

REVIEW

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Food security and large-scale land acquisitions by sovereign wealth funds: a systematic review of the literature from 2012 to 2023

Jordan Blekking^{1*} , Dalal Aassouli² and Ray Jureidini²

*Correspondence:
jblekking@cornell.edu

¹ Department of Global Development, Cornell University, 250 Warren Hall, Reservoir Ave., Ithaca, NY 14850, USA

² College of Islamic Studies, Hamad Bin Khalifa University, Education City - Gate 8, Ar-Rayyan, Qatar

Abstract

Many countries that have large surplus financial resources but contend with limited land *and* water resources use large-scale land acquisitions (LSLAs) in foreign countries to ensure national food security and earn long-term returns on their investments. LSLAs can provide positive direct and indirect benefits in countries where investment occurs by increasing access to financial and technical resources. On the other hand, LSLA critics state inequitable and unsustainable resource use practices are common, and that negative impacts tend to disproportionately impact local communities. Using the PRISMA systematic literature review approach, we conducted a literature review of 49 articles published between 2012 and early 2023 to understand if LSLAs contribute to food security, if national sovereign wealth funds invest in LSLAs, and to what extent the environmental, social, and governance impacts of LSLAs are evaluated. We find that most articles in our review state LSLAs do not improve food security in the country where the investment occurs or in the country where the investment originates. We also find that sovereign wealth funds were not prevalent LSLA investors during the study period, despite becoming a top contributor to agri-food sector investments during the same time. Finally, we find that the environmental, social, and governance impacts of LSLAs are not equally considered. Specifically, governance impacts are poorly understood. Improving the governance mechanisms associated with LSLAs could increase the equitability and sustainability of LSLAs, thus ensuring the public's best interest in the immediate and long-term and reassuring investors about the long-term financial viability of their investment.

Keywords: Foreign direct investment, Agriculture development, Agriculture investment, Land grabbing, Governance

Introduction

The United Nations' Food and Agriculture Organization estimates that approximately 828 million people face food insecurity issues annually (FAO et al. 2022). Recent and ongoing challenges related to climate change, the COVID-19 pandemic, and conflict, like the war in Ukraine, impact global food security (FAO et al. 2022). Increasing food

production is viewed as an approach for minimizing these challenges and improving food security. Yet, for many countries with poor natural resource endowments (i.e., limited land and/or water resources), this is difficult. To remedy this, some governments seek out land investments abroad to access requisite resources for current and future food production. For example, following the 2007/2008 global food price crisis which led to a decrease in food availability and accessibility (Header and Fan 2010), Asian and Gulf countries invested in large-scale land acquisitions (LSLAs) to ensure domestic food production and supplies (Sippel 2015; Alden 2013; Jägerskog and Kim 2016).

LSLAs are characterized as a transfer of rights to use, control, or own land through the sale, lease, or concession of 200 ha or more (Kinda et al 2022). LSLAs can lead to win–win scenarios. Countries with sufficient financial resources use LSLAs to ensure sufficient, stable food availability and accessibility, while countries where investments occur gain access to new technologies, investment in rural and agricultural infrastructure, and improved sector expertise (Kinda et al 2022; D’Ororico and Rulli 2013). However, LSLAs are not win–win initiatives when local populations are excluded from the decision-making process, human rights and governance are not ensured, land and water resources are unsustainably used, and agreements between investors and government officials are opaque (Dell’Angelo et al. 2017b; Mueller et al. 2021; D’Ororico and Rulli 2013). The extent that LSLAs balance benefits between the country invested in and the investor country is, in part, the result of environmental, social, and governance factors.

Sovereign wealth funds (SWFs)—national institutions tasked with investing public revenues into initiatives that provide financial gains and strategic public benefits—are playing an increasingly central role in foreign direct investments (including LSLAs). SWFs are important financial contributors to agri-food system changes throughout the world (Sippel et al. 2018; Capapé 2021). However, little empirical research exists into understanding the combined relationship between LSLAs, food security, and SWFs. To this end, we conducted a systematic literature review to investigate the following research questions:

1. Do large-scale land acquisitions contribute to food security in the country that is invested in, the investor country, or both?
2. How are the environmental, social, and governance impacts of large-scale land acquisitions considered in recent research?
3. How prevalent are sovereign wealth funds as actors in agricultural foreign direct investments in large-scale land acquisitions?

Our review focused on evaluating how manuscripts published from 2012 to early 2023 evaluated the impact of LSLAs on food security in countries where investments occur and come from. We also focus on SWFs, defined as a collection “of assets owned and managed directly or indirectly by governments to achieve national objectives” (Blundell-Wignall et al. 2008, p. 117). SWFs are particularly important to include due to recent efforts by Gulf Cooperation Council countries (GCC) to invest in LSLAs as a means of ensuring food sovereignty. For example, following the 2017 blockade of Qatar by neighboring Saudi Arabia, the United Arab Emirates, Bahrain, and Egypt, among other nations, the Qatari government used the Qatar Investment Authority, their national

SWE, to invest in food production LSLAs to ensure national food sovereignty for Qatar (Mustafa 2017).

Background

Food security is defined as “a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (World Food Summit 1996). In this conceptualization, food security is made up of four dimensions: availability, accessibility, utilization, and stability. Recently, the Food and Agriculture Organization’s High-Level Panel of Experts on Food Security and Nutrition proposed to extend the food security conceptualization to include agency and sustainability as dimensions (HLPE 2020). The agency dimension is important to assess inequalities that are systemic in agri-food systems, while sustainability assesses the social–ecological linkages inherent in food systems.

