Exploiting provisions of land economic productivity without degrading its natural capital

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ABSTRACT

Motivated by the United Nations target of achieving zero net land degradation by 2030 and the Rio + 20 United Nations' "future we want" resolution, which aims to achieve a green economy, this study was conducted with an objective of identifying strategies for achieving sustainable use of lands at a global and a regional level. Using econometric approaches, we observed that achievement of zero net degradation is possible, even in developing regions, if land users are provided with good market access and secure land rights and if institutions are strengthened to regulate land use. Such achievement is possible, even in densely populated and severely impoverished areas. The probability of achieving zero net land degradation is greater in drylands — especially among communities with pastoral and other livestock-based livelihoods.

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1. Introduction

During the Rio + 20 summit in June 2012, the United Nations Convention to Combat Desertification (UNCCD) set a sustainable development goal of achieving zero net land degradation and zero net forest degradation by 2030 (UNCCD, 2012). The Rio + 20 summit also adopted a resolution regarding the "The Future We Want" which reaffirmed the United Nations' past commitments to achieve sustainable development by building a green economy (Desai and Ringler 2012). A green economy is an economy that simultaneously improves human well-being and social equity, as well as reduces environmental degradation and ecological scarcity (UNEP, 2011). The zero net land degradation target comes at a time when increased attention has been directed to investment in land following the food price spike crisis in 2007 and of increased demand for bioenergy, which was triggered by a spike in gas prices (Pinstrup-Andersen, 2013). Achievement of such goals and targets could be realized by examining the successes of sustainable development attained under different socio-economic environments. It is particularly informative to examine the achievements of sustainable development in areas with severe poverty. The objective of this paper is to analyze areas that have not experienced land degradation. Particular attention will be directed to areas with limited or no land degradation but also with severe poverty.

The paper first reviews communities that have exploited provisions of land without degrading its natural capital — i.e. the stock of natural ecosystems that provides valuable ecosystem goods and services to the present and future generations (Costanza and Cleveland, 2008). This discussion focuses on communities in developing countries — where land degradation is more severe. The conceptual framework is then discussed to set the stage for the analytical methods used. The results of the data analysis are then discussed, and the paper concludes with policy recommendations based on the results.

1.1. Where is the green economy?

A recent study has shown that severe land degradation has been concentrated in the developing world (Bai et al., 2008). Such an observation is expected according to the environmental Kuznet curve and forest transition theories, both of which postulate that economic development will first lead to land degradation and then land improvement after a threshold is attained (Dinda, 2004; Mather, 1999; Meyfroidt and Lambin, 2011). While both the environmental Kuznet curve and forest transition theories have held in high-income countries and a number of medium-income countries, different patterns have been observed in some developing and medium-income countries (Rudel et al., 2005; Defries et al., 2010). Forest transition in Ethiopia and Togo has not occurred due to a lack of alternative employment and weak institutions to enhance tree planting and protection (Rudel et al., 2005). In other countries

