

The digitalisation of land: more data, less land



- *Land data systems are being funded by international cooperation on the promise that they promote sustainable land governance;*
- *Extracting and making land data available can improve “governance” but mainly by agents outside the territories;*
- *For corporations and investors, access to up-to-date information in the form of a “digital land profile” means that land can be located, offer and demand quantified, and prices for land, production and natural resources, such as carbon credits, calculated;*
- *This is a move that replaces existing systems with new technology and infrastructure. It puts control over land and its governance structure in new hands, making it easier to place land on the market in favour of transnational elites.*

Many countries have been digitising their land registries since the mid-nineties. With this, they aim to standardise and integrate information relating to existing lands and the natural resources on them to optimise sustainable land governance, both in urban and rural areas.

According to the main proponents of this process, such as the [World Bank](#), so-called “land governance” helps to formalise individual land ownership through a simplified, cheap and speedy land regularisation process. This, in turn, allows land to be sold on the market and encourages investment.¹Placing land in the market as private property is, according to them, the key to increasing agricultural productivity and generating employment,

which will, in turn, bring rural development and poverty reduction to the countries of the global South.

The logic is to standardise data collection through an integrated international system that will contain geo-referenced satellite data on land, updates on land-use change, and digitised land documents. Based on this data, a "digital land profile" is created capable of maximising business and investments in emerging countries.

Potentially, these technologies can help identify illegally appropriated land, recover it, and allocate land for agrarian reform. However, as GRAIN revealed in its September 2020 report [Digital Fences](#), the structure of these "modern" cadastres favours the legalisation of land illicitly acquired by local elites. It fosters a new, now digital cycle of land grabbing in the remaining agricultural frontiers of Latin America.

Cadastres and land registers: a story told by private property

These records have existed for a long time; many date back to colonial times. They were used as instruments to mark a central power's claim over a given territory. Cadastres authorised the collection of taxes by States on urban or rural land. Later, with the standardisation of private property and as enormous tracts of land were transferred to individuals, these cadastres started to incorporate legal and physical (cartographic) criteria to help define the location and boundaries of each property. This then served to define private property rights over the land, with its inclusion in the property register.²

In the Latin American context, deeds were granted by the Crown. These excluded all non-Europeans with no economic power (indigenous, enslaved black people, mestizos and women) from access to land and the means of production necessary for survival. Cadastres and property registers have historically been used as instruments to classify land as public or private, establish property rights, and replace the complex sociocultural relations established collectively by indigenous and peasant communities. This operation is at the heart of some of the most violent disputes in Latin America and involves indigenous people, peasants, Afro-descendants, States, and local and transnational elites.

Cadastre data is primarily collected through self-declarations and documents provided by the occupiers/owners themselves. Cadastres do not generate property rights but are used as a basis on which to formalise rights in property registries later. Cadastres—which are costly and require specialised professionals to collect physical and cartographic information about areas—, combined with the State's failure to publish complete details of the location and quantity of existing public and unoccupied lands, have historically allowed [national elites to illegally appropriate land](#). With more economic resources and political connections, these local elites can formalise ownership over large tracts of public lands. Often they have appropriated these lands, traditionally occupied by local peoples and communities, using violent means. This process is known as land grabbing.

So, land information held in cadastres and property registers tells the story from the land grabber's perspective. These people have become large landowners, and economic and

political elites, by dominating the use of force and the structure of land "governance" over time. With land agencies and registry offices dominated by local agrarian elites, the information in the cadastral systems is fragmented, unreliable and imprecise.

AgTechs: digitalisation, microcredits, and rural debt

Smartphone access has brought geospatial technology into the hands of every individual, in turn cheapening and expanding the digitalisation of land and natural resources. According to the World Bank, [precision agriculture](#) is “*the world’s largest sector using detailed satellite position services*” (GPS). However, the Bank highlights the need to reverse the [digital and geospatial gap](#) between developed (OECD) countries and [emerging countries](#).

