Scaling up Responsible Land Governance

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Empowering Land Audit in Zambia through technology

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1. Abstract

Zambia is divided into 10 provinces whereas the entire Land and Land statutory rights (tenures) are vested and managed by the Zambian government through the Ministry of Lands, Natural resources and Environment Protection. The ministry is divided into 3 land operational departments – Lands (headed by the commissioner of land), Lands & Deeds (headed by the chief registrar) and Survey department (headed by the Surveyor General). The ministry operates its land activities from the H.Q in Lusaka (The capital), another central site at Ndola (second biggest city) and 9 other provincial offices in the respective provinces. The total population of Zambia is about 13M people, and the total area is about 753K SQ/KM.

The government of Zambia embraced a mass titling program under the Land Audit exercise. With an objective to issue titles to every land owner, either customary or statutory, the government is on the process of a multi stages program whereas a strong robust and comprehensive Land Management Information system is the first stage in this program.

ZILMIS, Zambia Integrated Land Management Information System serves as the hub for the Land Audit program, and is in full operation since 06-2014. The system is currently being used by more than 200 con-current users daily, including Intake clerks at the service center, cashiers at account department, Land officers in Land department, Surveyors in Survey department, Deed officers in Land & Deed department and more.

The system was developed using Sivan Design's GeoERP and LAPS technologies. These technologies were developed over a period of 10 years prior to ZILMIS project inception. The experience that was gathered along these years both on technology and project management methodologies, led to a successful project implementation.

Currently, the government started the second phase of the Land Audit program which is Mapping and NSDI. The government also about to expand ZILMIS capabilities focusing on a better service to the public through on-line and SMS services. This document will provide an overview of Zambia Land Audit use case with focus on current achievements and future initiatives.

2. Key Words

Key Words	Description
ZILMIS	Zambia Integrated Land Management Information Systems
GIS	Geographical information system
MLNREP	Ministry of lands, natural resources and environment protection
LAPS	Land and property system
LAND AUDIT	Mass Land Registration
MXD FILE	File format in which the maps created from ArcGIS software can be stored
NSDI	National Spatial Data Infrastructure

3. Background

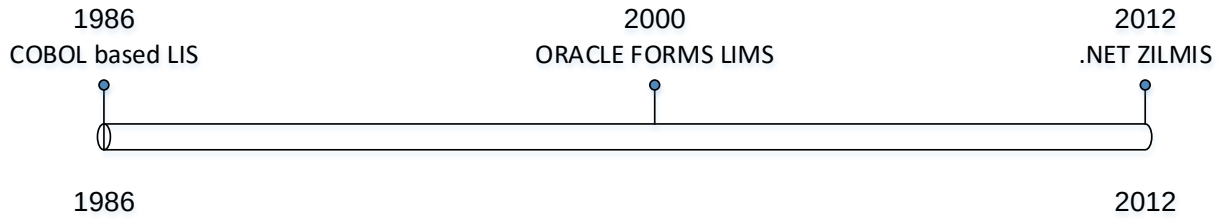
The Ministry of Lands, Natural Resources and Environment Protection (MLNREP) Land Division, is in charge of the critical responsibility of land administration on behalf of the people of Zambia and is responsible for the following portfolio functions: -

- Land Policy;
- Land Administration;
- Land Surveys and Mapping;
- Land and Deeds Registry; and
- Provision of land for all purposes.

In addition to the portfolio functions highlighted above, the Ministry is also responsible for the following statutory bodies:

- Lands Tribunal; and
- Survey Control Board.

In 2012, MLNREP published an open tender for replacing its old legacy system, LIMS, that exists since 2000 and that replaced a former system from 1986. LIMS was ORACLE forms based system that was intensively used but was lack of basic functionalities and capabilities, mainly on process management and linkage between the various departments (i.e. logic connectivity between Lands, Lands & Deeds and Survey department). The former system was also cripple concerning land related revenues management. These gaps were part of the new required system objectives named ZILMIS – Zambia Integrated Land Management Information System. It should also be specified that 3-4 years before the ZILMIS tender, a former attempt to replace the system was made using international assistance, but failed.



