

Rethinking Transnational Farmland Grabbing in Low- and Middle-Income Countries: Toward a Systemic Conceptual Framework Articulating Propulsive and Stimulating Factors

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Abstract:

Large-scale land acquisitions, commonly referred to as land grabbing, have intensified since the early 2000s, generating profound disruptions to food security, land tenure systems, and rural livelihoods in low- and middle-income countries. Despite a growing body of literature, existing analyses remain predominantly discipline-bound and treat the determinants of land grabbing additively, without distinguishing the latent structural pressures that motivate investors from the institutional and policy conditions that actually permit acquisitions to occur. This study addresses that specific gap. It develops a hierarchical conceptual model that organizes the structural determinants of land grabbing into two functionally distinct categories -propulsive factors and stimulating factors -and formalizes their conditional, multiplicative interaction. The framework is built through a critical, integrative review of peer-reviewed and institutional literature (Scopus, Web of Science, ScienceDirect, Cairn and the grey-literature corpora of FAO, World Bank, IMF, Land Matrix, GRAIN and Oxfam, 2000-2025), screened against explicit relevance and quality criteria. The interaction is represented by a Cobb-Douglas-type activation function in which a weighted aggregate of five families of propulsive pressures (natural-demographic, economic, financial, geopolitical and green-finance) is multiplied by supply-side and demand-side stimulating conditions; the two elasticity parameters measure the responsiveness of land grabbing to institutional permissiveness and to exogenous investment incentives. A central theoretical proposition -the annihilation property -states that propulsive pressures remain latent whenever stimulating conditions are absent. We deliberately frame the model as a conceptual contribution: we propose, but do not yet estimate, a log-linear operationalization based on internationally standardized indicators, leaving empirical validation to future research. The principal contribution is the propulsive/stimulating distinction and its multiplicative formalization, which reconciles fragmented perspectives within a single testable architecture. Two implications follow: it identifies institutional vulnerability and exogenous incentives as the decisive activation levers, and it provides land-governance and food-security policy with a structured tool for targeting those levers.

Keywords: Land grabbing; Propulsive factors; Stimulating factors; Land financialization; Institutional vulnerability; Cobb-Douglas activation model.

JEL Classification: Q15; Q18; F21; O13.

Paper type: Theoretical Research.

1. Introduction

Long regarded as a controversial issue in development studies, large-scale land acquisition has progressively emerged as one of the most significant manifestations of the contemporary reconfiguration of power relations surrounding strategic natural resources. Within the scientific literature, this phenomenon has been interpreted through deeply divergent perspectives (Akalu et al., 2025). On the one hand, it is portrayed as a systemic threat undermining food sovereignty, local land rights, and the sustainability of agricultural systems (Ashukem & Ngang, 2022; Anku et al., 2023). On the other hand, some scholars consider it a potential driver of economic development and productive investment capable of revitalizing underexploited agricultural areas and integrating rural economies into global markets (Cotula & Vermeulen, 2009). Beyond this dichotomy lies a global rush for fertile land driven by asymmetric economic and geopolitical dynamics that tend to benefit financially and technologically endowed actors while disadvantaging land-rich but institutionally fragile countries (IPES-Food, 2024).

Although the social science literature has extensively documented the causes, manifestations and consequences of land grabbing, existing studies remain largely confined within fragmented disciplinary approaches: economic and financial analyses focus on investment flows and speculative dynamics (Marzocchi & Arribas Cámara, 2024; Loughlin & Milne, 2024), while legal and institutional perspectives examine tenure systems and the protection of local rights (Geslin & Tourme-Jouannet, 2021). This study starts from a precise diagnosis of that fragmentation. The central research question it addresses is the following: under what conditions do the structural pressures driving transnational farmland acquisition translate into actual land grabbing in low- and middle-income countries? This question is decomposed into three operational sub-questions: (i) which families of structural determinants can be analytically distinguished, and according to which functional role do they operate? (ii) how do these determinants interact -additively or conditionally -in producing observed acquisitions? and (iii) how can this interaction be formalized so as to become, in principle, empirically testable?

Positioning this contribution requires an explicit comparison with the main existing frameworks rather than a generic claim of originality. Zoomers (2010) proposes seven processes driving the global land rush but lists them side by side without a functional hierarchy; Borrás and Franco (2012) and Margulis et al. (2013) offer powerful political-economy and governance readings yet do not formalize the conditional mechanism linking drivers to outcomes; Arezki et al. (2015) provide a robust econometric account of the determinants but treat them additively, with no distinction between latent pressures and activating conditions. Relative to these works, our framework retains their substantive insights while adding two elements they lack: a functional typology separating propulsive from stimulating factors, and a multiplicative interaction in which the former remain inert without the latter. It should be emphasized that the central question concerns the determinants of land grabbing (factors → LG): land grabbing is the sole modelled outcome, whereas its consequences for food security are treated throughout the paper as the analysis's motivation and policy stakes, a hypothesized downstream relationship that the model does not formalize and that is left to future empirical work.

Epistemologically, the study is a formalized theoretical essay grounded in an integrative literature review; the qualitative-systemic reading and the econometrically inspired formalization are not a heterogeneous assemblage but two ordered moments of a single design. The qualitative review serves the context of discovery -identifying and categorizing determinants -while the Cobb-Douglas formalization serves the context of justification -rendering the proposed mechanism

explicit, falsifiable and, ultimately, estimable. The formalization is therefore a hypothesis-generating device, not a claim of completed measurement.

