Land information systems for secure land rights



Digital solutions such as e-governance and land information systems make a significant contribution to securing land rights transparently and effectively.

Background

Worldwide, digital technologies are modernising government processes under the umbrella of e-governance. In land management, digital land information systems integrate spatial data into government processes, enabling better planning, monitoring and use of land resources. General systems support land use planning and resource monitoring, while cadastral systems manage ownership issues such as sale, rental, inheritance or consolidation. These systems benefit not only governments but also citizens and interest groups.

The basis for land information systems is geodata, which is collected and processed with the help of geographic information systems (GIS). The information provided can cover many different aspects, such as the environment, climate, agriculture, industry and population density.

However, there are various challenges and limitations in the collection and use of spatial data:

- Land information and cadastral systems are often set up in isolation. They capture only a part of the spatial data, such as formalised land rights. In many partner countries of German international cooperation, however, informal or traditional land rights are very common, which worked well before the introduction of cadastral systems. There is often a lack of legal and technical prerequisites or the political will to integrate them into modern systems.
- Data protection and data security must be guaranteed as a matter of principle.
- Data often has geostrategic relevance, and conflicts can arise locally or nationally due to published geodata.
- Some governments are critical of the collection and use of data because it creates transparency and exposes corruption.
- Data must be up-to-date and accurate. If this is not the case, its credibility decreases, and wrong decisions may ensue.

The more compatible different systems and data standards are, the easier it is for different institutions or administrative levels to work together. To this end, national spatial data infrastructures are being set up to clarify mandates and standards, for example. It is also important to note that access to digital technologies often varies greatly – for example, between urban and rural areas or between different population groups.

Digital land information systems and improved cross-sectoral data availability support the implementation of the global Sustainable Development Goals (SDGs). In particular, they contribute to the achievement of SDG 9 (Industry, Innovation and Infrastructure), SDG 11 (Sustainable Cities and Communities), SDG 15 (Life on Land) and SDG 16 (Peace, Justice and Strong Institutions).



Land information systems should contain as much data as possible **across sector boundaries** and should also cover **informal land rights**.

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Solutions from development cooperation

For the introduction and use of e-governance and land information systems, the legal and institutional framework must first be created. To this end, international cooperation can help to build a spatial data infrastructure, improve digital citizen services and develop data protection-compliant legislation – for the benefit of citizens.

In order to plan, set up and use land use systems effectively, national, regional and local decision-makers and administrative staff need appropriate know-how, which they can acquire through training and knowledge transfer.

With the help of e-readiness analyses, international cooperation supports its partners in assessing the technical and organisational requirements for the introduction of digital systems and offers support measures for digital infrastructure, internet access and hardware equipment on this basis.

Successful e-governance initiatives benefit when the administration, business, civil society and the science community work together in multi-stakeholder partnerships to design tailor-made solutions for a local context and establish open standards. Pilot and demonstration projects can serve as good practice examples and a basis for an exchange of experience. Open data initiatives make it possible to provide government data in open formats. This promotes transparency and innovation.

In most cases, the resources available for permanent operation of land information systems are limited. It therefore makes sense to analyse potential savings through digital data systems. How much time is saved, for example, if data is available directly, digitally and in a user-friendly way? For cost-effective maintenance of such systems, a fit-for-purpose approach is important, meaning that the approach is suitable and good enough to fulfil its intended function. The primary goal is to meet the specific land administration needs of a community or country using low-cost efficient methods and technologies to make land registration accessible for governments and society.

