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The Concentrated Legal Geography of Chilean Rural Private Property: An Opportunity for the VGGT?

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Abstract

In this article, I investigate the trajectory and intensity of land concentration in Chile within a context marked by the effects of climate change in rural areas. In this regard, I offer an analytical perspective that considers this phenomenon as a geographic expression of the land tenure system, characterised by its individual, absolute, and exclusive vocation of private property. Secondly, to quantify its trajectory, I systematically organize the data gathered from Agricultural Censuses conducted between 1965 and 2021, revealing a significant presence of the phenomenon in both irrigated and non-irrigated lands located in regions with the highest agricultural potential. Based on this, I argue that the Voluntary Guidelines on the Responsible Governance of Tenure (VGGT) have the capacity to articulate a dialogue to reconsider the content and limits of the geography of rural property in Chile, in order to strengthen a tenure system capable of offering a coordinated and collaborative alternative to the effects of climate change in rural areas.

Keywords: Rural Property, Land Concentration, Climate Change, Legal Geography, VGGT.

La concentrada geografía legal de la propiedad privada rural en Chile: ¿una oportunidad para los VGGT?

Resumen

En este artículo investigo la trayectoria e intensidad de la concentración de la tierra en Chile en un contexto marcado por los efectos del cambio climático en las zonas rurales. En este sentido, ofrezco una perspectiva analítica que considera este fenómeno como una expresión geográfica del sistema de tenencia de la tierra, caracterizado por su vocación individual, absoluta y excluyente de la propiedad privada. En segundo lugar, para cuantificar su trayectoria, organizo sistemáticamente los datos recogidos en los Censos Agrarios realizados entre 1965 y 2021, revelando una presencia significativa del fenómeno tanto en las tierras de regadío como en las de secano situadas en las regiones con mayor potencial agrícola. A partir de lo anterior, argumento que las Directrices Voluntarias sobre la Gobernanza Responsable de la Tenencia (VGGT) tienen la capacidad de articular un diálogo para reconsiderar el contenido y los límites de la geografía legal de la propiedad rural en Chile, con el fin de fortalecer un sistema de tenencia capaz de ofrecer una alternativa coordinada y colaborativa a los efectos del cambio climático en las zonas rurales.

Palabras clave: propiedad rural, concentración de la tierra, cambio climático, geografía legal, VGGT.

Introduction

The concentration of land is a global phenomenon with profound implications for rural development, equity, and sustainability (FAO, 2014; Guereña, 2016; Ilc & Oxfam, 2020; IPES-Food, 2024; Soto Baquero & Gómez, 2013). In the case of Chile, a few evidence suggests that concentration has re-emerged as a dominant feature of the agricultural landscape (Echenique, 2013; Murray, 2006; Villavicencio-Pinto, 2020). However, it is evident that a more precise methodology is needed to measure it accurately and comprehend its intensity, as well as its potential effects or interactions with other rural phenomena.

Thus, this article proposes considering the legal geography of rural private property as a concept whose content emerges from the linkage between the property regime and its material expression. In this sense, land concentration would be the material expression of land tenure system based in the notion of individual, absolute and exclusive private property. This approach, built upon the contributions of Graham, Shoemaker, Page, Blomley, and Nedelsky, facilitates the study of property as a relational right, connecting people with an object—land in this case—and making the effects of this connection significant. Furthermore, it allows us to situate land concentration as a geographical projection of property law and institutions, thereby expanding the analytical framework (Babie, 2010b; Blomley, 2004, 2019; Graham, 2011; Nedelsky, 2022).

Addressing the rural landscape in this manner enables us to problematise a relationship different from those traditionally analysed. Accordingly, the FAO's Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests (VGGT) represent a legitimate consensus on the principles and policies related to land management, administration, and access that should be implemented by all rural actors collectively (FAO, 2012). Thus, this article highlights the relationship between the geography of Chilean rural property and the VGGT. I argue that due to the way private rural property is institutionalised in Chile, there is a contradiction with the type of principles and policies promoted by the VGGT. In this context, I point out that the effects of climate change in Chile's rural areas act as an empirical element that tends to force a reflection on reconfiguring the legal frameworks of property to align them with the VGGT.

The study gathers information on land distribution from the Chilean Agricultural Censuses between 1965 and 2021. It then implements a set of metrics on land tenure inequality, such as the Gini Coefficient, concentration ratios, and the proportion of land by plot size. Regarding controls, the study focuses on land exclusively used for food production, while the 2021 Census allows for differentiation between irrigated and non-irrigated land, given their importance for agricultural production. These adjustments aim to contribute to an accurate understanding of the intensity of the concentration process, as the literature on this subject in Latin America has advanced a global and comparative perspective but has not specified these conditions.

The article consists of six sections. The first reviews the literature related to new conceptual approaches to environmental changes, such as the trajectory of the current tenure regime in the country and the central issues concerning global land concentration. This section

also analyses the policies promoted by the VGGT concerning rural land distribution, as well as the effects of climate change in the country's rural areas. The second section addresses the analysis of the materials and methods used, the third presents the results, and the fourth and fifth sections present discussion and conclusions.

New conceptual approaches to new environmental challenges

The rural land amidst Climate Change

Land is a crucial resource for the food security and livelihoods of rural populations. Loss of land due to extreme weather events, such as floods and droughts, can have serious consequences for the food security and incomes of rural households (FAO, 2024). Climate change is significantly affecting rural areas through various mechanisms. The increase in temperatures, changes in precipitation patterns, and extreme weather events such as droughts and floods are impacting agricultural productivity and the availability of water resources (Hatfield et al., 2011; H, 2015; Kalfas et al., 2024). These climatic changes not only affect food production but can also trigger resource conflicts and forced migration, as evidenced in Karamoja, Uganda (Abrahams, 2021). Furthermore, the loss of land and displacement due to rising sea levels and environmental degradation threaten the cultural identity and security of rural communities, particularly in the Pacific islands (Shibata, 2022).

Land management policies play a crucial role in this scenario. Proper land use planning can help mitigate climate change by guiding the establishment of waste management systems that minimize methane emissions and influencing agricultural practices to reduce greenhouse gas emissions (Kalfas et al., 2024). Moreover, sustainable land management (SLM) can enhance the resilience of small farmers to the impacts of climate change, such as rising temperatures, decreasing precipitation, and extreme weather events (Critchley et al., 2023). Policies that promote land consolidation, access to resources, and training in SLM for farmers are essential to close yield gaps and improve agricultural productivity (Cholo et al., 2020). Additionally, effective water resource management is crucial for adapting to the impacts of climate change, such as changes in precipitation patterns, saltwater intrusion, and habitat loss (Kalfas et al., 2024).

