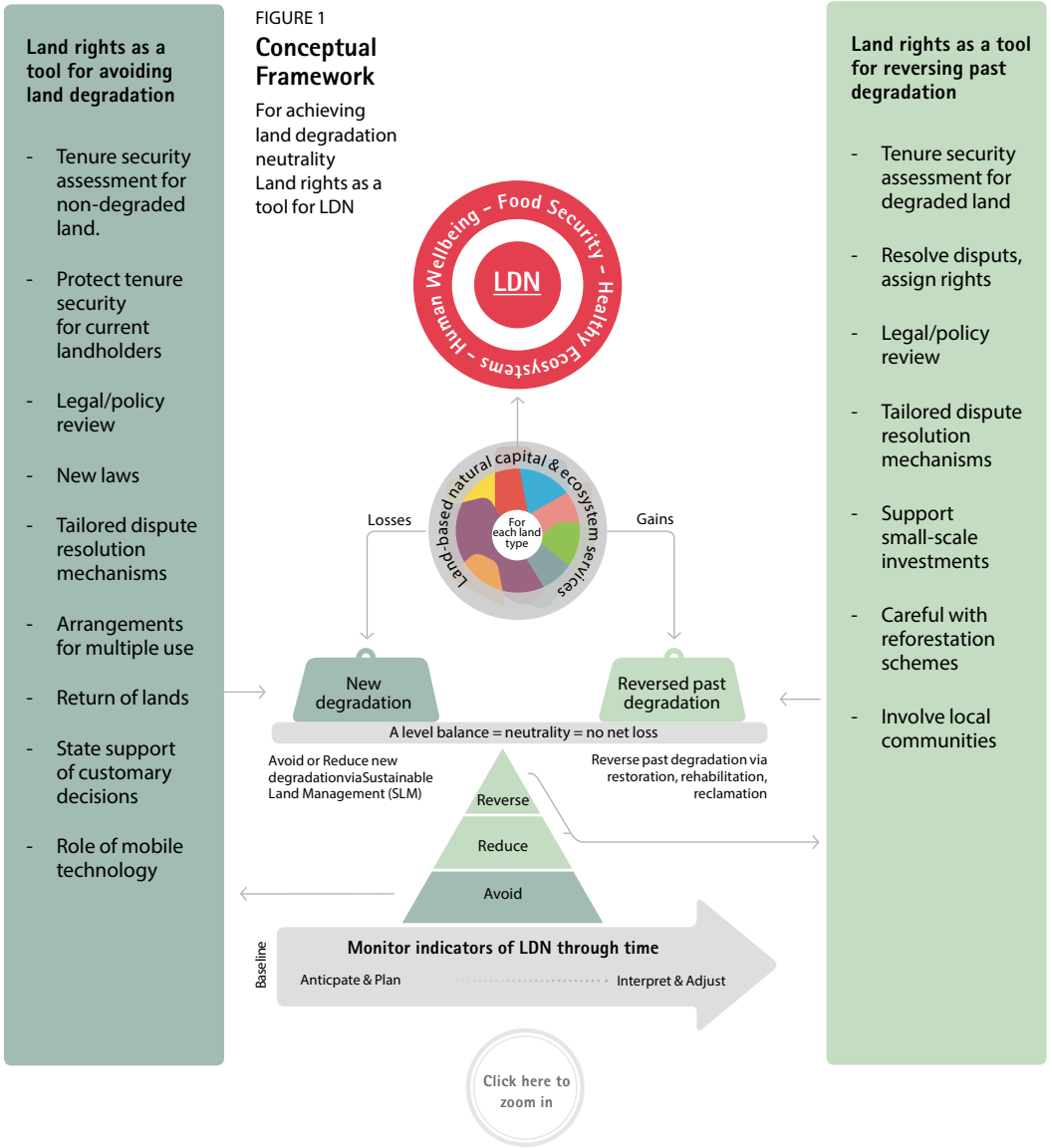
Figure 1 outlines how a selection of tenure rights tools can be inserted into the Conceptual Framework[1].

Figure 2 specifies how a subset of land tenure tools can be inserted into the LDN logic model, focusing on the elements of "policies and institutions" and "stakeholder participation" which comprise the first box under "Inputs and Preparatory Activities". Land tenure tools can also be inserted into the "tools/methods for capacity building" elements of the model, for both "land potential assessment" and "economic valuation",

FIGURE 1

Conceptual Framework

For achieving land degradation neutrality
Land rights as a tool for LDN



1 The point of listing the different land tenure tools for avoiding and reversing land degradation is to define where they can be positioned within the existing framework, as opposed to fully exhaustively examining each of these. As such not all of the tools are fully described in the text, but are nonetheless included in this 'positioning'. Some tools may not appear straightforward, but are nonetheless important; such as 'return of lands' which is important in cas-es of forced displacement, and 'careful with reforestation' which recognizes the widespread problems associated with reforestation being equated with claiming of lands by customary communities.

