Open-up guide

Open data for improved land governance

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land portal

ODC
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Contents

Target audience

The Open Up Guide has been prepared for use by national and local government agencies with a mandate for or an interest in making their land governance data open and available for others to re-use. Land governance data generally comprises the data and information that agencies collect as they carry out their core land administration functions of land tenure, use, development and value. Some countries already collect and manage their land governance data in open and re-usable formats. Others may be seeking advice on how to start, how to expand their activities or how to test what they do against best practice.

Open land governance data, published in accordance with a government's law and regulations, provides efficient and transparent government services and enables individuals, communities and businesses to run their lives ethically and with integrity.

The Guide is also intended to assist communities monitoring whether environmental protections are being upheld, and to support rights claims over geographical areas inhabited for generations; and for civil society organisations that can make use of land governance data to understand patterns of land deals, support environmental and social advocacy, and investigate and address corruption.

Background

This work to develop an Open Up Guide for Land Governance Data draws on major international work over recent years to improve the management, availability and accessibility of land governance data to address major ongoing social and economic issues arising from inadequate land governance and practices globally, including land corruption.

In 2019, **the State of Open Data** report included a specific chapter describing the current situation regarding the access to land governance data and outlining the two types of data needed to understand land ownership: cadastres, which record the boundaries (both formal and informal) of land parcels and land registries, which record property rights and interests.

In 2019, with the support of **Deutsche Gesellschaft für Internationale Zusammenarbeit** (GIZ) and in collaboration with **Cadasta Foundation**, the Land Portal Foundation's **online dialogue on open data, anti-corruption and land** resulted in a draft framework of datasets relevant to land governance. In early 2020, **The Land Portal Foundation** and the **Open Data Charter** (ODC) partnered to identify key core data types that should be considered for an effective land governance framework and held an **online workshop** to discuss key data and key open data use-cases for land governance.

In January 2021, GIZ, with the support of the German Federal Government, a study was released on **The Role of Open Data in Fighting Land Corruption: Evidence, Opportunities and Challenges** and a **webinar** and **data story** were published on the Land Portal to discuss what it takes for open data to have an impact on land corruption, as well as to arrive at recommendations that can guide practitioners and policy makers. This work builds upon the online discussion about **Open Data in the Fight Against Corruption** organized by the Land Portal Foundation in 2019.

Over 2018-2020, the Land Portal Foundation developed a methodology to assess country level land information ecosystems, assessing the availability and accessibility of data on: Land tenure; Land cover, use and management; Land disputes; Human settlements; Land markets and financing; and Land, climate change and environment. This methodology was applied to develop in-depth '**State of Open Land Information (SOLI)' reports on Kenya, Uganda, South Sudan, Tanzania and South Africa.**

In parallel, the Land Portal Foundation has been engaging with the development of the **Global Data Barometer** (GDB), a new study backed by the **International Development Research Centre** and the **Open Government Partnership** (OGP) (building on the **Open Data Barometer**) which will provide insight into government data capability, data availability, and data use, across 100+ countries. A land module within the GDB will provide a baseline view on the state of open land information worldwide and assess the extent to which countries have the frameworks in place for responsible re-use of data. It will also surface potential case studies of land data re-use, and will provide insights to target future in-depth SOLI reports. The survey work is taking place between March and June 2021 and the report is due in late 2021.

All of these activities are mutually reinforcing, with the GDB study highlighting the comparative position of different countries, the national SOLI process supporting multi-stakeholder action to improve land information ecosystems, the GIZ work seeking to address land corruption, and the ODC and OGP work promoting open land governance data for all to use and re-use legally.

ODC's open up guides

The **Open Up Field Guides are** practical tools developed by the ODC and thematic partners, for supporting governments and other actors to use the publication of strategic datasets to address key policy challenges, and are grounded in practical evidence while gathering learnings to make sure global norms are applicable locally.

This Open Up Guide on Land Governance is a resource aimed to be used by governments from developing countries to collect and release land-related data to improve data quality, availability, accessibility and use for improved citizen engagement, decision making and innovation. It sets out:

» Key datasets for land management accountability, and how they should be collected, stored, shared and published for improving land governance and transparency;

» Good data policies and frameworks, including metadata, standards and governance frameworks if available;

» Existing gaps or challenges in the policies and frameworks; and

» Use cases from real-life examples to illustrate the potential impact and transformation this type of data can provide in local contexts.

Problem statement

Land governance and administration

Land governance is the exercise of political, economic and administrative authority in a country and should include processes for citizens to participate. Responsible land governance may therefore be seen as being about how public and private actors use, control and provide access to land in a way that is socially legitimate and democratic (Borras & Franco, 2010). Land is a critical global asset (socially, culturally and economically), and is increasingly seen as an important governance issue. Land administration and governance problems include unequal access to land, gender discrimination, insecurity of tenure, unsustainable land use, weak institutions and deficient dispute and conflict resolution mechanisms (Palmer, Fricska, & Wehrman, 2009). The quality of land governance is, therefore, directly related to the manifestation of land tenure related problems. Land governance improvements are needed to achieve social and economic development goals that improve land tenure arrangements' support.

Efforts to improve land governance align with several global initiatives. The 2030 Agenda for Sustainable Development has **land-related targets and indicators** under the Sustainable Development Goals (SDGs) 1, 2, 5, 11, 15, 16 and 17. The FAO **Voluntary Guidelines on Responsible Governance of Tenure** of Land, Fisheries and Forests in the Context of National Food Security (VGGTs) (FAO, 2012) have become a soft law instrument internationally. The World Bank has developed the **Land Governance Assessment Framework (LGAF)**, a diagnostic tool to collect and assess land governance at the country level, which sets out pre-defined criteria and associated data elements for assessing land governance performance. Many governments, organizations and stakeholders have committed to fully implementing the SDGs, VGGTs and LGAF to monitor land-related indicators and assess performance in order to improve and promote responsible land governance.

The UN **Framework for Effective Land Administration** (FELA), acts as an overarching policy guide, providing a reference for UN Member States when developing, renewing, reforming, strengthening, modernizing, or monitoring land administration. It seeks to implement the **Integrated Geospatial Information Framework** to the land sector.

The Land Portal Foundation and the Global Land Tool Network (GLTN)'s dashboard, which is financially supported by the Omidyar Network, promotes **SDG land monitoring** (Land Portal, 2021). **LANDex**, the Global Land Governance Index developed by the International Land Coalition (ILC, 2021), measures progress towards ILC's people-centred land governance. This allows users to monitor the implementation of the global development frameworks, such as the SDGs and the VGGTs.

Benefits of effective land management

The 2020 Framework for Effective Land Administration (FELA) (UN-GGIM, 2019) states that effective land administration caters to all people, and will:

» develop confidence and trust, promote security, safety and peace building;

» accelerate the proportion of population with tenure security;

» allow economic development by supporting land value capture, revenue systems that are equitable and transparent;

» strengthen multi-disciplinary and multi-sectoral participation to achieve integrated geospatial information;

» contribute to smart and resilient rural and urban societies, with equitable spatial/ land-use planning, and land development;

» ensure participatory and inclusive land use, and land use planning;

» promote the recognition of the inherent rights of indigenous and vulnerable peoples to their lands, territories and resources, and recognise collective traditions, customs and customary tenures, consistent with existing obligations under national and international law;

» encourage efficient, sustainable and fair land markets, where appropriate, that take into account land tenure, value, use and land development aspects;

» cater to all circumstances, situations and people – in times of peace and prosperity, in times of stress and hardship (including disaster and conflicts, forced migration and human displacement, poverty, food and water scarcity);

» enable partnerships, bringing and building together knowledge, skills and experiences on land tenure, land value, land use and land development; and

» promote preparedness and resilience on climate change issues, and support biodiversity, conservation, and ecosystem sustainability.

Effective land management data

The land-related data, information and indicators necessary for monitoring performance needs to be readily available, timely, standardised and widely distributed to increase its impact. Historically the cadastre might have provided the legal property and its associated rights and obligations. However, modern land administration theory (Williamson, Enemark, Wallace, & Rajabifard, 2010) now prioritises the management of land and associated resources to respond to national and global imperatives such as poverty reduction, sustainable agriculture, sustainable settlements, economic development, conflict management and climate change. The emphasis is no longer on the legal property, but rather on the management of the spatial object and the role of the associated land management functions to support sustainable social, economic and environmental management (Zevenbergen, De Vries, & Bennet, 2016; Williamson, Enemark, Wallace, & Rajabifard, 2010). Land governance data must now include data on the core land administration functions of land tenure, use, value and development.

The sources of this land governance data are varied and include the national governments; some data may be collected by international organisations, some locally by civil society organisations and individuals, and some data might not be collected at all.

Improved land governance and the democratization of land management functions coincide with the development of the open data movement. By 2015, the open data movement had "*made explicit the potential links between open data and sustainable development*" (Davies, Walker, Rubenstein, & Perini, 2019) and open data had started to find its place alongside global thematic and sectoral initiatives, for example global development, with the SDGs using open data as a critical tool to monitor development efforts (Hammer, 2019; Gurin, Bonina, & Verhulst, 2019).

