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Threats to sustainable development posed by land and water grabbing

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Since small-scale farmers manage most of the cultivated land worldwide, the ongoing shift in systems of production associated with large-scale land acquisitions (LSLAs) may dramatically reshape the world's agrarian landscape, significantly impacting rural populations and their livelihoods. The societal, hydrological and environmental implications resulting from the expansion of large-scale agricultural production, through LSLAs, make their ultimate sustainability questionable. This study, through a literature review, analyses the negative impacts of LSLAs, their hydrological dimension and how they may affect the Sustainable Development Goals (SDGs). The core literature on land and water grabbing is reviewed and systematized using the 17 SDGs as a framework, in order to highlight the relationship between LSLAs and the sustainable development agenda. The magnitude of the global land rush phenomenon and the criticism raised in scholarly research highlight the controversial role that transnational land acquisitions may be playing in the global development agenda.

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Introduction

Sustainable development — the harmonization of economic, social and environmental aspects of development, benefitting current generations without compromising the capabilities and opportunities of future ones — is a key organizing principle of governance [1]. Despite having certain intrinsic logical contradictions, it projects an outline for a globally shared trajectory and vision for society; in 2015 the United Nations General Assembly adopted the resolution: 'Transforming our world: the 2030 Agenda for Sustainable Development' (UN, 2015). The Agenda represents a plan 'of action for people, planet and prosperity' organized through 17 Sustainable Development Goals (SDGs) and 169 targets [2]. All countries and stakeholders are encouraged to work toward ending poverty and hunger, protecting the planet from environmental degradation and promoting prosperity and peace through international partnerships.

Asides from this, a group of social movements, grassroots organizations, civil society organizations and NGOs formed the Global Convergence of Land and Water Struggles to address major social and environmental concerns about land and water grabbing. They called on international governmental organizations, States and local authorities to safeguard and to act in the interest of local communities, to take action against land and water grabbing and to adopt the 2030 Agenda for Sustainable Development. The Global Convergence promoted its declaration against water and land grabbing during the climate justice initiative organized during the COP21 in Paris in 2015, with the motto 'Water and Land: same plight same fight!' [3].

There is concern over the fact that the number of transnational land investments and large-scale land acquisitions (LSLAs) has increased to unprecedented levels [4]. The phenomenon has attracted the attention of international development organizations, U.N. agencies and civil society while simultaneously triggering scholarly debates [5–12].

It is argued that there are different potentially positive impacts that could result from LSLAs. Development opportunities, rather than land fees and other types of financial transfers associated with the acquisitions, are often described as the primary benefits. It has been pointed out that land concessions are generally granted by host governments in exchange for infrastructure

development, employment opportunities and know-how transfer commitments [6]. Potential benefits for the rural poor include: construction of rural infrastructure, schools and health posts, new jobs and employment opportunities, farm and off-farm activities, the spread of new technologies and increased food production resulting in greater availability in local markets [13,14]. However, there is little evidence of the positive impacts of LSLAs and the literature has generally focused on their negative aspects. The lion's share of peer-reviewed publications on the topic often explicitly speak of land grabbing's negative connotations, highlighting the social, economic and environmental impacts of LSLAs that negatively affect rural development.

Through a review of the literature on LSLAs we map the negative implications of large-scale land investments based on the SDGs framework, while raising awareness that land and water grabbing can compromise the success of the SDGs agenda. In this paper we synthesize the emerging body of literature on LSLAs and land grabbing with the intent of connecting and commenting on the threats of LSLAs to the SDGs agenda. We explicitly aim to synthesize the negative aspects of LSLAs as a diagnostic description of the symptomatic aspects of what has the characteristics of a global change 'syndrome' [15]. We review the key elements of the debate on land and water grabbing and then illustrate the main hypotheses relating to the dynamics of the phenomena and discuss its drivers. We also discuss the main methodological challenges and knowledge lacunas in the field. Finally, we focus on how LSLAs can potentially threaten progress toward the SDGs by highlighting their critical and most problematic aspects. We conclude by emphasizing the need for the land and water grabbing debate to be mainstreamed into the global sustainability agenda, to support global action and dialogue surrounding LSLAs.

Global land grabbing?