With the chronic lack of investment by public credit systems, family farmers have been increasingly [pushed into the financial system](#). But this is no coincidence. The digital inclusion of large producers and the world’s rural family farmers -which represent between [70% to 80% of the world’s farmland](#)- is essential for the continuous expansion of financial conglomerates. For the same reason, the regularisation of land as private property is crucial for it to be used as collateral on loans. In Cambodia, a large-scale land titling programme and the issuing of microcredits by global financial corporations over the past decade and a half have combined to make the country's rural population one of the most indebted in the world. The explosion of microcredit, backed by land titles as collateral, has increased poverty and is already contributing to a massive loss of land among the country's rural poor.³

In recent years, the so-called [AgTechs](#) - "the agro startups" - have been accelerating the implementation of [Agriculture 4.0](#). Along with data-based agricultural advice, they offer connectivity alternatives (such as Bluetooth or [free TV channels](#)) and grant microcredit, with [risk analysis](#) based precisely on the land data collected.⁴ Loans and rural insurance are increasingly granted on the condition that farmers adopt the Agriculture 4.0 technology and have traceable supply chains to prove that they comply with social, environmental and governance requirements ([ESG criteria](#)), as required by the new Green Deals. [Agrofy](#), an Argentinian company and the largest AgTech in Latin America, already has its own digital currency, AgroPay, and credit system. Among its shareholders are venture capital funds from major corporations such as [Yara Growth Ventures](#), [Bunge Ventures](#), [Syngenta Ventures](#), [Cresud](#) and [Brasil Agro](#).

Digital land grabbing

As per its nature, public and communal lands cannot be bought, sold or offered as collateral for loans, making it harder for land grabbers to extract wealth if they take over these lands. This is where new technologies come in; the digital integration of cadastres and land registries enables these lands to be reclassified. Through cadastres, rural

properties can be included on registries that provide access to public policies and funding, which, in turn, can be used as a basis to issue individual property titles. Large landowners are then able to grab the lands of indigenous, traditional and peasant communities and sell them onwards to an increasingly transnational elite.

Extracting and making land data available improves "governance", but mainly for those outside the territories who do not ordinarily hold this information. Up-to-date access to geospatial data on land use is crucial for corporations and financial investors to better locate and price land, resources of interest and production. This also makes it possible to put a price on and negotiate the commons- resources that were previously not on the market, like clean air, native vegetation and other elements of an ecosystem. Because they are unlike any other commodity, it is complicated to assign a price to the commons. The quantification of carbon sequestered by nature- such as native vegetation and soil- for the issuance of carbon credits, for example, absolutely depends on the digitalisation of land.⁵

The entry of land and its data into the digital world represents technological and infrastructural change. It has opened land to new buyers, shifting control of it and its governance structure to primarily transnational and financial agents. That said, local elites resist these programmes for fear of exposing fraud and land-grabbing schemes. Currently, they have the advantage that the State information systems are unreliable. To promote the shift to digitalisation, governments relax the requirements to regularise properties. Efforts include allowing remote information capture through satellite images, outsourcing digitalisation to private companies (often controlled by influential local businessmen), and keeping the information generated secret from the public.

In Colombia, President Ivan Duque's government has [replaced in-person verification](#) with capturing information based on high-precision aerial photos and satellites for its multipurpose cadastre. It has also authorised municipalities and private companies to carry out the registry, removing state oversight. These changes leave the new digital management of the cadastres vulnerable to influence by local elites and foreign capital, such as legalising the [approximately 48% of titles estimated to be illegally acquired](#) and including them on the map.