ODEPA (Oficina de Estudios y Políticas Agrarias—Office of Agricultural Studies and Policies) states that smaller farms in the drylands of Chile's northern and central regions are the most vulnerable to such phenomena compared to irrigated farms, which have better economic and technological conditions to design and implement productive strategies suited to new scenarios (ODEPA, 2023). Torres et al. note that neoliberal globalisation has driven urbanisation and conversion of agricultural spaces into forest plantations, favouring agro-industrial corporations and causing land concentration, undermining the agrarian workforce, and causing significant ecological damage (Torres et al., 2015). In addition, Melo and Foster examine projected climate conditions for 2040 and 2070, predicting a decline in agrarian employment and income losses in agriculture and forestry, especially under severe climate change scenarios, with risks of salinisation and desertification in northern and central Chile (Melo & Foster, 2021). Both

studies emphasise the critical need to assess rural vulnerability related to land tenure dynamics and climate change when formulating Chile's land use and rural labour policies.

In this context, the 2022 Climate Change and Land report from the Intergovernmental Panel on Climate Change (IPCC) underscores the importance of land in developing resilience, adaptation, and mitigation strategies. The report shows that expanding agricultural and forestry areas for commercial production contributes to higher net greenhouse gas emissions, accelerating native ecosystem loss and reducing biodiversity (Intergovernmental Panel On Climate Change, 2022). Climate change exacerbates these adverse effects, degrading soils, especially in vulnerable areas such as coastal lowlands, river deltas, and arid regions. The projected models highlight the urgency of land-based mitigation efforts to contain global warming, including reforestation, afforestation, efforts to curb deforestation, and the adoption of bioenergy.

The nexus between climate change and land use is bidirectional and complex; land use changes can influence climate patterns, while climate shifts can impact land use trajectories. In Chile, predictive models suggest substantial changes in the agricultural sector that will significantly redefine land use patterns. These changes are expected to impact the type, quality, and quantity of the country's agricultural produce. Altered precipitation patterns and extended drought periods will intensify competition for already in-demand land (FAO, 2024; Intergovernmental Panel On Climate Change, 2022). Torres observes that neoliberal policies have catalysed the proliferation of monocultures, particularly in the forestry sector, potentially inflating land values, a trend statistically reinforced by González and Velasco (González U & Velasco H, 2008; Torres et al., 2015).

The persistence of Memory: Land Concentration

Land concentration is a global process, generally conducted within the bounds of legality, resulting in the increasing accumulation of land by a decreasing number of enterprises or individuals (Guereña, 2016; Ilc & Oxfam, 2020; IPES-Food, 2024). In the context of this article, we refer to a process executed within institutional frameworks, primarily driven by land market operations. These conditions differentiate it from what is internationally known as Land Grabbing, characterised by informal and often illegal practices aimed at controlling large land areas, leading to higher concentration levels but under different conditions than those analysed in this study (Borras et al., 2012; Borras & Franco, 2013, 2024). Regarding ownership restrictions powers, regulatory frameworks on rural property closely link to concentration levels; higher controls or restrictions typically correlate with lower concentration degrees (Shields, 2022).

A range of international organisations has highlighted global land inequality trends. Their findings indicate that such processes are influenced by rural land deregulation (IPES-Food, 2024), with large corporations increasingly acquiring more land while small farmers face more significant access challenges (Ilc & Oxfam, 2020). Moreover, Latin America has the highest rural land concentration globally (Bauluz et al., 2020; Guereña, 2016). While these studies are valuable for presenting a global perspective on trends, they need a detailed examination of tenure frameworks and the role of private property regulation in this phenomenon.

For instance, post-socialist land privatisation and redistribution in Hungary resulted in a dispersed ownership structure, with land use concentrated in large corporate farms (Burger, 2001). In France, the structure of SAFER plays a crucial role in containing concentration levels through its land market role (Piet et al., 2012). In Romania, foreign and national investments have significantly increased land concentration, excluding small farmers and negatively affecting sustainability and social equity (Burja et al., 2020). Similarly, in Estonia, agricultural land concentration has led to unequal rural development and the exclusion of small farmers due to agrarian reforms and market policy (Rasva & Jürgenson, 2022). These studies illustrate how economic and legal dynamics influence land concentration, with significant implications for equity, sustainability, and rural development (Galor & Moav, 2009; Glass et al., n.d.; Shields, 2022).

In terms of effects, authors have identified the exclusion, marginalisation, and displacement of small farmers from rural areas, resulting in socio-economic inequality (Burja et al., 2020; Rasva & Jürgenson, 2022). Economically, Roberts and Key argue that it increases dependency on government subsidies and facilitates speculation, raising land prices and making access difficult for new producers (Roberts & Key, 2008). Environmentally, Lambin and Meyfroidt (2011) note that expanding large operations is associated with biodiversity loss due to the prioritisation of intensive production over sustainable practices or biofuel generation, leading to the conversion of natural ecosystems and raising concerns about environmental services. Positive effects include access to economies of scale and benefits from reduced production costs, enhanced access to capital and technology, increased agricultural productivity, innovation, infrastructure, services, and employment.

Chile's Agrarian Reform (1962-1973) represents one of Latin America's most comprehensive attempts at redistributive land policy. Initiated under President Jorge Alessandri's conservative government (1958-1964) with Law 15.020 in 1962, the reform gained momentum under Eduardo Frei Montalva's Christian Democrat administration (1964-1970) through Law 16.640 in 1967, and reached its most radical expression during Salvador Allende's socialist government (1970-1973). The reform's primary objectives encompassed redistributing land from large estates to peasant families, modernising agricultural production, incorporating marginalised rural populations into the national economy, and addressing the structural inefficiencies attributed to the traditional hacienda system (Ley de Reforma Agraria, 1967). By 1973, the reform had expropriated approximately 10 million hectares, fundamentally altering Chile's rural property structure before its abrupt reversal following the military coup (González et al., 2017; Villela, 2019).