Accordingly, this research makes one principal contribution -an integrated, hierarchical typology of the determinants of land grabbing distinguishing propulsive from stimulating factors and formalizing their systemic interaction through a Cobb-Douglas-type activation function -from which testable propositions and policy-relevant implications are derived. The potential role of land and agricultural policies as instruments of regulation and resilience is examined only later, once the theoretical mechanisms from which such implications follow have been established, so as to avoid premature normative claims. The remainder of the paper is organized as follows: Section 2 reviews the literature and builds the theoretical framework; Section 3 specifies the research design and review protocol; Section 4 presents the formalization and its theoretical propositions; and Section 5 concludes with limitations and avenues for empirical validation.

2. Literature Review and Theoretical Framework

The grabbing of arable land, also known as the land rush (Borras & Franco, 2024), has intensified since the early 2000s and persists despite earlier predictions of a slowdown (Baker et al., 2014). It is now embedded in a complex global dynamic fuelled by the intertwining of economic, geopolitical, environmental and speculative forces (Land Matrix, 2021; IPES-Food, 2024). Rather than accumulating these contributions additively, this section organizes the literature around the debates and contradictions that structure it: whether land grabbing is threat or opportunity (Cotula & Vermeulen, 2009 vs. Ashukem & Ngang, 2022); whether it is driven primarily by investor motivations or by host-country conditions; and whether its determinants operate independently or only through interaction. These tensions reveal a shared methodological weakness -the absence of an explicit functional categorization of determinants -which the framework developed below seeks to resolve.

As Zoomers (2010) and, more recently, Yang and He (2021) emphasize, the literature tends to focus on isolated factors, whereas the phenomenon results from multiple interconnected processes requiring a systemic, multidimensional analysis. Several studies identify investors' speculative, energy or food-related motivations (GRAIN, 2008; Cotula et al., 2009; Anseeuw et al., 2012; Borras et al., 2012), yet these motivations translate into concrete acquisitions only when activated by permissive conditions such as institutional gaps in host countries (Agboola et al., 2023; Dell'Angelo et al., 2017; Wily, 2011), land-related violence (Harvey, 2004; Chauveau et al., 2020), low land prices and an incentivizing international environment (Agunyai & Amusan, 2023). Even pluralistic accounts (Zoomers, 2010; Margulis et al., 2013) lack the analytical structure that would distinguish the specific function of each group of determinants.

2.1. Mapping the theoretical currents and the analytical framework

Because the phenomenon is approached from economic, institutional, geopolitical, legal and ecological perspectives that are rarely articulated, Table 1 maps the main theoretical currents mobilized in this study, their explanatory focus, and the precise role each plays in the proposed model. This positioning makes explicit which currents inform the propulsive component (the structural pressures motivating acquisition) and which inform the stimulating component (the conditions enabling activation).

Table 1: Positioning of the main theoretical currents in the proposed model

Theoretical current	Representative references	Explanatory focus	Role in the model
Neo-Malthusian scarcity	Malthus (1798); Nurkse (1953)	Demographic pressure and resource scarcity	Propulsive (X1)
Endogenous growth / Boserupian innovation	Boserup (1965); Romer (1986)	Population as a stimulus to agricultural innovation	Propulsive (X1), nuancing
Marginalist microeconomics	Jones & Easton (1983); Markusen (1984)	Factor substitution, cost arbitrage, FDI vs. trade	Propulsive (X2, X3)
Financialization	Clapp & Isakson (2018); Hirano & Stiglitz (2025)	Land as a safe-haven and financial asset	Propulsive (X3)
Geopolitics / food power	Blanc (2020, 2022)	Land as a strategic lever of power	Propulsive (X4)
Political ecology / green grabbing	Franco et al. (2013); Hamouchene (2023)	Carbon markets, debt-for-nature, conservation	Propulsive (X5)
New institutional economics	North (1992); Acemoglu & Robinson (2012)	Property rights, extractive vs. inclusive institutions	Stimulating (SF_S)
Accumulation by dispossession	Harvey (2004); Chauveau et al. (2020)	Coercive transfer and tenure insecurity	Stimulating (SF_S)
Neoliberal trade / policy	Sorda et al. (2010); Burnod (2023)	Liberalization, subsidies, demand incentives	Stimulating (SF_D)

Source: Authors' own elaboration.

The analytical core of the framework is the distinction between propulsive and stimulating factors. The choice of exactly two categories - rather than three or more-follows a single functional criterion: the causal role a determinant play in the production of an acquisition. Propulsive factors are the structural pressures that generate motivation or potential to acquire land; stimulating factors are the institutional and policy conditions that convert that potential into a realized transaction. The conceptual boundary is therefore functional, not thematic: a variable is propulsive if it raises the desirability of acquisition independently of the host country and stimulating if it raises its feasibility within a given host country. Hybrid or endogenous determinants -for instance external debt, which both pressures governments and lowers institutional resistance -are assigned to the function that dominates in a given configuration and are explicitly flagged as boundary cases; this treatment of hybridity is, in our view, a strength rather than a limitation of a two-category scheme, since it forces the analyst to specify the dominant mechanism.

Two cautions guide the reading that follows. First, we distinguish documented facts (e.g., recorded transaction volumes, price differentials), interpretive hypotheses (e.g., the motivational reading of investor behaviour) and the causal relations postulated by the model (the conditional propulsive-stimulating mechanism); the latter are presented as theoretical propositions to be tested, not as established regularities. Second, we differentiate the epistemic status of our sources: peer-reviewed articles provide evaluated empirical and theoretical claims; institutional reports (FAO, World Bank, IMF, African Union, United Nations) provide normative framing and authoritative context; and databases (Land Matrix, AQUASTAT, WGI) provide quantitative measurement. These are not interchangeable, and we signal which type underwrites each claim.

