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Informing investments in land degradation neutrality efforts: A triage approach to decision making

Martin Dallimer*, Lindsay C. Stringer

Sustainability Research Institute, School of Earth and Environment, University of Leeds, LS2 9JT, United Kingdom

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ABSTRACT

Sustainable Development Goal (SDG) target 15.3 commits countries to strive towards land degradation neutrality (LDN) by 2030. LDN requires reductions in land quality to be balanced by efforts to restore or rehabilitate degraded areas. However, decisions need to be made as to where to invest given limited budgets and the impossibility of targeting all degraded land. Any prioritisation process is likely to be controversial and needs to be underpinned by transparent, justifiable, repeatable decision processes. In this paper, we develop a triage approach for LDN, drawing on experiences from biodiversity conservation. In conservation, triage refers to prioritisation where for a given budget, threatened species, habitats or ecosystems receive management if they contribute more to the achievement of particular objectives (e.g. maintaining ecosystem function, ensuring the survival of a species) and the management actions are more likely to be successful. Conservation triage has proved both effective in allocating scarce resources, and controversial, as it requires acceptance that it is not possible to save everything. We present a decision framework 'the Decision Dahlia' that transposes triage principles to the LDN decision context, recognising that not all land can be improved. First, we consider countries' reporting needs on SDG 15.3 and set out a decision process to support progress towards three biophysical global indicators agreed by the United Nations. Second, we take a more people-centred approach, recognising the imperative for social justice and good governance, matching LDN investment decisions more closely with societal needs in an integrated social-ecological systems approach. We then reflect on the remaining risks, such as the potential for vulnerable areas to miss out on investments due to the scale of decision making and challenges of leakage. While we acknowledge the controversial nature of the approach, we argue that a decision framework grounded in triage principles, offers a transparent, justifiable and repeatable process for deciding where to invest in efforts to achieve LDN. This can lower financial costs and help to reduce risks so that 'striving towards LDN' does not exacerbate existing drivers of land loss and worsen poverty.

1. Introduction

Tackling land degradation is an urgent challenge affecting both human development and the environment. The problem is extensive, covering an estimated 23% of the Earth's terrestrial area (Stavi and Lal, 2015), affecting billions of people globally, particularly the poor (UNDP-UNCCD, 2011). Land degradation also comes at considerable economic cost (ELD Initiative, 2015). The Sustainable Development Goals (SDGs) set out a new approach to tackling land degradation, building on proposals tabled at the United Nations' Rio + 20 meeting that recognised the need to move towards 'no net land degradation' (Grainger, 2015). For the first time, the world has a land degradation management target to work towards by 2030, enshrined in SDG target 15.3: "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" (UNGA, 2015). While inclusion of land degradation neutrality (LDN) in SDG 15 ('life on land') represents notable progress in recognising the global severity of the degradation issue, routes to its attainment remain poorly developed. It is vital that the concept receives further clarification, both to avoid its misinterpretation, as has occurred in relation to the term desertification (Juntti and Wilson, 2005), and to reduce the environmental, social and economic risks associated with LDN investments. In some circumstances, restoration of degraded land might prove either impossible or extremely costly, particularly under climate change (Akhtar-Schuster et al., 2017), so rehabilitation may be more appropriate. A process is required through which LDN investment decisions can be achieved in a transparent, justifiable and repeatable way,

* Corresponding author.
E-mail address: m.dallimer@leeds.ac.uk (M. Dallimer).

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informing both restoration and rehabilitation.

The United Nations Convention to Combat Desertification (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" (UNCCD, 2016: 8). Achieving LDN therefore requires any reduction in land quality to be balanced by efforts to restore or rehabilitate already degraded areas (Barkemeyer et al., 2015). Countries can choose to participate in the UNCCD's voluntary target setting programme, elaborating national LDN targets. These can be complemented with sub-national targets that might not necessarily achieve neutrality but which can contribute towards avoiding, reducing and reversing land degradation. For countries to be able to set and work towards their targets requires clarity on the scientific basis and requirements for LDN.

The UNCCD's Science Policy Interface (SPI) developed a conceptual framework to inform the pursuit of LDN across all land types (Orr et al., 2017; Cowie et al., 2018). The framework presents the response hierarchy: avoid > reduce > reverse, recognising that the further through the hierarchy, in general, the more expensive it is to act (ELD Initiative, 2015). It highlights the need to consider food security and human wellbeing outcomes, and notes the importance of managing LDN at the landscape scale, balancing losses with gains within the same land type (Orr et al., 2017; Cowie et al., 2018). Although emphasis is placed on the global biophysical indicator set agreed by the UN to monitor progress (which incorporates land cover (land cover change), land productivity (Net Primary Production; NPP) and carbon stocks (soil organic carbon; SOC), it encourages use of complementary indicators, as relevant to specific country contexts.