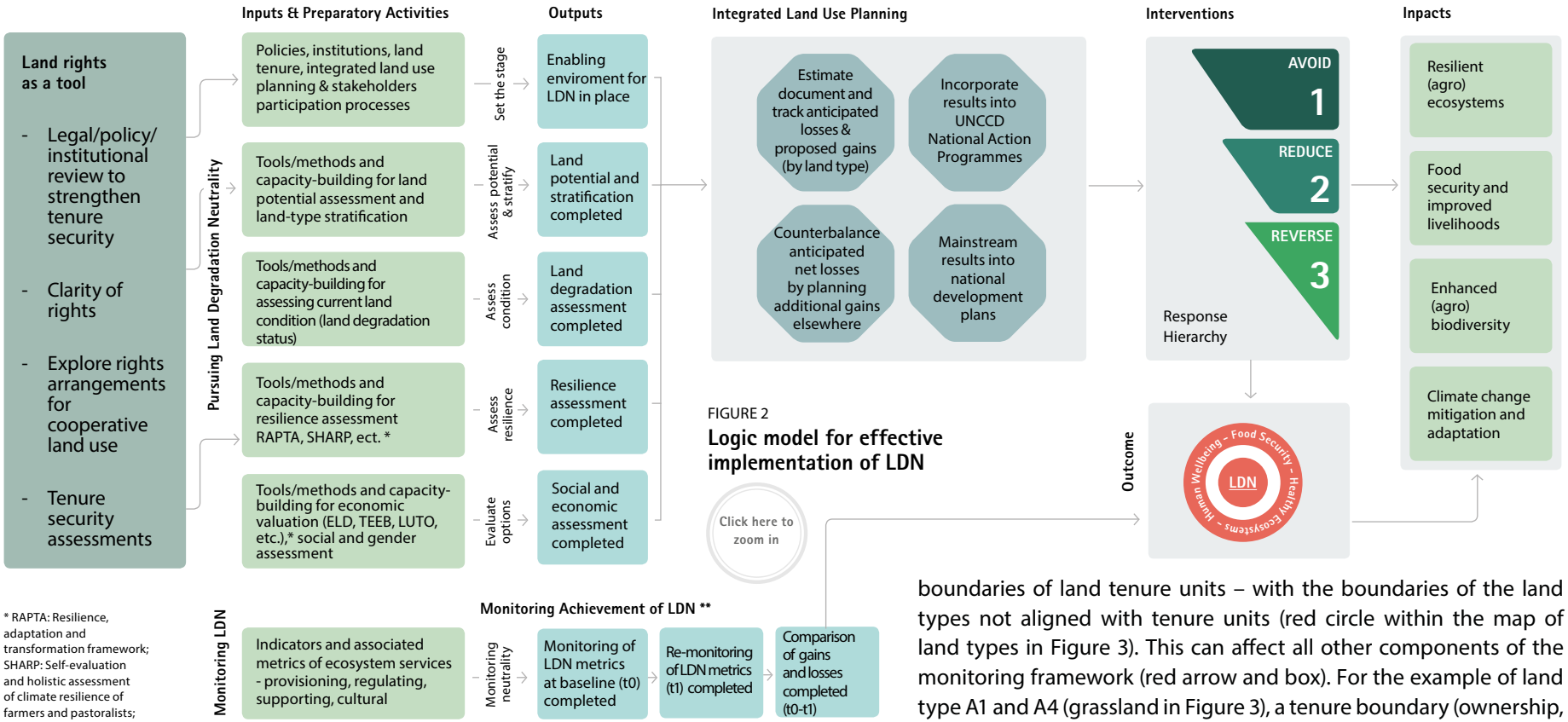


FIGURE 2
Logic model for effective implementation of LDN

* RAPTA: Resilience, adaptation and transformation framework; SHARP: Self-evaluation and holistic assessment of climate resilience of farmers and pastoralists; ELD: Economics of LAnd Dgradation initiative; TEEB: the economics of ecosystems and biodiversity; LUTO: Land use trade offs.

** Note that the 'Monotoring Achievement of the LDN' is different from the 'Monotoring LDN' in figure 3.

comprising the second and fifth box under "Inputs and Preparatory Activities". These insertions are described below as they pertain to the avoidance and reversal of degradation.

Figure 3 outlines the intersection of land tenure with the LDN monitoring approach. In this case tenure rights complicate the monitoring approach which uses "land type" as the unit of analysis for monitoring, such that a single land tenure unit (whether statutory, customary or indigenous) will cut across (and split apart) the individual land types as portrayed in the monitoring approach. Therefore, a single grassland land type will be divided by the boundaries of land tenure units – with the boundaries of the land types not aligned with tenure units (red circle within the map of land types in Figure 3). This can affect all other components of the monitoring framework (red arrow and box). For the example of land type A1 and A4 (grassland in Figure 3), a tenure boundary (ownership, rental, customary, statutory) that crosses the grassland will alter the use of part of the grassland in terms of grazing time, and hence its status. This will then influence the metric values at baseline for the land type, as well as the decisions that take place on either side of the tenure boundary and hence the metric values in the future. The result will be that the gains and losses for any single grassland as a land type unit will be more difficult to calculate rather than if the grassland were the unit of decision-making instead of tenure being the unit of decision-making. While the gains and losses for such a land type could be averaged for the entire land type (across tenure types), this will not reflect the different decisions which are needed

and take place that generates the "Context" section of the figure. This non-alignment of the monitoring approach with the realities of land tenure reveals that further work is needed in order to adequately reflect decision-making units across land types. Such an endeavour however is beyond the scope of the present paper. Land tenure tools for the prevention of degradation.

The set of tenure rights tools that are able to support the prevention and avoidance of degradation include a variety of assessment, legal, institutional, technological, and symbolic/trust components. These are introduced below and positioned to the left in Figure 1.

Tenure security assessments, monitoring, protection

Assessments are an important, established component of the existing LDN framework and logic model, and are useful for establishing baselines in the monitoring approach, and learning about important components of the degradation problem that require particular attention (UNCCD, 2013b). Assessments of the status of land tenure and in particular the degree of tenure security, are needed in order to determine a baseline of rights and tenure security, and to determine which tenure rights tools are most appropriately and effectively applied. At the same time, monitoring the status of tenure rights is useful for signals that change is underway in tenure status, which is important for protecting tenure security from declining, and to spot opportunities to improve tenure security.