The recent global economic and food security crisis, the adoption of new bioenergy policies and the investment opportunities in land resources are often described as the triggers of the escalation in transnational land investments. The unprecedented increase in transnational land investments, that peaked in 2008, has been described as a new 'global land rush' [11,16,17,18•,19–24]. In an attempt to understand the nature of this phenomenon several authors have investigated and described possible drivers, causes and dynamics. This phenomenon is associated with two main interrelated transformations: a small number of companies and actors controlling larger concentrated extensions of land [25–28] and a global agrarian shift from traditional, local, small-scale systems of production to large, intensive, commercially oriented agricultural models [28,29•,30,31,32•]. National and international actors and dynamics are subject to a series of changing contexts, forces and emergent processes that affect land control. There are a variety of players in this process, ranging from local actors such as national elites that include business figures, civil servants, politicians and community chiefs or leaders to multinational corporations that mobilize financial capital [22,33]. The people affected by land grabbing, usually consisting of small-scale farmers, pastoralists, indigenous people and those who traditionally used the land, often react to dynamics of dispossession by engaging in different typologies of conflict ranging from physical violence to initiatives of mobilization and contestation that often find the support of social movements and NGOs [24,34].

A combination of factors, on multiple levels, drive transnational large-scale land investments and acquisitions. A generally accepted understanding is that, in the context of a globalized world, food and energy crises and the fast growing demand for agricultural commodities represent the underlying forces for this phenomenon [22,35]. However, according to different authors and different typologies of studies, some dynamics and drivers are more significant than others. Key drivers identified are: financial land speculation and competitiveness of inputs and production costs [19,22], availability of water resources [18•,36••,37,38], and bioenergy development opportunities [39–42]. Moreover, several contextual factors have been studied to determine which conditions favor LSLAs. Focusing on the investor side, aspects such as dependence on food imports are considered particularly important, while looking at the target countries, land availability coupled with weak governance and an absence of local land protection rights emerge as fundamental pre-conditions [43]. Public policies that address national priorities in food and energy security through support to transnational investments, incentives and international agreements are likely to have intensified the effect of these factors [6,44•,45]. Regarding higher order causality level dynamics, these are associated with globalization and neoliberal deregulation of land markets [16], shifts in geopolitical and economic relations [22], different mechanisms of accumulation and dispossession [46], and changes in land control conditions [33]. These, with the global energy transition and the need for alternative energy sources [17•], have been presented as the ultimate drivers of the global land rush.

As small-scale farmers manage most of the cultivated land worldwide [47], this ongoing shift in systems of production may significantly reshape the agrarian landscape around the world with significant impacts on rural populations and their livelihoods [14,29•,48]. The societal and environmental implications associated with the expansion of large-scale agricultural production through LSLAs bring into question its ultimate sustainability [49•] and impact society on different levels, from the household to the national level [14]. The size of the phenomenon raises substantial ethical concerns about violations of human

rights, dispossession of the commons, environmental impacts and an overall power imbalance in the negotiation of land deals [24,29•,50,51•,52,53]. This explains the normative weight of the terminology often used to describe this process: 'land grabbing' [12,54]. A second line of interpretation hypothesizes that land investors are equally interested in water resources for crop production [55,56]. Increasing pressure on natural resources, population growth and hydro-climatic change all contribute to the spread of a 'water grabbing' syndrome associated with the global land rush.

In light of the global consensus on the SDGs, land and water grabbing can be described as a fundamental challenge to global and local sustainability. Land and water grabbing are considered a threat to sustainable development because they negatively affect local communities, traditional land users, and vulnerable indigenous peoples and produce negative environmental outcomes. The International Land Coalition — a global alliance of 150 representatives from international agencies, civil society, social movements, grassroots organizations and governments — defines large-scale land grabbing as acquisitions and concessions that violate human rights; disregard social, economic and environmental impacts and are not transparent or based on democratic deliberation [54].

Different countries have diverse land tenure and natural resources institutions and property systems; however the dynamics of globalization, the 'financialization' of agriculture and the surge in global demand for agricultural commodities have pushed a large number of developing countries to reform their policies and regulations on land and on investments so as to enhance their attractiveness to international investors [22]. Governance issues surrounding land grabbing are particularly complex. Actors frame the same phenomenon very differently based on opposing political perspectives and interests. What from a critical perspective could be depicted as a case of dispossession of traditional land users, from another perspective can be portrayed as a needed development opportunity for the country [34,53,57,58••].