While the LDN framework can inform development of approaches that enable progress towards LDN, countries and other stakeholders involved in tackling land degradation face persistent challenges associated with limited financing (Bauer and Stringer, 2009; Akhtar-Schuster et al., 2011). LDN is not yet supported by the necessary resources for substantial progress to be made. FAO and Global Mechanism of the UNCCD (2015) report that up to 90% of annual investments targeting land degradation issues come from public funding sources, and underscore that it is far from sufficient. Although a new LDN Fund has been launched that pools resources from public and private investors in an attempt to garner additional resources and engage private sector capital (Mirova, 2017), the challenge remains. This means that tough decisions need to be made regarding which areas of land should be prioritised for investment. Such prioritisation processes are not well developed within the land sector. However, there are opportunities to look more widely to other arenas to identify processes through which prioritisation takes place in the context of limited resources.

In this paper we present a decision tool that complements the LDN framework and helps to support LDN decision making so those responsible for delivering on SDG 15.3 can make more informed investment decisions. We explore the utility of ideas around the concept of 'triage' to help decision makers prioritise which areas receive investment. Triage has been associated with battlefield medicine since the 1800s, at which time important decisions had to be made regarding which of the injured soldiers should receive treatment given limited resources (Nakao et al., 2017). It has since been adapted and applied in conservation science and restoration ecology. Despite its controversies (outlined in later sections), we argue that lessons from triage approaches can be useful in informing a transparent, justifiable and repeatable approach towards LDN investment decision making, in the context of limited resources. We first examine the application of triage in the context of conservation decision-making. Next, we present a decision support tool that builds from experiences of triage in conservation science and guides achievement of different objectives for both environment and society in line with local stakeholders' objectives. We discuss important outstanding issues in the LDN decision context and highlight the need for the real world testing of our tool, in settings with various degrees of complexity.

2. Triage and its application in conservation

Decision makers charged with delivering biodiversity conservation commonly encounter resourcing dilemmas (Bottrill et al., 2008; Margules and Pressey, 2000). Given limited budgets, those tasked with managing biodiversity have to make decisions on what to save, how and when. Despite the desire to make significant advances towards SDG targets under goal 15 'life on land' and goal 14 'life below water', and save all species from extinction, there is not enough money to do so. For instance, the cost of reducing the extinction risk of all globally threatened bird species alone is estimated at up to US$1.23 billion a year for the next decade, yet only 12% of this amount is funded (McCarthy et al., 2012). Despite some successes, populations continue to go extinct, and large tracts of habitat are lost or declining in condition (Millennium Ecosystem Assessment, 2005; Butchart et al., 2010). Without a formal decision making and prioritisation process, limited budgets are unlikely to be spent efficiently, not least because decision makers can have little idea of the opportunity costs associated with their choices, potentially resulting in greater levels of habitat and species loss. Limited understanding of opportunity costs can lead to decisions based largely on subjective grounds, with the inevitable consequence of expensive failures (Manning et al., 2006; Hobbs, 2007). In an attempt to address this problem, a prioritisation decision making process, conservation triage, has been developed. In conservation, 'triage' refers to the process of allocating scarce resources to maximise the effectiveness of conservation actions by explicitly considering the costs, benefits and chances of success of different investment options (Bottrill et al., 2008).

Triage, as a process of prioritisation, developed rapidly into (systematic) conservation planning: "a discipline focused on providing decision support around the allocation of resources for biodiversity conservation" (McIntosh et al., 2017; 677). Underpinned by ecological principles, such as complementarity, representativeness, persistence and connectivity, systematic conservation planning is considered one of the most rigorous approaches in making decisions regarding the location and implementation of conservation actions. It has been applied globally (McIntosh et al., 2017). Well known examples of its implementation (rather than its advancement as an academic discipline) include the expansion of the Great Barrier Reef network of protected areas (Day, 2016). Here the identification of specific quantifiable objectives during the planning process is credited with having provided sufficient structure for political and social discussions to be held regarding the future of conservation in the Marine Park (Day, 2016). Further examples applying the approach include protected area designations in South Africa (Knight et al., 2006), Malaysia (Jumin et al., 2017) and planning strategies of large NGOs (Kareiva et al., 2014). When decision makers are made aware of costs (including opportunity costs) of investments in particular actions, this can lead to greater returns (Naidoo et al., 2006). For example, in New Zealand a prioritisation process based on triage and considering costs, benefits and probabilities of success and costs, meant that for a given budget, more species could be managed compared to processes based on threat status alone (Joseph et al., 2009). The importance of incidental benefits, such as improved social, human and financial capitals, or changed expectations among stakeholders regarding the need for conservation action as a result of going through the process of systematic decision making, has also been recognised (Pressey and Bottrill, 2009; Bottrill et al., 2012; McIntosh et al., 2017).

2.1. Conservation triage concerns and complexities

"There are no hopeless cases, only people without hope and expensive ones" (Soule, 1987; p. 181).

Not all conservationists view triage approaches positively (Marris,