In Paraguay, the National Institute for Rural and Land Development (INDERT) instructs that [paid titles](#) within the country's recently created digital database (SIRT) [be validated](#) without verifying whether these digital records were forged in historical [land grabbing and corruption](#) processes. This process amounts to counter agrarian reform in which peasant settlements are at risk of disappearing.⁶ The most significant number of settlements [registered in the SIRT](#) with titles issued before 2021 are in the departments with the most important presence of foreign capital, such as Alto Paraná. [SIRT data was made confidential](#) after several inconsistencies were pointed out, claiming that the question of ownership involves personal and not public information.

In Brazil, about [30% of public forests](#) (14 million ha) were illegally registered as private property in the National Rural Cadastre System (CAR) as of the end of 2020. As the CAR is self-declaratory, land grabbers draw fictitious rural properties within public forests on the map in a new onslaught of public land theft. The ease of digital land grabbing has stimulated subsequent cycles of deforestation and fires, which is necessary to appropriate and introduce the lands into the market.

Cadastrals in developing countries are characterised by high concentrations of land ownership and unreliable information about public and communal lands. In these countries, land tenure regularisation policies based on digital cadastrals, which support individual land titling in mass, are likely to consolidate the historical illegal occupation of public lands. Furthermore, cadastre and registry digitalisation has accelerated the privatisation of public and unclaimed lands, incorporating a more extensive stock of lands and resources of interest to the market and global financial flows.

The role of financialisation in the digitalisation of land and agriculture

From the middle of the 20th century, the technical integration of industry and agriculture and the increased agricultural production of commodities for export gave rise to agribusiness. Although based on the extraction of natural resources, agribusiness production increasingly integrates the industrial, service, and financial sectors. Agricultural production is not only about food. It's also about animal feed, fibres, energy, medicines, cosmetics and financial products derived from land and agricultural commodities—from [bonds](#) to carbon credits- increasingly demanded by the new social and ecological pact being forged internationally. As a result, trade with food, land, and natural resources has become a new frontier for multiple production chains, benefiting agents outside the agriculture industry, particularly the financial system and institutional investors such as pension and investment funds.

Global production chains for commodities often depend on access to large tracts of land in several countries to meet their respective demands. "Land governance", therefore, involves not only land, large landowners and states but also diverse sectors of the economy and investors interested in land-based financial derivatives. It consists of the governance of land, agriculture, energy, environment, climate and their respective markets. All this is made possible thanks to the digitalisation of information on land.

In the 1990s, as part of the push for market liberalisation, international cooperation actors such as the [World Bank](#), [the Inter-American Development Bank \(IDB\)](#), the United States Agency for International Development ([USAID](#)) and the Organization of American States ([OAS](#)), began to increasingly shift funding from land redistribution policies (colonisation projects and agrarian reform settlements to pacify rural conflicts), to the construction of Land Information Systems (SIT).^{7 8} Funding was earmarked "to modernise" and standardise technologies and forms of data collection— from manual formats to digital. The loans for building these SITs, in addition to encouraging countries to adopt a standardised system for capturing, storing and sharing information (such as through the

[LADM](#) and [SOLA/FAO System](#)), have also been set aside to expand and constantly update the types of information collected on land and other territorial information, for multiple purposes. Loans also cover the digitalisation of documents in public registries, which aim to transform deeds and land titles into cadastre-integrated magnetic records.⁹

In Colombia, [USAID](#) hired California-based company [Tetra Tech, who](#) subcontracted the implementation of the multipurpose cadastre of the National Land Agency (ANT) in 11 municipalities. All aimed to accelerate and lower the digitalisation process costs and formalise property rights over public lands (*baldíos*). Tetra Tech has launched the [Land Node platform](#) to collect, process and integrate cadastral information with land records. It has already digitised 1.5 million records. According to the platform, the shift from manual to digital clears doubts about the validity of records. The platform is a pilot case for the Bill and Melinda Gates Foundation's "[Enabling Satellite-Based Crop Analytics At Scale](#)" initiative to create a standardised, high-quality infrastructure to collect, store and constantly update information for sharing within the data chain.