This issue was extensively debated in Chile during the Agrarian Reform of 1967. Previous researchers had highlighted the land distribution in the country and the consolidation of what they termed the "latifundio" model. However, as contemporary scholarship recognises, this term requires careful qualification. The Chilean latifundio was not merely defined by size but by a confluence of characteristics: extensive landholdings combined with systematic underutilisation of productive capacity, labour relations based on *inquilinaje* (a quasi-feudal tenant system), minimal capital investment, and the maintenance of social hierarchies that perpetuated rural

marginalisation (Barraclough, 1973). These estates exhibited what Bengoa (2013) later described as 'productive irrationality'—vast extensions of potentially productive land deliberately kept idle or devoted to extensive cattle grazing whilst rural labourers lacked access to sufficient land for subsistence. For example, in 1965, plots smaller than 5 hectares of basic irrigation controlled 9.7% of the land, while those larger than 80 hectares owned more than 55% (Kay, 1981).

Consistent with the theoretical conceptualisation, the land concentration process in Chile was also legal, at least concerning the central-southern rural area. It utilised the law and institutions to function. The Agrarian Reform transformed the property structure by conceptually modifying private rural property (Villela, 2019). It altered the historical role of private, individual, absolute, and exclusive property, advancing towards a conception limited by its social function and facilitating access for small farmers or former agricultural workers (Moreno, 2014). This new legal framework resulted in expropriating properties of over 80 hectares of basic irrigation, approximately 10 million hectares, equivalent to 50% of the country's productive land (Bellisario, 2013; Bengoa, 2013; Kay, 1975; Silva, 1987; Valdés & Foster, 2015). Other measures included prohibiting legal entities from holding property rights and imposing restrictions on managing expropriated lands to safeguard their use for family farming (Ley de Reforma Agraria, 1967).

The agrarian transformation process initiated by the Agrarian Reform ended in September 1973 with the military coup led by Augusto Pinochet and aligned civilians. Between 1973 and 1989, the new regime partially reversed the reform process, distributing expropriated land among the armed forces, returning a portion to former owners, and titling a portion to individual entrepreneurs (Villela, 1979, 2019). The Agrarian Reform Law was repealed, ending property restrictions and reviving the rural land market. In 1980, Cristóbal Kay noted, "A new agrarian structure is emerging from the counter-reform and the process of capitalist socioeconomic differentiation. However, the latifundio has not yet been reconstituted. By 1980, estates above 80 H.I.B. probably owned no more than a tenth of the land they did in 1965, i.e., 5.6% instead of 55.3%, respectively. However, this group of productive units may grow again due to the removal of legal barriers on the land market, leading to new land concentration" (Kay, 1980, p. 18). As I will demonstrate in the following sections, this finally happened in the country.

Two policies implemented by the dictatorship directly benefited large-scale operations: Decree 701 and the Irrigation Law. Both aimed to facilitate extensive monocultures and agro-export, sectors dominated by larger farms (Gomez & Echenique, 1991; Silva, 1987; Villela, 2019). This new model dominates the land tenure structure in Chile to this day, characterised by private, individual, absolute, and exclusive property (Cordero Quinzacara & Aldunate Lizana, 2008; Novoa, 1982, 1989), with minimal state involvement in coordination, management, control, administration, and rural planning. This model, whose institutional framework supports and operates it, has been a fundamental pillar of tenure security and legal certainty, facilitating capital inclusion and driving innovation and economic development in the sector (de Soto, 2002; Soto, 2001).

Two policies implemented by the dictatorship directly benefited large-scale operations: Decree Law 701 and the Irrigation Law. Decree Law 701 (1974) provided substantial subsidies

covering up to 75% of afforestation costs and exempted forest plantations from land taxes, primarily benefiting large forestry corporations with the capital to invest in extensive monocultures. The Irrigation Law (Law 18,450 of 1985) established state subsidies for private irrigation infrastructure, with larger farms capturing the majority of these resources due to their greater technical and financial capacity to formulate competitive projects (Gomez & Echenique, 1991; Silva, 1987; Villela, 2019). This new model dominates the land tenure structure in Chile to this day, characterised by private, individual, absolute, and exclusive property (Cordero Quinzacara & Aldunate Lizana, 2008; Novoa, 1982, 1989), with minimal state involvement in coordination, management, control, administration, and rural planning.

Over recent decades, the study of land concentration in Chile has served more as a contextual background than a central aspect. The works of Kay (1996) and Gwynne and Kay (1997) criticise the effects of land market liberalisation policies and their impact on the agrarian structure, favouring large landowners and exporters and increasing rural inequality. From a property theory perspective, Butler argues that neoliberalism has promoted a property vision centred on maximising efficiency and individual welfare, often at the expense of community and environmental interest (Butler, 2022). This approach has encouraged intensive resource exploitation and wealth concentration, highlighting the need to rethink the property system to include broader considerations addressing property decisions' social and ecological impacts.

Murray used the 1997 Agricultural Census to contextualise his study, noting that 2.9% of larger farms controlled 30% of productive land, contrasting with family farmers, who made up 84% of farms but owned only 18% of farms (Murray, 2006). Echenique's works illustrate the concentration dimension in the country using the 2007 Agricultural Census. He notes that 25,000 farms over 12 hectares of essential irrigation accumulate 80% of irrigated land, while 242,000 farms under 12 hectares control 20% of irrigated agricultural land (Echenique, 2013). There is no empirical historical evidence to understand the evolution of concentration or to calculate inequality metrics confirming or dismissing its presence in contemporary times, nor calculations of the territorial intensity of this phenomenon.

The substantive legal landscape of Chilean rural property remains essentially unchanged today. While specific restrictions related to native forest management (*Ley Sobre Recuperación Del Bosque Nativo y Fomento Forestal*, 2008) exist, structurally, there are no changes. There are no limits on the amount of land an enterprise or individual can acquire, no sanctions for unproductive land use, land fragmentation into plots as small as 0.5 hectares is permitted, and rural zoning is declarative and does not substantively alter property exercise.

From Butler we can summarise the current role of Chilean property. For her, it is a complex system integrating diverse elements such as people and ecosystems. It aligns with Nedelsky's relational proposal, which sees property as a critical legal structure of power and inequality relationships (Butler, 2022). Thus, the Chilean rural private property regime is based on the individual notion, marked by social interactions. Graham argues that this phenomenon can be understood as the dephysicalisation of property, where the material object's value, role, and effects—land in this case—are almost entirely diffused (Graham, 2012, 2020). Consequently,

private rural land tenure becomes a documentary issue between people, detached from the socio-demographic outcomes that extreme land concentration might entail.

