



Land Governance in an Interconnected World

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HARMONIZING LAWS AND REGULATIONS WITH NEW TECHNOLOGIES AND INNOVATIONS IN LAND ADMINISTRATION

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Introduction

Innovative technologies and methods have been developed to demarcate land parcels and register land rights in an inexpensive and swift way.

Technology examples:

- rectified imagery acquired by aircraft, satellites or drones / UAVs or UAS
- fit-for-purpose land administration approach in order to register land rights systematically
- mobile data collection technologies to sporadically register land



Introduction (cont'd)

Though these innovative technologies have been applied in some developing countries for land registration there is a time lag between such developments and existing land legislation in many of these countries.

However,

- land legislation in these countries often appears to be out of date
- lack of or the existence of difficult to implement UAV regulations is hindering the drone operators to fly unmanned aerial vehicles freely

Recommendations:

Need to harmonize laws and regulations with new land registration methods and technologies



UAV in Land Registration

Usage of drones / UAVs becoming popular in land administration.
Used to acquire aerial imagery for the spatial capture of visible parcel boundaries and constructed structures.

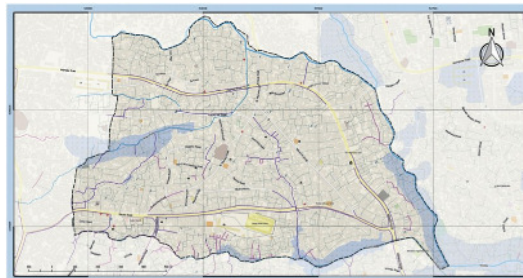
Drones have been used and tested in pilot land management projects in Namibia, Mauritania, Rwanda, Tanzania, Albania, Indonesia, Peru and other countries.



UAV in Land Registration (cont'd)

Examples - Tanzania

Drones have been exploited in Dar-es-Salaam to acquire aerial imagery used in mapping and modelling flood risks as part of the Ramani Huria project, a community-based mapping project



Source: <http://floodlist.com/africa/using-drones-map-model-flood-risks-dar-es-salaam-tanzania>, 2016



UAV in Land Registration (cont'd)

Examples - Tanzania

Drones have also been used in the Zanzibar Mapping Initiative to acquire aerial imagery at 7cm and 2.5cm of the Zanzibar isles, Unguja and Pemba, covering an area of 2,300.00 km².

This high resolution imagery will be used to produce maps which the Zanzibar Commission of Lands will apply for planning, development, land tenure and environmental monitoring



UAV in Land Registration (cont'd)

Examples - Namibia

Drone was used to cover an informal settlement, located at the outskirts of Gobabis, with high resolution aerial imagery (5cm) in 2014. Customary land parcels were mapped based on produced orthophotos. Positional accuracy achieved was better than 10cm.

Source:

University of Twente,
Netherlands – Micro
Aerial Projects LLC,
USA, 2015





UAV in Land Registration (cont'd)

Examples - Indonesia

Land parcels mapped using UAV captured aerial imagery to compare the boundary mapping with the existing approach which uses terrestrial surveying. The results of the UAV-based parcel mapping: accuracy fully acceptable, cost and time effective.



Source:
GIM International, 2016

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UAV in Land Registration (cont'd)

Using drones as a reliable and innovative tool in the land registration process, is also being researched and funded by European Commission through the Horizon 2020 its4land project. This project is built around an ICT innovation process that incorporates a broad range of stakeholders with emergent geospatial technologies, including smart sketchmaps, UAVs, automated feature extraction, and geocloud services. It consists of nine work packages. The application of UAVs in land tenure data acquisition is one of work packages.

In addition the World Bank Group has published guidelines with operational checklists about the management of the risks associated with unmanned aircraft system operation in its development projects.

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Fit-for-Purpose Land Administration

The fit-for-purpose land administration approach (FFP) is a method that has proven itself as a fast and accurate procedure to mass register land inexpensively and swiftly.