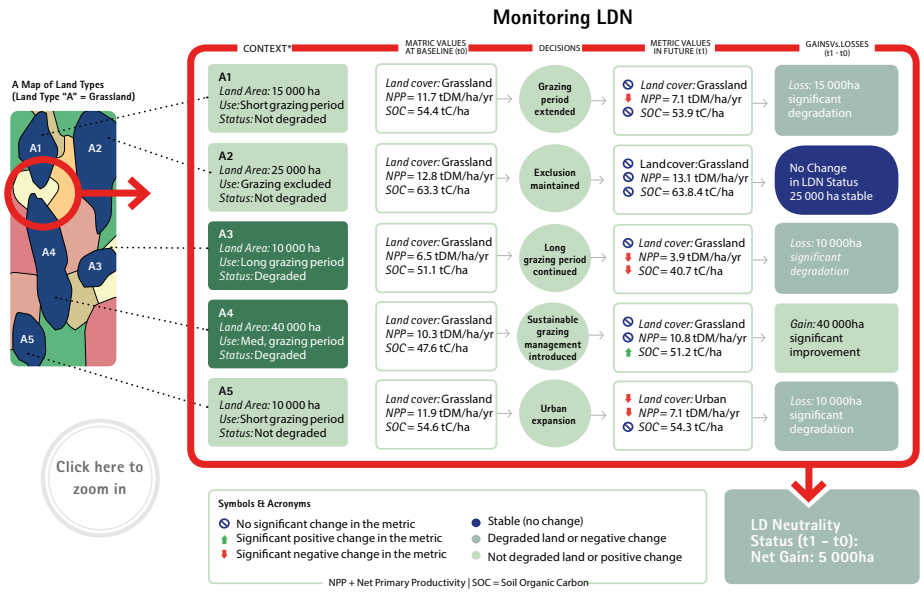
Conventional land tenure assessments have evolved over the years to meet a variety of needs, and can be rapid, straightforward and highly reflective of forms of tenure rights and tenure security (e.g. Payne *et al.*, 2015; Galudra *et al.*, 2010; USAID, 2005). Such assessments can be included in LDN efforts along with the other types of assessments that are already part of the framework. The metrics used in assessments can measure the features of landscapes and livelihoods that reflect the status of tenure security – including aspects of land tenure that affect women. Such assessments usually are carried out at the local community level in the form of household or community surveys – and they can be tailored for statutory, indigenous or customary land tenure systems. The metrics commonly included in land tenure assessments suitable for the LDN effort include:

Number of disputes. The number of land-related disputes in a given area is an important measure of tenure security. While all societies have disputes over land, what supports tenure security is how they are resolved. Land disputes that are not resolved in a timely and fair manner, accumulate so that their numbers become large and fraught with grievance, animosity, and searches for alternative ways to deal with land problems, including degradation and violence. As a result, simply the number of unresolved land disputes in an area is one important ingredient of tenure (in)security that can be easily

*This hypothetical example is designed to explain how LDN can be monitored. The initial status is not necessary for monitoring LDN, but provides context for each of the five examples. This example illustrates a grassland grazed by livestock.

FIGURE 3
Land tenure complicates the LDN monitoring approach

A single land ownership unit (state, customary, trival, etc.) will cross (split) several land types; affecting context, metric values at baseline, decisions, metric values in the future, and gains and losses for each type.



measured (Bruce and Migot-Adholla, 1994). High numbers of disputes in an area indicate a high degree of non-clarity for tenure rights and the resulting confusion and tenure insecurity. It also indicates a lack of institutions (local to national, customary, indigenous peoples) that are able to adequately deal with disputes in the quantity and type in which they occur. Moreover, the different types of land disputes can be revealing. A prevalence of boundary disputes will reflect a different aspect of tenure security than a prevalence of ownership disputes. In addition, disputes involving specific rights can be measured – rights of access, use, extraction, temporary residence, grazing, tree planting, etc. And the frequency of disputes over these rights can reveal which sub-population is more insecure (Hollingsworth, 2014; Simbizi, 2016), informing with some precision the "policies and institutions" component of the logic model (Figure 2).

Dispute resolution institutions. The presence of what are regarded to be effective and fair dispute resolution institutions, procedures and authorities (different from the quantity and type of disputes themselves) comprises a set of several important measures for tenure security. That such institutions belong to customary, indigenous or state tenure systems is less important than their performance and how they are regarded by local populations. Simply the existence of land dis-pute resolution institutions in an area does not necessarily mean that they function in the rapid and fair manner that is needed to support tenure security. Thus, there are five metrics regarding these institutions that reveal their effectiveness in supporting tenure security. They include: 1) the ease and quickness of access, 2) the cost of having a dispute heard by an institution, 3) the perceived fairness of the institution, 4) the ability of the institution to acknowledge and value the forms of evidence that claimants do have access to (including customary and indigenous evi-dence), and 5) the enforcement of decisions. These five metrics are used in assessments to help reveal degrees of tenure security. Such a situation influences the tenure security of more people than just those directly involved in the disputes. This is because the failure to resolve disputes quickly and fairly is a signal to a broader community that landholdings generally are not secure in the overall area (Laksa and el-Mikawy, 2009; Bruce and Migot-Adholla, 1994).

Investmets in land (land improvements and ameliorations). The presence of specific investment types is an important indicator of tenure security, because security in tenure rights to one's land results in long term investments that are easily observable – including investments in the recovery of degraded land. This includes tree planting for wind breaks, soil stabilization and water harvesting; plugging gullies and ravines with embankments; sound cultivation practices including modifying cropping patterns, erosion control, terracing, irrigation works, water wells, and permanent fencing. Often land tenure studies look at the frequency of such investments as a metric of tenure insecurity. Such long-term investments in the landscape can be contrasted with shorter-term investments such as simple building construction, easily constructed fencing and other boundary markers and poor agricultural practices and production. The absence of landscape-based investments, particularly where they should be present to prevent degradation, can reveal tenure insecurity. These include the absence of terraces on steep slopes that are cultivated and the absence of water and erosion control features in flood prone areas.

Evidence attesting to claim. The possession of the prevailing forms of evidence or proof of rights to land is also a metric for tenure security assessments. The importance of evidence does not depend on whether it is an official document, or is customary or indigenous peoples evidence; rather it more depends on whether the evidence is obtainable, workable and relevant as evidence, and respected as legitimate by the local to national communities and authorities deciding land matters.

Confusion. The degree of confusion within a community or population about what rights are possessed by who is an important metric of tenure security. Community surveys regarding under-standings and

opinions about what rights to what lands are possessed by who and how those rights operate, can easily measure the degree of confusion at the community level, with greater confusion revealing lower tenure security.