These authors also highlight a second effect generated by the liberal property model. Babie argues that the landowner's power is expressed as almost impregnable individual sovereignty, posing a challenge when constructing collaborative strategies for using and managing property in the context of climate change (Babie, 2010a). There is an emerging but robust literature on tenure systems' role in facilitating adaptation or resilience strategies to the effects of the climate crisis (Leal Filho et al., 2022). Specifically concerning property, Kalfas emphasises the importance of spatial planning (Kalfas et al., 2024), while Critchley underscores that sustainable land management plays a crucial role in soil and water conservation. However, the question of the role of rural private property in the face of climate change still seems to be inadequately addressed with the same intensity (Critchley et al., 2023).

What are the VGGT in this Scenario?

The VGGT specifically address land and property issues. They state that countries should take measures to prevent the effects of land concentration on rural communities. Regarding property, they emphasise that no tenure right, including private property, is absolute and that all tenure rights are limited by the rights of others and state measures for the common good. Such measures should be determined by law solely to promote general welfare, especially environmental protection, under states' human rights obligations.

In the Chilean context, the application of the VGGT presents particular challenges and opportunities. Chile's constitutional framework strongly protects private property rights, making direct interventions in land markets politically and legally complex. However, the VGGT's emphasis on voluntary compliance and multi-stakeholder governance aligns with Chile's market-oriented approach, suggesting that implementation could proceed through incentive-based mechanisms, transparency initiatives, and collaborative agreements rather than regulatory impositions. The guidelines' focus on climate change adaptation and sustainable land management resonates particularly strongly given Chile's vulnerability to desertification, water scarcity, and extreme weather events, providing a compelling rationale for reconsidering traditional property arrangements without necessarily challenging their fundamental legal basis.

The history of the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests (VGGT) dates back to 2006 when the final declaration of the International Conference on Agrarian Reform and Rural Development (ICARRD) highlighted the importance of secure and sustainable access to land, water, and other natural resources (Seufert, 2013). In 2009, the FAO initiated an inclusive and participatory process to develop the VGGT, involving governments, civil society organisations, multilateral institutions, and the private sector. The final negotiations took place in the Committee on World Food Security (CFS) and included active participation from social movements. The legitimacy of the VGGT stems from this broad consultative process and its final adoption by the CFS in 2012 (Seufert, 2013). Although voluntary, the VGGT reference is binding international human rights obligations related to land and natural resources. Moreover, the inclusive and participatory negotiation process, based on

the principle of one country, one vote, and institutionalised civil society participation, makes the VGGT "one of the most democratic global decision-making frameworks".

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Regarding their relationship with specific policies, Tramel argues that the VGGT provide a unique opportunity to place land tenure and natural resources under the prescriptions of international human rights law rather than allowing tenure to be subsumed by a narrow understanding of property rights based on civil and commercial law (Tramel, 2019). Meanwhile, Jansen (2015) and Jansen & Kalas (2020) highlight the gaps in monitoring VGGT compliance and the difficulties these guidelines face in domestic regimes due to their voluntary nature and the weight of rural traditions, which often limit women's access to land (Sobrino-García, 2023). From a strategic perspective, Kramer suggests that linking the implementation of the VGGT to the human rights obligations of states can strengthen efforts towards responsible land governance reforms and help hold governments accountable for their commitments.

In terms of policies and precise alignment with the property principles mentioned, the VGGT values the possibility of establishing limits on land transactions, regulating procedures for authorising large-scale transactions, and setting limits on land within redistributive reforms, mainly where high property concentration combines with significant rural poverty due to lack of land access, respecting the rights of all legitimate tenure rights holders.

Materials and Methods

For the historical analysis of land concentration, this study primarily draws on secondary sources and aggregated data from different agricultural censuses and earlier scholarly works (Bellisario, 2013; Jefferies, 1971, p. 197; Kay, 1977, 1980, 1981; Villela, 2019). The information available for years such as 1965, 1975, and 1997 generally comes from published tables reporting land size ranges, each employing distinct methodologies that hinder the construction of a consistent micro-level comparative series. Moreover, these census editions often do not consistently distinguish agricultural land from forestry land, nor do they apply uniform land-use categories over time. Consequently, the historical overview focuses on describing broad trends in land tenure and on incorporating previously consolidated quantitative findings, rather than recalculating each year's metrics anew. By contrast, the contemporary empirical section relies on the more granular data available in the 2021 Agricultural Census, enabling precise calculations on land use, property distribution, and irrigation status. This dual approach preserves methodological coherence by contextualizing the historical trajectory of land concentration while offering a detailed, up-to-date analysis of current conditions.

The 2021 Agricultural Census provided an opportunity for more precise analyses of rural property concentration at the territorial level, offering access to disaggregated data. This allowed for a more precise selection of the productive use of the lands under study and the regions included in the analysis. Initially, irrigated land was differentiated from rainfed land due to the impact of water access on agricultural products (Echenique, 2013). Only land used for cereals, legumes, industrial crops, vegetables, fruits, vines, flowers, seedbeds, nurseries, forage crops, and improved pastures was included. To place the analysis more precisely in the rural context, the regions of Valparaíso, O'Higgins, Maule, Ñuble, Biobío, and Metropolitana, which contribute more than 60% of the country's agricultural GDP (ODEPA, 2019), were selected.

The analysis of agricultural land concentration predominantly relies on metrics such as the Gini coefficient (Bauluz et al., 2020; Cipollina et al., 2018; Popovici et al., 2018; Vollrath, 2006, 2021) and concentration ratios (Palšová et al., 2021; Plogmann et al., 2022; Rasva & Jürgenson, 2022). Additionally, land share analysis by farm size (Berkbek & Neuvelon, 2020) and simultaneous equation models are employed to explore the relationship between land concentration and income distribution. The data in these studies typically come from administrative records and agricultural censuses, such as the Integrated Administration and Control System (IACS) data in Germany (Plogmann et al., 2022), Agreste and Eurostat data in France, and FAO agricultural censuses (Bauluz et al., 2020; Vollrath, 2006). Surveys and local interviews also provide qualitative and contextual information, as seen in studies conducted in Slovakia (Palšová et al., 2021) and Estonia (Rasva & Jürgenson, 2022). These data sources enable a detailed and multifaceted analysis of agricultural land distribution and concentration at both regional and global levels.