The Open Definition states that "*Data is open if anyone is free to access, use, modify, and share it — subject, at most, to measures that preserve provenance and openness*" (Open Definition 2.1), and the **Open Data Charter (ODC)** works for a world where governments collect, share, and use well-governed data, to respond effectively and accountability to the most pressing social, economic, and environmental challenges of our times. The ODC **global principles** state that data should be made open by default, timely, in a comprehensive, free, accessible and usable format. This will enable public uptake and use of the data and ensure that it is comparable and interoperable to facilitate analysis. Through its '**publishing with purpose approach**', the ODC encourages governments to take small steps that yield quick wins: it prioritises opening up and enabling use of quality data to help address globally relevant problems and developing a trustworthy data governance framework to achieve this goal.

Accessibility and the capacity and empowerment to use open data are key to making data a relevant factor in good land governance (Jaitner, Schilling, & Matthaei, 2020). The developments in land administration theory and open land data offer social and economic benefits as well as democratic change to the land governance sector. Land registers and cadastres have historically been open to the public in analogue formats, but digitization has bypassed many. Innovations and advances in information technology tools and geographic information systems allow access to and availability of open land data while providing for privacy of personal and restricted data. Within the **GODAN Action Project** the Land Portal Foundation has worked to understand the data **standards relevant for land governance data** and explored gaps in land data standardisation.

The Land Data chapter in the report on "*The State of Open Data*" (2019), Davies & Chattapadhya states that despite "*large donor investments in land registration systems, few resources are currently made available to enable open data related to these projects*" and that this represents untapped opportunities. It argues that interventions regarding open data standards, infrastructures and ecosystems need to consider that land data is political in nature.

Land Portal has developed a methodology to assess country level land information ecosystems. This methodology, which assesses the availability and accessibility of data on: Land tenure; Land cover, use and management; Land disputes; Human settlements; Land markets and financing; and Land, climate change and environment, has been applied to develop in-depth '**State of Open Land Information (SOLI)' reports on South Africa, Kenya, Uganda, South Sudan and Tanzania.**

The Columbia Center on Sustainable Investment's **OpenLandContracts** is a repository of publicly available contracts and associated documents created to strengthen the growing campaign for information disclosure around land-based projects and to demonstrate that contract transparency is both feasible and valuable. The site includes full text of contracts and related documents (in PDF form), summaries (or "*Annotations*") of each contract's key social, environmental, human rights, fiscal, and operational terms, and tools for searching, sharing and comparing contracts and their key terms.

Land corruption

Corruption is a major issue in the land sector and open data has been shown to be a powerful tool to combat it. The NUST-NELGA Hub for Southern Africa (2019) reports that;

> *"In Southern Africa, legal reforms to secure land tenure, redistributive land reforms and attempts to practise good land governance all try to reduce inequalities in access, ownership or use of land. However, none of these initiatives have abolished existing inequalities in assets deeply embedded in (colonial) history or avoided generating new ones. Population growth, corruption, poorly implemented land reforms and gender insensitive policies are major reasons for failure. These failures become more visible in rural areas. However, they are also gaining in importance in urban informal settlements".*

Research commissioned by GIZ reveals overwhelming support for the use of open data as an anti-corruption tool in the land sector, and strong evidence that there is a high degree of untapped potential (De Maria & Howail, 2021). It reports that "*the lack of transparency and openness in land information systems, together with the presence of overlapping and sometimes conflicting tenure systems in many countries around the world, creates a perfect environment for corruption to thrive in many areas related to land governance*".

It further says that "*land corruption is a sectoral form of corruption that affects both urban and rural areas, and disproportionately affects vulnerable and marginal groups in society*". It sets out recurrent negative implications of land corruption:

» It can reduce the ability of small-scale farmers to increase agricultural productivity,

» It can contribute to restrict access to land for specific groups, especially for those who rely on this vital resource for their livelihood;

» It can contribute to money laundering;

» It can exacerbate gender inequalities, favouring gendered forms of discrimination in land and property inheritance;

» It can lead to fundamental human rights violations, such as forced evictions;

» It may lead to social unrest, land conflicts and land disputes across the world.

The report concludes that building greater consensus on open land data and information initiatives, as well as producing further compelling evidence to demonstrate their impact in eradicating land corruption are crucial elements for unlocking this potential.

Towards an open up guide on land governance

This Open Up Guide on Land Governance led by the Land Portal foundation and the Open Data Charter seeks to complement and contribute to the ongoing work that has been done on open data and land governance:

» It documents lessons from international initiatives on open land governance data and information

» Outlines the barriers, risks and challenges to open data such as the lack of resources, lack of technical capacity and systems to interact with data and the complexity of the datasets

» Describes the opportunities and challenges associated with open land data and balances the social, cultural and economic benefits realised with equity, privacy and security concerns

» Sets out agreed key land governance data types, how they should be collected, stored and published for improving land governance and transparency

» Showcases use cases from real-life examples to illustrate the potential impact and transformation open land data can provide in local contexts

The Guide is intended to help improve data quality, availability, accessibility and use for improved citizen engagement, decision making and innovation. It also complements the practical guidance set out in the Open Data Charter's **Open Up Guides on Anti-corruption, Climate Change and Agriculture**.

Open land governance data

Open data is "*digital data that is made available with the technical and legal characteristics necessary for it to be freely used, re-used, and redistributed by anyone, anytime, anywhere*". It is structured data that can be downloaded for legal use, analysis and re-use. It does not include digital documents and information, such as policy documents or research reports that analyse data.

Publishing open data requires countries and international organisations to apply common standards and policies so that personal and restricted data is protected, data formats are consistent and the data can be legally used locally and globally. These common standards and policies enable better decision-making and offer efficiencies in national and local organisations and communities that collect and manage data.

Codes of conduct are also emerging to cover the sharing of sensitive data to protect all involved from the risks of data sharing. They provide principles that the signatories agree to apply in their contracts. An example is **GODAN's codes of conduct**, voluntary guidelines and sets of principles around how to transparently govern farm data. This online tool provides the conceptual basis for general, scalable guidelines for everyone dealing with the production, ownership, sharing and use of data in agriculture.

Open land governance data can be used to support land claims and provide public evidence of land ownership, thereby reducing corruption opportunities and offering a route to greater public empowerment. It helps communities monitor whether environmental protections are being upheld, and supports rights claims over geographical areas inhabited for generations. It helps civil society organisations understand patterns of land deals, support environmental and social advocacy, and investigate and address corruption.

There is very little global evidence of open land governance data. **International indices** show that it is currently restricted to land tenure data in a small number of developed countries such as Canada, South Korea, Australia and New Zealand which have sophisticated land information systems. They release cadastre data (boundaries of land parcels) and land registries (property rights and interests and some details of ownership of particular parcels of land) as open data. They routinely publish geospatial (linked to a location reference point) data as open data.

Governments rarely publish data collected for administering the other land administration functions of land use, value and development as open data. The 2019 research undertaken for the *State of Open Data report* "could not locate any sources indicating the extent to which different countries provide structured data on government land holdings, their purchases and disposal. It noted individual instances of some open data, for example, the *UK government's open datasheet of overseas companies that own property in England and Wales* but no corresponding datasheet showing the land that has been sold off.

Some national and local governments sell their land and property sales data, thereby earning revenue to assist with the costs of maintaining their information systems. Others contract this work to private organisations that also usually sell it.

International open land data is generally geospatial data or aggregated data from international surveys or national statistical offices. It is released by international organisations such as the World Bank, United Nations, and bi-lateral donor organizations, e.g. *World Bank Official Boundaries*. The *Land Portal* offers a wide range of statistical data aggregated from trusted providers.

Publishing land data in open formats can place a burden on countries if the process is not built into existing systems and understood by those creating and managing the data. Ideally it requires digital information systems designed with an open-by-default capability which also protects personal and restricted records. It is crucial for countries to set policy which protects the privacy and security of individuals in order to gain their confidence. For example, New Zealand requires all users of its open land ownership data to agree to a *separate licence* before they can use, reuse and share the property and ownership layers that contain personal information. This does not apply to public elements of the data in the Land Information New Zealand Data Service.

The developing countries which are undertaking projects to upgrade their legacy paper-based information systems, with the support of development banks, do not appear to be including an open data component. They also need to accommodate and manage the data collected by community groups and individuals when existing national systems have been incomplete or minimal. These projects can also take advantage of new methods for collecting land data, such as GPS, satellite and mobile phone technologies.

The land data types identified below aim to help countries upgrade their information systems, plan and implement their open data projects, or consider options for doing so. They set out the key land governance data types, list the required data standards and give examples of countries and organisations that release open data or are on the journey to do so.

Land data assessment frameworks

Numerous international instruments and frameworks have been developed to assess and promote good land governance. At the global level, and perhaps best known, are the Sustainable Development Goals (SDGs) of the United Nations (UN), which recognise that poverty eradication is the single biggest challenge to ensuring sustainable development. The UN has developed 17 goals with 169 corresponding targets. Each target has one or more indicators associated with it. While there is no explicit goal on land governance, many of its targets and indicators relate to land governance.