The principles of this approach are flexibility, inclusiveness, community participation, affordability, reliability, attainability, and upgradeability.

This approach has been applied in many countries in Asia, Eastern Europe and Africa.



Fit-for-Purpose Land Administration (cont'd)

- used in Rwanda where more than ten million parcels were demarcated and registered over a period of 4 years (2009 – 2013);
- being used in Ethiopia (Land Investment for Transformation [LIFT]) for mass registration and issuance of second level land certificates for fourteen million parcels (2014 - 2020);
- being used in Mozambique since 2016, to regularize five million parcels and to demarcate four thousand communities in a period of 5 years



UAV Regulations

A lack of clear or implementable regulations is hindering the use of drones at a larger scale, and these are urgently needed in the land administration sector.

International Civil Aviation Organization (ICAO), responsible for regulating international aviation, has 191 member states shows on its website that only 32 states have UAV regulations. For Africa only South Africa is listed.

Other websites such as <https://www.droneregulations.info/index.html> or <https://www.airport-uav.com/> show that more countries in Africa have UAV regulations.



UAV Regulations (cont'd)

For its4land project three East African countries are involved



The drones to be used in the its4land project are fixed wing aerial vehicles which are equipped with high precision GPS and Inertial Measurement Units (IMU).

Source:
www.droneregulation.info and
Hansa Luftbild AG, 2018



UAV Regulations (cont'd)

In Ethiopia there are no regulations.

In Kenya UAV regulations were introduced in October 2017.

Rwanda enacted its UAV regulations in March 2016.



UAV Regulations (cont'd)

In Ethiopia no UAV flights in the its4land project could be carried out due to the lack of a flight permit and non-existent regulations.

Kenyan Civil Aviation Authority issued on January 29th 2018 an authorization to operate the its4land UAV in order to acquire aerial imagery to map study case location in Mailua in the Kajiado county (UAV imagery was acquired on 08 March 2018)

In Rwanda its4land UAV was used on 29 January 2018 to acquire aerial imagery to map study case location. Flight permit was issued by Rwandan Civil Aviation to the only local company in Rwanda with operator permit.



UAV Regulations (cont'd)

Implementation of Rwanda UAV regulations

- every drone coming into Rwanda must be registered by the Rwandan Civil Aviation Authority (RCAA).
- operator requires an operator permit issued by the RCAA - rules to obtain such a permit are very strict
- drone pilots have to be certified to fly their UAVs
- applicants for the RCAA UAV pilot certificate should include a knowledge test report showing that the applicant passed an initial aeronautical knowledge test. RCAA currently accepts test results issued by UAV training schools which have the National Qualified Entity (NQE) status in the UK or by an FAA-approved knowledge testing center in the USA.

Thus pilot certification procedure is difficult to follow in Rwanda. In comparison with the Rwandan regulations the Indonesian UAV regulations are less restrictive and simpler to implement



Land Laws and Legislation

In many developing countries land legislation decrees high precision field surveys with conventional cadastral systems in order to determine the boundary of a land parcel.

Conventional cadastral systems are slow and not suitable for mass land registration due to the amount of work, expertise and costs involved. This is seen as a hindrance by the majority of the small land holders to formalizing their informal land right. swiftly and inexpensively.

- small land holders would like to see their government legislating for and embracing the new technologies and approaches in order to regularize their land rights.



Land Laws and Legislation (cont'd)

In Ethiopia the Federal Government distinguishes between rural land and urban land. Accordingly it has enacted two proclamations, one being the Rural Land Administration and Use Proclamation 456/2005 and the other being the Urban Lands Lease Holding Proclamation 721/2011. The rural land proclamation stipulates under Article 6 that the sizes of the land holdings be measured by the competent authorities using traditional and modern measurement equipment. The urban land proclamation stipulates under Article 8 that urban land should be parceled and delineated prior to offering it for tender.

Both proclamations don't stipulate the use of the FFP approach even though this approach is being used in Ethiopia.