Development of Zambia LIS systems

4. Land Audit efforts

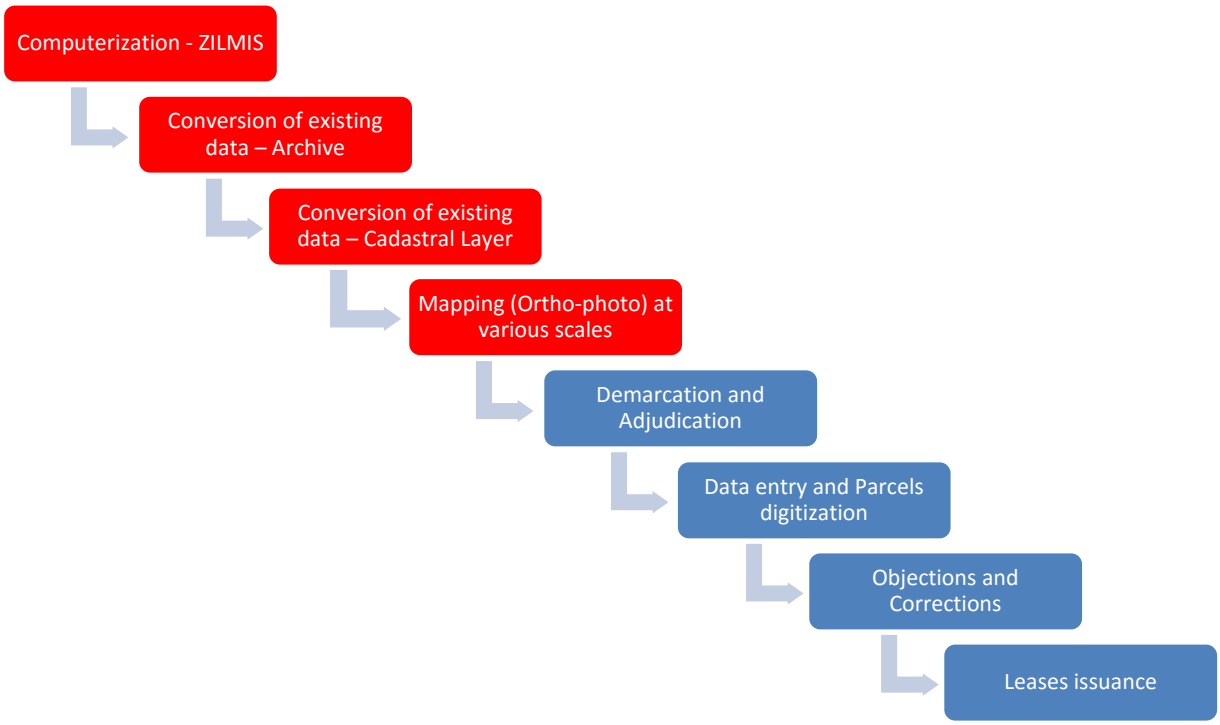
The government of Zambia through the MLNREP, embraced a mass titling program under the Land Audit exercise. Land Audit, also known as systematic land registration, aims toward mass issuance of Land titles. The current status of ~500,000 land ownerships records, ~120,000 leases, and less cadastral information, represents a low percentage of the inhabited areas. With a full implementation of the Land Audit program, the ministry intends to increase these numbers by thousands of percentages.

Based on other countries use cases (like those of Rwanda), MLNREP decided to focus on the system land registration module, dividing it into a multi-phase program.

The first phase, which is the entire program hub, is the development, installation and commission of ZILMIS – Zambia Integrated Land Management Information System. This phase was fully achieved.

The second program phase is mapping at a cadastral scale and the development of NSDI – National Spatial Data Infrastructure.

Further phases are scanning and indexing of old archives, conversion of existing data into a cadastral fabric, demarcation and adjudication, Data entry and Parcels digitization, Objections and Corrections and Leases issuance.



Land Audit General Framework

5. ZILMIS

5.1 Project and system objectives

The main project assignment was to review the current and implement a new Land Information Management System. The objectives of the project were:

- To carry out an Institutional Assessment in order to streamline processes and workflows, enhance land records management, improve the human resource capacity and determine the operational ICT requirements;
- To review the current Land Information Management System (LIMS);
- To Prepare the Systems Requirement Specification (SRS) and detailed system design with the full participation of the client;
- To migrate records from the former system to the new system;
- To design and develop a new Land Information Management System with detailed technical and user manuals;
- To design all-inclusive training and change management programmes in order to build capacity;
- To develop the new system with interoperability and integration capability with other relevant government information systems; and
- To design and develop a versatile accounting and billing system in order to enhance revenue collection and accountability.