LANDex aggregates data sources, including governments' administrative data, household surveys, people-based assessments, including the perspectives of unaffiliated individuals, and participatory or community-generated data. Its methodology is based on a set of "*10 ILC commitments to people-centred land governance*" incorporating 33 indicators (LANDex, 2021).

Prindex is a global perception-based index using a random sampling of interviewees in every country (PRINDEX, 2020). The PRINDEX (2020) is focussed on a single comparable indicator, tenure security, to "*assess how respondents feel about the security of their tenure, not their legal status*".

The Land Matrix "*promotes transparency and accountability in decisions over large scale land acquisitions in low- and middle-income countries by capturing and sharing data about these deals at global, regional, and national level*" (Land Matrix, 2021) and tracks indicators on the size of deals, the number of deals and the status of deals.

The Land Governance Assessment Framework (LGAF) was developed by the World Bank (World Bank, 2012) and applied by scholars (Deininger, Selod, & Burns, 2012) as well as in a modified form in the Land Governance Scoping Study for Southern Africa (Bayer, Enemark, & Kirk, 2020). The LGAF tool assesses land governance over 5 themes and numerous indicators resulting in performance scores across 80 dimensions as rated by national land experts.

The scholars (Burns & Dalrymple, 2008) have developed a conceptual framework for good governance in land administration that includes a set of principles and corresponding indicators. Other frameworks for land governance include the FAO's Voluntary guidelines for the responsible governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (FAO, 2012) and Koroso, van der Molen, Tuladhar, & Zevenbergen (2013) who developed an assessment framework for urban land use rights in China.

A common characteristic of these frameworks is that they attempt to assess the state of land governance based on perception, interviews, surveys and other data. These approaches rely primarily on secondary data, rather than on the primary data produced by the land governance activities. They tell us a lot about how countries are performing with regards to broader land governance principles.

The Global Land Indicators Initiative (GLII) indicators, developed by the Global Land Tool Network, focus on tenure security, land conflicts, land administration services and land use (Quan & Kumar, 2017) and assess land data based on the land administration and governance functions. The GLII is also engaged with the Africa Centre for Statistics to fast-track land data generation, analysis, reporting and development of a land data repository. The GLII mandate includes support to land and statistical institutions to collect gender disaggregated data, analysis and reporting, and the adoption of new data technologies. It promotes evidence-based approaches to land monitoring, impact measurement of tenure security measures, policy influencing, and use of open land data repositories. Finally, the GLII supports the application of analytical tools for open data repositories, commonly agreed indicators, tools for data collection that are accessible and affordable, and development of regularly updated open datasets, including reliable technical solutions for land data gathering on informal tenures (GLII, 2017).

The State of Land Information Methodology, developed by the Land Portal, has three elements: scoping the information landscape in a country, an open data compliance assessment, and targeted capacity building interventions based on open data assessment and associated recommendations designed to achieve improvement in information management practices. This methodology assesses both the availability and the accessibility of data on Land tenure;

Land cover, use and management; Land disputes; Human settlements; Land markets and financing; and Land, climate change and environment. It has been applied to develop in-depth '***State of Open Land Information (SOLI)' reports on Kenya, Uganda, South Sudan and Tanzania,*** and ***South Africa***.

These reports "*uncover the country's land data and information ecosystem and provide a framework to democratize and improve it*". It focuses "*on the database or dataset and its sources*" and "*identifies trends and gaps when it comes to land data collection, as well as how accessible it is on the world wide web*" (Napier, et al., 2020).

In the same way, this Open Up Guide is assessing the accessibility and the availability of land data that a well-functioning land administration system and its associated functions are expected to produce. It documents the types of data and information required to contribute to good land governance. While it focuses on the primary data produced by the land administration functions, some secondary data is also included.

Land data

Unlike other types of data, land data has an intrinsic spatial element. While text data can contribute much about land and rights, it's singularly enriched when incorporating the spatial aspects of a land record. This generally adds an additional layer of complexity for the administration, management and analysis of data. However, in land administration systems there is an implicit understanding and expectation that spatial data is the norm, rather than the exception. This Guide includes and distinguishes between spatial data and non-spatial data; and accepts this as a necessary precondition for discussion on land data for improved governance of land and associated resources.

The online workshop "*Towards an Open Up Guide on Land Governance*", held in March 2020, identified the core data needs for opening up data on land governance. These are information on i) land parcels, ii) land use, iii) land transactions, iv) and performance of land governance functions. The workshop also identified an additional 7 data needs relating to land valuations, tax collection, policy evaluation and the decision-making framework around land. These data needs correspond very closely with the primary functions of a modern land administration system geared towards supporting sustainable development and good land governance.

The March 2020 workshop provided the foundation for the Open Up Guide, and using the new theory of *Land Administration for Sustainable Development* as the conceptual framework, further develop knowledge about open data for improved land governance. Land governance data therefore includes data and information on the core land administration functions of land tenure, use, value and development.

This approach and the key data types which relate to each function were validated at *an online workshop run by the Land Portal Foundation and the Open Data Charter* on 8 April 2021.

These land administration functions are:

Land tenure: the processes and institutions related to securing access to land and inventing commodities in land and their allocation, recording, and security; cadastral mapping and legal surveys to determine parcel boundaries; creation of new properties or alteration of existing properties; the transfer of property or use from adjudication of doubts and disputes regarding land rights and parcel boundaries.

Land value: the processes and institutions related to assessment of the value of land and properties; the calculation and gathering of revenues through taxation; and the management and adjudication of land valuation and taxation disputes.

Land use: the processes and institutions related to control of land use through adoption of planning policies and land-use regulations at the national, regional, and local level; the enforcement of land-use regulations; and the management and adjudication of land-use conflicts.

Land development: the processes and institutions related to building new physical infrastructure and utilities; the implementation of construction planning; public acquisition of land; expropriation; change of land use through granting of planning permissions, and building and land-use permits; and the distribution of development costs.

Although the Open Up Guide focuses on public sector data collected or administered by national and local governments, there might be other types of data collected by international organisations, civil society organisations, private enterprises and individuals. If this is the case, this Guide suggests ways for regulating and sharing data among these stakeholders to enable a good land governance framework.

Key
data types
for land
governance

Land tenure data

Table 1 lists only **spatial data** and typically involves cadastral mapping and legal surveys to determine parcel boundaries as well as the creation of new properties or alteration of existing properties and their boundaries. It also lists sectional titles (condominiums, apartment buildings) where the boundaries are removed from the surface of the earth and may float in space and be depicted in three dimensions.

Table 1: Land Tenure Data

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
PARCEL DATA SET CADASTRE: SURVEYED PARCEL BOUNDARIES			
Information contained on the National Cadastre. This is a record of all surveyed parcels nationally. Encompasses urban and rural land parcels. Also includes sectional parcels removed from the surface of the earth (3-D) » Coordinate System: Ellipsoid, Geoid, Projection » Parcel ID: Unique Parcel Identifier, Lot Number » Parcel Dimensions: Area, Length of sides, Coordinates » Parcel Description: Township, Reference Plan, Sectional Plan	» Spatial Vector	» Surveyor General or Equivalent	» *ISO 19152:2012 Land Administration Domain Model* (LADM)
PARCEL DATA SET CADASTRE OF TRADITIONAL/INDIGINOUS OR CUSTOMARY LAND PARCELS			
Contains information on customary land parcels. Sometimes stored by Government agencies where customary rights are legally recognised. Often deregulated and stored by traditional authorities in a distributed manner and across a range of formats. Information, if documented, might not be digital. Predominantly a rural phenomenon. » Coordinate System: Ellipsoid, Geoid, Projection » Parcel ID: Unique Parcel Identifier, Customary Lot Number » Parcel Dimensions: Area, Length of sides, Coordinates » Parcel Description: Traditional Authority Area, Reference Plan, Locality Plan	» Spatial Vector	» Minister Responsible for Traditional or Indigenous Affairs » Traditional or Indigenous Authorities » Individuals	» *ISO 19152:2012 Land Administration Domain Model* (LADM)
PARCEL DATA SET CADASTRE OF SETTLEMENTS, PARCELS OR STRUCTURES			
Contains information on the location of urban land parcels. Often these parcels might be documented by the local authorities responsible for the area. Sometimes also involves Traditional Authority structures, especially in peri-urban areas. Often deregulated, distributed and stored across a range of formats. Predominantly urban and peri-urban phenomenon. » Coordinate System: Ellipsoid, Geoid, Projection » Parcel ID: Unique Parcel/Structure Identifier, Informal Lot Number » Parcel Dimensions: Area, Length of Sides, Coordinates (Point Coordinate) » Parcel Description: Settlement Area, Reference/Community/Municipal Plan	» Spatial Vector	» Minister responsible for Local Government » Local Authorities » Traditional or Indigenous Authorities » Community Based Organisations, Individuals	» *ISO 19152:2012 Land Administration Domain Model* (LADM)
PARCEL DATA SET SURVEYED ROADS AND UTILITIES			
Contains information on Roads and other public services. Some services might be linear (power lines) but are typically buffered by easements/servitudes. These easements are sometimes, but not always registered or surveyed. Thus, it is important that the location of physical infrastructure is known. » Coordinate System: Ellipsoid, Geoid, Projection » Feature Type: Road, Powerline, Water Services, Sewerage, ITC infrastructure » Legal Buffer Zone: Distance within service where development is prohibited. » Feature Location: Coordinates » Feature Description: Length, Depth, Height, Width, Diameter, Load	» Spatial Vector	» Minister responsible for Public Works » Utility Companies » Local Authorities	» *ISO 19152:2012 Land Administration Domain Model* (LADM)