2.2. Propulsive factors

Within the proposed framework, propulsive factors are the primary exogenous determinants that initiate and sustain large-scale land acquisitions. They are analytically grouped into five interdependent categories: natural-demographic, economic, financial, geopolitical and green-finance factors. Rather than enumerating these families additively, each is presented below as a

site of unresolved theoretical debate -both between competing schools and within a single factor - so as to expose the contradictions that an additive reading conceals and that the model later arbitrates.

Natural and demographic pressure. The role of demography is itself contested. From a populationist perspective inherited from Malthus, demographic growth exerts disproportionate pressure on agricultural resources, generating scarcity and self-perpetuating under-accumulation (Nurkse, 1953). The Boserupian and endogenous-growth traditions invert this causality, reading demographic pressure not as a curse but as a stimulus to agricultural innovation and human-capital formation capable of raising productivity (Boserup, 1965; Romer, 1986). The opposition is not merely academic: it implies opposite policy conclusions. This study sides with neither pole, arguing instead that the scarcity at stake is relative and socially produced rather than absolute. Between 1985 and 2005 arable land grew by only 4.5% while world population grew far faster (FAO, 2009); yet the binding constraint is less land in general than water. The Falkenmark threshold of 1,700 m³ per capita per year is now breached in a growing number of countries, notably across the Middle East, so that competition concentrates on water-secure, irrigable land rather than on arable land as such (Chiarelli et al., 2022; Johansson et al., 2016). Demographic pressure therefore becomes propulsive only once mediated by ecological limits and spatial selectivity -a qualification a cumulative listing of ‘drivers’ would miss.

Economic factors. Here the controversy opposes a neoclassical reading, in which land-price differentials simply signal efficient international arbitrage, to a critical political-economy reading, in which they express unequal exchange and the externalization of social and ecological costs. The gap is stark: arable land averages roughly €11,791/ha in the EU (rents ≈ €173/ha; Eurostat, 2023) against annual rents of €1.30-2.60/ha in Rwanda (Boisselet, 2012; Abay et al., 2021), encouraging international arbitrage (Seo & Rodriguez, 2012). Whether such differentials reward genuine productivity gaps or merely the cheapness of weakly protected land is precisely what divides the two camps. A second, overlapping dispute concerns agro-energy: the ‘food-versus-fuel’ debate pits those who treat biofuels and biomass as a structural driver of acquisitions (Carroccio et al., 2016; Cudlínová et al., 2020) against those who read them as a secondary, policy-contingent motive amenable to marginalist substitution analysis (Jones & Easton, 1983). The framework does not settle these disputes empirically; it locates them, insisting that price arbitrage and agro-energy generate pressure that is realized only where host conditions make conversion feasible.

Financial factors. The financialization of farmland is the most polarized debate of all. One position, emphasizing portfolio logic, presents land as a resilient safe-haven asset whose attractiveness rises with global savings gluts and structurally low interest rates (Hirano & Stiglitz, 2025); the post-2008 surge in African deals (GRAIN, 2021) and the projected growth of the agricultural-products market from \$13.39 trillion in 2023 toward \$19 trillion by 2027 (Business Research Company, 2023) are read as rational reallocation toward real assets. The opposing position holds that the entry of banks, pension funds and hedge funds, leveraging heavily, subordinates social and ecological imperatives to financial return and renders food systems more -not less -fragile (Clapp & Isakson, 2018). The disagreement is at once empirical and normative, turning on whether ‘resilience’ for investors is compatible with stability for food systems; the model captures it by treating financial pressure as latent until institutional conditions convert it into acquisition.

Geopolitical factors. The notion of “food power” (Blanc, 2020, 2022) is similarly debated. A realist reading treats farmland as a strategic asset conferring the four capacities formulated by Sur (1995) -“to do, to have done, to prevent from doing, and to refuse to do” -as illustrated by Russia’s

2014 embargo following the annexation of Crimea (Pouch, 2014) and by the supply shocks of the Russian-Ukrainian war. A more interdependence-oriented reading cautions that such ‘weaponization’ is frequently overstated and double-edged, since exporters depend on markets as much as importers depend on supplies (Abis, 2023). The tension between an offensive logic (projecting power through resources) and a defensive one (securing one’s own supplies) is, in our account, not a contradiction to be resolved but a duality that raises the geopolitical pressure term without, by itself, triggering acquisition.

Green-finance factors. Finally, the ‘green’ rationale for acquisition is sharply contested. Proponents frame carbon-offset markets and debt-for-nature swaps as instruments of conservation and climate finance; critics, under the banner of “green grabbing”, argue that they reproduce dispossession and North-South inequality behind an ecological discourse (Franco et al., 2013; Hamouchene, 2023). The case of Blue Carbon -securing rights over one million hectares of Liberian forest (about 10% of the country) before extending to some 25 million hectares across Africa under Article 6 of the Paris Agreement (Bonnerot, 2023) -and the spread of debt-for-nature swaps (Banque Africaine de Développement, 2022) are read by one side as climate action and by the other as territorial dispossession through debt and offsetting. This debate exemplifies the study’s broader claim: a propulsive pressure can be simultaneously legitimated and contested, and its translation into land grabbing depends on stimulating conditions rather than on the pressure’s normative framing.

Taken together, these five debates show that propulsive factors are neither self-evident nor independently sufficient: each is theoretically contested, and each generates only potential pressure. What converts contested pressure into realized acquisition is the configuration of stimulating conditions, to which we now turn.