Mobilizing and effectively using available financing is important for ensuring world, regional, and national development goals (Capapé 2017), including food security. One avenue of financing development initiatives and promoting economic growth is through foreign direct investment (FDI), defined as a cross-border investment in which an investor residing in one economy establishes a lasting interest in and a significant degree of influence over an enterprise residing in another economy (OECD 2023). Research on the effects of FDI on development goals is mixed. Within the development literature, FDI advocates view increases in foreign involvement as natural and necessary for modernizing countries. Proponents believe that FDI can more rapidly improve development outcomes (as compared to domestic investments) through increased access to capital, production technologies, organizational and managerial skills, knowledge of economic marketing, and access to foreign markets (Deininger and Byerlee 2011; Kumar and Pradhan 2002). In theory, these external investments will spill over to domestic actors and improve overall economic well-being in the country of investment. In recent years, the economic liberalization of markets in developing countries has considerably changed through FDI, specifically within the agri-food sector. Reardon (2015) states that FDI liberalization, in addition to changes in business regulations, food laws, and infrastructure investments, has transformed value chains and agri-food systems in developing regions. However, critics of FDI contend that these investments are problematic when international actors attempt to avoid taxes, extract capital and other resources from the country of investment, and influence policy in ways that benefit the investor without improving on-the-ground outcomes in the country of investment (Forte and Moura 2013).

Agri-food system shocks often spur widespread policy responses. The 2007/2008 global financial crisis spurred a global food crisis through increased global food prices, commodity speculation, export bans, and long-standing food insecurity (Headey and Fan 2010). Since then, additional food price volatility in 2011 (HLPE 2011), during the COVID-19 pandemic (Barrett 2020), and related to the war in Ukraine (Behnassi and El Haiba 2022), among other shocks, have highlighted the precarity of global agri-food systems. In response to these challenges, many countries have worked to insulate themselves against dependence on world food markets and related agri-food system shocks by increasing food production, in part, through acquiring agricultural land abroad, a form

of FDI. FDI-related land acquisitions are often pursued by countries (where investments occur and where investments originate) with low agricultural production capacity. Agricultural comparative advantage plays a central role in FDI (Abbott and Thomson 1987), with investing countries providing necessary financial and technical support, while the countries receiving investments provide access to necessary natural resources. For example, Gulf Cooperation Council nations face shortages of freshwater supplies and arable land, while African countries south of the Sahara are comparatively more well-endowed with these resources (Williams 2015).

The increase in LSLAs globally has revived debates surrounding the financialization of agri-food systems and foreign investment in developing regions. Agri-food system financialization largely occurs through corporate concentration, and the parallel impacts of financialization and consolidation have increased concerns regarding negative impacts on equitability, sustainability, and governance (Clapp 2021). Relatedly, sovereign wealth funds (SWFs) have contributed to the financialization of agri-food systems. Globally, SWFs hold approximately \$7.5 trillion in financial assets (Capapé 2017), and since the 2007/2008 global food price crisis, some SWFs have become increasingly involved in agri-food system-related investments, including LSLAs, to increase the domestic food supplies of their home countries (Sippel et al. 2018). For example, starting in 2015, the Saudi Arabian Public Investment Fund (PIF) re-focused to allow for broader investment autonomy (PIF 2023), including in agri-food-related systems.

SWFs, like the PIF, are often touted as an avenue for responsible, ethical investment. For example, the website for the Qatar Investment Authority, the national SWF of Qatar, states that they “apply the highest ethical, moral and professional standard of conduct in all [their] undertakings” (QIA 2023). The increasing role of foreign actors and firms as development financiers is viewed by some as a new form of colonization (Robertson and Pinstrup-Anderson 2010). This viewpoint is somewhat buoyed by research conducted by the World Bank following the 2007/2008 global food price crisis states that many LSLAs are established in countries with weak governance arrangements, and where local populations have limited land tenure and resource rights (Arezki et al. 2015). In reaction to these and other critiques, some LSLA investors have worked to assuage concerns related to equitability and sustainability by recasting their roles. Some firms now frame LSLA investments as essential to meeting global food security and climate change challenges (Smith and Lawrence 2021). By claiming a “social license to operate,” firms attempt to invoke ideas of corporate social responsibility, even though investment outcomes may be harmful. For instance, Smith and Lawrence (ibid) state that Australian agribusinesses involved in sugar production attempted to distance themselves from negative public health outcomes by invoking a narrative based on energy and food security needs. In claiming this, the firms attempted to strengthen social support for their investments, despite the negative impacts that commodifying unhealthy foods may have on public health.

Attempts to improve the equitability of LSLAs include efforts to improve transparency and sustainability through voluntary, non-binding initiatives. For instance, the FAO’s *Principles for Responsible Investment in Agriculture and Food Systems* calls on investors to voluntarily abide by ten principles, including contributing to sustainable and inclusive development, respecting local resource tenure, and promoting accountability, among

others (Committee on World Food Security 2014). Other examples include the United Nations Conference on Trade and Development's *Responsible Agricultural Investment: Knowledge into Action Notes* series and the *Principles for Responsible Agricultural Investment that Respects Rights, Livelihoods, and Resources*, which was convened by the FAO, IFAD, UNCTAD, and the World Bank (UNCTAD and World Bank 2018; World Bank 2010). These initiatives outline principles that promote a rights-based approach focused on responsible investment and development through accountability, inclusivity, equitability, and sustainability. However, a notable challenge with these initiatives is that they are non-binding and lack accountability mechanisms (Smith and Lawrence 2021).