While the Gini coefficient is a widely accepted and easily interpretable measure of inequality, it has limitations, such as its inability to capture different distribution forms or multiple dimensions of land inequality, like soil quality or corporate land ownership (Vargas & Luiselli, 2020). Other approaches, such as analysing the proportion of land in different farm size categories (Bauluz et al., 2020; Berbek & Neuvelon, 2020) or comparing the land ownership of the top 1% with the bottom 99%, can complement the Gini coefficient by providing a more nuanced picture of where land ownership is concentrated and how its distribution is changing. However, these methods also have limitations, such as the dependence on arbitrary size categories or the inability to capture inequality within specific distribution segments. Thus, the complementarity of methods is crucial in understanding the extent and intensity of the phenomenon.

Results

Historical Evolution of Land Concentration in Chile

Chile's long-standing pattern of rural land concentration can be traced back at least to the early twentieth century. Observers confirmed that Chile ranked among the most unequal countries worldwide in terms of landholding: toward the early 1960s, a small elite of roughly 81,700 individuals commanded around 65.6% of agricultural income, whereas over half a million rural

workers and smallholders shared the remaining 34% (Jefferies, 1970). At the core of this inequality stood the latifundio system. According to Kay (1977), 2% of landed proprietors owned more than half of Chile's farmland, while 80% of peasant proprietors collectively held less than 10%. This skewed configuration, combined with widespread underutilization of land—over half left permanently in natural pasture and over 10% left fallow—highlighted systemic inefficiencies. The Agrarian Reform (1967–1973) attempted to rectify this imbalance by expropriating large estates, effectively reducing the share of properties above 80 hectares of basic irrigation (HRB) from 55% in 1965 to merely 5.6% by 1980 (Kay, 1980). Nevertheless, Kay predicted a potential re-concentration once legal barriers on the land market were lifted, a scenario that began to unfold during the military regime (1973–1990), which reversed many reform measures and reinstated the primacy of private ownership (Villela, 2019).

The evolution of Chile's agrarian structure from 1976 onward can be partly ascertained from agricultural census data (INE, 2007). In 1976, around 305,000 farms spanned 28.4 million hectares. By 1997, the number of farms had risen slightly to 312,000, though total area declined to 26.4 million hectares, reflecting an intermediate phase of subdivision and moderate de-concentration. However, between 1997 and 2007, a contrasting pattern emerged: the number of farms dropped to 278,000 (an 11% decline), while total area expanded to 29.7 million hectares—beyond the 1976 level—revealing renewed consolidation in fewer hands (INE, 2007).

When disaggregated by land size, the overwhelming majority of farms (over 70% in each census) measured under 20 hectares yet controlled less than 5% of total agricultural land. Conversely, large estates exceeding 500 hectares—constituting only 1–2% of farms—accounted for over 70% of the country's farmland, approaching 80% by 2007. The Gini coefficient of land distribution, estimated at approximately 0.92 in 1976, dipped slightly to 0.90 in 1997, then climbed back to 0.93 in 2007, indicating a return to extreme inequality (INE, 2007).

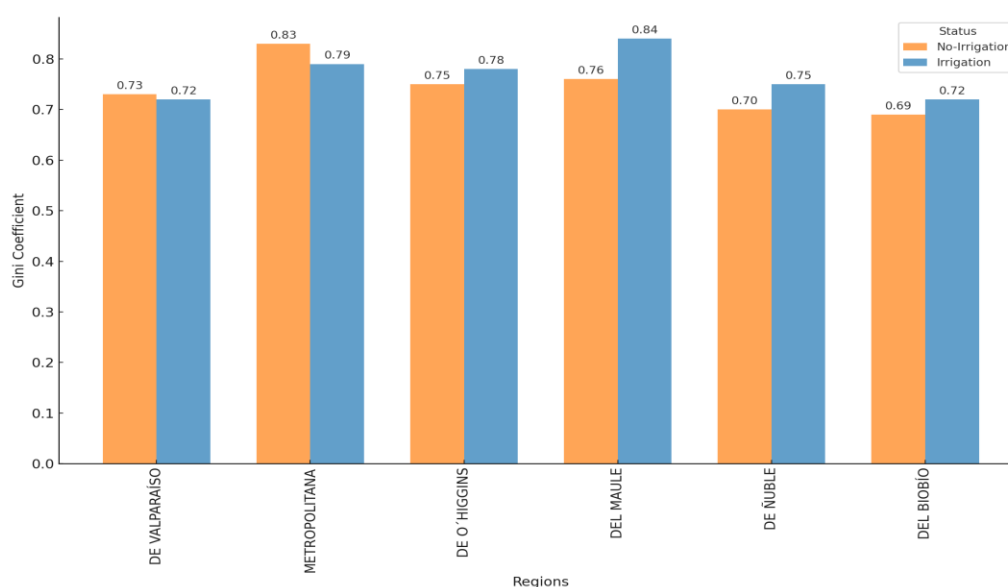
Overall, these data confirm that Chile's historical legacies of latifundia persisted throughout the late twentieth century and into the twenty-first. While the Agrarian Reform initially disrupted large estates, subsequent policies favored market-led transactions and the privatization of expropriated lands, enabling renewed concentration. Overall, these data confirm that Chile's historical legacies of latifundia persisted throughout the late twentieth century and into the twenty-first. While the Agrarian Reform initially disrupted large estates, subsequent policies—including the auctioning of expropriated lands to private bidders, the elimination of restrictions on corporate land ownership, and subsidies for export-oriented agriculture through programmes like Decree Law 701 (forestry) and Law 18,450 (irrigation)—favoured market-led transactions and the privatisation of expropriated lands, enabling renewed concentration. The structural shifts observed between censuses underscore how even moderate breaks in Chile's latifundista trajectory were insufficient to prevent further consolidation. By the mid-2000s, the hierarchical distribution of land—few large properties alongside numerous minifundia—remained firmly entrenched, setting the stage for current debates on rural development, climate adaptation, and responsible land governance.