Once these different metrics for measuring tenure security are gathered in a community level survey, they are usually combined in various ways to produce a single continuous index, from extreme tenure insecurity at one end of the index, to high levels of tenure security at the other. Often such assessments can begin with or build on existing information from other assessments (such as those already involved in the LDN effort), or which are collected on a country or re-gional basis. For example, the "Institute for Rural Development in South America" recently produced a wide ranging document examining the land tenure of Bolivia, Ecuador, Colombia, Para-guay and Peru (IPDRS, 2016); and the Prindex methodology collects data on a variety of countries regarding tenure security (Prindex, 2019). These approaches could be built upon in the conduct of land tenure surveys for the region.

The legal domain: legal policy review, new laws, dispute resolution

Within the land tenure legal domain of most countries there are two broad areas that are of concern to preventing and avoiding land degradation, and these are relevant to the insertion of land tenure governance tools into the "policies" box of the logic model for implementation (Figure 2). The first is to examine (with a legal review) the relevant policies and laws, but more precisely the articles within laws that inadvertently lead to, or encourage land degradation. Usually such laws and articles are made with good intentions, but have unintended consequences for land degradation. As a result, often minor changes are needed to correct the legal problem. The second is the derivation and implementation of new laws and amendments to existing laws that are able to act against or discourage land degradation activities and processes. Associated with any legal change of course is its implementation and enforcement, along with effective awareness raising.

A legal review of existing laws within a country pertaining to land acquisition, transfer, inheritance, demarcation, expropriation, compensation, valuation, taxation and use, from a perspective of how they lead to land degradation, can be relatively easily and quickly performed and recommendations made as to their adjustment – particularly if one of these issues stands out as problematic. A number of these types of laws are widely known and used, and a selection is presented here.

Use-it-or-lose-it. Designed to encourage more equitable land distribution in a society, or to discourage having productive land sit idle, laws that establish a "use-it-or-lose-it" time-frame whereby lands not under cultivation for a certain period of time can be taken by government and redistributed to others or heavily taxed, can be an important driver of land degradation (Home, 2011). Such degradation occurs when lands need to be adequately fallowed in order to recover soil productivity. If the legal timeframe is shorter than an adequate fallow period – which is the case for many such laws – then the current rights holder or occupant is encouraged to cultivate the land every year, or only allow for an inadequate fallow period before cultivating again – in order to retain control of the land or avoid burdensome taxes. Over time this seriously degrades agricultural lands over large areas. Adjusting the law to become aligned with an ecologically adequate fallow period (often different in different ecosystems within any one country) is often the best way to proceed. A different option would be to adjust the law to include the presence of economically valuable trees in fallowed lands within the definition of "in use". This would encourage both tree planting within an old agricultural field in need of fallow, and an adequate fal-low period; while allowing the current occupant to retain rights to the land without feeling com-pelled to cultivate continuously.

Inheritance. Inheritance laws and practices – statutory, customary and indigenous – that result in land fragmentation as land passes

from one generation to the next, can result in significant overall land degradation – although certainly permutations to this scenario exist. This occurs as land holdings get smaller and smaller over generations, and thus must be cultivated more intensively and more often in order to produce a harvest able to sustain a household. While a shift to highly productive intensive agriculture through utilization of irrigation, fertilizers and much greater labour, can be sufficiently productive to support household economies with small parcels, this shift usually takes a great deal of time, requires that other ingredients in society and economy are also in place, is costly and often does not occur. What can be useful in such cases, are changes to law that encourage joint land use arrangements, such that adjoining fields (under separate tenure) are cultivated together in cooperative approaches, thereby taking advantage of economies of scale. Such cooperation can include sustainable land management practices and investments that are jointly engaged in by relatives.

Abuse of laws. There can exist a wide variety of well-intentioned laws and articles within laws that inadvertently allow for abuse of tenure rights, resulting in land grabbing and then acute tenure insecurity – with the associated land degradation. This encourages forms of "defensive farming" (Pfeifer *et al.*, 2012) and "clearing to claim" (Unruh *et al.*, 2005) and other overuse of resources in order to keep land from being subjected to grabbing, or in order to extract all available resources and productive value before the land is grabbed. Often well-intentioned laws regarding eminent domain can be abused by those in a position to do so, in order to take land for private use or sale. Other laws that can be abused in this way include those that facilitate the expropriation of lands in order to protect what are deemed to be historical or heritage lands, national parks, or militarily sensitive areas (such as border areas). Such abuse can result in widespread reluctance to adhere to state laws for land matters. For such laws often what is needed is to tighten up and monitor how they operate in order to reduce opportunities for abuse.

Large-scale land acquisitions (LSLAs) can be carried out by foreign and domestic investors, by way of national laws which can be misused. The situation in Argentina illustrates that even countries with a history of quite well developed institutions can be affected by LSLAs with negative consequences. In Argentina over 1.5 million hectares of land has been subjected to LSLAs by international investors; with domestic investors accounting for even more acquisitions. And while multiple use of such land (between local communities and investors) is almost always an option (particularly if supported by law), of the 47 LSLAs studied by the "Land Matrix" in Argentina, 87% involved outright purchase of land, which precludes multiple use by customary and indige-nous communities (LM, 2017).

Overly complicated or too many laws. Land laws that are overly complicated or too numerous can create a good deal of confusion over what rights are possessed by who, and what the procedures are for transferring, inheriting, registering, paying for, improving and protecting land. Such confusion is a primary driver of tenure insecurity and the associated land degradation. In addition, laws about land that are heavily bureaucratic, difficult to understand and costly to apply, add to confusion. And laws that are not clear in their implementing regulations as to who they apply to and how, lead to inadequate enforcement and can be open to multiple interpretations and abuse. One study in Latin America found over 700 bureaucratic steps were needed in order to register land (de Soto, 2000). Such a situation invites confusion, non-compliance, non-enforcement and corruption, and contributes significantly to tenure insecurity. In such cases, efforts to streamline, simplify, clarify, make accessible and reduce the costs of understanding and complying with laws, would contribute significantly to increasing tenure security, with positive effects on land use.