Other efforts have focused on the development of indicators to evaluate environmental, social, and governance impacts, commonly referred to as ESGs. ESG metrics are used by investors (e.g., SWFs or development banks) and researchers to determine the impact of FDI, including LSLAs, in the countries where investment occurs. ESG metrics and associated policies are increasingly common. A report by Invesco (2022) states that in 2011, 46% of SWFs surveyed had an ESG policy, while by 2022, that number had risen to 75% of SWFs. Importantly, SWFs use their ESG policies and metrics to ensure their investments contribute positively, directly, and intentionally to ESG-related outcomes. However, some investors state that adhering to ESG criteria and metrics may hamper financial returns (Capapé 2017). A pressing challenge is that no standardized approach to ESG data collection or reporting exists. The lack of standardized ESG data has led to concerns that SWFs and other investors use ESG metrics not to guide investment, but rather to justify and market their investments without pursuing tangible changes (Invesco 2022).

Methods

We used the PRISMA systematic literature review methodology to investigate the role of LSLAs in contributing to food security, both in the country where the investment occurs or in the country where the investment originates, and to what extent SWFs are cited as actors in agri-food LSLAs. A systematic literature review provides informative insights into a specific topic by identifying, evaluating, and synthesizing relevant methods, findings, and other components of existing empirical studies (Higgins et al. 2019). We began the review with an initial, exploratory search using Google Scholar for articles related to food security and LSLAs. This initial search allowed us to create a list of candidate search terms for use in a database query. We used the Scopus Database to identify potential articles because Scopus is one of the largest abstract and citation databases of high-quality peer-reviewed literature, covering a wide range of disciplines and topics. Using Scopus, we conducted 20 iterative searches using different keyword combinations and exclusion criteria. Each iteration used various combinations of search terms, until a final set was settled on. The final iteration (conducted February 8, 2023) used a combination of the following keywords: *foreign direct investment, sovereign wealth fund, sovereign investment fund, social wealth fund, central bank, foreign investment, land grabbing, or land acquisition* (see Supplementary Material for the Scopus final search criteria). The final search iteration only included journal articles that were published between 2012 and early February 2023. We do not include articles before 2012, because during our preliminary literature review, we found that SWFs did not become involved in food

security-related investments until the mid-2010s. However, to ensure article inclusivity, we included articles that were published before the mid-decade mark. We also limited the searches to empirical studies that were published in English, thus excluding review articles, articles in other languages, and non-journal publications (e.g., World Bank reports). This approach allowed us to narrow the search in such a way that returned a comprehensive, diverse array of peer-reviewed articles about LSLAs, sovereign wealth funds, and food security. Non-English articles were excluded due to language proficiency constraints on the part of the article reviewer and because of resource constraints, which limited the possibility of translating non-English articles.

During the identification stage of the PRISMA methodology, our targeted search criteria identified 165 articles published between 2012 and early 2023. The titles, abstracts, keywords, and other relevant bibliographic information of these 165 articles were exported from Scopus into a CSV file format. Figure 1 illustrates the PRISMA process that we used to screen and select articles for inclusion in the systematic literature review. We examined the 165 articles for duplicate articles, but none were identified. During the screening stage, we then examined the titles, keywords, and abstracts of the 165 articles, to ensure that they met the following inclusion criteria: (1) The article contains empirical research (i.e., it was not a review); (2) the article focuses on foreign direct investment in agriculture; and (3) the article focuses on food security and land acquisitions. We did not use a specific metric for ensuring these criteria were met, rather we included articles if each of these three criteria was broadly met. We also did not use a specific definition of food security during this stage of the article evaluation process. In general, we cautioned on the side of error and leaned toward article inclusion in the event that a manuscript was not clearly excludable. The screening stage identified 63 articles (102 were excluded) that met all three criteria.

During the eligibility stage of the PRISMA methodology, the full texts of these 63 articles were reviewed and coded according to a range of survey questions using Qualtrics software. Survey sections included questions on the location where the investment occurred and where the investment originated, investment characteristics (e.g., types,

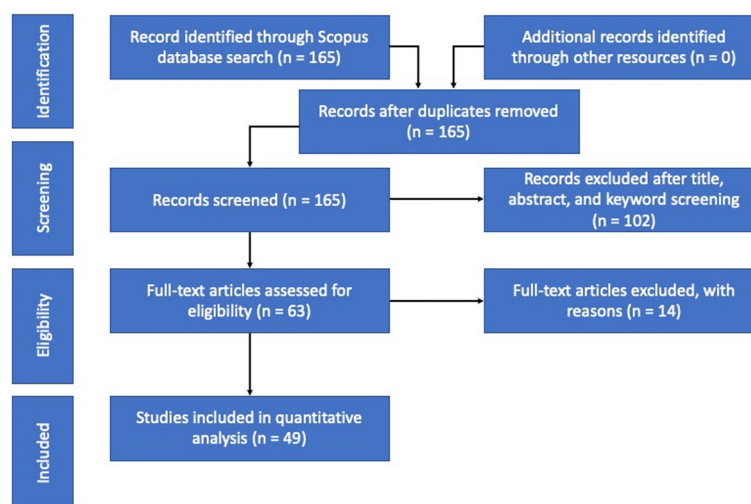


Fig. 1 Conceptual diagram illustrating the approach used for the systematic selection of articles to review