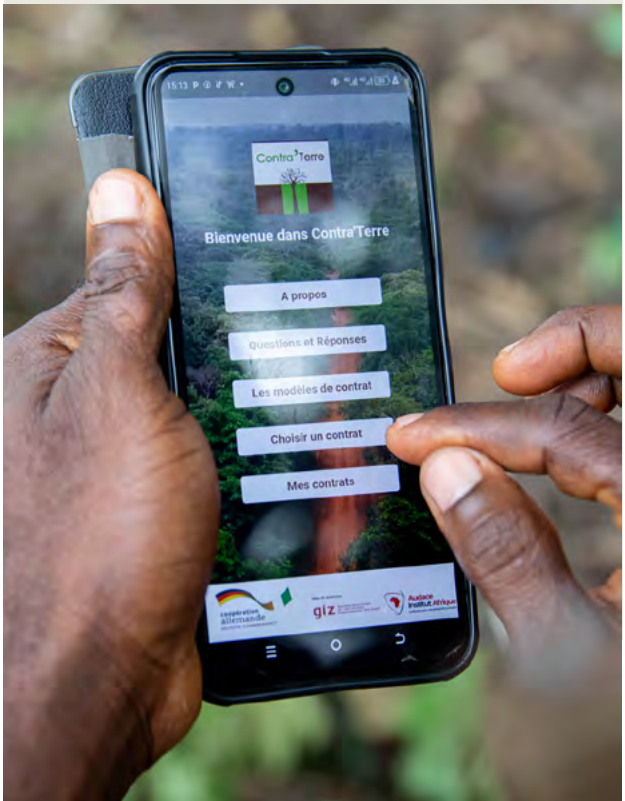


Côte d'Ivoire: Securing land rights with a fit-for-purpose app

In Côte d'Ivoire, the high level of immigration from neighbouring countries and internal migration have led to a complex system of mainly verbal land-use agreements, especially in the agriculturally important cocoa-growing region. However, such informal agreements create many uncertainties and migrants are increasingly questioning them, which often leads to land conflicts and low investment in sustainable land management.

As part of the Global Programme Responsible Land Policy, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, together with the State Land Agency (Agence Foncière Rurale – AFOR), developed the ContraTerre app to help municipalities create and document land contracts more efficiently. The app offers downloadable, online fillable forms, built-in guidance and ten standardised contract templates developed by AFOR. It is free, user-friendly, and works offline to ensure broad accessibility.

In the introductory phase, ContraTerre was deployed in 33 project villages, where four young villagers were trained as contract brokers. In these villages alone, more than 1,500 land contracts have been created via the app. In total, more than 3,000 landowners used the app to document their rights and defuse emerging land conflicts at an early stage. AFOR plans to scale the app nationwide.



Uganda: Integration of geospatial data into the land information system

In Uganda, where about 70 per cent of land is unregistered, the Responsible Land Policy in Uganda (RELAPU) project has supported the documentation of land rights on both Mailo and traditional land in the central and northern regions. Using a fit-for-purpose approach, RELAPU introduced the CRISP (Cadastre, Registration and Information Saving Paper) software to replace manual data collection and hand-drawn maps. With CRISP, over 110,000 Land Inventory Protocols (LIPs) were created, providing details of parcel size, ownership and location, and serving as a basis for Certificates of Customary Ownership (CCOs) and Certificates of Occupancy (CoOs).

However, most certificates were still produced manually on typewriters, and inconsistent data formats and different levels of accuracy among implementing partners made much of the data unsuitable for integration into the Uganda National Land Information System (UgNLIS).

After defining the technical specifications for CoO data, the Ministry of Lands, Housing and Urban Development (MLHUD) created a workflow in the UgNLIS to integrate CCO land data and digitise the process of issuing CCOs, replacing the old typewriter-based system.

Since then, RELAPU has helped MLHUD build district-level capacity to prepare and integrate CCO data. This led to the first 46 digital CCOs in the Lango region and 22 in Gulu. In Central Uganda, RELAPU also supports the integration of spatial CoO data into UgNLIS and the production of certificates of use in regional offices. The first digital CoOs from UgNLIS are already close to completion.

Results of GIZ's Global Programme
Responsible Land Policy (GPRLP) (2016–2026)

In Côte d'Ivoire,
digital systems and public-private partnerships
cut land contract costs
from 400 to 100 US dollars per hectare
and reduced **processing time**
from 36 to 12 months.

Based on a co-financed digital pilot
implemented by the global programme,
AFOR developed **nationwide systems for registering land ownership documents**.

AFOR also launched the **ContraTerre app** for registering land use agreements in agriculture, agroforestry and agropastoralism, **extending services to more households.**