5.2 Challenges

Project challenges may be divided into two main groups – project management and technical:

5.2.1 Project management challenges

The client has (rightfully) given a lot of focus to change management. Nevertheless, the fear from change along with the time it took to get the full collaboration of stakeholders within and outside the ministry, created challenges in project implementation, mainly in the initial stages.

To tackle the change management challenge, two governing committees were created – Steering and Project committees. The **steering committee** responsibilities were mainly to provide overall policy, decide strategies for the implementation of the project, review the work of sub-committees and sort out administrative & financial matters.

The **project committee** responsibilities were mainly to Monitor weekly progress of the project, deal with the daily challenges within the project, changing the existing workflows and sign and accept all project deliverables.

Another important project management challenge was the review of the land division **workflows**. While the client highlighted the need to re-organise and re-structure its procedures, getting the consent of stakeholders to the new workflows was a great challenge. This challenge was finally solved by an off-site (out of the client offices) work-shop whereas work-flows and procedures were redesigned and were commonly accepted by the relevant officers.

5.2.2 Technical challenges

ZILMIS was developed on Sivan Design's GeoERP and LAPS technologies. Prior to project inception, these technologies were tested and successful implemented in similar organisations. The usage in these technologies therefore reduced the risk to the client and, in fact, greatly contributed to the project success.

Indeed, efforts were done to tailor made GeoERP/LAPS technologies to client's requirements. Computerisation and structuring of the entire lands & deeds (subsequent transactions) department's workflows was a challenge, and due to gaps between the SRS (System Requirements Specifications) and the practical requirements (mainly due to the amount of exceptions and special use-cases), these workflows had to be re-engineered into the system on the production stage.

Other technical challenges were to migrate the data from the old system to the new system, create full-replication between two far distance sites, connect provinces sites to the main database (working in on-line and off-line modes) etc.

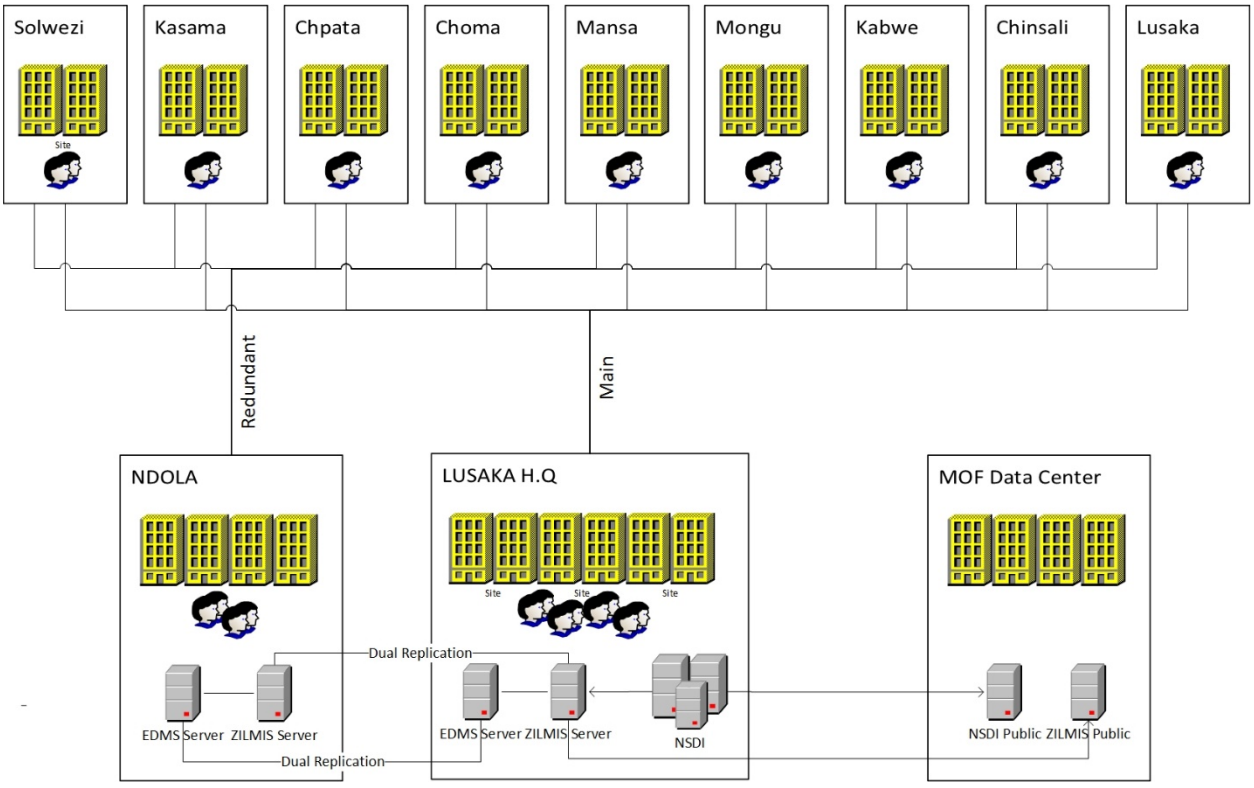
5.3 Technical and functional description

