

## **Uganda and Tanzania Land Administration Modernization Based on IT-Leap Concept**

**Aurélie MILLEDROGUES, France, Igor POPIV and Maksym KALYTA, Ukraine and Carol ROFFER, USA**

IGN FI has successfully implemented pilot projects to establish national land information systems in Uganda (2010- 2013) and Tanzania (2016-2019, **ILMIS** project) and is now in the final stages of implementing the roll-out of the National Land Information System (**DESINLISI** project) in Uganda (2015-2020). This paper and presentation will provide a detailed description of those projects implemented by IGN FI in cooperation with Innola Solutions

As DESINLISI, ILMIS will contribute to the creation of a reliable land administration service for clients and improve public confidence in land administration services. Implementation of the ILMIS Project comprised of the following six major objectives: 1) Development of the system software and establishment of the National Land Information Centre (NLIC); 2) Rehabilitation and conversion of existing data and land records including cadastral maps and drawings into digital format that were uploaded to the ILMIS database; 3) Integration of all land records into a single data set linking land registration data comprising certificates of occupancy, land administration records and data on cadastral parcels with the appropriate domains within the ILMIS; 4) Implementation of ILMIS involving the architecture of offices, the purchase and installation of the necessary hardware, equipment and consumables according to the system design and improve the security and reliability of the registration and cadastral service delivery; 5) Informing the public and key stakeholders of the ILMIS initiative, increase public awareness on the benefits of formalizing property rights and promote new registration and cadastral services to encourage clients to formalize property rights; and 6) Training of MLHHSD personnel to operate and maintain the system.

Proposed by the authors in 2017 IT-Leap concept recognized the Information Technology (IT) as not only a critical component of the Land Administration systems but has been proven as a mature business driver adopting customized standard data model, automating re-engineered end-to-end rule-driven business processes, integrating the enterprise, discovering and enabling public and corporate electronic services. The technology solution has been branded as Innola® framework adhering to industry standards such as ISO 19152:2012 - Land Administration Domain Model (LADM), OGC, W3C and utilizing BPMN 2.0 workflow engine and business rules management component, and based on a proven enterprise level open source technologies stack.

Adopting Innola as the technology platform in the referred national scale projects has helped to structure and standardize major implementation activities that might serve as the best practice model for future projects. The key aspect of the implemented solutions was the end-to-end coverage of the enterprise with integrated business processes. The availability of the framework helps with very early involvement of the customer's stakeholders in the agile

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development cycles. Focusing on a specific set of functions and business processes to be implemented and operated over each iteration it systematically helped to minimize and even eliminate certain technological and operational risks at the latest acceptance stages. This approach turned the scheduled implementation into a continuous knowledge exchange between the vendor and stakeholders, bringing the agile principles to collaborative development. Customer's domain experts learned understanding of the processes mapping in BPMN and provided their inputs and feedback followed with the hands on testing of the early delivered functionality. Innola framework core, built on a LADM-compliant data model, at the very early stage of the development was extended and customized according to the country-specific information content. Such adoption of the data model established a national land administration data model profile adhering to LADM standard. Base on the customized national profile data model were started incremental configuration of the working processes, transactions and related rules, forms, reports and specific operational dashboards.

Successful implementation of a national land administration system depends on the most critical factor of populating the modernized system with existing relevant data, either in digital or paper form through data digitization, migration, and integration. Data capture/conversion/cleansing processes along with the data migration and maintenance has been viewed as an integral part of the overall enterprise-wide business processes supporting ongoing formalized tenure operations.

A flexible land administration system implemented on top of the database, compliant with the national LADM profile, served as the integrated software conversion tools to enable required data digitization production through easily configured workflows and rules and to allow data to be "on-the-fly" validated and consolidated. Such a system allows subsequent transactions to be linked to the back-file integrated data within the same enterprise integrated environment. As an example of the efficiency of the process in Uganda National Land Information System (NLIS) project there were implemented 29 different workflows operating specifically rule-driven 103 transactions covering all currently identified land tenure operations.

The performance and efficiency of the implementation is further catalyzed by the domain expertise. The customer formed a dedicated Standards Committee focused on reviewing the efficiency of the processes including timely feedback and corrective inputs that drive system iterative evolution.

The operational NLIS with migrated data also integrates with other national systems and services such as:

- *Uganda Revenue Authority (URA)* system to validate payment receipts provided by applicants for registration and cadastral services;
- *Uganda Registration Service Bureau (URSB)* system to verify legal entities (Certificates of Incorporation);
- *National Identification and Registration Authority (NIRA)* system to verify physical persons (National IF Cards);
- *SMS Service* to enable owners and applicants notification upon property related transactions filing in and completion.

Another most recent completed project in Tanzania operationalized Integrated Land Management Information System (ILMIS) based on Innola platform with 37 different workflows implementing 103 various transactions.

Operational in two districts ILMIS with converted back file data integrates with other external systems and services:

- *Government Electronic Payment Gateway (GEPG) to validate payment receipts provided by applicants for registration and cadastral services;*
- *National Identity Authority (NIDA) system to verify physical persons (National ID Cards)*
- *SMS Gateway to enable owners and applicants notification upon property related transactions filing in and completion*

## CONTACTS

Aurélie MILLEDROGUES

IGN FI

FRANCE

E-mail: [amilledrogues@ignfi.fr](mailto:amilledrogues@ignfi.fr)

Igor POPIV

Innola

UKRAINE

E-mail: [igor.popiv@innola-solutions.com](mailto:igor.popiv@innola-solutions.com)

Maksym KALYTA

Innola

UKRAINE

E-mail: [maksym.kalyta@innola-solutions.com](mailto:maksym.kalyta@innola-solutions.com)

Carol ROFFER

Innola

UNITED STATES OF AMERICA

E-mail: [carol.roffer@innola-solutions.com](mailto:carol.roffer@innola-solutions.com)