cost, and duration, among other variables), which conceptual aspects of food security or food systems were directly discussed in the manuscript, and questions regarding the environmental, social, and governance contexts of the investments. During this stage of evaluation, article inclusion was more conservative. Survey answers were selected only if the manuscripts specifically stated a pre-listed term. For instance, in coding the dimensions of food security that the manuscript covers, “availability” was selected if the manuscript specifically mentioned, for instance, “food availability” or “available food.” We did this in an effort to mitigate assumptions that would bias our analysis. After reviewing all 63 full-text articles, 14 articles were excluded because they did not fit the scope or criteria of the study, resulting in 49 articles being included in the final analysis. Survey data were analyzed using R, and the respective research questions were answered using descriptive statistics, specifically frequency, mean, and median values. No bias assessment tool was used because the first author evaluated all 165 articles used in the initial search, and all 63 articles included in the full-text analysis. A full list of included and excluded articles can be found in the supplementary material.

Like Liguori et al. (2022), we did not use scores to evaluate articles included in our review; rather, each article included in our study was evaluated for issues pertaining to bias using a list of predefined criteria. Quantitative articles were considered against 14 criteria, while qualitative articles were considered against 10 criteria. For more information on how the studies were reviewed, as well as key differences and similarities in their findings and methodologies, please see the Bias Reporting file in the Supplementary Material section. After completing this process, no articles were excluded from the analysis due to the bias reporting evaluation. The first author conducted quality appraisals of the included papers.

Results/discussion

LSLAs and food security

Our literature review findings suggest that LSLAs rarely improve food security. Twenty-one of the 49 articles (~43%) stated that LSLAs do not improve food security, while 7 of the 49 articles (14%) stated that LSLAs improve food security. The remaining articles stated mixed results (12 of 49 articles; 24%) or did not state a claim (9 of 49 articles; 18%). Despite a large percentage of articles stating that food security is not improved by LSLAs, our overall finding requires nuance. The association between LSLAs and food security is likely to vary depending on the specific investments made and the context in which they occur. Each LSLA comes with unique characteristics, such as tradeoffs for the area where investment occurs, and the investment goals held by the investor(s). A positive relationship between an LSLA and food security partially hinges on whether the proposed benefits of the land acquisition contribute to positive on-the-ground outcomes. For instance, Chen et al. (2017) contend that Chinese-funded LSLAs in Africa and Asia rarely produce agri-food products that return to China; instead, these investments directly increase agricultural investment, production, distribution, and consumption in the country where investment occurs. However, in their study of LSLAs and food security in 32 African countries, Kinda et al. (2022) find that LSLAs for food crop production hindered food security by decreasing cereal production and increasing malnutrition. Specifically, the authors state that a negative impact occurs if large tracts of land

are removed from smallholder production, and the revenues that would have been generated are not replaced with many compensatory jobs created. If farmers are stripped of land to produce their own food, while contending with few alternative economic opportunities, their food availability and access are diminished. The direction and benefits of the relationship between LSLAs and food security depends on country-specific characteristics, such as the openness of countries to agricultural FDI and existing governance regimes (Yao et al. 2020).

One reason why LSLAs may not clearly contribute to food security is because food availability on its own is not sufficient for determining food security. Our review found that food availability is the primary food security dimension considered (22 of 49 articles; 45%). Specifically, 40 out of 49 articles (82%) that discussed agricultural FDI focused on acquiring land for crop or horticultural production, followed by land acquired for rearing livestock (8 of 49 articles; 16%). In their study of LSLAs in 39 countries, Mueller et al. (2021) find that LSLAs in Africa expanded and intensified agricultural production for non-local staple crops, but also contributed to decreased dietary diversity in local communities. The paradox of LSLAs is that agricultural production can increase through LSLAs, while, at the same time, food security in the area of production can decrease overall.

Food security is a multi-dimensional concept which requires satisfaction of several criteria beyond increased production of crops and livestock. Our results suggest that the other five dimensions of food security are less considered in LSLAs. Accessibility was the second most included dimension of food security (13 of 49 articles; 27%), followed by utilization (7 of 49 articles; 14%) (Fig. 2). Stability, agency, and sustainability were each mentioned three times or less. The limited discussion of stability is potentially the result of a lack of data. Without longitudinal data, it is difficult to assess the stability of food availability, accessibility, and utilization before and after an LSLA. The limited mention of agency and sustainability is also understandable since only recently did the FAO's High-Level Panel of Experts on Food Security and Nutrition advocate for including both as additional dimensions of food security (HLPE 2020), thus articles published prior to 2020 would not have included these dimensions. Lastly, over half of the articles surveyed in our study (26 of 49 articles; 53%) broadly refer to food security as a concept inherent in their study, but do not provide more specific details on which dimensions are considered.