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
PARCEL DATA SET GEOLOGICAL/MINERAL RESOURCES SURVEY			
Typically mining leases and parcels as demarcated by the geological surveys. May contain data relating to Geochemical, Geophysical, Geological Data » Coordinate System: Ellipsoid, Geoid, Projection » Claim License Holder: Natural or Juristic Entity (Shareholding) » Claim ID: Unique Claim Identifier » Claim Dimensions and Location: Area, Length of Sides, Coordinates (Point Coordinate) » Claim Description: Type of License (Prospecting, Mining) » Claim Type: Base Metals, Industrial Minerals, Precious-Semi Precious Minerals/Metals » Base Geological Data: Geochemical, Geophysical	» Spatial Vector » Raster	» Geological Survey/ Ministry responsible for Mines	» *Committee for Mineral Reserves International Reporting Standards* (CRIRSC)
PARCEL DATA SET NATURAL RESOURCES AND ENVIRONMENTAL MAPPING			
This could include information on the use of natural resources rights such as forest products including leases and community uses and protected areas. » Coordinate System: Ellipsoid, Geoid, Projection » Forestry or Natural Resources Claims/Licences: Natural or Juristic Entity (Shareholding) » Forestry or Natural Resources Claims/Licences ID: Unique Claim Identifier » Forestry or Natural Resources Claims/Licences Dimensions and Location: Area, Length of Sides, Coordinates (Point Coordinate) » Base Natural Resources Data: Land Cover, Soil Type, Vegetation	» Spatial Vector » Raster	» Ministry responsible for Forestry and Environment.	

Table 2 below lists the **non-spatial data** descriptions of the corresponding spatial datasets. In fully integrated cadastres these data types might be contained in one database but this is not always the case. For the purposes of clarity, they are expressed here as separate non-spatial (or attribute) data types that contain the component. They would typically detail the type of rights held (leasehold, licence, use, ownership etc), the duration of such rights, and the identity of the legal entity holding such rights. Often the non-spatial information could also contain financial information such as the cost of the rights, mortgages if any, and dues that are liable or benefits that may be accrued.

Table 2: Non-spatial Land Tenure Data

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
DATA TYPE REGISTER OF SURVEYED PARCEL OWNERSHIP AND RIGHTS			
Typically, the information contained on the National Land Register. This is a record of all surveyed parcels and the associated rights. Typically encompasses urban and rural land parcels. Includes all new transactions. » Parcel ID: Unique Parcel Identifier, Lot Number » Parcel Owner: Natural/Juristic Person (Name, Gender, Identification/Company Registration Number) » Deed/Title Number: Reference to Legal Instrument of Rights » Title Registration: Effective Date of Registration/Transfer » Type of Rights: (Ownership, Sectional title, Leasehold rights) » Restrictions: Servitudes, Easements, Mortgages	» Non-spatial	» Registrar General or Equivalent	» *ISO 19152:2012 Land Administration Domain Model* (LADM)
DATA TYPE REGISTRY OF TRADITIONAL/CUSTOMARY OR INDIGENOUS LAND RIGHTS			
Contains information on customary land rights. Rights could be individual or group rights. May also be leased out for commercial purposes to non-traditional members. Sometimes stored by Government agencies where customary rights are legally recognised. Often deregulated and stored by traditional authorities in a distributed manner and across a range of formats. Information, if documented, might not be digital. Predominantly rural phenomenon. » Parcel ID: Unique Parcel Identifier, Lot Number » Parcel Owner: Natural/Juristic Person (Name, Identification/Company Registration Number) » Instrument Number: Reference to Legal Instrument of Rights » Registration: Effective Date of Registration/Transfer » Type of Rights: (Ownership, Customary, Leasehold rights) » Restrictions: Use rights, Group Rights, Servitudes, Easements, Mortgages,	» Non-spatial	» Minister responsible for Traditional Affairs » Traditional, Indigenous, Customary, Authorities » Individuals	» *ISO 19152:2012 Land Administration Domain Model* (LADM)
DATA TYPE REGISTRY OF INFORMAL LAND RIGHTS			
Contains information on the rights to urban land parcels held by individuals. Often these rights might be documented by the local authorities responsible for the area. Sometimes also involves Traditional Authority structures, especially in peri-urban areas. Often deregulated, distributed and stored across a range of formats. Predominantly Urban and peri-urban phenomenon. » Parcel ID: Structure, Unique Parcel Identifier, Lot Number » Parcel Owner: Natural/Juristic Person (Name, Identification/Company Registration Number) » Instrument Number: Reference to Legal Instrument of Rights » Registration: Effective Date of Occupancy/Registration/Transfer » Type of Rights: (Occupancy, Ownership, Customary, Leasehold Rights) » Restrictions: Use rights, Group Rights, Occupancy Rights	» Non-spatial	» Minister responsible for » Local Government. » Local Authorities. » Traditional and Indigenous Authorities » CBOs & Individuals	» *ISO 19152:2012 Land Administration Domain Model* (LADM)

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
DATA TYPE SURVEYED ROADS AND UTILITIES			
Record the ownership of polygons, line or point features such as roads, electrical, water and other cables and pipelines or wells. Sometimes part of the land registry (ownership or easement/servitude) but in many instances unregistered and not indicated as part of the parcel fabric, but as part of the utility company or government department. » Feature Type ID: Polygon, Line or Point ID » Feature Owner: Entity Name or Company Registration » Type of Rights: Ownership, Leasehold, Easement » Registration: If applicable, date of registration, acquisition or installation of infrastructure. » Detail of Feature Type: Road (According to Legal Classification), Powerline (According to Legal Classification) » Legal Buffer Zone: Distance within service where development is prohibited. » Restrictions: Any Development Restrictions associated with the feature. » Feature Description: Length, Depth, Height, Width, Diameter, Load	» Non-spatial	» Minister responsible for Public Works. » Utility Companies » Local Authorities	» *ISO 19152:2012 Land Administration Domain Model* (LADM)
DATA TYPE GEOLOGICAL/ MINERAL RESOURCES SURVEY			
Typically, the ownership or rights holders of mining leases and parcels as demarcated by the geological surveys. May contain data relating to different types of licenses and rights and durations. » Claim ID: Unique Claim Identifier » Claim License Holder: Natural or Juristic Entity (Shareholding) » Registration Date: Effective date regarding acquisition of rights. » Claim Description: Type of License (Prospecting, Mining) » Claim Type: Base Metals, Industrial Minerals, Precious-Semi Precious Minerals/Metals » Base Geological Data: Geochemical, Geophysical	» Non-spatial	» Geological Survey/Ministry responsible for Mines	» *Committee for Mineral Reserves International Reporting Standards (CRIRSC)* » *EITI Standard*
DATA TYPE FORESTRY/ENVIRONMENTAL MAPPING			
Typically, Forestry information, including leases, permit holders, community uses and protected areas. Would indicate whether private or public forest or conservation area. In some jurisdictions could also be commercial forest plantations, community uses or communal/community forests. » Forestry or Natural Resources Claims/Licences ID: Unique Claim Identifier » Forestry or Natural Resources Claims/Licences: Natural or Juristic Entity (Shareholding) » Registration Date: Effective date regarding acquisition of rights. » Forestry or Natural Resources Claims/Licences Description: Type of License (Harvesting, Use) » Forestry or Natural Resources Claims/Licences Type: Hardwoods, Thatching Grass, Forest Fruits,	» Non-spatial	» Ministry responsible for Forestry and Environment.	

Land value

This should contain all the information regarding land valuations and transfers so that information on the land market and its functioning may be derived. It should include information on the processes, valuations and tax rates of all parcels of land in the country. Increasingly large-scale investments in land from non-national entities globally are a cause for concern. While their impact is still being debated (Muller, et al., 2021; Hufe & Heuermann, 2017), data on the large international land investments could prove to be a valuable contribution to understanding and subsequently improving land governance.