2.3. Stimulating factors

While propulsive factors create pressure, stimulating factors are the activation conditions (SF) that transform latent pressure into concrete opportunities, operating on both the supply and the demand side. As with the propulsive side, they are presented here through their controversies rather than as a checklist, since each ‘enabling’ condition is itself the object of competing interpretations.

Institutional factors. The core debate opposes a new-institutionalist thesis -that extractive institutions and ill-defined property rights invite expropriation (North, 1992; Acemoglu & Robinson, 2012) -to a critical-agrarian thesis that foregrounds coercion and accumulation by dispossession (Harvey, 2004; Chauveau et al., 2020). Abundant available land -over 60% of fertile land unexploited in sub-Saharan Africa (FAO, 2017) -combined with weak or absent property rights opens land to investors, and acquisitions empirically concentrate where such land is plentiful and thin where it is scarce (Carter et al., 2017; Mazzocchi et al., 2018). A second, sharper controversy concerns customary tenure itself: one view treats communal rights as a vulnerability to be remedied through privatization (Dell’Angelo et al., 2017; Nolte & Vāth, 2015), while another insists that collective tenure is a legitimate, historically grounded and protective institution whose abolition is neither necessary nor sufficient for security (Anaya, 2011; Wily, 2011). What separates these readings is whether institutional weakness is a technical gap or a structural relation of power; the model encodes it as the supply-side stimulator SF_S, whose near-absence -strong, inclusive institutions -can, by the annihilation property, neutralize propulsive pressure.

Socio-economic factors. Institutional biases that facilitate access to land, particularly for foreign investors, are significantly reinforced by the structural dynamics of rapid population growth and accelerated urbanization. The expansion of the population, coupled with the gradual emergence of

an urban middle class, generates a sustained increase in demand for housing, urban infrastructure, and associated services. This rising demand operates as a powerful stimulating factor, channeling capital flows toward real estate markets in high-potential emerging economies.

Whether urbanization is a neutral demographic transition or an active mechanism of dispossession is itself disputed. The magnitude is not: Africa's cities grew from 3,300 to 7,600 since 1990, adding roughly 500 million urban residents (OECD, 2022) and widening agricultural-to-urban rent differentials. The critical reading treats this not as background but as a structuring mechanism that converts peri-urban farmland into real-estate assets; the more sanguine reading sees a diversification of land use, noting that food production still drives most investment (around 61%) relative to non-agricultural uses (Wily, 2011). The disagreement matters because it points to different policy levers.

Macro-financial factors. Beyond institutional and social structures, macro-financial constraints play a central role in stimulating land-grabbing dynamics. In particular, the burden of external debt prompts governments to mobilize their land resources as instruments of financial adjustment to obtain foreign currency for heavily indebted countries. The sale or lease of green resources becomes a way of generating cash flows that can be used to service debts contracted in foreign currency (Dembélé, 2015). This dynamic has a high ecological cost for countries in the Global South, which sacrifice their natural capital to repay their debt (Broschimmer, 2010). This logic gives rise to a form of impoverishing growth (Bhagwati, 1958), compromising intergenerational justice.

Let X be the total value of exports, D the stock of foreign currency-denominated external debt, and c the coefficient representing the share of annual exports used to service the debt. In highly export-oriented economies, repayment capacity is structurally dependent on the performance of the export sector (Chenery & Strout, 1966; Pattillo et al., 2002; Samsu et al., 2016; Oyadeyi et al., 2024), particularly in countries whose exports are mainly based on natural resources. The absence of repayment constraints (RC) can then be expressed by the relationship: $RC = c \cdot X - D = 0$. This approach highlights the close link between debt sustainability and ecological sustainability. Indeed, the pressure exerted on natural resources to service debt can have harmful environmental and social effects, compromising long-term development prospects.

In this context, the debate on debt cancellation for low-income countries takes on strategic significance. It goes beyond purely financial considerations to become part of a broader logic of climate justice and historical reparation, particularly for countries whose debt is considered odious, resulting from an illegitimate transfer of colonial debts at the time of independence. This perspective calls for a rethinking of international debt management mechanisms in light of ecological and historical inequalities, and for the issue of debt to be included in global agendas for just transition, economic sovereignty, and sustainability.

The transfer of land resources has even been stimulated by the premature opening up of sensitive sectors imposed by debt conditions. Thus, external debt is a means of prescribing a neoliberal agenda focused on the liberalization of agriculture, the promotion of extroverted development models, the commodification of land, price liberalization, the encouragement of fiscal and social dumping as a lever of attractiveness, and the decline of subsistence agriculture. Through its conditionalities, debt has thus become a tool for dismantling borders, promoting access to the green resources of developing countries to the detriment of their local populations. Structural adjustment plans have sought to promote financial sustainability (which benefits creditors) and undermine social and ecological sustainability.

Public debt is not limited to a simple transfer of land resources to the private sector; it involves all aspects of development dynamics. In countries where debt is a structural burden, the levers of local development are gradually delegated to private actors, often as part of investment incentive policies formulated in an advantageous manner. These measures, although geared towards economic growth, frequently clash with fundamental human rights principles, particularly the right to food. Thus, the weight of public debt has an inverse relationship with food security, insofar as it directs development choices according to the interests of private investors, to the detriment of the socio-economic needs of local populations (Schutter, 2024). In this context, the private sector becomes the privileged, and sometimes forced, partner of indebted states, whose room for maneuver is considerably reduced. The pursuit of profit that drives these actors leads to the intensification of export crops, the overexploitation of land and water resources, ecological degradation, and the premature opening of markets, often in flagrant contradiction with the objectives of food sovereignty.