These two opposing views are reflected in the discussions on governance arrangements. International organizations such as the United Nations' Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Conference on Trade and Development (UNCTAD) and the World Bank group have promoted voluntary approaches to govern large-scale land investments such as the Principles for Responsible Agricultural Investment, the FAO's Voluntary Guidelines on the Responsible Governance of Tenure of Land Fisheries and Forests and voluntary certification schemes for sustainability standards [59••]. The idea that corporate self-regulation and voluntary codes of conduct for foreign investors and host governments can promote good governance [13] is strongly challenged by authors that see this as part of a neoliberal agenda that threatens human rights, food security, the livelihood and wellbeing of farmers and traditional users of land, as well as natural resources in developing countries [1,30,59••, 60,61].

Water grabbing?

Unlike land grabbing, water grabbing has no commonly accepted definition in either academia or international development policy. Water grabbing can be abstractly defined as a circumstance where powerful actors are able to appropriate water resources at the expenses of traditional local users, often with negative impacts on the environment [62••]. This definition applies to a wide range of circumstances and different authors have used the 'water grabbing' term to denote a variety of forms of water appropriation for industrial and agricultural purposes. These actors seize water for thermoelectric or hydropower production [63–65], mining [66], or commercial agriculture [67–71]. Specifically, emphasis on the concept of water grabbing in the agricultural domain results from the assessment of the hydrological dimension of LSLAs. Water stored in surface water bodies and aquifers is generally defined as 'blue water' while the root zone soil moisture is referred to as 'green water' [72]. Blue water differs from green water because it can be extracted and conveyed through canals and pipelines for industrial, domestic and agricultural activities. Green water instead is indissolubly attached to the land and cannot be transported. Agriculture may depend on both green and blue water (irrigated agriculture) or only on green water (rainfed agriculture). The acquisition of land for agricultural purposes is automatically associated with the appropriation of green water resources but if an irrigation infrastructure is developed then blue water resources are also exploited [73]. Based on this interpretation, land and water grabbing are inseparable concepts. In other words every 'land grab' is also a 'green water grab', which becomes a 'blue water grab' if land is irrigated. Irrigation possibilities depend on whether the irrigation water necessary for cultivation in optimal irrigating conditions is a substantial fraction of the sum of blue and green water used by the crops [38].

Conceiving water grabbing as the hydrological component of LSLA raises two issues: the first is semantic and the second is related to the role water plays in the LSLA process. The definition of LSLA-associated water grabbing depends on the normative question of what 'land grabbing' means. However, the underlying dynamics in the acquisition of irrigation water might differ from those driving land investments because they may involve varying levels of consent and power relations. For instance in regions with abundant land and scarce water a community

might favor land acquisitions but be unwilling to allow investors the rights to withdraw water from rivers or aquifers.

The volume of water appropriated through LSLA (including both irrigation and rainwater) is considerable [36••] and this phenomenon may have important implications for the environment and sustainable development of the target regions. Studies have assessed the hydrological relevance of LSLAs, posing fundamental questions about the biophysical drivers and dynamics of global land investments for commercial agriculture [18•,36••]. Other studies explore whether transnational land investments are fundamentally driven by the quest for water or by the need for land itself, and to what extent the associated water appropriations are in conflict with the local social and environmental needs of present and future generations [37,38,51•,55,56,62••,68,74,75].

Knowledge gaps and different methodological approaches

Quantitative estimates of the scope of LSLAs vary from ~44 million hectares [76•] to 227 million hectares [77]. These assessments, conducted under clear limitations in data availability, report information on the size, purpose, negotiation stage, and typology of acquisitions, as well as the names of the formal investors and their home countries. However they do not provide details on the acquisition dynamics or their social and environmental impacts, nor about political and institutional dimensions. A debate on the different approaches and metrics to study LSLAs has highlighted the complexity and multiple scale levels of this phenomenon, its methodological challenges and the data limitations [8–11,78–80].

Challenging assessments of the global large-scale land investments have yielded promising multidimensional and multilevel tools, and many global inventories of the recent expansion of transnational land deals map and report the distribution and size of these investments [76•,79,80].

The core body of the literature instead has focused on the political economy and political ecology of land grabbing, addressing the fundamental questions of who wins, who loses and why this occurs. A variety of case studies analyze the institutional dimensions, political economy drivers, the roles of different actors and players, conflicts, power imbalances and the socio-environmental dynamics of these investments [58••,59••,81••,82••,83••,84••].

An examination of LSLAs based on these two levels of analysis — that is, global assessments and in-depth case studies — provides deep insights into the knowledge gaps and the geographical representativeness of the available information. The integration of these two different approaches through new synthetic procedures such as meta-studies [14,24,38] are useful in producing knowledge with global relevance deriving from contextualized critical studies.

Do LSLAs impede the achievement of the SDGs?