LSLA ethical considerations require that agency and sustainability be directly considered in the future evaluations of LSLAs. LSLAs can be a powerful tool for positive transformative change in countries where investments are targeted, but they can also lead to negative, disruptive outcomes. When land deals fail to receive the consent of local communities, do not engage in democratic planning, lack meaningful participation from a wide range of invested parties, or avoid transparency, LSLAs can exacerbate existing inequalities. For instance, Dell'Angelo et al. (2017a) identify how acquiring common property used by rural communities is a central feature of contemporary land acquisition initiatives, and that acquisitions often occur through coercion, leveraging power imbalances, and conflict. The expropriation of land often violates the rights of land users where LSLA investment occurs, and a lack of mechanisms for remedying grievances and making appeals further exacerbates issues

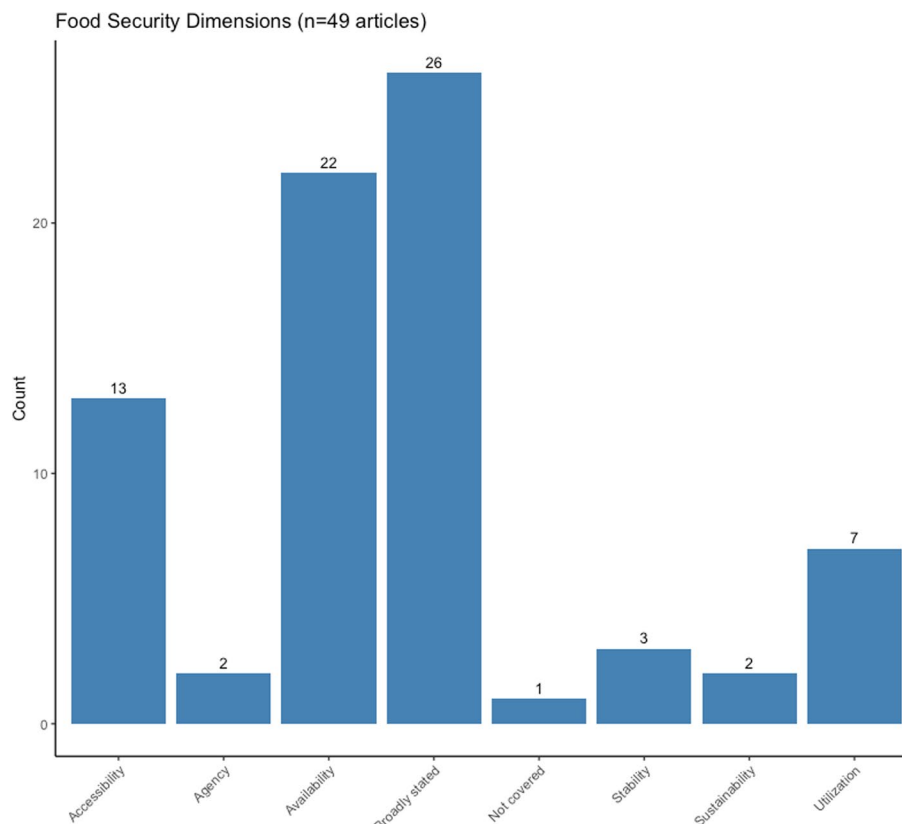


Fig. 2 Many of the articles we reviewed (26 out of 49) broadly stated food security as a concept, while more specific dimensions were stated less often. The two recently advocated for dimensions, agency and sustainability, were seldom mentioned

pertaining to land and resource rights (UNCTAD and World Bank 2018). In effect, a lack of agency on the part of local people can lead to negative outcomes related to LSLAs. Despite the importance of considering inequalities, we found that 26 out of 49 articles (53%) did not cover any types of inequalities (Fig. 3). This finding suggests a considerable lack of investigation into the broad impacts that LSLAs can have on local populations. When articles did discuss inequalities, economic inequalities (e.g., fair purchase price for land, income/wages, and working conditions, among others) were most often highlighted (18 of 49 articles; 37%), followed by social inequalities (e.g., gender dynamics, resource access, and group affiliation, among others) (15 of 49 articles; 31%). Manuscripts included governance inequalities the least (5 of 49 articles; 10%). As discussions related to diversity, equity, and inclusion continue to gain more widespread traction within international development, food security, and agri-food systems debates, we expect to see increasing consideration of inequalities beyond economic and social characteristics.

The ethical impacts of LSLAs also relate to sustainability concerns, which have become more prevalent in recent years due to the expansion of LSLAs globally (Dell'Angelo et al. 2017b). We found that economic sustainability was included in 30 out of 49 articles (61%), followed by environmental sustainability (22 of 49 articles;

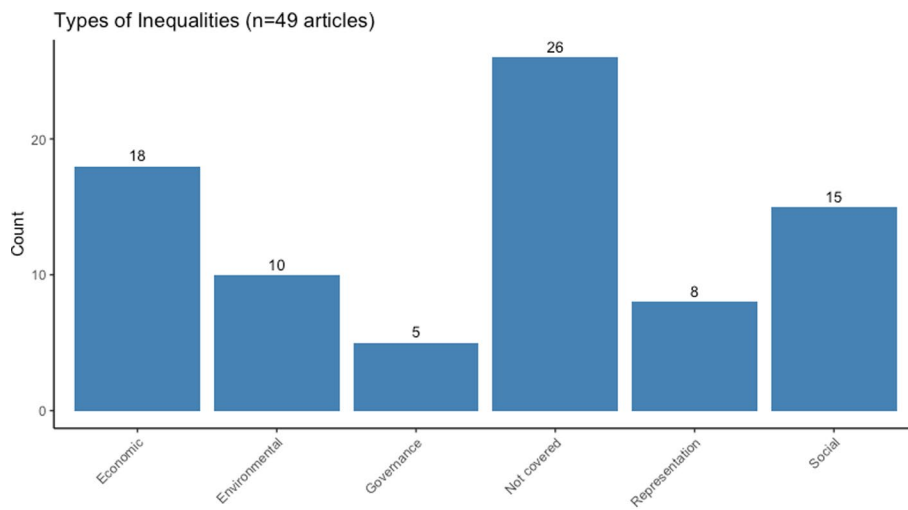


Fig. 3 The number of articles that cover different forms of inequalities in food-related foreign direct investment. In general, types of inequalities were not typically discussed in the 49 articles we reviewed. Articles that discussed inequality tended to focus on economic and social inequalities, as compared to governance and representation