Land Laws and Legislation (cont'd)

Kenya's land laws don't endorse the fit-for-purpose land administration approach even though the main land concerned laws were revised recently.

For example the Land Act, the Land Adjudication Act, the Land Registration Act and the Survey Act which were revised in 2012 and 2016 do not legally endorse the FFP land administration approach.



Land Laws and Legislation (cont'd)

In Rwanda the Organic Law 08/2005 which determines the use and the management of land stipulates that the registration of land is obligatory. However, it does not stipulate a methodology for demarcating and registering the land.

Nevertheless, more than 10 million land parcels using a FFP land administration approach through the Land Tenure Regularisation Programme. One would claim that without the international support, Rwanda would not have applied the FFP approach for mass land registration.

Rwanda Natural Resources Authority, responsible for land registration, and issuance and holding of original land deeds, published the Land Registration Procedure Manual, which is a detailed guide to the Rwandan land administration system and describes the procedures to be followed for land transactions.

The manual lacks the guidelines which would allow the adaption of methods and technologies which fall within the FFP approach.



Land Laws and Legislation (cont'd)

In Indonesia the Government Regulation No. 24 of 1997 under Article 2 states that "Land registration shall be implemented on the basis of the following principles: **simplicity, safety, affordability, currency, and transparency**". These principles partially coincide with the FFP land administration approach.

In addition, the use of photomaps in cadastral data acquisition is regulated by the Government of Indonesia through Presidential Decree No 34 of 2003 which concerns the national land policy. The decree directs the Indonesian National Land Agency (BPN) to accelerate the development of land information systems with a database of land assets, textual and spatial data to be used for land registration, cadastral mapping and an inventory of land tenure and ownership.

However, **cadastral data acquisition is still undertaken using a terrestrial method - measuring tape, electronic total stations or GPS receivers**, in accordance with the guidelines of BPN.

Hence, the guidelines for the data acquisition of the cadastral boundaries is considered outdated because the photomap is just used as a sketch map while the measurement of the boundaries is made terrestrially.



Recommendation to Harmonize Laws and Regulations

In many developing countries the FFP land administration approach is not legally supported through necessary legislation and applicable laws even though FFP is applied there.

The 2016 guide of the FFP land administration approach sets out three key principles: the spatial framework, the legal framework and the institutional framework to be considered by countries wanting to apply this approach.



Recommendation to Harmonize Laws and Regulations (cont'd)

A flexible legal and regulatory framework ensures effective land administration. Such a framework provides for an adaptive tenure system consisting of a compliant registration system and can cover the land administration functions of land tenure, land value, land use and land development.

By enshrining the FFP land administration approach in the respective land laws and regulations the legislative bodies pave the way to formalizing and regularizing the informal situations of land holders.

Tenure security for land holders ensures economic progress which in turn can alleviate poverty and provide political stability.



Recommendation to Harmonize Laws and Regulations (cont'd)

The endorsement and the application of new technologies and innovations in the land administration sector will require as a first step the updating, the adaptation and the harmonization of existing land laws and legislation with the application of the new technologies and innovations.

If no land law or regulations exist then new ones should be drafted which will allow the usage of the new technologies and innovations in the land administration sector.

Land legislation and law should be easy to interpret, easy to adhere to and easy to implement. The law should clearly legislate for the application of the fit-for-purpose land administration approach in order to give the land registration performed with this approach a legal status.



Recommendation to Harmonize Laws and Regulations (cont'd)

Laws and regulations should also be drafted and passed to allow the usage of new technologies, such as UAVs / drones.

The laws for the use of drones should provide clear rules and less restrictive UAV regulations which promote the use of these new and promising technologies.

It is crucial that the responsible aviation authority regulates the usage of drones in a manner that is transparent, neutral and clear thus making such atechnology also affordable.

It is recommended that if knowledge testing centers are to assess the pilot certificate applicants then these should be based in the region of the respective country rather than on a different continent.



Thank you for your attention

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