Table 3: Land Value Data

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
DATA TYPE LAND VALUE (OPEN MARKET)			
Typically, the information contained on the National Land Register. Includes all new transactions as well as their value. Mortgage information is also recorded. » Parcel ID: Unique Parcel Identifier, Lot Number » Parcel Owner: Natural/Juristic Person (Name, Identification/Company Registration Number) » Deed/Title Number: Reference to Legal Instrument of Rights » Value: Commercial/Private Valuation of Property » Purchase Price: Price paid for Transaction » Type of Rights: (Ownership, Sectional title, Leasehold rights) » Land Use: Zoning or Use Rights on Parcel (Industrial, Commercial, Residential, Agricultural) » Restrictions: Servitudes, Easements, Usufruct	» Non-spatial	» Registrar of Deeds/Titles » Land Registry » Valuer General or Equivalent	» *ISO 19152:2012 Land Administration Domain Model* (LADM)
DATA TYPE LAND VALUATION (FOR TAXATION)			
Most Local and National authorities publish a valuation roll for the purposes of rates and taxation. These public values are distinct from the private valuation for commercial transaction and mortgaging. These values are updated on a regular basis usually pre-defined (annual or up to five-year cycles). » Parcel ID: Unique Parcel Identifier, Lot Number » Parcel Owner: Natural/Juristic Person (Name, Identification/Company Registration Number) » Deed/Title Number: Reference to Legal Instrument of Rights » Value: Public Valuation of Property (Valuation Roll) » Date: Date of Current Valuation » Period: Duration or Period of Validity of Valuation Roll » Method: Method used to determine Valuation » Type of Rights: (Ownership, Sectional title, Leasehold rights) » Land Use: Zoning or Use Rights on Parcel (Industrial, Commercial, Residential, Agricultural)	» Non-spatial	» Valuer General or Equivalent » Local Authorities	» *International Valuation Standards (IVS)*
DATA TYPE LOCAL/NATIONAL PROPERTY TAXATION			
Publish information on the value for taxation of municipal/national properties. This may be done per local authority and/or nationally. Rural and agricultural land may be subject to similar valuations for taxation based on national or regional levels. » Parcel ID: Unique Parcel Identifier, Lot Number » Tax Rate: Approved Local Authority/National Taxation Rates » Tax Types: Endowments, Betterments and other Land Value Capture Instruments » Land Use: Effective Land Use for Taxation Purposes » Tax Exemptions: Entities that might be exempt from paying Tax, and the degree of exemptions. » Revenue Generation: Revenue Generated from Local/National Property Taxes » Default Rates: Degree or Extent of Payment/Default/Arrears including the parcels.	» Non-spatial	» Local Authorities. » Ministry Responsible for Urban Land » Ministry Responsible for Rural/ Agricultural land.	
DATA TYPE LAND MARKETS AND TRANSFERS			
Tax rates for land transfers, volume of transfers and other information on land value and land markets. » Land Transfer Taxes: Policy on Taxation of Land Transfers (Capital Gains Tax and Rates) » Land Transfer Fees: Policy on Fees of Land Transfers (Stamp Duty, Transfer Duty) » Instrument Number: Reference to Legal Instrument on Transfer Fees and Taxes » Annual Revenue Generated: Land Transfer Taxes » Annual Revenue Generated: Land Transfer Fees » Annual Land Transfers: Number, Type, Size, Value of Land Transactions	» Non-spatial	» Ministry Responsible for Finances » Local Authority	

Land use data

The data should reflect the scale and scope of land use and control through national and local land use planning practices and process, the degree to which plans are developed and how they relate from the national framework to the regional and local frameworks (Integrated Land Use Planning). The data should also reflect the use of the land, the degree of enforcement of land use regulations and the management of conflicts that may arise from alternative land uses.

Land Use data is usually distributed over a range of entities and local authorities. Often these organisations could also have very different capacities. This could be a very challenging area to get information about at the national level. The support of a statistical agency or other national agencies that have a data and information dissemination mandate could play an important role here in developing land use information at the national level, as well as coordinating with local governments to get subnational and regional disaggregated data.

Land use should also be understood in the context of the expected, designed or planned land use and the actual land use. The permitted land use and the actual land use might not be the same, and provides important information with regards to compliance and enforcement of laws, policies and other regulations.

Table 4: Land Use Data

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
DATA TYPE LAND USE AND ZONING			
Land Use Data is collected at national and local level and could be highly distributed depending on the capacity at local authority levels. Could be contained in zoning plans (typical in local authority areas), land use plans and town planning schemes for urban and rural areas. Informal Land use data should also be included as appropriate. Shack Dwellers federations, community-based organisations as well as local authorities of track land uses that occur outside the formal system. These community planning instruments should be included in that land use data set for consideration and planning. » Parcel ID: Unique Parcel Identifier, Lot Number, Polygon Feature » Land Use Type: Land Use Classification Systems (Agriculture, Urban, Conservation Area, Customary, Informal etc.) » Zoning Type: Zonation Classification Systems (Residential, Industrial, Commercial, Institutional etc) » Administrative Authority: Entity that has jurisdiction over the Land Use » Land Use Policy: Description of Land Uses and allowable activities. » Zoning Policy: Description of Zones and allowable activities. » Land Use Amendments: Track changes in statutory land use. » Zoning Amendments: Track changes in statutory zoning. » Land Use Map: Show Aggregated land use » Zoning Map: Show aggregated zonation.	» Spatial + » Non-spatial	» Ministry Responsible for Local and Regional Government » Local and Regional Authorities. » National Spatial Data Agency » Community Based organisations such as the Shack Dwellers Federation.	
DATA TYPE ENFORCEMENT OF LAND USE AND ZONING.			
Ensuring adherence to legal land use is critical to planning and ensuring transparency and the good governance of land. Use of the land should be public and in conformity with the rules and regulations to protect society and the environment from harm and sustain the land for future use. » Enforcement Policy: Outline the rules and regulations, including penalties for non-compliance for land use and zonation. » Enforcement Mechanisms.: Outline how Enforcement Policy is implemented, including statutory power and powers of investigation. » Land Use and Zoning Amendments: Policy and Procedures for Changing/amending the land use or zonation (Including fees payable and other value capture instruments). » Land Use Profile: Number, Type, Size, Value of Land Uses » Zonation Profile: Number, Type, Size, Value of Zones » Land Use Change: Show Changes in land use » Zoning Change: Show changes in zoning	» Spatial + » Non-spatial	» Ministry Responsible for Local and Regional Government » Local and Regional Authorities. » National Spatial Data Agency » Community Based organisations such as the Shack Dwellers Federation.	
DATA TYPE PUBLIC LAND INVENTORY			
Public lands are often treated differently from the local authority or government owned land. A public land inventory would typically capture the land use and even cover for a range of public land parcels and uses. Some of this information might be contained in the Land Registry, but it is good practice to document public land separately. » Parcel ID: Unique Parcel Identifier, Lot Number » Public Land Inventory: Location, size, use dimensions of all public land. » Public Land Transfers: The location, size, use land rationale for public land that has been alienated. » Alienation: Policy and Procedures for the alienation of public land, including compensation. » Use of Public Land: Name of Entity using Public Land, including terms and conditions. Date that rights were alienated and duration of such rights. » Revenue from Public Land: Revenue Generated from Public Land (Rental, Parks, Leases etc)	» Non-spatial	» Local Authorities. » Ministry Responsible for Rural/ Agricultural land. » Ministry Responsible for Urban Land » National Spatial Data Agency	» *ISO 19152:2012 Land Administration Domain Model* (LADM)

Land development data

Land development data may refer to the construction of new physical infrastructure, both private and public. This would include information on the licenses and permits required for construction to take place, the approvals process as well as enforcement to ensure adherence to the conditions provided in terms of the new constructions. It could also relate to the process of changing land use and the alienation of public land for private use as well as the expropriation of private land for public use. This may be tracked through local authority permits and approvals for building permits, land use permits and land value capture mechanisms and the distribution of development costs.

Table 5: Land Development Database

DESCRIPTION	TYPE	DATA STEWARD	STANDARD

DATA TYPE DEVELOPMENT APPROVALS

| Local authorities are assumed to track, monitor and enforce development and land use permits. They should also have a database of and budget for development costs as well as land use capture instruments used. | » Spatial
» Non-spatial | » Minister responsible for local and regional government
» Minister responsible for land
» Local and regional authorities | |

- » Development Policy: Policy on land developments approvals, including procedures and durations. Outline cost and type of applications that may be submitted as well as how applications are considered.
- » Land Development Application: Application number and basic details of the application.
- » Object ID: ID of the spatial object relating to the application.
- » Application Type: Use Change, Development Proposal, Subdivision, Agriculture, Industry etc
- » Application Classification: Policy on the Classification of Development Applications
- » Applicant ID: Identification (Natural or Juristic) of Applicant
- » Scope of Application: Indication regarding the impact of the application
- » Outcome: Outcome of the applications submitted for approval.
- » Approved Application: Value, Size, Units, etc. of application approved.
- » Rejected Applications: Value, Size, Units, etc. of application rejected.