The policies advocated by international financial institutions, such as the International Monetary Fund (IMF) recommendations promoting raw material exports and the liberalization of strategic sectors, have reinforced the cycle of debt without generating real repayment capacity. Structural adjustment programs have prioritized financial sustainability, primarily for the benefit of creditors, at the expense of social and ecological balance. In this context, the sale or concession of agricultural land is an alternative mechanism for debt reduction, particularly in the case of foreign currency-denominated debt. The reduction in usable agricultural area per capita (ha/capita) then becomes an indicator correlated with the reduction in debt per capita (D/capita), at the cost of impoverishing national productive resources.

Neoliberal and financial stimulators. Within a globalized economic context, the expansion of large-scale land acquisitions is increasingly shaped by neoliberal institutional frameworks, financial innovations, and trade liberalization policies, which collectively act as powerful stimulators of agricultural land grabbing. The instruments that de-risk agricultural investment are double-edged. Agricultural insurance and derivatives are defended as efficient risk-allocation devices that attract productive investors (Folus et al., 2020; Capelle-Blancard, 2009) and criticized as enablers of speculation; trade liberalization and value-chain fragmentation are read both as sources of resilience -the rapid recovery of agro-food chains after COVID-19 (Chatellier et al., 2022; FAO, 2021) -and as vectors of vulnerability and dependence (Mazzocchi et al., 2018; Burnod, 2023). Subsidies crystallize the contradiction: the Cotton-4 dispute (Benin, Burkina Faso, Mali, Chad) denounced developed-country support as distorted competition (Fok, 2006), yet the protest, voiced in the name of smallholders, often serves agribusiness and large landowners who would capture any reform (Vivas, 2010; Guematcha, 2011) -smallholders functioning as symbolic figures of an injustice whose principal beneficiaries lie elsewhere.

Socio-historical factors. Finally, from a more anthropological perspective, the neoliberal paradigm has profoundly transformed humanity's relationship with the land. Once a vehicle for identity, memory, and social ties, land is now perceived as an economic asset whose value is measured primarily in terms of profitability. Scholars dispute how far contemporary acquisitions are continuous with colonial orders. A continuity thesis stresses that institutional regimes inherited from colonization still confer privileged, low-cost access on former metropolitan actors -as in the persistent UK/US dominance of Ghanaian land deals (Anku et al., 2023; Home, 2021) -while a more agency-centred reading emphasizes the emergence of new actors (Gulf and Asian investors) that redraw the map of influence. Underlying both is the contested anthropological claim that

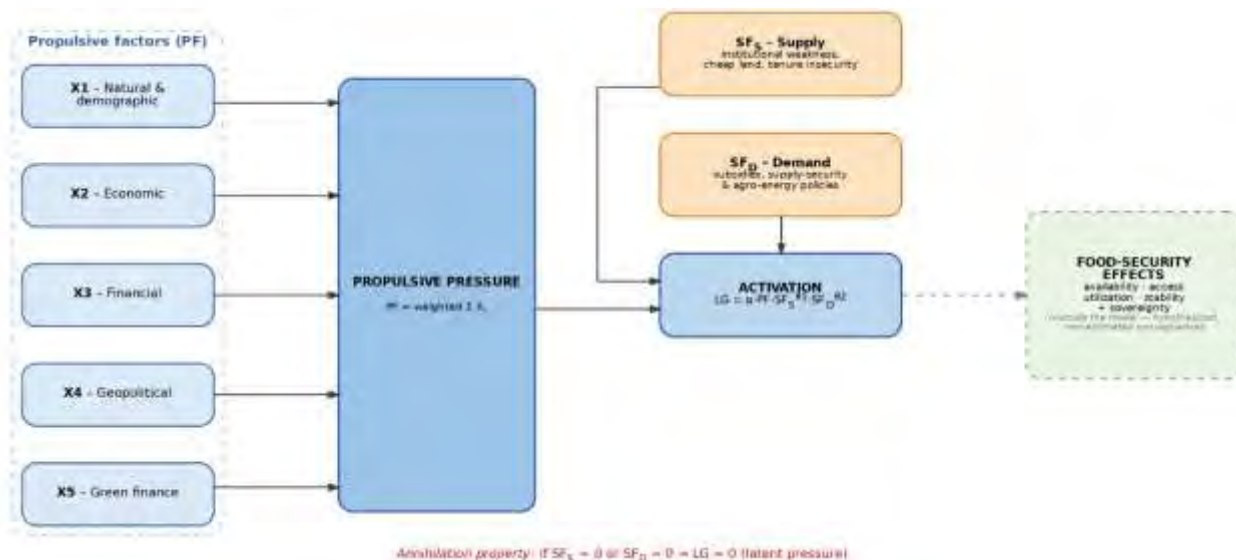
neoliberalism has commodified land, eroding cultural and emotional ties in favour of a utilitarian valuation (Ruellan, 2010).

These controversies reinforce the paper's central methodological point. Because both propulsive and stimulating factors are sites of unresolved debate, an additive model that simply sums 'drivers' cannot capture the phenomenon. The framework's contribution is to articulate the debates: contested pressures become realized acquisitions only through equally contested activation conditions, and the relation between the two is multiplicative rather than additive -the claim formalized in Section 4.