Critics of LSLAs highlight the societal and environmental impacts of this phenomenon, and the threats posed to sustainability. When related to the SDGs (Table 1), many of the dynamics described in the literature on land and water grabbing demonstrate the problematic nature of LSLAs as summarized in Table 1 and the references therein. Smallholders, traditional land users and indigenous people have been dispossessed. Their rights to natural resources have been violated in several instances (first Sustainable Development Goal, SDG1), aggravating inequalities and strengthening the dynamics of exclusion and discrimination (SDG10). LSLAs are often the result of unbalanced power dynamics and occur at the expense of more vulnerable groups, in some cases with negative gender-related impacts (SDG5). Where complex globalization processes drive the expansion of LSLAs, actors invoke a vision of development that promotes economic growth (SDG8), despite the intrinsic contradictions between the expansion of economic activity and the degradation of natural resources. The decoupling of economic growth and environmental impacts has inherent limitations, extensively discussed in the literature, that should be considered.

In developing countries, some actors have promoted LSLAs as a necessary typology of investment in agricultural growth [85,86]. However, an opposing view suggests the negative impacts on smallholder farmers or on global and local food security (e.g. through agricultural exports from countries affected by malnourishment) outweigh these supposed benefits (SDG2). Large-scale agricultural production has had a significant impact on land and water resources (SDG6, SDG12, and SDG15), including water pollution, diminished access to clean water and high rates of water extraction from rivers and aquifers for irrigation. While some theories of economic development invoke the construction of hydraulic infrastructures (e.g., dams and canals) as a means for prime growth in the agricultural sector [87,88], the environmental impacts of these interventions can be huge and irreversible [89], and may become an impediment to sustainable development.

LSLAs produce fundamental changes in natural resources, land access and ownership, often excluding traditional users from critical decisions impacting their well-being and livelihoods. In many instances, individuals, communities and social movements have responded to these perceived injustices with varying degrees of violent or non-violent forms of resistance (SDG16). The recent 'wave' of land acquisitions for biofuel production in response to policies for climate change

Table 1

Negative impacts of LSLAs in relation to SDGs

SDGs	Negative impacts of LSLAs in relation to SDGs	Selected references
1. No poverty (specific targets: 1.1; 1.2; 1.4; 1.5; 1.b)	Dispossession of smallholders and traditional land users, destruction of livelihoods, reduction of means of subsistence.	[29•,58••,59••,81••,82••,90,91]
2. Zero hunger (specific targets: 2.1; 2.2; 2.3; 2.4; 2.5)	Appropriation of agricultural products, reduction of lower income and vulnerable people's access to food.	[58••,81••,92–98]
3. Good health and wellbeing: (specific targets: 3.9)	Large-scale plantation workers exposure to agrochemicals.	[70,99]
5. Gender equality (specific targets: 5.1; 5.5; 5.a; 5.c)	Rights, interests and needs of women are affected. Gender inequality is aggravated.	[52,58••,84••,100]
6. Clean water and sanitation (specific targets: 6.1; 6.3; 6.4; 6.6; 6.b)	Impacts on blue water, appropriation of water scarce countries' virtual water resources through trade. Agrochemical contamination of water resources. Increased competition over water between different users.	[18•,36••,56,57,62••,68,75]
7. Affordable and clean energy (specific targets: 7.2)	The target of increasing the share of renewable energy mix has produced incentives in increasing biofuels large-scale production which is a fundamental driver for LSLAs.	[6,16,17•,31,40,42,61,101]
8. Decent work and economic growth (specific targets: 8.1; 8.3; 8.4; 8.7)	Economic growth development models can encourage systems of large-scale agricultural production. Small-scale farming systems can, however, be in competition with LSLAs. Large-scale agricultural production can have significant impacts on environmental and resource degradation. Cases of workers exploitation in large-scale plantations are documented.	[58••,59••,81••,82••,84••,102]
10. Reduced inequalities (specific targets: 10.1; 10.2; 10.3; 10.6)	Large-scale land investments can increase economic inequality through dynamics of proletarization of smallholders. Exclusion of affected land users and in particular vulnerable groups are reported. Voices representing developing countries are often not granted a hearing in the national and international agreements on land investments.	[58••,59••,82••,84••,90]
12. Responsible consumption and production (specific targets: 12.2; 12.4; 12.6; 12.8)	LSLAs are associated with many instances of unsustainable natural resources exploitation and degradation, as in the case of accelerated deforestation. There is evidence of agro-chemical contamination of land and water resources. Whether practices in LSLAs are environmentally sound is questionable and information is not transparent.	[19,29•,37,58••,59••,81••,84••,103]
13. Climate action (specific targets: (13.1; 13.b)	Small-scale farmers, traditional land users and vulnerable groups might be more exposed to climate change hazards once they are displaced by LSLAs. Climate change programs might increase green grabbing phenomena.	[83••,104,105]
15. Life on land (specific targets: 15.1; 15.2; 15.3; 15.5)	LSLAs' negative effects on terrestrial and freshwater ecosystems; in particular, problematic cases of deforestation and land degradation impacting biodiversity.	[19,49•,83••,103,105]
16. Peace, justice and strong institutions (specific targets: 16.1; 16.5; 16.6; 16.7)	LSLAs are associated with increases in cases of social conflict and violence. Instances of bribery and corruption of local government functionaries for land concessions are reported. Transparent and accountable institutions are not the norm in relation to LSLAs and local users are often excluded from decisions that affect them.	[30,34,58••,82••,97,102,106–109]
17. Partnership for the goals (17.5; 17.10; 17.11; 17.18)	Promotion of investment regimes should consider the specifics of LSLAs. The WTO should be attentive to the LSLAs' socio-environmental implications. Export from developing countries should not happen at the expenses of national food security. Better data and monitoring of LSLAs should be developed.	[30,59••,60,82••,84••,93]