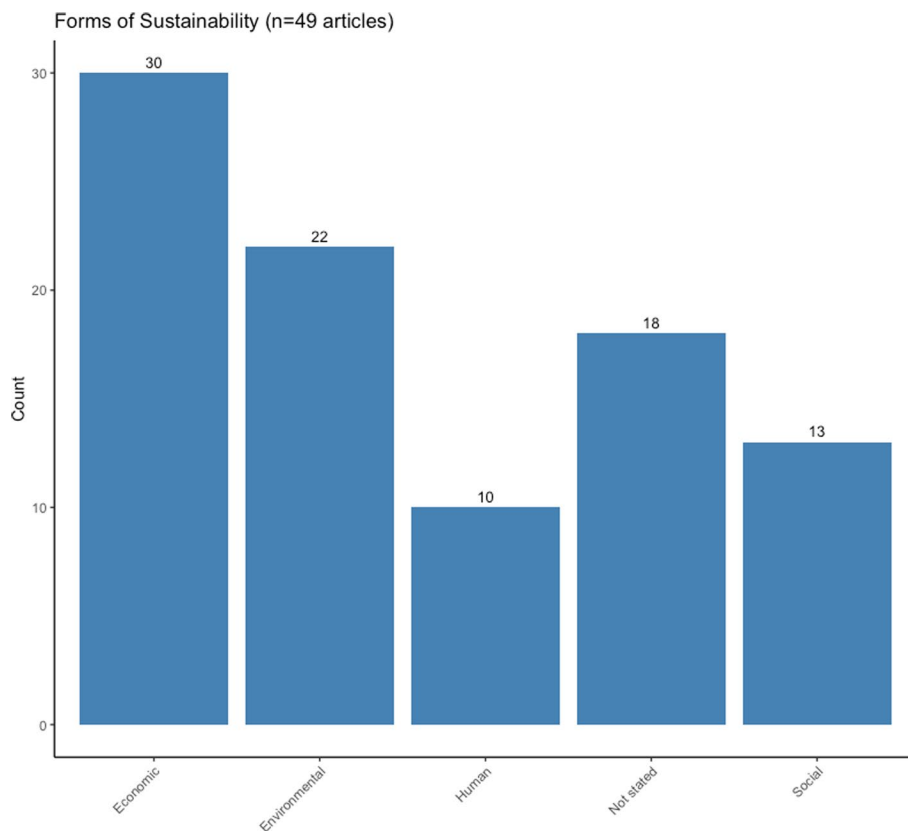


Fig. 4 The number of times different forms of sustainability were discussed in the 49 coded articles. Economic sustainability and environmental sustainability were most often discussed, with human sustainability the least mentioned

45%) (Fig. 4). Eighteen out of 49 articles (37%) did not include sustainability themes of any kind, while social sustainability or human sustainability were included in 13 and 10 out of 49 articles (27%; 20%), respectively. Due to the interconnectedness of rural livelihoods with land and water resources, direct consideration of the interactions between sustainability and the ethical aspects of LSLAs is necessary.

Leveraging the environmental, social, and governance (ESG) indicators to evaluate LSLAs may assuage concerns regarding sustainability and ethics; however, our results indicate that ESG indicators are not often directly considered. Instead, articles often considered aspects of ESG indicators. For environmental impacts, resource use and management were most cited (40 of 49 articles; 82%), followed by climate change (16 of 49 articles; 33%) and biodiversity (11 of 49 articles; 22%). For social impacts, labor (30 of 49 articles; 61%), some variation of human rights (27 of 49 articles; 55%), and equity or equality (25 of 49 articles, 51%) were discussed. For governance impacts, rules, laws, or policies were mentioned most (31 of 49 articles; 63%), while government structure was the second most mentioned (12 of 49 articles; 24%), and ethical issues were mentioned in 11 articles (22%). Overall, social impacts were most often included and discussed in articles, while governance impacts were the least discussed. The high inclusion of social impacts may be the result of many articles conducting empirical analysis of the impacts of LSLAs on local communities and households. This data was often collected through household- and community-level surveys and focus group discussions (see Chiarelli et al. 2022; Sullivan et al. 2022). Data pertaining to on-the-ground impacts are often leveraged in critiques of LSLAs. For example, in Nigeria, the Kwara State Government leased 13,000 ha to 13 international farmers, but access to the land required removing ~1300 smallholder farmers from the land (The Guardian 2024). Even though the deal was aimed at providing strategic regional benefits, the removal of smallholders contributed to critiques about the equitability of the land deal for local communities. Again, the lack of transparent investment data hinders our understanding about the land investment context, which would allow for a more clear evaluation of the ESG impacts of LSLAs.