2.4. Land grabbing and food security: a disaggregated conceptualization

Because food security is the principal stake motivating this study rather than a variable of the model, the link between land grabbing and food security is conceptualized here as the analysis's downstream horizon, not as a modelled outcome. It is specified along the four canonical dimensions of food security, availability, access, utilization and stability (FAO), to which we add food sovereignty as a distinct, rights-based concept. Land grabbing primarily erodes availability (by diverting arable land from local food production) and access (by dispossessing customary users and raising local prices); it affects utilization indirectly through income and infrastructure effects, and undermines stability by exposing food systems to external shocks. Food sovereignty is conceptually distinct: it concerns the capacity for self-determination in agricultural policy, which financialization and exogenous incentives directly threaten. The interaction is moreover circular: food insecurity itself, by generating macroeconomic pressure, can lead governments to lease or sell land, feeding a vicious circle. Distinguishing these dimensions clarifies which effects the model is designed to explain and prevents conflating distinct mechanisms under a single label. Figure 1 synthesizes the proposed architecture, representing the relationships between categories of factors and the activation mechanism. The food-security effects are therefore depicted as hypothesized consequences lying outside the formalized model, not as estimated outputs.

Figure 1: Systemic conceptual model of farmland grabbing -from propulsive pressures to food-security effects through stimulating activation



Note: the food-security effects shown on the right denote hypothesized, non-estimated consequences that lie outside the formalized model, which explains only the determinants of land grabbing (LG).

Source: Authors

3. Materials and Methods

3.1. Research design

This study is explicitly designed as a formalized theoretical essay grounded in an integrative literature review (Snyder, 2019; Torracco, 2005; Whittemore & Knafl, 2005). We adopt this label deliberately, in place of the earlier and looser references to a “critical, systematic and systemic” approach, because the aim is not to produce an exhaustive systematic review in the PRISMA sense, nor an empirical estimation, but to synthesize a fragmented multidisciplinary literature and to recast it into an internally consistent, formalized conceptual model (Jaccard & Jacoby, 2010). The design proceeds in two ordered moments: an integrative review that identifies, compares and categorizes the determinants of land grabbing, followed by a conceptual formalization that specifies the functional relationships among those determinants and derives testable propositions.

3.2. Review protocol

To make the documentary basis transparent and replicable, the review followed an explicit protocol. Databases. Peer-reviewed sources were retrieved from Scopus, Web of Science, ScienceDirect and Cairn.info; institutional and grey literature from the repositories of the FAO, World Bank, IMF, Land Matrix Initiative, GRAIN and Oxfam. Search terms. Combinations of “land grab*”, “large-scale land acquisition(s)”, “farmland investment”, “land tenure”, “food security/sovereignty”, “land financialization” and “green grabbing”, in English and French. Period. 2000-2025, with seminal earlier works (e.g., Malthus, 1798; Boserup, 1965; North, 1992) retained for theoretical anchoring. Inclusion criteria. Studies addressing the determinants, mechanisms or food-security consequences of transnational farmland acquisition in low- and middle-income countries. Exclusion criteria. Purely local case studies without transferable analytical content, opinion pieces, and duplicates. Screening. Records were screened by title/abstract and then full text against relevance and quality criteria; institutional sources were appraised separately for authority and potential normative bias. The retained corpus comprises approximately ninety sources, whose contributions are integrated thematically rather than enumerated, consistent with the integrative-review method.

The central analytical contribution of the design is the distinction between Propulsive Factors (PF) and Stimulating Factors (SF), which represents an explicit departure from the additive approaches prevailing in the empirical literature (Arezki et al., 2015), where determinants are treated without differentiating latent structural conditions from effective activation conditions. The model introduces a conditional multiplicative logic, $LG = f(PF, SF)$, reflecting the structural reality that, absent permissive institutional conditions or demand-side incentives, no degree of geopolitical or financial pressure is sufficient to trigger actual acquisitions. This mechanism is formalized in Section 4 through a Cobb-Douglas-type activation function whose log-linearization is proposed - but, as stated, not yet estimated - to enable future empirical testing with internationally standardized indicators.

4. Theoretical Results: Conceptual Formalization of the Model

Because this study does not yet provide an empirical validation in the strict sense, the elements presented below are deliberately termed theoretical results, or conceptual propositions, rather than empirical findings; the terminology is adjusted throughout to avoid any scientific over-promise. Land grabbing (LG) is modelled as a dependent construct resulting from the interaction between

propulsive factors (PF) and stimulating factors (SF): $LG = f(PF, SF)$. LG denotes the stock of appropriated land capital per capita (hectares appropriated / local population).

4.1. The activation function and its functional-form justification

Propulsive factors are represented by a vector $PF = (X_1, X_2, X_3, X_4, X_5)$: X_1 natural-demographic, X_2 economic, X_3 financial, X_4 geopolitical and X_5 green-finance pressures. Stimulating factors are $SF = (SF_S, SF_D)$, distinguishing supply-side conditions (institutional weakness, abundant cheap land, tenure insecurity) from demand-side incentives (foreign subsidies, supply-security and agro-energy policies). The activation function is:

$$LG = \alpha \cdot X_1^{\beta_1} \cdot X_2^{\beta_2} \cdot X_3^{\beta_3} \cdot X_4^{\beta_4} \cdot X_5^{\beta_5} \cdot SF_S^{\theta_1} \cdot SF_D^{\theta_2}$$

An earlier draft alternated between an additive aggregate of propulsive terms and a fully multiplicative form; the formulation is harmonized here as the fully multiplicative Cobb-Douglas specification above, which is the form actually used. The choice of a Cobb-Douglas functional form is theoretically motivated rather than conventional (Cobb & Douglas, 1928). First, multiplicativity encodes the core theoretical claim that propulsive and stimulating factors are complements, not substitutes: each must be strictly positive for an acquisition to occur, which an additive form cannot represent. Second, the constant-elasticity property gives the exponents a direct, interpretable meaning - β_i and θ_j are the elasticities of land grabbing with respect to each pressure and each activation condition -so that the model speaks the language of applied economics. Third, weak separability between the propulsive block and the two stimulating blocks reflects the hypothesis that supply-side and demand-side conditions activate pressures through distinct channels. These assumptions (positivity, constant elasticity, separability) are stated as explicit, falsifiable hypotheses, not as established facts.