Regulating pastoralism. Laws, rules and practices that unduly restrict movement of pastoralists across international borders and other boundaries, and into farmed areas after harvest, can result in pronounced overgrazing in the remaining areas that are accessible. While such restrictions can be necessary at certain times, overly restrictive, poorly applied, or inflexible rules can lead to land

degradation and conflict. Darfur provides an example, whereby flexible customary rules about the timing of livestock access into farmed areas after harvest facilitated both cultivation and grazing and a productive relationship between pastoralists and farmers across ethnic lines. It was unfortunate that the Sudanese government replaced these rules with more rigid laws regarding timing of livestock entry into farmed lands, causing widespread disruption in farming and grazing activities, overgrazing and conflict – to the degree that the issue became part of the war in Darfur (Unruh, 2012).

Inappropriate categorization. Laws that inappropriately categorize commons lands as "open", "unclaimed", or "abandoned" can promote degradation. This occurs as the lands are then allocat-ed or sold and become inaccessible for grazing, fuelwood and other forms of natural resource gathering and use, leading to degradation elsewhere. Useful in this regard is a much more careful use of legal categorization of lands by the state, along with consultation with local and adjacent communities and a review of the validity of existing legal categorizations for these lands.

Technology and law. Certain new uses of mobile technology applications have been shown to greatly assist in defining, delineating and registering tenure rights, and are beginning to provide robust avenues for many rural communities to obtain increased legal clarity of rights and tenure security. A number of national and international organizations have produced mobile technology applications such as FAO's SOLA and Open Tenure platforms (FAO, 2019), the "Social Tenure Domain Model" developed by the Global Land Tool Network (STDM, 2017), and the "Mobile Application to Secure Tenure" (MAST) developed by USAID (2015). These and other applications allow a wide variety of demarcations, photos, fingerprints, testimonies and other infor-mation to be used easily and quickly on mobile phone platforms that people already have, so as to facilitate registration of tenure rights within the formal legal system or in some cases the customary tenure system. These applications are becoming more widespread as development partner and civil society organization projects as well as local communities and governments adopt technologies to aid in formal land registration of customary and indigenous lands.

Cooperative land management. Specific laws that encourage, promote and in some cases mandate that certain land uses engage in cooperative management of land resources can be important in the avoidance of degradation. In Mozambique, the postwar land law contains an article that stipulates that the occupation of lands by indigenous peoples and customary groups, "according to customs and norms", is equivalent to statutory title in formal law (Hanchinamani, 2003). A related article states that a compulsory formal consultation with local communities regarding occupation and use plans must occur when outside investment is attempted (Norfolk and Liversage, 2003). As a result, all foreign and national investors must negotiate directly with the relevant local community[2] for use rights to land (De Wit, 2002; Pancas, 2003). Together these articles have led to a policy known as the "open border model", a legal cooperative land use approach that allows both investment and local communities to have simultaneous and continued access to the same lands (Tanner, 2002).

Land and infrastructure projects. While infrastructure projects can be important forms of development in many countries, they need to be implemented after the tenure rights in and around affected areas have been inventoried and legally protected as a prerequisite – including leasing and other rights that are often not registered. If this does not occur then the inevitable rise in land values in a wide zone around the projects or along a transportation corridor will invite land grabbing, dispossession, land consolidation, land speculation and degradation as large numbers of migrants are drawn to the project area. Such migrants seek employment and business opportunities and then become squatters on nearby lands, often severely degrading them and acting in confrontation with local communities. The rise in land values, dispossession and degradation due to migrant attraction to project areas has been the case in Afghanistan (Delesgues, 2007),

2 Applying the Free, Prior and Informed Consent (FPIC) principle, cf. http://www.fao.org/3/a-i3496e.pdf; http://www.fao.org/3/a-i6190e.pdf; http://www.fao.org/indigenous-peoples/our-pillars/fpic/en/

Cambodia (Ironside, 2010), Kenya, Ethiopia, Tanzania and elsewhere (DRC, 2016). What is needed is legal solidification, and clear registration of tenure rights in such areas, including formalizing indige-nous and customary occupation and claims.

State support of customary decisions. Statutory laws that do not recognize customary or indige-nous land tenure, boundaries, types and terms of land use or institutions, can (but not always) encourage land degradation. This occurs as non-recognition means that local communities are unable to exclude others from their lands. This then drives competition for land-based resources (fuelwood, fertile soils, grazing, timber, etc.) and overuse of resources. Often what is needed are revisions in law that legalize indigenous and customary rights, decisions and boundaries; or amendments that equate indigenous or customary forms of claim with statutory forms of claim, such that one does not prevail over the other. While the latter can appear as though it would re-sult in confusion, and competition, Mozambique has found that it results in more negotiation and cooperation between claimants (Norfolk and Liversage, 2003). And while there can exist many laws that do protect customary and indigenous lands, lack of adequate enforcement leads to their being disregarded by those seeking to obtain lands illegally.

Multiple land use. Laws that discourage (or do not encourage) forms of multiple, cooperative land uses, especially those uses that involve cooperation between customary/indigenous and statutory tenure systems, can result in land degradation. This is not intended to mean that single land uses are at times not the best, as indeed they can be, depending on the society and environment. However often large-scale land investment using statutory law desire "complete and exclusive" control over all land resources within a specified area in a concession, purchase, or lease. This ex-cludes customary and indigenous peoples – often without providing alternative or adequate lands or compensation. This leads those that are excluded to purposefully over-use land resources in the area, believing that it is better for them to get some benefit from their lands. Particularly important in this regard are laws that discourage or do not facilitate cooperative land uses between farmers and pastoralists, and between outside investors and local communities. In the latter case, leasing land instead of purchasing land by investors can be a way forward. In this example land can be leased by local indigenous peoples and customary communities instead of government, or in *consortium* with government. Past experience has shown that leasing specific rights for a set period of time, can be more secure for investors than private tenure rights that are then contested and resisted by a local population. A significant contribution in this regard is the recent effort on "Responsible Investment in Agriculture and Food Systems" (RAI), in which respect for rights is seen as the starting point for how investments can contribute to global food security (CFS/FAO, 2014).