DATA TYPE EXPROPRIATION OF LAND

| Expropriation of public and private land is inevitable to ensure adequate social and economic development in society. Expropriation is often contentious and should be treated with care. | » Non-spatial | » Ministry Responsible for Local and Regional Government
» Local and Regional Authorities.
» National Spatial Data Agency | |

- » Expropriation Policy: Outline the rules and regulations, including compensation for land expropriation.
- » Expropriation Purpose.: State the Purpose for which land was expropriated.
- » Expropriation Commencement: Date of Start and Completion of Expropriation Process.
- » Parcel ID: Clearly identify the location, size, dimensions and value of the expropriated land.
- » Parcel Owner: Natural/Juristic Person (Name, Gender, Identification, Citizenship, Company Registration Number, Country of Registration)
- » Compensation: State value of compensation agreed upon, including any value in lieu!
- » Expropriation summary: Value, Compensation, Size, Location, Number of land parcels Expropriated

DATA TYPE LAND CONFLICTS

| Expropriation development approvals and the location of land rights may be subjected to conflicts and challenges. As part of the land management process systems to manage and adjudicate these conflicts are necessary. | » Non-spatial | » Local Authorities.
» Ministry Responsible for Rural/Agricultural land.
» Ministry Responsible for Urban Land
» Judiciary, Traditional Courts, ADR | |

- » Land Conflict Policy: Policy that describes the type and the scope of land conflicts. These could be about land use, title, customary, inheritance, objections to development proposals or other types of conflicts.
- » Conflict ID: Unique identification of conflicts.
- » Type of Conflicts: Describe the nature/type of conflict in line with policy.
- » Escalation of Conflict: Adr/Traditional/Lower court/High Court
- » Status: Resolved/Ongoing/Paused
- » Conflict Description: Describe the conflict. (Issue, Parties, Jurisdiction)
- » Outcome: Describe the eventual outcome of the conflict.
- » Outcome Summary: The number, type and escalation of conflicts.

Other data types

If good land governance is about being efficient, effective and transparent while ensuring that the processes are autonomous and participatory and that outcomes are equitable and secure, then accessible and up-to-date primary and secondary data is needed to measure and re-use this. Other data types that are perhaps not typically derived from the land administration paradigm, but are complementary to it, may also be important for good land governance.

At the most basic level this includes data on the political and administrative boundaries and areas of jurisdiction, including traditional authority areas or any other areas of special jurisdiction. This may be described as spatial or simply in text by virtue of a formal government notification.

Many countries continue to enforce land reforms, and it is important that these reforms are considered on their own in terms of performance and outcomes. Data should demonstrate the nature and extent of these reforms to enable subsequent analysis of their efficacy.

The national census data is an important resource of information and data for understanding the underlying socio-economic issues in many countries. Information on agriculture may be incomplete, isolated from other national data and suffers from inconsistent investments. However agricultural census information on activities such as land use, employment and production provide critical data for a modern land administration system.

Table 6: Other Data Types

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
DATA TYPE ADMINISTRATIVE AND POLITICAL BOUNDARIES			
This could be information related to the local, regional and national government areas of jurisdiction. Could also include data on traditional authority management areas. » Powers and Authorities: Policies and Laws on the jurisdiction of each level of government. » Classification of Jurisdiction: Policy describing the levels of government from local/village level to regional/provincial, federal and national government. » Object ID: ID of the spatial object relating to a level of government » Description of Object: Name of governing entity, Level of Government, Size, Boundaries » Restrictions: Summary of Restrictions Applied to the Object Jurisdiction » Features of Object: Number of Residents, Level of Education, Income, Contribution to National Tax Base, Employment, Primary Industry, Level Of Infrastructural Development » Object Plans: Description of National, Regional Local Development Plans applicable to the area. » Socio Economic Status of Object: Derived from Census Data	» Spatial + » Non-spatial	» Surveyor General or Equivalent » Minister Responsible for Regional/Local Government » Minister responsible for Traditional and Indigenous Authority Areas	» *ISO 19152:2012 Land Administration Domain Model* (LADM)
DATA TYPE LAND REFORM DATA			
This would include data on beneficiaries that have been resettled or rights that have been restituted. » Land Parcel ID: Land Parcels that have been the subject of a land reform (redistribution, restitution) process. » Beneficiaries: Identification and description of beneficiaries. » Evictions: Identification and description of persons/groups that have been evicted, or have had rights curtailed » Value: Value of land that has been redistributed or for which compensation has been paid. » Size: The amount of land that has been transferred as part of the l=reform process. » Compensation: State value of compensation agreed upon, including any value in lieu! » Volume: Number and distribution of parcels transferred. » Impact: Number of Beneficiaries that have been resettled/restituted. » Cost: Spending on land reform initiatives, including fixed, operational and capital costs. » Benefits: Income and equity benefits derived from land reforms.	» Non-spatial	» Surveyor General or Equivalent » Minister responsible for Land Reform » National Spatial Data Agency	
DATA TYPE NATIONAL CENSUS DATA/SOCIO-ECONOMIC INDICATORS			
The nation census likely contains information on household access to services, housing and other relevant socio-economic indicators linked to land. » Housing » Society, Culture and Heritage » Business and Economy » Education » Income » Demography » Health » Services and Utilities	» Non-spatial	» National Statistics Agency	

DESCRIPTION	TYPE	DATA STEWARD	STANDARD

DATA TYPE NATIONAL AGRICULTURAL CENSUS/AGRICULTURAL LAND USE INDICATORS

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
The national agricultural census collects critical information on agricultural activities such as agricultural land use, employment and production provide structured data at regular intervals.	» Non Spatial	» National Statistics Agencies » Ministry Responsible for Agriculture	» LSMS-ISA (WB)

- » Characteristics of the household dwelling: Non-food household expenditure items, Fund transfers, Food security, Food consumption
- » Agriculture and livestock: Access to land, Seasonal agriculture, Livestock, Forestry, Agricultural equipment
- » Community: Economy and infrastructure in the village/neighborhood, Characteristics of agriculture in the village/neighborhood, Livestock and negative shocks which the community has been victim during the last 5 years, Community needs for infrastructure, Local prices Index

DATA TYPE PUBLIC ASSET DECLARATIONS

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
Ministers and Public servants (especially senior civil servants) are often required to declare their assets and financial interests. Even when this is not required there are often policies in place to regulate the activities of public officials to ensure that they do not benefit unfairly from their positions of relative authority with regards to public works.	» Non-spatial	» Minister Responsible for Public Service	

- » Policy on Public Servants Business: Policy that governs public servants work and private business.
- » Public Servant identification: Name, gender, year in he/she took office, office/public entity in he/she works
- » Assets information: Company directorships and controlling interests, Interests (such as shares and bonds) in companies and business entities, Employment, Interests in trusts, Organisations and trusts seeking Government funding, Real estate property–property type (house, apartment, building, car, boat, location, current value, acquisition value, ownership percentage, method of acquisition (bought, donation, inheritance), Wife/Husband/Son/Daughter Properties, Superannuation schemes, Managed investment schemes, Debtors, Creditors, Overseas travel, Gifts, Discharged debts, Payments for activities.

DATA TYPE BENEFICIAL OWNERSHIP

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
Freely available register of information on company owners so that business is done in the open, markets are fair and governments run effectively	» Non-spatial	» Minister responsible for Trade, Business and Commerce	» *Beneficial Ownership Data Standard*

- » Ownership or Control Statement: Entity, Interested party (a reference to an entity, natural person, arrangement or trust), Details of the interest, Provenance of information for the statement.
- » Politically Exposed Person Status Details
- » Person Statement: Information known about a natural person at a particular point in time, or from a given submission of information
- » Interested party:
- » Publication details
- » Publisher

DATA TYPE PUBLIC PROCUREMENT

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
Publication of public tenders, direct contracting, and awarded contracts as open data	» Non-spatial	» Minister responsible for Trade, Business and Commerce	» *Open Contracting Data Standard*

- » Parties (organisations) awarded contracts: : address, contact, ID, name, roles
- » Amounts: amount, currency
- » Items: quantity, description, ID, unit, value
- » Time periods: end date, start date
- » Documents: date published, description, document type, format, ID, title, language, URL
- » Milestones: description, due date, ID, title

DATA TYPE KEY LAND DATASETS FOR RESILIENCE AND CLIMATE CHANGE

DESCRIPTION	TYPE	DATA STEWARD	STANDARD
Datasets identified as playing a critical role in decision-making in the four stages of emergency management: risk reduction, readiness, response and recovery, and climate change	» Spatial + » Non-spatial	» Minister responsible for Land Administration » Dataset owners	» *ISO 19152:2012 Land Administration Domain Model* (LADM)

For example:
- » People and Property: population, buildings, address, emergency services
- » Rivers: Rivers, water catchments
- » Land: elevation, aerial imagery, coastline, topo maps

See: *https://www.linz.govt.nz/data/linz-data/resilience-and-climate-change/key-datasets-for-resilience-and-climate-change*

Policies and standards

Policies

The Integrated Geospatial Information framework (IGIF) (United Nations Statistical Division 2018-2020) provides a basis and guide for developing, integrating, strengthening and maximizing geospatial information management and related resources in all countries. It has three separate but connected parts: Part 1 : an Overarching Strategic Framework, Part 2: an Implementation Guide, and Part 3: a Country-level Action Plan, which together serve a country's needs in addressing economic, social and environmental factors, which depend on location information in a continually changing world. It aims to translate high-level concepts to practical implementation guidance for use by Member States and does this by leveraging seven underpinning principles, eight goals and nine strategic pathways.