Log-linearization transforms the product into a sum that is linear in the parameters:

$$\ln(LG) = \ln(\alpha) + \beta_1 \ln(X_1) + \beta_2 \ln(X_2) + \beta_3 \ln(X_3) + \beta_4 \ln(X_4) + \beta_5 \ln(X_5) + \theta_1 \ln(SF_S) + \theta_2 \ln(SF_D)$$

This linear-in-logs form would, in principle, allow estimation by multiple linear regression on panel data, yielding directly interpretable elasticities ($\beta_i = \partial \ln LG / \partial \ln X_i$). We stress, however, that this is a proposed estimation strategy: no estimation is performed in the present paper.

4.2. The status of the variables

To remove an ambiguity flagged in earlier formulations, we specify the measurement status of each term. The five propulsive families and the two stimulating dimensions are not directly observable variables but latent theoretical constructs. In the proposed operationalization they are represented by composite indices: each X_i is a normalized aggregate of two or more standardized indicators, while SF_S and SF_D are multidimensional constructs to be summarized by the first principal component of a set of governance, tenure and policy indicators. LG is the only directly observable variable. This construct-level reading is essential to interpreting the elasticities correctly and to designing any future estimation.

4.3. The annihilation property

The most distinctive property of the model is stated formally as a numbered proposition.

Proposition 1 (Annihilation). In the multiplicative activation function above, with $\beta_i, \theta_j > 0$, the absence of either stimulating dimension nullifies land grabbing irrespective of propulsive pressure: if $SF_S = 0$ or $SF_D = 0$, then $LG = 0$ for any $PF > 0$. Equivalently, $\lim(SF \rightarrow 0) LG = 0$, so propulsive pressures remain latent -potential but unrealized -until activated by strictly positive stimulating conditions.

Proof and scope. The result follows directly from the multiplicative structure: any factor raised to a positive exponent that equals zero sets the whole product to zero. Its validity conditions are therefore (i) strict multiplicativity and (ii) positive elasticities; its analytical implication is that policy can neutralize land grabbing by acting on stimulating conditions (e.g., securing tenure, removing demand-side incentives) even when propulsive pressures cannot be reduced. The property is empirically meaningful only under the boundary convention that SF indices admit a genuine zero (total institutional closure or absence of incentives); near-zero rather than exact-zero values yield strong attenuation rather than annihilation, a nuance we treat as a testable corollary.

4.4. Operationalization of the model

Each construct is, in principle, translatable into measurable indicators drawn from internationally recognized databases. We present this mapping as a proposed operationalization (Table 2), adding for each construct the theoretically expected sign of its relationship with land grabbing, so that the table doubles as a set of testable hypotheses. The dependent variable LG is the ratio of concluded large-scale deals (ha) to rural population, using Land Matrix data on verified transactions exceeding 200 hectares (Anseeuw et al., 2012; Nolte & Vāth, 2015). Continuous variables would be log-transformed; SF_S and SF_D would be built as PCA composite scores, with min-max normalization as a transparent alternative.

Table 2: Proposed operationalization of model constructs and expected signs

Variable	Construct	Empirical proxy	Source	Exp. sign
LG	Land grabbing per capita	Concluded deals (ha) / rural population	Land Matrix	-
X ₁	Natural & demographic pressure	Falkenmark water-stress index + arable land per capita	FAO-AQUASTAT; WB WDI	+
X ₂	Economic factors	FAO Food Price Index + land-price differential (investor vs. host)	FAO; Eurostat; WB	+
X ₃	Financial factors	Global real interest rate + stock-market cap / world GDP	IMF IFS; WB	+/-
X ₄	Geopolitical factors	Fragile States Index + net food-import dependency	Fund for Peace; FAO	+
X ₅	Green-finance factors	Carbon credits (Art. 6 Paris) + debt-for-nature swap value	UNFCCC; Nature4Climate	+
SF_S	Supply-side stimulators	PCA: rule of law + CPI + land-rights index + land-conflict incidence	WB WGI; TI; Prindex; GLOCON	+
SF_D	Demand-side stimulators	PCA: agri. ODA + biofuel mandates + sovereign FDI share + institutional distance	OECD DAC; IEA; Land Matrix; WB WGI	+

Note: signs denote the theoretically expected direction of association, to be tested empirically.

Source: Authors

5. Discussion

5.1. How the factor categories are derived from the literature

Each propulsive family is derived from an identifiable body of work rather than asserted: X₁ from neo-Malthusian and Boserupian debates on scarcity and innovation (Nurkse, 1953; Boserup, 1965); X₂ from marginalist accounts of factor substitution and land-price arbitrage (Jones & Easton, 1983; Eurostat, 2023); X₃ from the financialization literature (Clapp & Isakson, 2018;

Hirano & Stiglitz, 2025); X_4 from geopolitics of food (Blanc, 2020); and X_5 from political ecology and green-grabbing scholarship (Franco et al., 2013; Hamouchene, 2023). The two stimulating dimensions are derived, respectively, from new institutional economics and accumulation-by-dispossession theory (North, 1992; Acemoglu & Robinson, 2012; Harvey, 2004) for SF_S, and from the political economy of trade liberalization and agricultural incentives (Burnod, 2023; Sorda et al., 2010) for SF_D. Making these derivations explicit closes the gap, noted in earlier versions, between the mobilized literature and the structure of the equation.