Current Conditions and Characteristics of Land Concentration in Chile

According to the ODEPA study, the 2021 Agricultural and Forestry Census (2021) reveals an overall land distribution in Chile that is highly skewed in favor of a small fraction of large producers (Mejías, 2025). Of the nearly 175,600 agricultural and forestry holdings nationwide, more than 88% of the total surface is concentrated among just 0.45% of these units, resulting in a Gini coefficient of 0.979—indicating marked inequality by global standards. This extreme concentration becomes especially evident in non-agricultural uses, such as native forest and shrubland, where the top 1% of holdings captures over 90% of the respective areas. In contrast, production categories like industrial crops and cut flowers exhibit somewhat more equitable distributions. Regionally, the country's northern macrozones show the highest Gini values (close to 1.0), suggesting near-total land control by a handful of large estates in desert or semi-desert environments, whereas the central-southern regions post comparatively lower, though still high, indices. Overall, these results confirm that much of Chile's silvoagropecuaria land remains in the hands of a few, raising concerns about the social and economic implications of such pronounced territorial inequality.

While the ODEPA data highlight the magnitude of land concentration at a national scale, the present analysis adopts a narrower regional and land-use focus to capture more specific dynamics. Figure 1 show how the highly productive agricultural areas—Valparaíso, Metropolitana, O'Higgins, Maule, Ñuble, and Biobío—and distinguishing irrigated from non-irrigated farmland, this study refines the assessment of land distribution. In doing so, it excludes purely forestry or non-productive tracts that could inflate aggregate indicators, thus offering a more targeted view of the factors driving concentration in Chile's principal farming regions.

Figure 1. Gini Coefficient of Land Concentration in Selected Chilean Regions



Source: Author's calculations based on Agricultural Censuses 2021.

The regions of Valparaíso, Metropolitana, O'Higgins, Maule, Ñuble, and Biobío have been chosen as the geographical scope of this investigation to concentrate the analysis on rural territories that are pivotal for agricultural and forestry production. Following OECD parameters, these regions encompass a rural population totalling 1,443,473 inhabitants, which constitutes 32.2% of the nation's aggregate rural population (ODEPA, 2019). Collectively, these six regions generate 58.9% of the national agricultural and forestry GDP, with O'Higgins contributing 18.7%, whilst Ñuble and Biobío each account for 14.2%, and Maule represents 13.9%. Concerning agricultural surface area, these regions comprise half of the nation's total land cultivated with fruit orchards. Furthermore, the Maule and Biobío regions encompass 54% of the country's agricultural and forestry holdings (ODEPA, 2019). With respect to income-based poverty in rural zones within these regions, the period spanning 2017-2022 witnessed increases in rural areas of Valparaíso, Metropolitana, Maule, and Biobío, whilst reductions were documented in O'Higgins and Ñuble (Ministerio de Desarrollo Social y Familia, 2017).

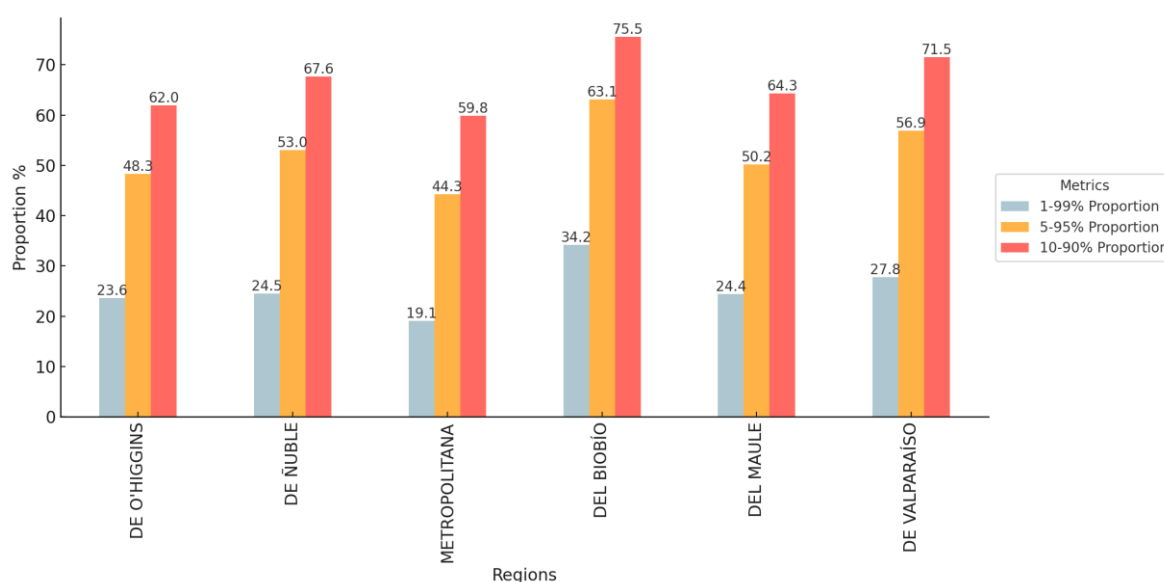
Contemporary scholarship addressing territorial concentration in Latin America (Ilc & Oxfam, 2020; IPES-Food, 2024) documents remarkably elevated levels. Nevertheless, given their global scope, these analyses lack granular data regarding land utilisation or sub-national regional specificities. Within this framework, this article endeavours to advance the scholarly discourse through an analysis explicitly grounded in agricultural landholdings. Consequently, the following section presents findings derived from both the proportion of land under the control of specific cohorts and the Gini coefficient, employing regional differentiation whilst distinguishing between rain-fed and irrigated territories.

The Gini coefficient demonstrates a broader pattern distinguished by substantial land concentration across the examined regions. As illustrated in Figure 1, these regions uniformly exhibit values exceeding 0.7. Consistent with Echenique (2013) and Vargas and Luiselli (2020), calculating these metrics for lands with water availability becomes imperative given their significance for agricultural productivity. Findings display inter-regional variations when computing the correlation coefficient between landholding dimensions and irrigation infrastructure, though broadly speaking, the correlation remains notably weak. Certain regions such as Valparaíso and Metropolitana demonstrate negative or absent relationships, whilst others including Maule exhibit marginally stronger positive correlations. This pattern suggests that the relationship between holding size and irrigation infrastructure is heterogeneous and potentially influenced by region-specific determinants.

When quantifying regional concentration through the Gini Coefficient, the primary finding is the pronounced level of concentration. Moreover, in O'Higgins, Maule, Ñuble, and Biobío, irrigated territories display higher coefficients, whilst Valparaíso and Metropolitana exhibit the inverse pattern. Given the Gini Coefficient's responsiveness to intermediate distribution values, calculating the proportion controlled by the upper 1%, 5%, and 10% proves more instructive. Figure 2 substantiates regional concentration, most notably in Biobío, where the largest 1% of holdings commands 34% of aggregate land area. Furthermore, concentration intensity escalates markedly when examining the upper 5%, with this cohort controlling over 50% of rural territory across the three selected regions.