Access to digitalised information from cadastres and land registries means that up-to-date information about a particular property's legal status, size, environmental conditions, and productivity can easily be consulted when the financial banking system or the capitals market prepares to grant rural credits and loans.

In Brazil, real estate credit associations, FinTechs, financial market entities and banks have presented a [draft law](#) for a centralised electronic system that integrates information from public registries. All these actors aim to reduce the costs and time spent searching for "*(debt) guarantees on movable and immovable property, making credit acquisition and financial transactions more efficient*". Recent [changes to the legal frameworks for land, the environment and the rural credit system](#) have created new mechanisms to increase the participation of international financial investors in land in the country. Digitalisation of the debt guarantee system is the next step on the agenda for the financial market.

Evidently this technological shift aims to create a digital “governance” structure that consolidates and expands land and resource capture in favour of global value chains and the financial system.

Digital profile: turning land into a financial product.

With diverse land information, digital infrastructure seeks to bring greater standardisation of prices for agricultural, energy and environmental commodities at a global level, in parallel to increasing the international mobility and marketability of land and its securities. Although the value of agricultural commodities influences the value of land, especially in areas where global chains invest, its price depends on where it is located and its characteristics—from soil quality, topography, infrastructure, presence of water, native vegetation to whether it is deforested and ready for planting.

The status of property rights over it and its natural resources also play a significant role in its value.

The *digitalisation of land governance* would require a type of structuring that could further separate land value from its physical reality, facilitating the creation of separate financial products based on a land data market, created and managed by financial agents, as already occurs with carbon credits, agribusiness bonds or environmental services.¹⁰

Just as in social networks "real" people create "user profiles" that are more or less connected to reality, depending on the quality and frequency of information and photos shared, digital land registries aim to create a "land profile". How good this "digital land profile" is will depend on the quality and extent of the information available on its location, carbon stock quantification, water availability, etc.

From these profiles, it is possible to create land-based financial derivatives with price structures that can track but are separate to the value of land as a means of production. Ownership of these new products and securities on land would be different from land ownership, just as carbon credits, mining and water rights can differ from those with rights over the soil. Based on land data, such financial products would encourage excess financial liquidity and multiply land deals, expanding the potential for transactions by creating new commodities/assets/derivatives. This trend would bring land closer to becoming an "ideal" financial product.

Conclusion

The very nature of land and natural resources means that its capture by global financial flows is something that faces strong resistance. Land is strongly linked to its physical context, which presents obstacles when standardising prices to convert it into a commodity. The intangible nature of these ecosystems and the commons found within them offer an additional barrier when trying to appropriate and market them like any other product. Furthermore, changes in land ownership and its "governance" is marked by historical contradictions involving a violent process of disputes between communities, local elites and transnationals.

The digitalisation of information on land and natural resources may seem to set land governance on the right path of sustainable management. However, considering the hegemony of financial capital, digitalisation could result in a new cycle of land theft, further increasing the concentration of land ownership in the hands of those who control data and global finances. A new period of enclosures and scarcity of vital resources for the world's majority could be ushered in.

The fact is that food and medicinal raw material for all societies come from the biodiverse territories of the world that are the fruit of an already existing and resilient community "governance". This democratic governance involves the careful intergenerational work of building knowledge, techniques and technologies by traditional peoples and

communities. Strengthening the unrestricted use of biodiversity by these peoples and knowledge networks, beyond the fences of private property and financial capture, is what can provide a viable future for humanity.

¹ Since the beginning of the 1990s, the Interamerican Development Bank (IADB) has approved nearly 20 land regularisation and administration projects across 14 countries in Latin America and the Caribbean. According to a 2014 report, few studies identify any correlation between land regularisation and increased agricultural productivity. BID. Land Regularisation and Administration Projects, 2014.