Land tenure governance tools for recovery of degraded lands

While a number of the tools noted above are also important in addressing problems on lands already degraded, there are several distinct tools that can be used specifically for recovery. Lands that are already degraded are often the most problematic in terms of land tenure, which is why they are degraded. The land tenure tools that are needed to stabilize and reverse degradation processes are specific, known, and given the potential value of recovered lands in contributing to national economies, very worthwhile. Reversing land degradation is a primary component of the LDN framework (Figure 1) constituting the 'gains' arrow, the 'reversed past degradation' weight on the 'neutrality' balance, and the 'reverse' component of the fulcrum upon which the balance rests. The land tenure governance tools able to support recovery of degraded lands are listed to the right in Figure 1, and a selection is elaborated below. Reversing degradation is also included in the logic model (Figure 2) as the third 'response' within the 'response hierarchy' under 'interventions' and within the 'gains' elements of the monitoring approach (Figure 3).

Land tenure assessments for degraded lands

There is a need for specific types of assessments for lands that are already degraded and targeted for recovery efforts. These assessments are different for lands that are occupied and not degraded, or in the process of becoming degraded. Often lands that are already severely degraded have no obvious occupant (because they are unproductive) and so can appear abandoned, and therefore open to different forms of claim, including large-scale land recovery schemes such as tree planting, sand dune fixation, fencing and protection, etc. However such lands are almost certainly already claimed by at least one and usually several groups (potentially belonging to indigenous, customary and state tenure systems) that have engaged in unrestrained competition for the resources in the area which has resulted in degradation. In case of any granting of an outside (non-local) claim as part of a state recovery plan, a variety of historical claims will certainly emerge, many of which will be very difficult to verify. A land tenure assessment in this context should complement the biophysical assessments conducted as a part of established LDN efforts, but focus on locating the various claims and claimants to the land, and in particular focus on the land tenure reasons why the land became degraded in the first place. An assessment should define who the true claimants are (customary, indigenous, statutory) and then make recommendations as to how to resolve issues of competing claims and uses, poor institutions, and poor land policy. This should occur ideally before any biophysical land recovery efforts begin. Such an assessment should also recommend how to administer land tenure rights in the area while it undergoes recovery, and derive ways that claims of tenure rights will be upheld once the lands are recovering and becoming productive. This last step can also be seen as an opportunity to include women's rights and cooperative instead of competitive land uses.

Tree tenure as a tool in land recovery

While land tenure is in many cases quite complex and problematic on degraded lands, in some cases "tree tenure" (rights to economic trees or their produce) as a distinct component of land tenure, can provide opportunities to engage in recovery of degraded lands. This is because in many parts of the world the owner of an economic tree can be different from the owner of the land. Where this is the case there can exist the opportunity to engage in land recovery using trees as a separate set of rights than rights to land. A land tenure assessment in support of LDN can determine where and how this may occur.

Where there exists a disadvantaged group in terms of tenure rights (for example women, migrants, particular ethnic or socio-economic groups), tree tenure can provide an important form of rights security. In other cases tree planting may increase security of tenure in land and enhance rights to land, which – if unchallenged – can eventually evolve into proof of tenure rights and hence increase tenure security. In agricultural areas of Africa, Asia, Latin America and elsewhere, trees are planted not only to delimit clear boundaries, but also as permanent improvements to the land; both of which serve to strengthen rights to land. This illustrates the perception-based nature of "improvements to the land" upon which subsequent tenure rights can be based (Oba, 1985; Brokensha and Glazier, 1973).

In the Brazilian Amazon – as in many of the world's natural forests – tenure can be secured by "improvements to the land", meaning clearing the land. Whereas in Costa Rica and Tanzania squatters attempt to make their tenure rights more secure by planting trees; either because (for Costa Rica) the law requires compensation for improvements, or (for Tanzania) permanent use rights can be obtained. In the Peruvian Amazon, management of swidden-fallows for locally valuable economic trees establishes tenure rights of the fallow in a situation where land tenure is usually abandoned along with the fallowed land after the cultivation cycle (Unruh, 1988). This agroforestry tree planting approach to degraded lands has an additional advantage. Agroforestry adoption rates are often highest among the most disadvantaged populations who must subsist in situations of very low agricultural productivity, in other words on degraded lands. Likewise a UNCCD report noted that approximately 40 percent of the world's degraded land occurs in areas with the highest incidence of poverty (UNCCD, 2014). Thus degraded lands, poor populations and the highest agroforestry adoption rates all occur on the same lands – creating a significant opportunity for recovery.

The purposeful planting and removal of trees stands at the intersection between land tenure and land degradation recovery – because such activities that establish "facts on the ground" to claim land, and remove the claims of others, commonly exist in state, customary and indigenous law. As a result there is considerable potential in the policy domain regarding tree planting and removal. But caution is warranted that no one approach will fit all circumstances, and an assessment will be important to determine what the opportunities are in any specific situation.

Legal and policy opportunities

While most of the items in the legal review section above for avoiding and preventing land degradation are also relevant for lands already degraded, a couple of additional policy and legal constructs regarding tenure rights are important specifically to the recovery of degraded lands. These will ideally need to be implemented after completing the policy/legal changes noted above for avoiding land degradation. For example it will do little good to attempt to rehabilitate degraded lands if the law that supports a "use-it-or-lose-it" approach is still in place.

The policy/legal domain is one of significant potential in the recovery of degraded lands, because a variety of legal incentives can be used to encourage land recovery efforts by occupants and owners. In Sierra Leone, degraded lands were rented out to occupants who then wanted to plant trees on the land they were renting. While this would have contributed significantly to the recovery of these lands, tenants were prevented from planting trees by the owners of the land, because of the understanding that those who plant trees can then claim the land. In order for rented land not to be lost in this way, the owners prohibited tree planting by renters, uprooted trees that were planted, and evicted renters who attempted to plant trees. Thus in this case a law or regulation that would disconnect tree planting from claiming land by renters, would both guarantee ongoing rights to the rights holder, and allow tree planting to contribute to land recovery.