Key messages

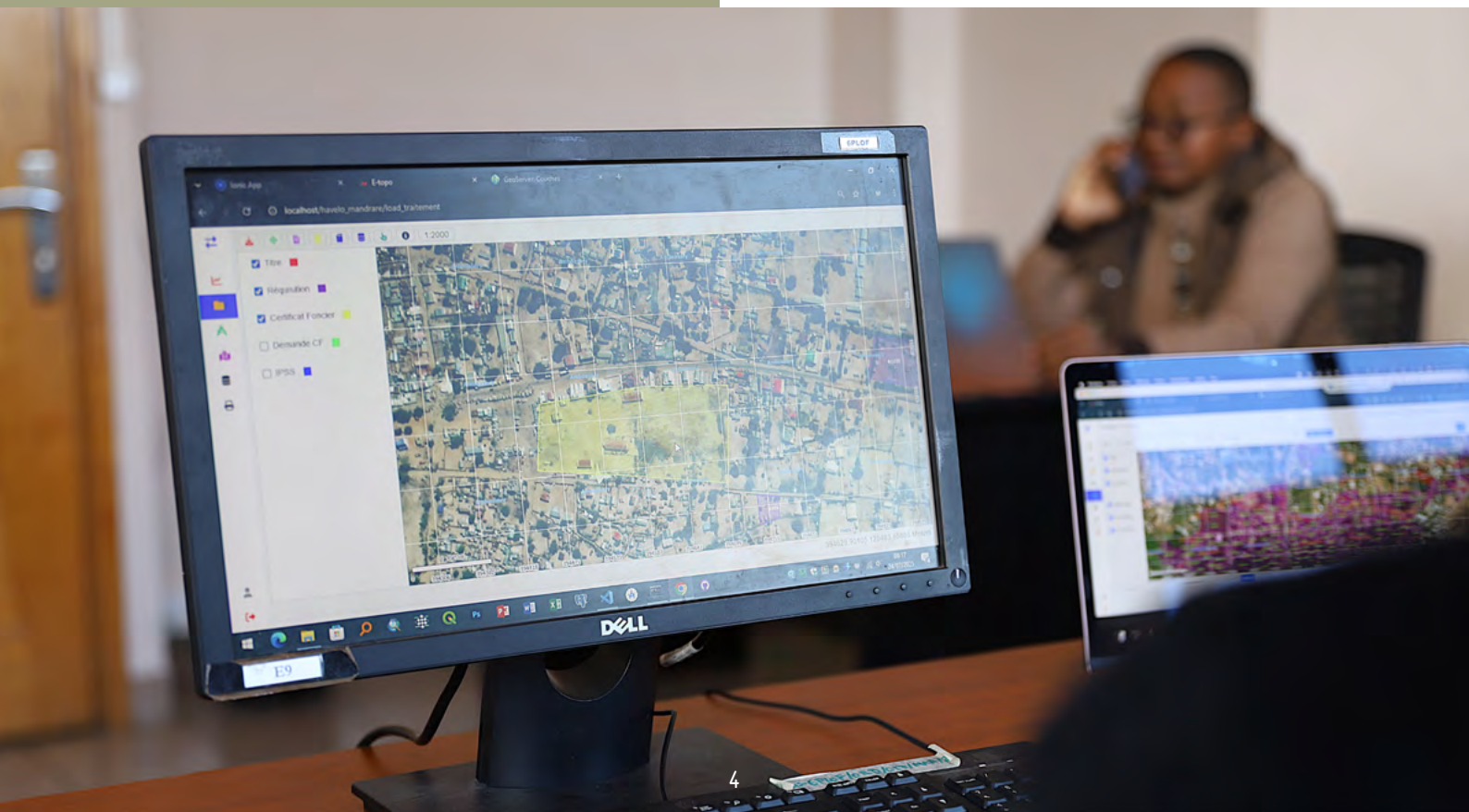
1 E-governance and land information systems are central building blocks of modern, citizen-oriented and transparent land administration. Their impact will be enhanced by a solid national spatial data infrastructure.

2 The digitalisation of land management leads to greater efficiency and enables versatile use of land data as well as broader social and political participation of target groups in land management.

3 Land information systems can only be fully effective if the necessary legal, technical and institutional frameworks are in place and stakeholders have sufficient know-how.

4 Mandates, data protection, data quality and interoperability must be addressed consistently.

Land management systems
are more successful if
local structures are integrated
into the collection, integration and use of data,
clear technical standards are defined,
and **open data formats**
are used.







Recommendations for development cooperation

1. Adoption of mandatory standards for data management and IT security: Development cooperation should promote mandatory standards for data management, interoperability and IT security for public administration processes in its partner countries through a national spatial data infrastructure.

2. Capacity-building for land administrations: Development cooperation should aim to build the capacities of land administrations in particular – through targeted training and long-term knowledge transfer.

3. Integrate e-governance into development strategies: E-governance should be systematically integrated into cross-sectoral development strategies in order to reap the benefits of digitalisation for policy areas other than land policy.

4. Create participatory structures for digitisation projects: Open dialogue formats and transparent decision-making processes should be used to create participatory structures for digitisation projects.

5. Promoting digital infrastructures and internet access: Development cooperation should promote digital infrastructures and universal internet access in partner countries to bridge the digital divide.

Digital tools make it easier to secure land rights. This increases agricultural investment, reduces conflicts and strengthens trust in government and administrative services.





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FAO (2022): Funding Digital Transformation of Land Administration

FAO, UN and FIG (2022): Digital Transformation and Land Administration

FIG and World Bank (2014): Fit-for-Purpose Land Administration

GIZ: Digital Transformation in Development Cooperation

GIZ (2021): Good Practice – Scaling up the LaoLandReg - a Comprehensive, Electronic Cadastre Management System

Land Portal (2025): Good Practice - Contractualization as a Central Tool for Land Tenure Security and Social Cohesion | Land Portal

UN-GGIM (2022): The Global Statistical Geospatial Framework: Implementation Guide

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