<https://publications.iadb.org/es/publicacion/16799/proyectos-de-regularizacion-y-administracion-de-tierras-evaluacion-comparativa>

² Land registration is an official process for documenting land rights through deeds. It can be done by registering land transactions, which do not prove ownership rights, or by registering title deeds (property records or property deeds), which confer legal ownership rights over the land.

³ LICADHO and STT, "Collateral damage: Land loss and abuses in Cambodia's microfinance sector," 2019: [https://www.licadho-](https://www.licadho-cambodia.org/reports/files/228Report_Collateral_Damage_LICADHO_STT_Eng_07082019.pdf)

[cambodia.org/reports/files/228Report_Collateral_Damage_LICADHO_STT_Eng_07082019.pdf](https://www.licadho-cambodia.org/reports/files/228Report_Collateral_Damage_LICADHO_STT_Eng_07082019.pdf); Nathan Green and Maryann Bylander, "The Exclusionary Power of Microfinance," *Sociology of Development* 7 (2) : 202-229, June 2021: <https://doi.org/10.1525/sod.2021.7.2.202>

⁴ AgTechs offer products, services and information in real-time for the entire agribusiness chain, connecting producers, input suppliers, rural credit and insurance systems, processors, the food industry and even retailers. AgTechs also initiate contact between producers and capital markets by providing land and production bond issuance and registration services and issuing agribusiness assets, such as carbon credits and other environmental services.

⁵ The concept of modern land registries arose to standardise the land administration model by integrating the complete documentation of property rights into a broader, fully coordinated and automated land information system. It was developed between 1994 and 1998 by the International Federation of Surveyors (FIG) with support from FAO. Christiaan Lemmen et. al. The Land Administration Domain Model. December, 2015. <https://www.sciencedirect.com/science/article/pii/S0264837715000174>

⁶ Around 1 million ha—or 40% of peasant settlements in the country—are dedicated to soybean monocultures or cattle pastures, illegally occupied by around 3% of large landowners who are not agrarian reform beneficiaries. Luis Rojas Villagra and Abel Areco. Las colonias campesinas en el Paraguay. Base-IS, 2017. Base-IS, 2017. https://www.baseis.org.py/wp-content/uploads/2018/03/2017Dic_Las-Colonias-del-Indert.pdf

⁷ The OAS is supporting cadastre and property registration to land markets located in countries such as El Salvador, Guatemala and Bolivia, and in the following pilot municipalities: Colón (Venezuela), Cojutepeque (El Salvador), Belén (Costa Rica), Azogues and Cuenca (Ecuador). These initiatives are part of the MuNet Catastro project, funded by the Canadian Agency for International Development (CADI). "OAS supports the cadastre of the Americas". <http://portal.oas.org/portal/sector/sap/dptodemodernizaci%C3%B3ndelestadoygovernabilidad/npa/munetcatastro/tabid/839/language/en-us/default.aspx>

⁸ USAID supports projects to enhance land and natural resource governance in many countries such as Côte d'Ivoire, Ethiopia, Mozambique, Tanzania, Liberia, and Ukraine. In Latin America, it focuses principally on Colombia. "USAID land tenure projects". https://www.land-links.org/usaaid-land-projects/?fwp_projects_status=active&fwp_sort=date_desc.

⁹ The Land Administration Domain Model (LADM), ISO 19152 2012 certified and the global standard for digitalisation, creates a standardised infrastructure to integrate physical, spatial and administrative data on land within a country and across jurisdictions to facilitate international administration of land and resource transactions as well as records for carbon credit accounting. The Food and Agriculture Organization of the United Nations (FAO) subsequently launched Solutions for Open Land Administration (SOLA), based on the LADM system, for open-source computerised cadastre and registration that can be customised to each country's laws and policies. SOLA is currently a land rights registry and automated cadastre that collects multiple types of territorial information for land management.

¹⁰ LOHMANN, Larry. "Financialisation, Commodification and Carbon: The Contradictions of Neoliberal Climate Policy." *Socialist Register* 2012. 85-107. 2012.