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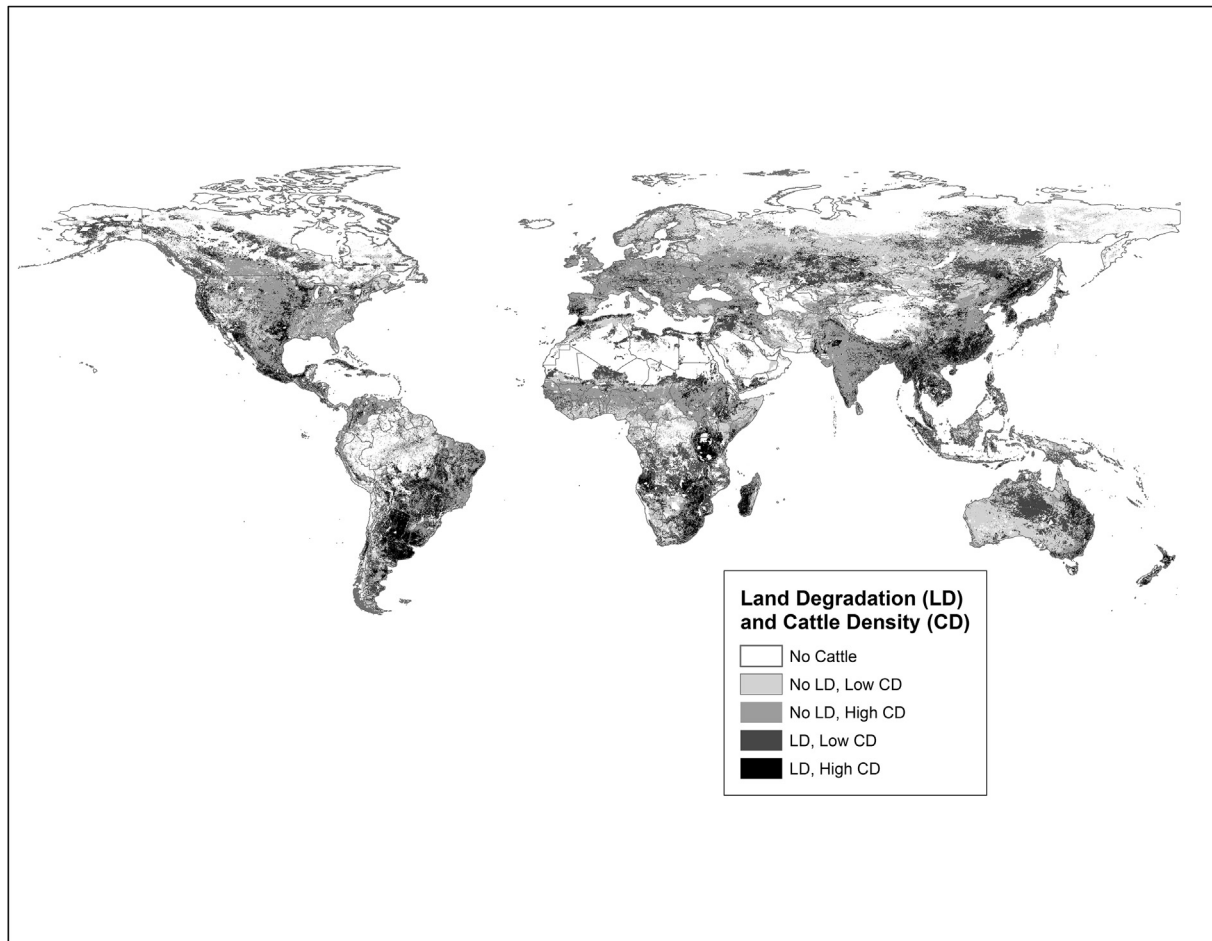E-mail address: e.nkonya@cgiar.org (W. Anderson).

Fig. 1. Land Degradation & livestock density, 2005. Key: Low cattle density (heads of cattle) = 0–5, High cattle density >5.
Sources: Livestock density data: http://www.fao.org/ag/againfo/resources/en/glw/GLW_dens.html, NDVI change: See Table 1. Cartography: Authors.

(namely Burundi, Rwanda and Sierra Leone), civil wars led to deforestation (Rudel et al., 2005).

Strong policies and NGOs' grassroot activities have enhanced forest recovery and declining cropland in some countries. In Niger for example, the government passed a statute (*rural code*) giving land owners tenure security of any tree that they plant or protect (Larwanou et al., 2006; Adams et al., 2006). The planted forest area, as a share of the total forest area in Niger, was 12% in 2010 and was among the highest in Sub-Saharan Africa (SSA) (FAO 2010). This achievement was a result of a combination of efforts by local communities, changes in government policies and statutes, support from NGOs and religious organizations, and environmental stress, which prompted communities for a solution. Niger's success story shows that sound policies that provides incentives for land users to protect trees, presence of technical support and active involvement of local institutions can lead to successful land restoration. Additionally, the tree planting program in Niger used acacia — which is an indigenous tree species — an aspect which contributed to significant survival of seedlings. Other natural regeneration through tree protection programs similar to that of Niger have worked at a small-scale in Chad. Similarly, Mongolia has succeeded in restoring forests and grasslands in dryland areas through protection and planting of indigenous trees (Magnouvox et al., 2007).

Other tree planting programs in arid areas have used exotic trees whose survival rates are low. For example, China's great green wall tree planting program — which started in 1978 and planned to run up to 2050 — set a target to plant trees on 37 million hectares stretching

4480 km across the northern drylands — first used exotic trees, whose survival rate was as low as 15% (Cao et al., 2011). The Chinese State Forestry Administration has realized this mistake and is currently experimenting with native trees (Luoma, 2012). SSA is also implementing a similar tree planting program under its Great Green Wall for Sahara and Sahel, which consists of a 15 km wide and 7100 km long tree belt running from Dakar to Djibouti (GEF, 2011). The program will allow each country to formulate its own implementation program utilizing past experiences in the region (Ibid). For example, the success story of Niger will be used in several countries (Ibid). However, given that each country will implement its own program, there are challenges of achieving the ambitious goals.

Past studies have shown that countries with highly decentralized natural resource management and community-managed forests and rangelands fared better than countries with centrally-managed natural resources. Long-term studies of forest management by the International Forestry Resources and Institutions (IFRI)[1] for example, have shown that centrally-managed forests were more degraded than those managed within communities (Poteete and Ostrom, 2004).

Generally, pastoral areas — which are concentrated in semi-arid areas (Nori and Davies, 2007) — are less degraded as compared with cropland. Fig. 1 shows that areas with high cattle density in the world experienced limited or no land degradation during the time

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[1] http://www.ifriresearch.net/.