Mitigating "displaced" land degradation and the risk of spillover through the decommoditization of land products

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Land Use Policy

Viewpoint Paper

Title

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Highlights

- Land degradation More than 70% of the Earth’s ice-free terrestrial ecosystems have been transformed from their natural state and countries have reported that 1/5 of all land (more than 2 billion hectares) is now considered degraded
- Telecoupling, that is linking consumption zones and production pose unprecedented challenges and opportunities for sustainability.
- Innovative blockchain solutions make 'farm-to-table' food traceability and will turn a commodity into a "decommodity"

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Abstract

Land degradation impacts human well-being and biodiversity while increasing exposure to emerging infectious diseases. The primary indirect driver of land degradation is consumption, which increasingly involves agricultural products produced far away. Reversing these negative trends requires the decommoditization of land products through consumer-transparent ‘farm to table’ information on land health combined with an efficient land use planning that is a greater optimization of land use and management decisions towards the achievement of multiple benefits.

Keywords: Land degradation, telecoupling, decommoditization

The COVID-19 pandemic has highlighted the multiple and complex relationships between biodiversity, anthropization of environments, zoonoses and human health. Among the causes of the emergence of zoonoses are land degradation and contact between societies and animals that are reservoirs for pathogens (Morand et al., 2019). This pandemic has also reinforced the image of the "butterfly effect" and its consequences thousands of kilometers away. Distant interactions between people and the environment, referred to as telecoupling (Liu et al., 2013), pose unprecedented challenges and opportunities for sustainability. Lenzen et al. (2012) show that 30% of threats to biodiversity are due to international trade.

Land is the basis of all terrestrial ecological processes. Land degradation is characterized by a negative trend in land condition (IPCC, 2019), involving the total or partial loss of vegetation cover, soil fertility, productivity and/or biodiversity, leading to a decline in ecosystem services as well as both ecosystem and community resilience (UNCCD, 2017). More than 70% of the Earth’s ice-free terrestrial ecosystems have been transformed from their natural state (IPBES, 2018; IPCC, 2019) and countries have reported that 1/5 of all land (more than 2 billion hectares) is now considered degraded (UN-STATS, 2020). Economic losses equivalent of 10 to 17% of the world’s gross domestic product have been attributed to land degradation and land use change (ELD, 2015) undermining the well-being of 3.2 billion people (IPBES, 2018) and contributing to the projected extinction of 1 million species by

2050 (IPBES, 2019). Moreover, land use change is the primary transmission pathway for emerging infectious diseases due to modification of natural habitats, which expands the wildlife-human interface and heightens the risk of pathogen spillover from wildlife to domestic animals and humans (Jones et al., 2013).

As much as 35% of all land is used for agricultural purposes and the rate of land conversion for the provision of food products and materials for biofuels is accelerating (IPCC, 2019). While land use is necessary for meeting human needs, overexploitation of land by humans, is the main determinant of land degradation. The concept of Human Appropriation of Net Primary Production (HANPP) has been suggested as an integrated socio-ecological indicator of human intervention of natural ecosystems (Haberl et al., 2014). However, this indicator does not factor in the *imported* products that are consumed by the population. Embodied HANPP (eHANPP) is an extension of the HANPP concept and is related to consumption. It thus highlights both nationally-produced food and fiber, but also products (timber, cereals, biomass, etc.) imported from other parts of the world for national consumption. In short, the aim of the eHANPP concept is to better link land use with consumption to be able to quantify environmental demands resulting from consumption (Haberl et al., 2016). The eHANPP concept can be used to analyze telecoupling and describe the balance/unbalance between production and consumption areas, and thus highlight the importance of trade and the connection/disconnection between these areas (Meyfroidt et al., 2013; Erb et al., 2009).

Weinzettel et al. (2019) estimate that 23% of the ecological footprint of agriculture results from the consumption of imported products. The wealthiest societies have a particularly large per capita footprint, the majority of which comes from imported products. Europe is among the ten regions of the world that import the most products to meet consumer needs (Haberl et al., 2016). Consumption of imported products may lead to economic benefits through exports, but it also effectively displaces land degradation towards the countries that become suppliers of products that are imported. Although the consumption-based accounting is well documented, there is also a need to reassess the role of “growth-oriented economies and the pursuit of affluence” (Wiedmann et al., 2020).

Taking into account future projections of population growth and consumption (Tilman et al., 2011), rich countries will need to stabilize or even reduce their agricultural footprint in order to (i) share the available primary productivity potential with poorer countries and (ii) reverse land degradation. The reduction of food-waste (IPCC, 2019), balanced food diets (Alexander et al., 2016), the acceleration of the transformation of food systems (Springmann et al., 2018) could bring solutions to avoid, reduce and reverse land degradation. Transforming fashion supply chains could also be part of these solutions (Caniato et al., 2012).

In today's telecoupled world, human-environment interactions need to be documented to support sustainable development, conserve biodiversity and avoid the risk of catastrophic pathogen spillover. This will require an integration of our efforts towards the sustainable resource use in and among countries (SDG target 12.2) and out efforts to ensure no further harm (in net terms) to land for each land type[1] in each country (SDG target 15.3). The former includes the measurement of the material footprint, the attribution of global material extraction to domestic final demand of a country (analogous to eHANPP). The latter is a concept known as land degradation neutrality (LDN), which is defined 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). It is a no-net loss approach that seeks to maintain or enhance the natural capital of land, emphasizing the multiple benefits which can be derived from land while fully recognizing that land is a limited resource. The focus is thus on the optimization all land use planning decisions across the landscape so that new degradation can be avoided (conservation), the risk of further degradation where conversion has taken place can be reduced (sustainable land management), and more of our future needs for land can be met through the reversal of past land degradation (rehabilitation and restoration) (Cowie et al., 2018).

Linking consumption and production (measured as flows) to land degradation (measured in area) requires embedding information about the sustainable use and management of land into what consumers can learn about the products at the point of purchase. However, information on the land use and management practices associated with imported products is not typically accessible to consumers who may

[1] "Class of land with respect to land potential, which is distinguished by the combination of edaphic, geomorphological, topographic, hydrological, biological and climatic features that support the actual or historic vegetation structure and species composition on that land". In Orr, B.J., A.L. Cowie, V.M. Castillo Sanchez, P. Chasek, N.D. Crossman, A. Erlewein, G. Louwagie, M. Maron,G.I. Metternicht, S. Minelli, A.E. Tengberg, S. Walter, and S. Welton. 2017. Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. United Nations Convention to Combat Desertification (UNCCD), Bonn, Germany.

wish to know the impact their diet has on land quality, biodiversity, ecosystem health in production areas, far from home (Alexander et al., 2016). Innovative blockchain solutions make 'farm-to-table' food traceability of this kind possible (Horton, 2020). Encouraging such innovations can support the full emergence of what is currently a niche market for producers and retailers that aim not to degrade land. Integrating sustainable consumption with sustainable land management will turn a commodity into a "decommodity" (Bennett et al., 2019), effectively incentivizing land restoration and disincentivizing land conversion. Working to reduce “displaced” land degradation with more informed consumer choices combined with more informed land use planning decisions will reduce the pressure on biodiversity, while also helping close down a primary transmission pathway for emerging infectious diseases.

“The views expressed herein are those of the authors and do not necessarily reflect the views of the United Nations.”

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