Similar to trees, renters of lands can be prohibited from making erosion control and soil enhancement structures, even simple ones, because this can be seen as renters attempting to invest in and hence claim the land for themselves. This implies land tenure insecurity on the part of the rights holder, which is why they prevent the installation of such structures by those renting their land. Just as for trees, laws that separate making such structures from the act of claiming land, can prove worthwhile in a recovery context.

Other circumstances can be quite different, even opposite in terms of the linkages between recovery, improvements made on the land, and land tenure; and it would be the role of a land tenure assessment to determine exactly what the linkages are. In some situations it may be desired to legally connect tenure rights explicitly to recovery improvements, so that those who do engage in erosion control structures, tree planting, forms of soil recovery and agriculture, can be rewarded with tenure rights to the land. This approach is evident in Mexico, where simple water flow and soil deposition control structures on the desert landscape established expanding fields of silt which were then cultivated and owned on otherwise unclaimed or state land by those who established the structures (Nabhan and Sheridan, 1977). Similar arrangements on a larger scale have taken place in Madagascar (Unruh *et al.*, 2010). Generally speaking, there needs to be greater innovation with regards to the ways that legal incentives can be used and tailored to local situations in order to use land and tree rights and the rights connected to improvements, so as to encourage recovery of degraded lands. As well, land tenure policies can create an enabling legal environment for rewards and incentives for engaging in social entrepreneurship and experimentation for recovering degraded lands. In this regard, local communities who live very close to the land usually have their own good ideas about how to go about the recovery of degraded lands, and their social entrepreneurship and experimentation should be encouraged.

4. CONCLUDING REMARKS

Despite the growing prominence of UNCCD's land degradation neutrality (LDN) approach and the different ways it has been examined, how land tenure intersects with LDN has yet to be introduced in the academic, policy, practitioner or development literatures. The intent of this article is to introduce and contribute to the establishment and use of land tenure within the LDN approach. An important finding of this paper is that the robustness of the LDN framework allows for a detailed "good fit" of land tenure as tools into the framework. In this regard, land tenure can identify in two broad sets of tools that align with the LDN priorities. This approach aligns resources, including the eight design principles of institutions that have shown to be relevant to successful management of common pool and non-common pool resources. In particular, the principles of clearly defined boundaries, the participation of individuals and communities affected by operational rules in rule definition and modification, and the need to derive conflict resolution and monitoring mechanisms for finite resources such as land.

While additional work is needed in order to more thoroughly integrate into the LDN approach the important land tenure research, policy, and practice that has taken place in recent decades, it is the intent of this article to start this process so as to make progress toward the sustainable development goal of land degradation neutrality by the 2030 target date.

Sand quarry on forest land close to the Soesdyke-Linden highway, the Co-operative Republic of Guyana

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© Jon D. Unruh

Darfur, an example of the relationship between conflict and land degradation

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ANNEXES

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A patch of land covered with mulch. Rusumo, Tanzania.

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FIGURE 1

Conceptual Framework

For achieving land degradation neutrality

Land rights as a tool for LDN

Land rights as a tool for avoiding land degradation

- Tenure security assessment for non-degraded land.
- Protect tenure security for current landholders
- Legal/policy review
- New laws
- Tailored dispute resolution mechanisms
- Arrangements for multiple use
- Return of lands
- State support of customary decisions
- Role of mobile technology

Losses

Gains

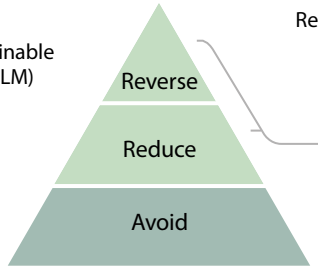
New degradation

Reversed past degradation

A level balance = neutrality = no net loss

Avoid or Reduce new degradation via Sustainable Land Management (SLM)

Reverse past degradation via restoration, rehabilitation, reclamation



Baseline

Monitor indicators of LDN through time

Anticpate & Plan ..... Interpret & Adjust

Land rights as a tool for reversing past degradation

- Tenure security assessment for degraded land
- Resolve disputs, assign rights
- Legal/policy review
- Tailored dispute resolution mechanisms
- Support small-scale investments
- Careful with reforestation schemes
- Involve local communities

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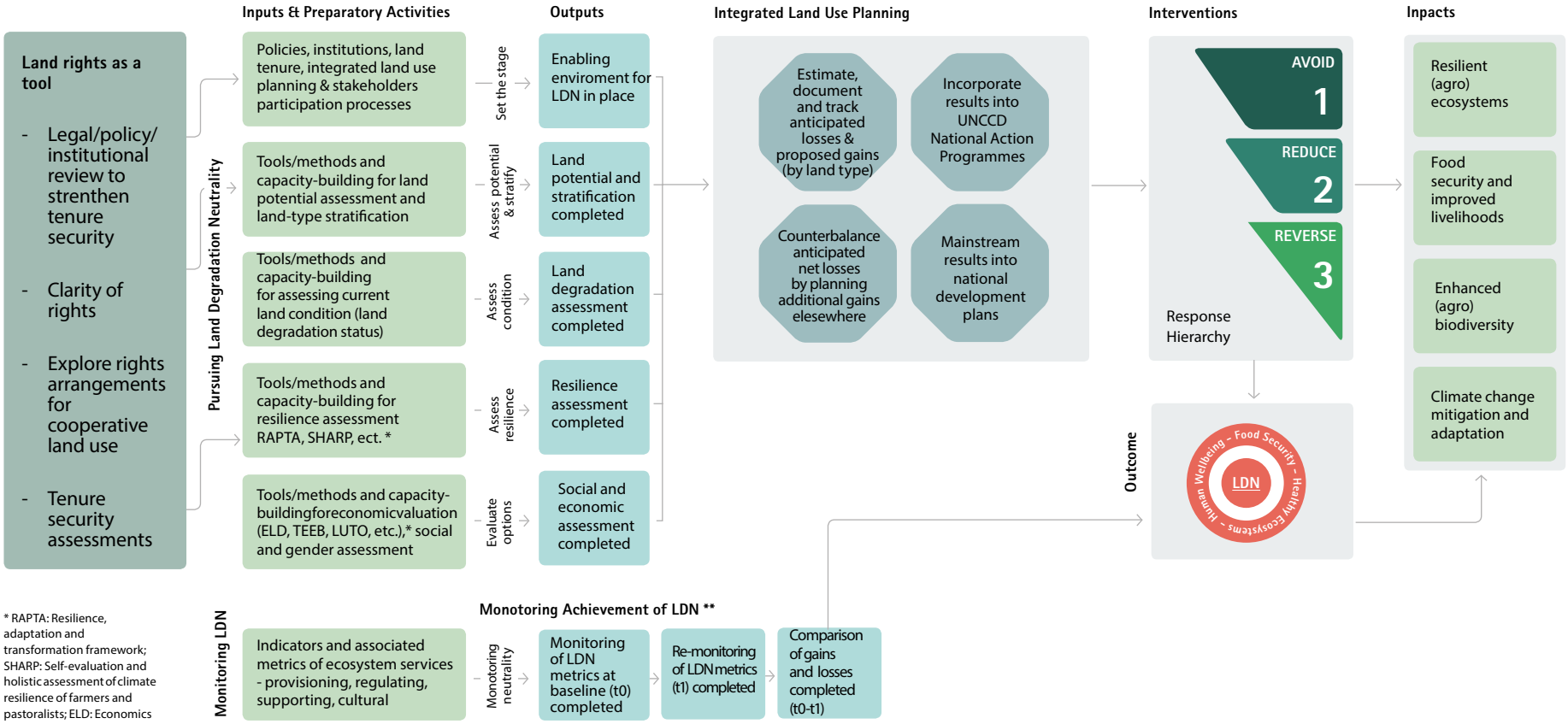
FIGURE 2