The Implementation Guide sets out what is needed to establish, implement, strengthen, improve, and/or maintain a national geospatial information management system and capability. It focuses on location information that is integrated with any other meaningful data to solve societal and environmental problems, and is a catalyst for economic growth and opportunity and for understanding and taking benefit from a nation's development priorities and the Sustainable Development Goals.

The UN GGIM Framework for Effective Land Administration (*FELA*) (GGIM, 2020) is an overarching policy guide for Member States when developing, renewing, reforming, strengthening, modernizing, or monitoring land administration. It seeks to:

» implement the Integrated Geospatial Information Framework to the land sector, and support the achievement of the Sustainable Development Goals;

» develop a comprehensive vision for understanding, advocating and promoting effective land administration;

» provide strategic guidance towards country-specific action plans to be prepared and implemented;

» advocate continuous strengthening of land administration and management procedures, techniques, and tools; and

» enhance multilateral partnerships through policy discourse or harmonisation for effective land administration with a view to further guiding already existing policies in Member States.

It is relevant for developing and developed countries, all jurisdictions and all other stakeholders. It has four parts: the contextual background and drivers for FELA; the definition of effective land administration and how that relates to the Sustainable Development Goals; a high-level vision statement, goals, requirements, and outcomes; and nine pathways for effective land administration, including a series of priority actions as guidance for implementation.

The Addis Ababa Declaration on Geospatial Information Management towards good land governance for the 2030 agenda (Fourth High Level Forum on UN Global Geospatial Information Management, 2016), amongst other resolutions:

» promotes cooperation between and among all UN-GGIM regional committees in setting up global frameworks, common standards and application of best practices in geospatial information management, and also collaboration in implementing UN-GGIM regional action plans for achieving good and sustainable land governance; and

» embraces "*open data and standards, innovative and creative approaches and platforms that are fit-for-purpose to collect and collate, share and distribute geospatial and land information needed to address the diversity and complexity within the land sector with the singular aim to improve and secure land and property rights for all.*"

The 14 Global Fundamental Geospatial Data Themes (United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), 2019) are Global Geodetic Reference Frame, Addresses, Buildings and Settlements, Elevation and Depth, Functional Areas, Geographical Names, Geology and Soils, Land Cover and Land Use, Land Parcels, Orthoimagery, Physical Infrastructure, Population Distribution, Transport Networks, Water.

These themes are considered fundamental to strengthening a country's geospatial information infrastructure. Implementing them will require National Geospatial Information and Mapping Agencies, National Statistical Offices and other institutions to integrate information to produce standardised, fundamental data, for use within Member States, and to support initiatives such as the implementation of the 2030 Sustainable Development Agenda and its 17 Sustainable Development Goals (SDGs). They are also a key supporting foundation for overarching policies, such as the Integrated Geospatial Information Framework.

Open licensing policies have been set by mostly developed countries, requiring government agencies to release their non-personal, unrestricted data in open formats, allowing legal re-use. A typical example is the **New Zealand Government Open Access and Licensing** framework, which recommends the use of the **Creative Commons suite of International Licences**. Similar policies have been set by **Canada** and the **United Kingdom**. Namibia has passed an open data policy as a **spatial data infrastructure policy**, and has agreed and listed the category of 97 data types that must be open, many government departments have not yet complied with that policy. The **Africa Data Revolution Report 2018** reports that only 6% of all data (28 out of 420 datasets assessed) is openly licensed in compliance with the criteria laid out by the Open Definition. Open licence terms are used by statistical offices in Botswana, Senegal, Rwanda, and Somalia, as well as open data portals in Cote d'Ivoire, Eritrea and Kenya and Mauritius. Usually, websites provide copyright notes but do not apply licence terms dedicated to the website's data. In rare cases a Creative Commons Attribution (CC-BY) licence was being used. More common are bespoke terms that are compliant with the Open Definition. 14.5% of all data (61 out of 420 datasets assessed) is provided in at least one machine-readable format.

Standards

Countries developing, reforming or implementing land governance systems should apply the international standards and specifications for effective land and geospatial administration which are designed to assist them at all stages:

The ***ISO 19152:2012 Land Administration Domain Model*** (LADM) is the fundamental international land administration data standard. It contributes to the Sustainable Development Goals: 1, 2,11,14 and 15. Its purpose is to:

» define a reference model covering basic information-related components of land administration (including those over water and land, and elements above and below the surface of the earth)

» provide an abstract, conceptual model with four packages related to parties (people and organizations); basic administrative units, rights, responsibilities, and restrictions (ownership rights); spatial units (parcels, and the legal space of buildings and utility networks); spatial sources (surveying), and spatial representations (geometry and topology)

» provide terminology for land administration, based on various national and international systems, that is as simple as possible in order to be useful in practice and provides a basis for national and regional profiles; and

» enable the combining of land administration information from different sources in a coherent manner.

The ***Open Geospatial Consortium (OGC) Standards and Resources*** which members developed to make location information and services FAIR – Findable, Accessible, Interoperable and Reusable. Software developers use them to build open interfaces and encodings into their products and services.

These standards address specific interoperability challenges, such as publishing map content on the Web, exchanging critical location data during disaster response & recovery, and enabling the fusion of information from diverse Internet of Things (IoT) devices.

OGC's Abstract Specifications describe the conceptual foundation upon which OGC standards are built. ***OGC's Member-Developed Standards*** are developed by OGC members inside the O***GC Technical Committee***. ***OGC's Community Standards*** are widely-used specifications developed external to OGC but endorsed by OGC members as being a valuable part of the OGC Standards Baseline.

The ***INSPIRE Implementing Rules on interoperability of spatial data sets and services (IRs) and Technical Guidelines*** (Data Specifications) for the European Community specify common data models, code lists, map layers and additional metadata on the interoperability to be used when exchanging spatial datasets. It covers datasets which come under one or more of 34 spatial data themes which match the data types in this Open Up Guide.

The ***ISO/TC 211 Multi-Lingual Glossary of Terms (MLGT)*** has been compiled from International Standards developed by ISO/TC 211 to encourage consistency in the use and interpretation of geospatial terms. It is being made freely available to all interested people and organizations. It is available in two formats:

» Original Microsoft Excel version: ***2020602 Edition ISO/TC211 Multi-Lingual Glossary of Terms (MLGT)***

» The newly developed, online edition of the Multi-Lingual Glossary of Terms (MLGT) is available at ***Geolexica***

LandVoc, a standards controlled vocabulary developed by the Land Portal Foundation, covers concepts related to land governance. It consists of 310 concepts organized hierarchically and is available in a multitude of languages, including English, French, Spanish, Portuguese, Khmer, Vietnamese, Burmese, Thai, Swahili and Arabic. LandVoc goes beyond the sphere of land related matters by connecting to and exchanging information with other databases linked to other vocabularies. It is an ***AGROVOC*** sub-vocabulary hosted by FAO.

Cadastre and Land Administration Thesaurus (CaLAThe) is a thesaurus for the domain of cadastre and land administration. It is encoded as a ***Simple Knowledge Organization System*** (SKOS), according to specifications developed by the ***World Wide Web Consortium*** (W3C). As of December 2019, CaLAThe is hosted at the ***OGC Definitions Server***.

The ***EITI, the Global Standard for the Good Governance of Oil, Gas and Mineral Resources*** provides a framework and a process for promoting greater transparency and accountability in the oil, gas, and mining sectors. The EITI Requirements related to a transparent legal framework and awarding of extractive industry rights include: legal framework and fiscal regime; contract and license allocations; register of licenses; contracts; beneficial ownership; and state participation in the extractive sector.

Committee for Mineral Reserves International Reporting Standards. This identifies the countries and their standards which are in accordance with the principles of the CRIRSCO Template.

The ***Open Contracting Data Standard (OCDS)*** enables disclosure of data and documents at all stages of the contracting process by defining a common data model. It was created to support organizations to increase contracting transparency, and allow deeper analysis of contracting data by a wide range of users.

The ***Beneficial Ownership Data Standard*** has been developed to serve as a solid conceptual and practical framework for collecting and publishing beneficial ownership data, and enabling the resulting data to be interoperable, more easily reused, and of higher quality. A common data standard enables the exchange of data between implementing countries and allows for a rapid build-up of best practice on collecting, storing, and publishing beneficial ownership data.

The ***Open Up Guide: Using Open Data to Combat Corruption*** identifies priority datasets, including asset and pecuniary declarations, open standards and open data use-cases that governments, civil society and other stakeholders can focus on to tackle corruption at all levels and to respond to increasingly complex corruption networks. This is complemented by the World Bank's 2019 publication, ***Getting the Full Picture on Public Officials: a How-To Guide for Effective Financial Disclosure***.