The percentile analysis deepens this reading, as illustrated in Figure 2. In the Biobío region, the top 1% of landowners control 34% of agricultural land, and in all other regions studied, the top 5% hold more than half. The contrast between the top 10% (with an average holding of 51.7 hectares) and the bottom 10% (holding between 0.1 and 0.3 hectares) reflects a disparity of roughly 400:1. The average holding of the top decile (~52 ha) is equivalent to 73 football fields, whereas that of the bottom decile (~0.13 ha) fits within one-fifth of a field. At this scale, mechanisation, access to credit, or implementation of irrigation infrastructure becomes virtually impossible. The disproportion reveals a market where smallholders lack the critical mass—in terms of land area and capital resources—necessary to benefit from economies of scale, negotiate collectively, or influence productive models aligned with climate adaptation goals.

Figure 2. Land Concentration Metrics in Selected Chilean Regions



Source: Author's calculations based on Agricultural Censuses 2021.

On average, the territorial extent of the largest 10% of holdings exceeds that of the smallest 10% by a factor of 408 across the examined regions. Figure 1 demonstrates that throughout all analysed regions, the largest decile of holdings commands a substantial share of aggregate area, ranging from 59.84% in the Metropolitan Region to 75.53% in Biobío. This concentration results in marginal territorial participation for smaller holdings, with the bottom decile controlling between 0.09% and 0.27% of land across these regions, as documented in Table 1. The differential in mean hectareage between the largest and smallest holding cohorts confirms this inequality. Within each region, the mean area of the upper decile of holdings substantially exceeds that of the lower decile. For instance, in Valparaíso, the largest holdings average 74.70 hectares, whilst the smallest scarcely reach 0.10 hectares. This pattern persists across all regions, with large holdings averaging between 43 and 74 hectares whilst small holdings barely exceed fractional hectareage. Finally, examining the remaining 90% of holdings, which encompass 32.83% of

aggregate land, these maintain an average of 2.81 hectares compared to 51.71 hectares for the upper decile.

Upon integrating the hydrological dimension into the analysis, concentration persists at elevated levels. Within the investigated regions, 24.31% of territory comprises rain-fed land, whilst 75.69% benefits from irrigation infrastructure. As documented in Table 1, the upper decile of irrigated holdings commands 65.1% of irrigated territory, averaging 60.3 hectares. Rain-fed holdings control 67.5% of such land category, with a mean of 34 hectares. Consequently, concentration remains substantial under both conditions. However, the upper decile contains more irrigated holdings (4,684) than rain-fed holdings (2,765). This pattern suggests improved territorial distribution within this segment, potentially linked to crop typology, given that fruit orchards, nurseries, vegetables, seedbeds, floriculture, and improved pastures constitute over 50% of irrigated territory. Irrigation availability enables larger and more diversified holdings dedicated to higher-value crops requiring intensive management. Conversely, rain-fed territories predominantly focus on conventional crops with reduced plot dimensions.

As documented in Table 1, the bottom decile of irrigated holdings commands 0.1% of irrigated territory, averaging 0.09 hectares across 4,648 holdings. Rain-fed holdings control 0.43% of such land category, with mean areas of 0.22 hectares across 2,765 holdings. When examining the remaining 90%, irrigated holdings command 34.90% of territory, averaging 3.59 hectares, whilst rain-fed holdings possess 31.47% of such land, averaging 1.82 hectares. Consistent with the upper decile pattern, irrigated territories exceed rain-fed ones in size, yet over 42,000 irrigated holdings exist compared to 24,000 rain-fed holdings, demonstrating a fragmentation phenomenon within irrigated rural property structures.

Table 1. *Comparison of Land Concentration between Irrigated and Non-Irrigated Lands*

<i>Percentile</i>	<i>Land Type</i>	<i>% of Land Controlled</i>	<i>Average Area (ha)</i>	<i>Number of Exploitations</i>
Bottom 10%	Irrigated	0.10%	0.09	4,684
	Non-Irrigated	0.43%	0.22	2,765
50%	Irrigated	4.43%	0.82	23,422
	Non-Irrigated	6.66%	0.67	13,827
90%	Irrigated	34.90%	3.59	42,159
	Non-Irrigated	32.47%	1.82	24,888
Top 10%	Irrigated	65.09%	60.32	4,684
	Non-Irrigated	67.52%	34.05	2,765

Source: Data from Agricultural Census 2021.

Discussion

Property regimes have the capacity to create landscapes characterised by continuity and change. In Chile, the individual, absolute, and exclusive conception of private property has been pivotal in constructing and developing the land market and the institutions that support it. This can be

referred to as the status quo of Chilean rural property, as since the dictatorship established it in the mid-1980s, there have been no significant changes to its core component (Novoa, 1982, 1989).

In this context, land concentration appears to be a continuous element. The results indicate that, regardless of the metric used, the phenomenon persists over time, and its presence is evident in regions crucial for the country's agricultural and export production. The economic consequences of this process are complex to ascertain. Analysing the reduction in rural poverty and the economic growth of the agricultural sector separately, one might argue that the market has resolved the land issue, which has managed to integrate economic growth, poverty reduction, and land concentration into a virtuous equation (Valdes & Foster, 2014, 2018). Although no studies have conclusively linked these variables to confirm this hypothesis, the proposition opens up a discussion about the factors that could potentially alter the trajectory of property concentration.

Climate change in Chile's rural regions has the potential to transform the productive framework and prompt inquiries regarding the function of rural property in this evolving context. According to ODEPA (2024), heightened aridity, reduced production yields, and alterations in precipitation patterns are likely to have a more pronounced impact on smallholders in non-irrigated zones, which are marked by minimal technological integration. Conversely, irrigated regions, distinguished by intensive agriculture and advanced technology, are better prepared to address these challenges.

The VGGT have the legitimacy and capacity to mediate between these elements of continuity and change. However, their implementation requires active engagement from state and non-state actors. In Chile, whilst civil society organisations such as ANAMURI (National Association of Rural and Indigenous Women) and the Movement for Water and Land Defence have advocated for land reform, their political influence remains limited within the current institutional framework. The dominance of agro-export associations and the constitutional protection of property rights create significant barriers to VGGT implementation, though opportunities exist through local governance mechanisms, particularly in water user associations and indigenous land management systems where collective decision-making traditions persist.

