

# 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

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

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#### <u>CRediT</u>

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#### <u>Highlights</u>

- 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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#### 4 Abstract

5 Land degradation impacts human well-being and biodiversity while increasing 6 exposure to emerging infectious diseases. The primary indirect driver of land 7 degradation is consumption, which increasingly involves agricultural products 8 produced far away. Reversing these negative trends requires the decommoditization 9 of land products through consumer-transparent 'farm to table' information on land 10 health combined with an efficient land use planning that is a greater optimization of 11 land use and management decisions towards the achievement of multiple benefits.

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13 Keywords: Land degradation, telecoupling, decommoditization

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15 The COVID-19 pandemic has highlighted the multiple and complex relationships between biodiversity, anthropization of environments, zoonoses and human health. 16 17 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., 18 2019). This pandemic has also reinforced the image of the "butterfly effect" and its 19 consequences thousands of kilometers away. Distant interactions between people 20 21 and the environment, referred to as telecoupling (Liu et al., 2013), pose unprecedented challenges and opportunities for sustainability. Lenzen et al. (2012) 22 23 show that 30% of threats to biodiversity are due to international trade.

Land is the basis of all terrestrial ecological processes. Land degradation is 24 characterized by a negative trend in land condition (IPCC, 2019), involving the total 25 26 or partial loss of vegetation cover, soil fertility, productivity and/or biodiversity, leading 27 to a decline in ecosystem services as well as both ecosystem and community (UNCCD, 2017). More than 70% of the Earth's ice-free terrestrial 28 resilience 29 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 30 now considered degraded (UN-STATS, 2020). Economic losses equivalent of 10 to 31 17% of the world's gross domestic product have been attributed to land degradation 32 and land use change (ELD, 2015) undermining the well-being of 3.2 billion people 33 34 (IPBES, 2018) and contributing to the projected extinction of 1 million species by

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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).

39 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 40 accelerating (IPCC, 2019). While land use is necessary for meeting human needs, 41 overexploitation of land by humans, is the main determinant of land degradation. The 42 concept of Human Appropriation of Net Primary Production (HANPP) has been 43 suggested as an integrated socio-ecological indicator of human intervention of 44 45 natural ecosystems (Haberl et al., 2014). However, this indicator does not factor in the *imported* products that are consumed by the population. Embodied HANPP 46 47 (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, 48 49 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 50 51 consumption to be able to quantify environmental demands resulting from consumption (Haberl et al., 2016). The eHANPP concept can be used to analyze 52 telecoupling and describe the balance/unbalance between production and 53 consumption areas, and thus highlight the importance of trade and the 54 55 connection/disconnection between these areas (Meyfroidt et al., 2013; Erb et al., 56 2009).

57 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 58 particularly large per capita footprint, the majority of which comes from imported 59 60 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 61 62 may lead to economic benefits through exports, but it also effectively displaces land degradation towards the countries that become suppliers of products that are 63 imported. Although the consumption-based accounting is well documented, there is 64 also a need to reassess the role of "growth-oriented economies and the pursuit of 65 affluence" (Wiedmann et al., 2020). 66

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 75 documented to support sustainable development, conserve biodiversity and avoid the 76 risk of catastrophic pathogen spillover. This will require an integration of our efforts 77 78 towards the sustainable resource use in and among countries (SDG target 12.2) and 79 out efforts to ensure no further harm (in net terms) to land for each land type<sup>1</sup> in each country (SDG target 15.3). The former includes the measurement of the material 80 81 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 82 83 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 84 85 security remain stable or increase within specified temporal and spatial scales and 86 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 87 derived from land while fully recognizing that land is a limited resource. The focus is 88 thus on the optimization all land use planning decisions across the landscape so that 89 new degradation can be avoided (conservation), the risk of further degradation where 90 conversion has taken place can be reduced (sustainable land management), and 91 more of our future needs for land can be met through the reversal of past land 92 degradation (rehabilitation and restoration) (Cowie et al., 2018). 93

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

<sup>&</sup>lt;sup>1</sup> "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 99 in production areas, far from home (Alexander et al., 2016). Innovative blockchain 100 101 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 102 103 niche market for producers and retailers that aim not to degrade land. Integrating sustainable consumption with sustainable land management will turn a commodity 104 into a "decommodity" (Bennett et al., 2019), effectively incentivizing land restoration 105 and disincentivizing land conversion. Working to reduce "displaced" land degradation 106 with more informed consumer choices combined with more informed land use 107 planning decisions will reduce the pressure on biodiversity, while also helping close 108 109 down a primary transmission pathway for emerging infectious diseases.

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111 "The views expressed herein are those of the authors and do not necessarily reflect112 the views of the United Nations."

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