mitigation, has induced competition between food and energy crops. In this case a 'leakage' effect may emerge, whereby some SDGs (SDG7 and SDG13) that invoke the adoption of strategies for renewable energy and climate change mitigation favor land acquisitions for greenhouse gas reduction (or 'green grabs'), thereby exacerbating the competition for water and land by food and energy crops, in possible contrast with SDG1 and SDG2.

Discussion and conclusions

How then does the theory on sustainable development relate to the issue of LSLAs and the most negative definitions of land and water grabbing? We started this review with this question in mind and have synthesized the core literature, applying the most influential operationalization of the concept of sustainable development. We have related the main threats and challenges

associated with LSLAs to the 17 SDGs. This conceptual mapping shows the multidimensionality of the negative impacts of LSLAs and how each of these goals is specifically affected by the problematic aspects of LSLAs. Relating LSLAs to SDGs serves two specular purposes. The first, as stated from the title, is to consider how land and water grabbing could potentially impact the attainment of the different development goals and therefore provide a base for a general diagnosis of the global land rush. The second is that the SDGs also represent a useful framework for considering the different dimensions under which LSLAs should be evaluated.

The expansion of transnational land acquisitions and intensive large-scale agricultural production in an increasingly globalized world — where natural resources are relentlessly commodified and degraded and traditional users marginalized — raises fundamental sustainability concerns. Are these concerns justified? Is it correct then to consider LSLAs as 'land grabbing'? Or should LSLAs be differentiated by distinguishing between those that could represent forms of grabbing and the ones that instead produce positive development impacts? In this second case, then, on what criteria should LSLAs be evaluated and what are the appropriate institutional instruments to govern these deals? These questions, which are at the center of a policy and scholarly debate, produce very different answers based on diverging normative and political perspectives.

However, the debate on land grabbing is not only a debate about the specifics of how LSLAs are implemented and regulated or about dispossession, violation of human rights and environmental injustice. It is also, and most importantly, a debate about contrasting visions of development. It is a debate on what kind of trajectories developing countries should take to improve their agricultural sector, food security and other fundamental aspects of rural development that affect the wellbeing and human rights of large shares of the global population and more directly the livelihoods, resilience and adaptation of farmers, indigenous people and traditional users of the land.

The perspectives on this debate are generally polarized. On one side stand those who are supportive of a capitalist restructuring of global agriculture and, on the other, those who speak in defense of small-scale farming, subsistence and the need for land redistribution [52,110]. LSLAs are considered a potentially positive transformational phenomenon by those who advocate a rural transition in developing countries that includes modernization of their agricultural systems, improvements in technology and infrastructure, commoditization and commercialization, integration in global markets by attracting foreign investments and increase in the export capacity of agricultural commodities [4,35,43,57,86,111,112]. Meanwhile, critics, as illustrated by this review, consider LSLAs as a threat to multiple dimensions of development and in general a mechanism through which resources are transferred from the global South to the richer countries.

The relationship between LSLAs and SDGs adds new elements to discuss in the heated debate on global land governance and calls for the attention of both scholars and practitioners concerned with the future of developing countries.

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