Logic model for effective implementation of LDN



* RAPTA: Resilience, adaptation and transformation framework; SHARP: Self-evaluation and holistic assessment of climate resilience of farmers and pastoralists; ELD: Economics of LAnd Dgradation initiative; TEEB: the economics of ecosystems and biodiversity; LUTO: Land use trade offs.

** Note that the 'Monotoring Achievement of the LDN' is different from the 'Monotoring LDN' in figure 3.

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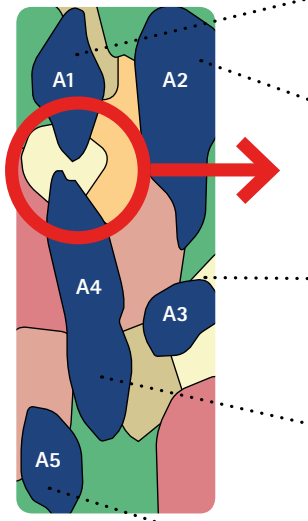
FIGURE 3
Land tenure complicates the LDN monitoring approach

Monitoring LDN

A Map of Land Types
(Land Type "A" = Grassland)



CONTEXT*	MATRIC VALUES AT BASELINE (t0)	DECISIONS	METRIC VALUES IN FUTURE (t1)	GAINSVs.LOSSES (t1 - t0)
A1 *Land Area:* 15 000 ha *Use:* Short grazing period *Status:* Not degraded	*Land cover:* Grassland *NPP* = 11.7 tDM/ha/yr *SOC* = 54.4 tC/ha	**Grazing period extended**	⊘ *Land cover:* Grassland ↓ *NPP* = 7.1 tDM/ha/yr ⊘ *SOC* = 53.9 tC/ha	*Loss:* 15 000ha significant degradation
A2 *Land Area:* 25 000 ha *Use:* Grazing excluded *Status:* Not degraded	*Land cover:* Grassland *NPP* = 12.8 tDM/ha/yr *SOC* = 63.3 tC/ha	**Exclusion maintained**	⊘ Land cover: Grassland ⊘ *NPP* = 13.1 tDM/ha/yr ⊘ *SOC* = 63.8.4 tC/ha	No Change in LDN Status 25 000 ha stable
A3 *Land Area:* 10 000 ha *Use:* Long grazing period *Status:* Degraded	*Land cover:* Grassland *NPP* = 6.5 tDM/ha/yr *SOC* = 51.1 tC/ha	**Long grazing period continued**	⊘ *Land cover:* Grassland ↓ *NPP* = 3.9 tDM/ha/yr ↓ *SOC* = 40.7 tC/ha	*Loss:* 10 000ha *significant degradation*
A4 *Land Area:* 40 000 ha *Use:* Med, grazing period *Status:* Degraded	*Land cover:* Grassland *NPP* = 10.3 tDM/ha/yr *SOC* = 47.6 tC/ha	**Sustainable grazing management introduced**	⊘ *Land cover:* Grassland ⊘ *NPP* = 10.8 tDM/ha/yr ↑ *SOC* = 51.2 tC/ha	*Gain:* 40 000ha significant improvement
A5 *Land Area:* 10 000 ha *Use:* Short grazing period *Status:* Not degraded	*Land cover:* Grassland *NPP* = 11.9 tDM/ha/yr *SOC* = 54.6 tC/ha	**Urban expansion**	↓ *Land cover:* Urban ↓ *NPP* = 7.1 tDM/ha/yr ⊘ *SOC* = 54.3 tC/ha	*Loss:* 10 000ha significant degradation

**This hypothetical example is designed to explain how LDN can be monitored. The initial status is not necessary for monitoring LDN, but provides context for each of the five examples. This example illustrates a grassland grazed by livestock.*

Symbols & Acronyms

- ⊘ No significant change in the metric
- ↑ Significant positive change in the metric
- ↓ Significant negative change in the metric
- ● Stable (no change)
- ● Degraded land or negative change
- ● Not degraded land or positive change

NPP = Net Primary Productivity | SOC = Soil Organic Carbon

LD Neutrality Status (t1 – t0): Net Gain: 5 000ha

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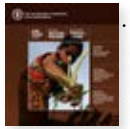

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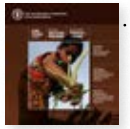

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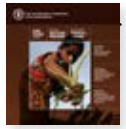

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