Gaps and challenges

CURRENT STATE

Primary land tenure data is released for public use in only a very small number of countries globally. Governments rarely publish their primary land use, value and development data as open data. Some national and local governments sell their land and property sales data, thereby earning revenue to assist with the costs of maintaining their information systems but restricting access for many. Releasing land governance data in many countries has significant technical, institutional and financial barriers; in some cases, reliable, formal land tenure data does not exist at all, metadata is inadequate, the date of the resource and its source are unknown and there are no formal custodians for the data. Government officials may be embarrassed if the data they open up is inadequate, as this might suggest that their performance is inadequate. When improving this situation, countries and international organisations can use common standards and policies to protect personal and restricted data and to ensure reliable and consistent data formats and legal data use at local and global levels.

SOCIAL AND POLITICAL CONCERNS

Reform without political will, an open legal and regulatory property rights framework and effective land administration is risky. Opening up land governance data is primarily about improving the performance of the responsible agents of land administration, which is the government. Improving access to land governance data must therefore also be geared towards enabling governments departments to make use of and improve their performance, decision making and policy development. Reform is likely to be less successful if there is no clear benefit for improved governance and if reforms are simply seen to create additional work for these departments. Similarly, if there is no information law and confidence that personal data is protected, society may be adversely affected by open data reforms. Improving trust and transparency are fundamental. Whistleblowing legislation in some countries may also require a protection infrastructure for whistleblowers.

INCREASE TRUST

Citizens in many countries are not confident that their privacy and security is being protected at local and national levels. The lack of transparency and openness in land information systems disproportionately affects vulnerable and marginal groups in society, particularly women and ethnic minorities. Large donor investments in land registration systems currently make few resources available to enable open data. The introduction and upgrading of land information systems requires that major foundational work accompanies such reforms; namely a transparent

legal and regulatory framework for property rights, a functioning land administration system and tools and techniques for online support.

REDUCE INEQUITY

While better access to land governance data and information contributes to improved equity and combating corruption in society, there is a potential for negative outcomes. When access to data and information in many countries is unequal, it may result in land grabbing and resource appropriation as those with the resources to access this information may analyse and use it at the expense of the public and traditional/indigenous communities. Land administration authorities need a legal infrastructure and operational policies to manage this.

COST OF LAND GOVERNANCE DATA REFORM

The cost of opening up land governance data remains a challenge for many countries in the face of other pressing considerations. The most cost-effective time to design and build information systems which are 'open by default' is when countries are introducing or upgrading their land administration systems. System design that equally protects personal and restricted data and sets up business as usual publication of public (i.e., non-personal and unrestricted) data in open formats is less costly when introduced from the outset.

CONSIDER PUBLIC/COMMERCIAL PARTNERSHIP

Increasing access to, and enabling the collection, publication and use of open land governance data, should not be seen as the prerogative of the government alone, but rather of a broad partnership between citizens, the public and commercial sectors. While governments have the primary responsibility for the collection, use and publication of primary land governance data, commerce and the public also collect a significant

amount of data and information. Work to combine the government and private data and to ensure that an environment is built up that encompasses this tripartite approach remains a challenge.

INTRODUCE OPEN DATA POLICY AT NATIONAL LEVEL

Realising the benefits of open access to data and information needs modern intra-governmental policy and legislative environments. Countries must introduce policy for the collection, storage, stewardship, publication and use of all of the government's data types followed by regulations managing particular functions, for example, land administration. These instruments will set the foundations for data use and analysis and to address the problems that the government and the public face. They will also encourage legal and innovative reuse of open data to assist the country economically and socially.

IMPROVE ACCESSIBILITY OF SPATIAL DATA

With the increasing availability and use of geographic information systems, many governmental organizations, private companies, and academic researchers have expanded the quantity, accuracy, and types of their spatially referenced data. Central and local governments and the private sector are now collecting baseline spatial data, such as geodetic data, once and sharing it. This is reducing duplication of effort and addressing the underutilisation of this information that is created at considerable cost and effort. It is equally important that this information is accessible and that users do not have to download hardware and software to access it. A simple interface and easy open source tools are needed to allow easy exploration of the geospatial data. This could help address concerns that governments are lagging behind the private sector, for example, Google Earth.

WORKING WITH ALL WHO COLLECT AND MANAGE LAND DATA

In some developing countries, land administration data is collected by local governments or even by private and community groups. Some local or municipal governments are afraid of what the private sector might do with the data, A national land governance policy is needed that ensures that all collect, maintain and make available accurate, standardised and updated data, and that they work with national authorities as they are established or expanded.

RAISING ANALYTICAL CAPABILITY

As primary and secondary land data is made more open, it is essential that capability to use the data for analysis, decision making and policy development is put in place. Data coming from different sources and custodians (public and private) will need to be layered and integrated for advanced information analysis. Developing capacity for private and public officials and users to gain analytical and data science skills should be a top priority.

DIGITIZATION OF DATA AND DIGITIZATION OF PROCESSES

Many land registers only offer analogue and paper-based land governance data and information which makes searching, retrieving and analysis of a large number of transactions a slow and arduous task. Programmes to convert this information into digital records (digitizing) are slow, arduous and expensive in terms of financial and human resources. When digitising the data, organizations (private and public) must also convert their business processes (digitalisation) in order to fully derive the benefits of access to digital data and information. This will require detailed consideration of whether to include this work in a full reform of their land administration systems or to carry it out separately.

Digitization and digitalisation of public data, government departments and commercial enterprises remains a crucial challenge to overcome if the benefits of open access to land information are to be realised.

BUILD VALUE-ADDED GOVERNMENT SERVICES WHICH UTILISE OPEN LAND GOVERNANCE DATA

To address concerns that making public land data open for all to use means losing a revenue stream, authorities could offer value-added services built on top of the core provision of the open data. This revenue could replace what was accrued when there were charges for the data and create long term core data-based government services which other agencies can use and rely on. It is unlikely that a change of government would close access to the data if that would mean that key government services would close down.

Use cases

Kenya OGP National Action Plan 2020-2022. This plan includes several activities related to land governance data:

- » Enforce digitisation of records held by public institutions
- » Support development of GIS Labs and digitisation of development control
- » Regularly update Kenya Open Data Portal
- » Adopt Open Contracting Data Standard to cover all stages of public procurement
- » Publish details of companies winning mining contracts
- » Strengthen and encourage whistleblowing

DVF land valuation requests: an open platform for public data by the Ministry of Finance in France *https://www.data.gouv.fr/en/datasets/demandes-de-valeurs-foncieres/*

The *Land Information Inquiry Portal–Rwanda*

This Portal was established by Rwanda Land Management and Use Authority to help land owners, citizens, organizations and investors to confirm land ownership, to check the land area, land use and the planned use, to verify whether a parcel has any restriction or a mortgage registered against it, if there is an ongoing transaction on the parcel.

The portal is accessible on all platforms like desktop, mobile devices or tablets. For efficient use of the system, you must be a registered user. If you already have an account you will be allowed to sign in, in case you are using the portal for the first time, kindly register before proceeding.

The voluntary reports on the SDG land-related indicators 1.4.2, 5a1 and 5a2 by *Kenya*, *Namibia* and *Rwanda* include their progress toward meeting the SDH land-related indicators.

National Spatial Data Infrastructure (NSDI) for Namibia promotes an open and reliable supporting environment that facilitates access to geospatial information for society and government. *http://geofind.nsa.org.na*

openAFRICA, Africa's Largest Volunteer Driven Open Data Platform, aims to be the largest independent repository of open data on the African Continent.

Landonline, New Zealand's official land register, is primarily "the transaction centre for property professionals and local councils to carry out land dealings efficiently and securely online. It also has a public *online NZ land record search* where anyone can search for a title, instrument, survey or parcel and pay for a copy of the record. The *LINZ Data Service* delivers property and ownership, topographic, hydrographic, geodetic and electoral address open data in commonly used location information formats and via a web-service using global open standards. Most is licensed for the widest re-use possible under the Creative Commons Attribution 4.0 International licence (CC-BY) licence. Exceptions are layers of data containing property ownership which need a special licence to cover protection under Domestic Violence legislation.

The following potential use cases suggested at the 8 April 2021 Open Up Guide workshop are being further investigated:

» cost benefit studies show that businesses are downloading land governance data and integrating it into their own applications and products

» online data saves costs for governments as they do not have to dedicate time and resources to responding to citizens' requests for analogue which in many cases is the same information

» utilities use the data to find out to whom they could offer their services, e.g. mapping of homesteads offers them potential customers, providing economic benefits downstream

» the real estate market uses reliable, ideally complete and accurate property evaluation and planning data to stimulate land market activity which is beneficial to government and the public

» insurance companies use the data for property and other types of insurance

» the Namibian data agency has signed an agreement with a cell-phone company that has agreed to fund some of the agency's activities

» land records for agricultural land in India have led to smooth functioning of the market

» when data is opened up, people will invent possible services that were not possible before.

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