5.2. Confronting the model with empirical cases and competing frameworks

Although not estimated, the model can be confronted illustratively with documented cases and rival accounts. The contrast between high-intensity acquisitions in institutionally fragile, land-abundant economies (e.g., Ethiopia; Marzocchi & Arribas Cámara, 2024) and the relative scarcity of deals where available land is limited (Carter et al., 2017; Mazzocchi et al., 2018) is consistent with the annihilation logic: comparable propulsive pressure yields very different outcomes depending on SF_S. The Cambodian case of speculative Chinese investment (Loughlin & Milne, 2024) similarly illustrates the joint necessity of supply- and demand-side conditions. Relative to competing frameworks, the model retains Zoomers' (2010) breadth of drivers and Arezki et al.'s (2015) econometric ambition, but adds the conditional structure both lack; conversely, it is more parsimonious than governance-centred accounts (Margulis et al., 2013) at the cost of abstracting from actor-level politics -a trade-off we acknowledge.

5.3. Transferability and regional heterogeneity

The framework gives particular attention to the African context, which exhibits the highest intensity and fastest dynamics of land grabbing, but it does not confine the analysis to Africa. Its transferability rests on the fact that the propulsive-stimulating logic is parameter-dependent: regional, institutional and tenure heterogeneity among low- and middle-income countries is captured not by changing the model's structure but by allowing the elasticities (β_i , θ_j) and the composite indices to take context-specific values. South-East Asian, Latin American and sub-Saharan configurations would thus differ in the magnitude of θ_1 (institutional permissiveness) or θ_2 (demand incentives) rather than in the form of the mechanism. The conditions of transferability -comparable data availability and the existence of a genuine activation threshold -are stated as scope conditions for future comparative testing.

5.4. Differentiating institutional and policy levers

Institutional and political variables are the model's most decisive levers, and they are disaggregated here to avoid an over-inclusive category. Within SF_S we distinguish (i) regulatory dimensions (the clarity and enforcement of property and land-use law), (ii) administrative dimensions (cadastral capacity, registration, transparency of allocation), (iii) tenure dimensions (the balance between statutory and customary regimes), (iv) fiscal dimensions (land taxation, investment incentives, special economic zones) and (v) diplomatic dimensions (bilateral investment treaties and state-to-state land deals). This disaggregation matters analytically because different policy instruments act on different sub-dimensions, and empirically because they map onto distinct indicators in Table 2.

5.5. Policy implications

The implications below are presented as conditional hypotheses derived from the model, not as immediately generalizable prescriptions. First, because propulsive pressures are largely exogenous

and hard to influence, the hierarchical categorization suggests that the most actionable levers lie on the stimulating side: securing tenure and reducing demand-side incentives should, if Proposition 1 holds, attenuate acquisitions more effectively than attempts to suppress global pressures. Second, the systemic approach implies that sectoral land legislation that ignores macro-financial pressures or transnational investor motivations is likely to remain insufficient, so cross-sectoral coordination is required. Third, the disaggregated levers in Section 5.4 can inform monitoring indicators that anticipate, rather than merely record, food-security risks. Each implication is conditional on the model's assumptions and would require empirical confirmation before policy adoption.

6. Conclusion

This study set out to explore the polymorphous origins of arable-land grabbing and to recast a fragmented, multidisciplinary literature into an integrated conceptual model. Its central contribution is the analytical distinction between propulsive and stimulating factors and the formalization of their conditional, multiplicative interaction through a Cobb-Douglas-type activation function, from which the annihilation property (Proposition 1) is derived. We present this as a coherent and, in principle, testable theoretical architecture rather than as a demonstrated empirical superiority: the model's analytical advantages over additive approaches are argued and formalized, but they remain to be validated. Accordingly, the present framework explains the determinants of land grabbing; its consequences for food security are advanced as implications and as a priority avenue for future empirical validation, not as established results.

The framework devotes particular attention to the African context while claiming only conditional transferability to other low- and middle-income regions, as discussed in Section 5.3. Its value is twofold: theoretically, it articulates economic, institutional, geopolitical and environmental logics within a single structure; practically, it offers policymakers a structured way to identify the activation levers on which regulation can most plausibly act.

Several limitations must be stated frontally. First, the study is conceptual: it contains no empirical test, so its propositions remain hypotheses. Second, the proposed operationalization depends on secondary, internationally standardized data that are sometimes incomplete or unevenly comparable across countries. Third, aggregating heterogeneous determinants into five propulsive families and two stimulating dimensions entails a risk of conceptual over-aggregation that may mask within-category variation. Fourth, the constant-elasticity and separability assumptions of the Cobb-Douglas form, while analytically convenient, are simplifications that empirical work may need to relax. Finally, the framework abstracts from actor-level political dynamics that governance-centred approaches foreground.

These limitations open clear avenues for future research. Priority should go to empirical, comparative validation: log-linear panel estimation of the activation function across diverse territorial contexts; multi-country case studies testing the annihilation logic; and non-linear or threshold specifications testing the near-zero corollary of Proposition 1. Further work could differentiate effects by investor type and tenure regime, incorporate emerging variables such as climate transitions and technological change, and refine the composite indices through dedicated measurement work. Through such validation, the model could evolve from a conceptual proposal into an operational instrument for land-governance and food-security analysis in a world increasingly shaped by recurrent crises.

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