Land acquisition actors

Our findings suggest that SWFs were not prevalent actors in agricultural foreign direct investment in LSLAs between 2012 and 2022, even though SWFs have become a top contributor to agri-food sector investments in the past 10 years (Capapé 2021). SWFs were specifically mentioned in 13 of 49 articles (27%), but SWFs were included as actors in the empirical analysis of only 7 out of 49 articles (14%). However, a large pool of working papers from the World Bank and other regional development banks (for example, see Park 2008; Curto 2010; Triki and Faye 2011) contend that SWFs are increasingly important for financing development initiatives. For instance, Curto (2010) states that SWFs may become important financial actors in facilitating flows of south–south investment. For example, in 2008, the Qatar Investment Authority invested in the Hassad Food company to ensure food supplies for Qatar (Sippel 2015). Since then, Hassad Food has directly invested hundreds of millions of dollars in Global South countries (e.g., Pakistan, India, and Oman) to increase national food supplies (Hassad Food 2023; Mustafa 2017). Beyond LSLAs, SWFs are active investors in agri-food biotechnology,

agricultural technologies, and food delivery service, among other agri-food technologies (Capapé 2021). Despite their increasing presence in the agri-food sector, understanding the extent to which SWFs contribute to food security is a challenge due to a lack of clarity and transparency regarding land agreement details, yields, and food flows.

Many of the 49 articles we reviewed lamented the fact that LSLA-specific information (i.e., temporal length of the deal, primary investors, and goals of the investment) is not widely available. We acknowledge that firms and organizations engaging in LSLAs seek to achieve competitive advantage, which means ensuring confidentiality to some point; however, existing limitations regarding transparency will continue to encourage doubts surrounding the ability of LSLAs to provide meaningful and sustainable benefits to those investing and receiving the investment. To evaluate LSLA-related outcomes, many researchers rely on the Land Matrix database (see Kinda et al. 2022; Chiarelli et al. 2022; Rulli and D'Odorico 2014), an open-access platform that provides detailed information about LSLAs in almost 100 countries made available by a partnership of global organizations (Land Matrix 2024). However, using the Land Matrix database and other similar tools is not a panacea for transparency (Anseeuw et al. 2013). For instance, an agreement between the Gulf Merchant Bank (GMB) and the Moroccan government to develop shellfish production operations in Morocco is reported as concluded in the Land Matrix database, but the current state of the project is not reported (Land Matrix 2024). Thus, it is unclear at what stage the project is at or the extent to which the project is meeting its stated goals. A lack of available data regarding investor characteristics may be the reason why our research most often included analysis of actors in the countries of investment, rather than actors from the investing countries. For instance, many of the manuscripts we reviewed empirically evaluated on-the-ground impacts of LSLAs in the immediate area of households, thus 28 out of 49 articles (57%) included households in their analysis. Private firms (either directly named or broadly characterized) were mentioned in 27 out of 49 articles (55%).

Future directions

The studies in our review primarily focused on the production and consumption stages of agri-food systems (Fig. 5), but the middle stages (aggregation, processing, and distribution) are also important. Reardon (2015) states that the middle segments of an agri-food value chain form 30–40% of the value added and costs of agri-food products. Despite the importance of these stages, there exists less understanding of their roles in comparison with production and consumption. Agricultural production was mentioned in 44 of the 49 articles (90%) we reviewed, while consumption was mentioned in 37% of the reviewed articles (18 of 49). Aggregation, processing, and distribution were mentioned in 6, 10, and 12 articles (12%, 20%, and 24%), respectively. If the 2007/2008 global food price crisis led to decreases in food availability because of increases in food prices, the recent supply chain issues that stemmed from the COVID-19 pandemic and war in Ukraine may increase future investments into the areas of aggregation, processing, and distribution. As many of the 49 articles we reviewed suggest, some countries use LSLAs to increase food availability, but once national food supplies (availability) are met, a shift from acquiring land to acquiring actors involved in food aggregation, processing, and distribution may occur. To some extent, this may already be happening. For example, in

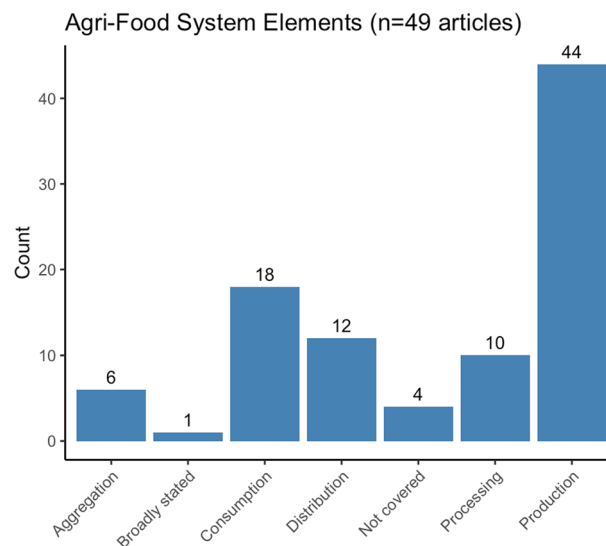


Fig. 5 Production was the most mentioned element of agri-food systems, followed by consumption and distribution. Few studies mentioned the processing or aggregation stages of agri-food systems

2020, Qatar's Hassad Foods purchased shares in Sunrise Foods International, a global grain and feed processor and distributor.