Furthermore, the VGGT provides an analytical framework for examining the intersection between legal landscapes—encompassing property regimes—and geographical landscapes—manifested through land concentration patterns—whilst assessing how these dimensions are challenged by global climatic phenomena and identifying appropriate strategic responses to address such pressures. Firstly, the VGGT invite states to recognise that policies and laws on tenure rights operate within a broader political, legal, social, cultural, religious, economic, and environmental context. If this context changes, necessitating reforms in tenure provisions, states should strive to build a national consensus on the proposed reforms. Based on the VGGT's provisions and principles, four elements could mediate the tension between the geography of Chilean rural property and the risks posed by climate change.

Encouraging private land agreements to align with the VGGT represents a significant challenge. This is because geographical and legal conditions have also been consolidating and

strengthening power relations in rural areas. While it may be difficult to envisage an optimistic scenario for some VGGT provisions related to land concentration being included in private land contracts, an efficient alternative would involve advancing technical management of risks, projections, and alternatives offered by land administration in rural areas in the face of climate change. Emphasising collaborative tenure models rather than exclusively individual, absolute, and exclusive property models, as is currently the case, could be beneficial. Providing this type of information through state or mixed technical agencies can facilitate the internalisation of the VGGT in such agreements.

The issue of access to rural land links the interaction between the VGGT, peasant organisations, and land concentration in a climate change context. In Chile, peasant organisations such as ANAMURI (National Association of Rural and Indigenous Women), the Confederación Nacional Campesina, and the Movimiento de Defensa por el acceso a la Tierra, el Agua y la Protección del Medioambiente (MODATIMA) have actively advocated for land reform and water rights. However, their capacity to influence policy remains constrained by limited political representation and the strength of agribusiness lobbies. Despite these challenges, these organisations have achieved some success in raising awareness about land concentration and promoting agroecological alternatives, particularly through alliance-building with environmental and indigenous movements. However, concentration is a limiting scenario where agricultural land is increasingly concentrated and less productive. Here, the state has the potential to play a role through the strategic use of public lands. Regarding the conditions and factors to consider when designing such a policy, this strategy could be effective without requiring legal reforms to private property. Instead, it would involve a management, use, administration, and development strategy that strengthens the participation of excluded groups in rural development processes.

Market Transparency and State Role

In Chile, the institutional framework and functioning of the rural land market have been linked to the sector's economic development. Tenure security is one of the critical elements of such operations. However, in line with the VGGT, the state's role in this system seems extremely limited, especially concerning transparency, which is crucial for its sustainability. No public body or private agency in Chile can accurately track rural land transfer activities. The Real Estate Conservators (Conservadores de Bienes Raíces) maintain property records at the municipal level, but these are neither digitised nor centralised, making systematic analysis of land transactions virtually impossible. Furthermore, the absence of requirements to disclose beneficial ownership allows for concentration through complex corporate structures that obscure actual control patterns. As a result, the only available data are those voluntarily reported on platforms like LandMatrix regarding the capital and actors behind large-scale land purchases. Similarly, fluctuations in rural land prices, critical to understanding the trajectory of concentration and extreme fragmentation, can only be indirectly monitored through land sale portals.

International experience is rich regarding these monitoring systems' role in land management and territorial planning. Such systems do not alter the content or exercise of

property rights but aim to make public what is already published (Anseeuw et al., 2013; Gerber et al., 2018; Locke & Henley, 2013; Stessa Chao, 2018; Voß & Bannert, 2018). This is crucial because policies of this nature do not require extensive legal procedures, considering that the Chilean tenure system declares these transactions public and managed by Notaries and Conservators of Real Estate. The issue arises when these institutions, serving as auxiliaries of justice, maintain these records in formats that make their tracking and evaluation practically impossible, rendering them invisible in practice. Here, the state plays a role as a facilitator of the land market by improving transparency levels in its functioning. Additionally, it obtains precise and updated information to enhance its agencies dedicated to rural territorial planning.

Conclusions

Land concentration is a central element in the geography of Chilean rural property. The calculation of various metrics and their trajectories demonstrate a high intensity in regions that produce nearly 60% of the country's agricultural GDP. Thus, Cristóbal Kay's warning in the mid-1980s about the possibility of Chile returning to a high degree of rural land concentration has become a reality. This is further complicated because such high concentration levels are evident in irrigated and non-irrigated lands, with the latter being more vulnerable to climate change. Methodologically, advancing towards a multidimensional land concentration analysis, as Vargas and Bauluz proposed, seems crucial. However, three elements are fundamental in countries where census information cannot be supplemented with data from social characterisation surveys. First, access to disaggregated data is essential. Secondly, it is necessary to filter the productive use of the land to focus on those areas involved in food production. Lastly, analysing land behaviour based on irrigation access is vital. These controls help ensure a robust calculation of agricultural land concentration by isolating effects that might exaggerate concentration, such as including forest or forestry lands.

There is an evident and contradictory tension between the geography of Chilean rural property and the principles and policies promoted by the VGGT. On one hand, the current model is rooted in individual, absolute, and exclusive property, with geographic manifestations including extreme land concentration in agriculturally rich rural areas. The VGGT, however, explicitly state that property as a right should not be considered absolute, and its exercise should be linked and restricted to societal interests, offering alternatives like limits and controls on large land transactions. Nevertheless, both the geography of property and the VGGT actively promote tenure security as a fundamental value for rural development.

In this context, the country's land policy must engage in dialogue with this historical and persistent geography. The continuity of land concentration goes hand in hand with the continuity of its foundational institutional element—the tenure regime based on private rural property. However, the VGGT and the tensions arising from climate change present a horizon of new possibilities for land management, use, and coordination, as well as the roles of private, public, and social actors interacting in this space.

The expansion of desert frontiers, changes in rainfall patterns, alterations in temperatures and seasonal cycles, and the loss of land due to extreme fragmentation seem to require

conceptual and public policy elements beyond the mere repeated, sustained, and consolidated application of the idea of private property. In this context, the VGGT, supported by the evidence provided in this article, challenges the sustainability of Chile's instruments to structure its rural development. By presenting alternatives such as transaction limits or the establishment of democratic control procedures, the VGGT are particularly useful for highlighting traditionally obscured issues, which now, considering the agro-climatic context, seem to resurface with unprecedented relevance.

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