Policy implications

Improving land acquisition governance can improve resource equitability and sustainability for local communities, governments, and investors. Countries with weak governance regimes receiving agricultural FDI may not have the capacity to coordinate, manage, and regulate LSLAs (Alamirew et al. 2015), which can threaten development equitability and sustainability. This type of situation may allow investors and similar stakeholders the opportunity to dictate LSLA-related policies, including policy justifications. For instance, investors and national governments often justify LSLAs by claiming land is unused and that acquiring it is in the public's interest to meet certain national strategic goals (Borras and Franco 2010). However, as the World Bank and United Nations states in their *Responsible Agricultural Investment* initiative, no land is unused. Land is often a common resource used by communities in an assortment of ways (UNCTAD and World Bank 2018; Dell'Angelo et al. 2017a). Efforts to increase the governance of LSLAs can help to avoid negative impacts on local communities by aligning investment opportunities with the reality of local land tenures and resource use regimes, which will help to increase sustainability and equitability. At the same time, strengthened governance systems can provide security for investors looking to ensure investment guarantees (Zecca and D'errico 2021). One approach to improving the governance of LSLAs may be through facilitating land titling, where low-income and marginalized communities are provided the opportunity to register and take ownership of land (UNCTAD and World Bank 2018).

SWFs are increasingly using ESG metrics to improve transparency, which may positively benefit LSLA accountability in the decade to come. The International Forum of Sovereign Wealth Funds (2022) and Invesco (2022) both state that more than 70% of

SWFs reported integrating ESGs into their investment practices. For instance, SWFs that have signed on to the *Santiago Principles* all agree to increase transparency through a set of 24 investment and monitoring principles and practices that are implemented to promote good governance, accountability, and prudent investments (IFSWF 2008). However, efforts to improve the ESG impacts of LSLAs are entirely voluntary, meaning that accountability mechanisms are weak. As a result, conceptualizing, operationalizing, and monitoring LSLA impacts can vary considerably across investors, governments, and agreements—leading to a wide range of data quality standards, assessments, and outcomes (IFSWF 2022). It is necessary to harmonize definitions of ESG criteria and metrics, clearly define guidelines on ESG reporting, and improve transparency and accessibility to ESG data to ensure comparability, reliability, and decision-making.

Limitations and potential biases

We identify two limitations inherent in this study. First, the articles we reviewed for this article were all published in English. We did include articles that appear in dual-language journals (e.g., Hopma 2015) when applicable, yet it is likely that articles related to LSLAs, food security, and SWFs exist in non-English journals. We acknowledge that it is possible that excluding non-English language potentially negatively biased our results. However, it is also possible that inclusion of these articles would have strengthened our findings. What is certain is that including non-English articles would provide for a more robust understanding of LSLAs. Second, our findings suggest that LSLAs do not improve food security, but this finding needs to be contextualized due to the lack of data available regarding the LSLA deal characteristics. The articles in our analysis often used data collected in the communities in which the investment occurred, rather than data in the countries where the investment originated. Because LSLA deals lack transparency, it is difficult to accurately evaluate the successfulness of LSLA outcomes in the country where the investment comes from, which would enable a more complete evaluation of the interaction between LSLAs and food security.

Conclusion

Large-scale land acquisitions (LSLAs) have emerged as a significant global phenomenon, with far-reaching implications for food security, sustainable development, and the livelihoods of local communities. On the one hand, LSLAs can attract investment, introduce new technologies, and create employment opportunities in rural areas, potentially enhancing food security and reducing poverty. On the other hand, these deals can also lead to the displacement of local communities, the loss of traditional land rights, and the concentration of land ownership in the hands of a few powerful actors. Moreover, the emphasis on export-oriented crops or non-food commodities may undermine local food security and exacerbate existing inequalities.

The implications of LSLAs for food security are complex and context-specific. Using a systematic literature review, this study investigated the relationship between large-scale land acquisitions, food security, and sovereign wealth funds. We find that from 2012 to early 2023, most of the empirical studies included in our analysis stated that LSLAs do not improve food security and often lead to inequitable outcomes. These results require nuance because each LSLA deal varies by its investment goals, deal

conditions and terms, and the natural resources which the LSLA covers. Still, LSLAs primarily aimed at improving food production will not alleviate food insecurity if there is little parallel effort to improve other food security dimensions. Our results also suggest that sovereign wealth funds were not prevalent LSLA investors during the study period, despite actively investing in different stages of agri-food systems.

Going forward, sovereign wealth funds may play an important and growing role in improving transparency and efforts related to equitability and sustainability. Many sovereign wealth funds voluntarily subscribe to policies that integrate ESG metrics. Because the lack of transparency surrounding LSLAs hampers our understanding of how land acquisitions contribute to rural livelihoods, systemic inequalities, and long-term sustainability, the increased use of metrics that improve transparency and evaluation are a step in the right direction. The efforts of SWFs to increase transparency and ESG integration and disclosure may set the stage for other investors (e.g., development banks and private equity firms) to pursue similar efforts. However, ESG metrics are not perfect, and more work is required to harmonize ESG definitions, criteria, and reporting guidelines. Future research aimed at understanding how the environmental, social, and governance indicators interact with one another, and, specifically, how governance of LSLAs enables or hinders food security is a valuable avenue of research.

Abbreviations

ESG	Environmental, social, and governance
FAO	Food and Agriculture Organization of the United Nations
LSLA	Large-scale land acquisition
SWF	Sovereign wealth fund(s)

Supplementary Information

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Additional file 1 (XLSX 28 kb)

Additional file 2 (DOCX 13 kb)

Additional file 3 (DOCX 145 kb)

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Author contributions

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The dataset used is available in the Supplementary Material section of this article. The dataset and R code used in the study analysis are available from the corresponding author on reasonable request.

Declarations

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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