ZILMIS is based on GeoERP/LAPS technology - Sivan Design’s unique technology for LIS (Land Information System)/Cadastral GIS. While GeoERP/LAPS technology is design to work with any rational database (MSW SQL, ORACLE, PostgreSQL) Due to specific client’s requirements, the project was executed using ORACLE Database that stores both the Geo-Spatial and none Geo-Spatial information. The GIS engine is ESRI based (ArcGIS).

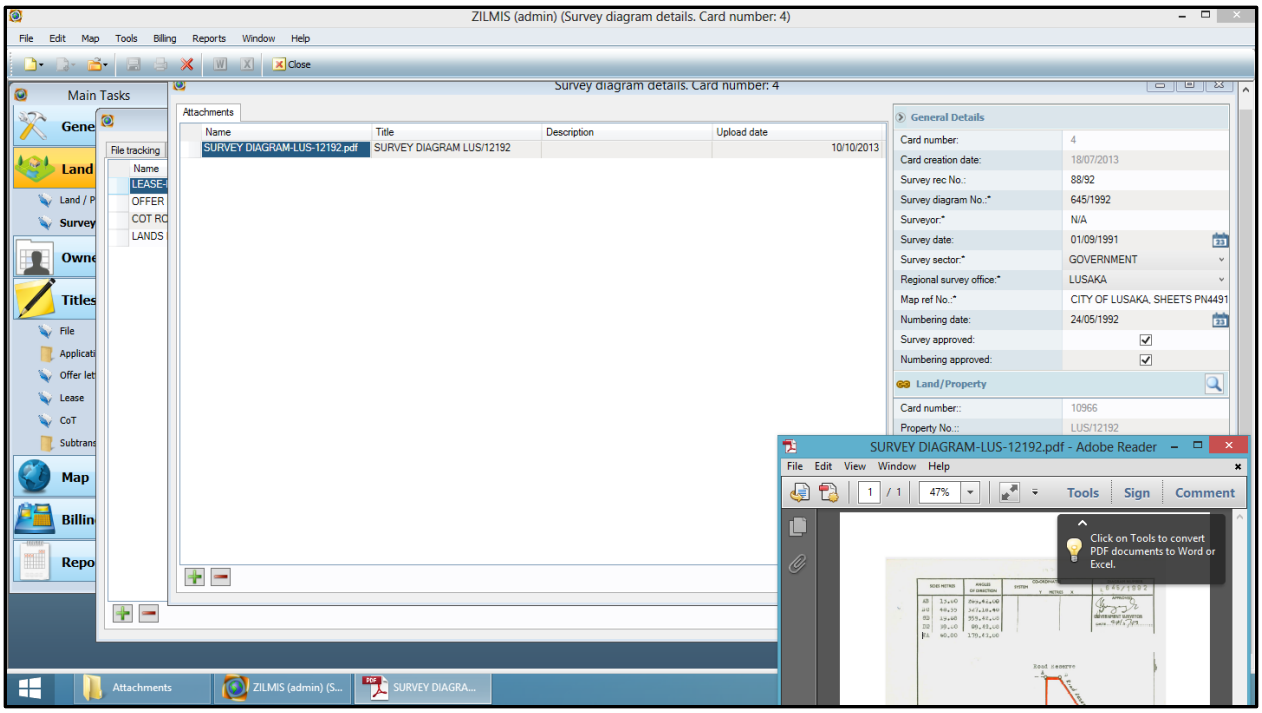
ZILMIS was developed with a hybrid system approach – "heavy tasks" users use Desktop application (.Net technology) while "light users" use web interface. In both cases, the "thin client" approach was kept to ensure re-current updates and light working environment.

One of the main focuses of the system implementation was reviewing and adoption of the system to support the vast workflows with an objective to track each process and file movement. The system was further developed and enhanced by a new file tracking and workflows management module. Each workflow can be easily modified by the system administrator. Each process and file location can be tracked and monitored.

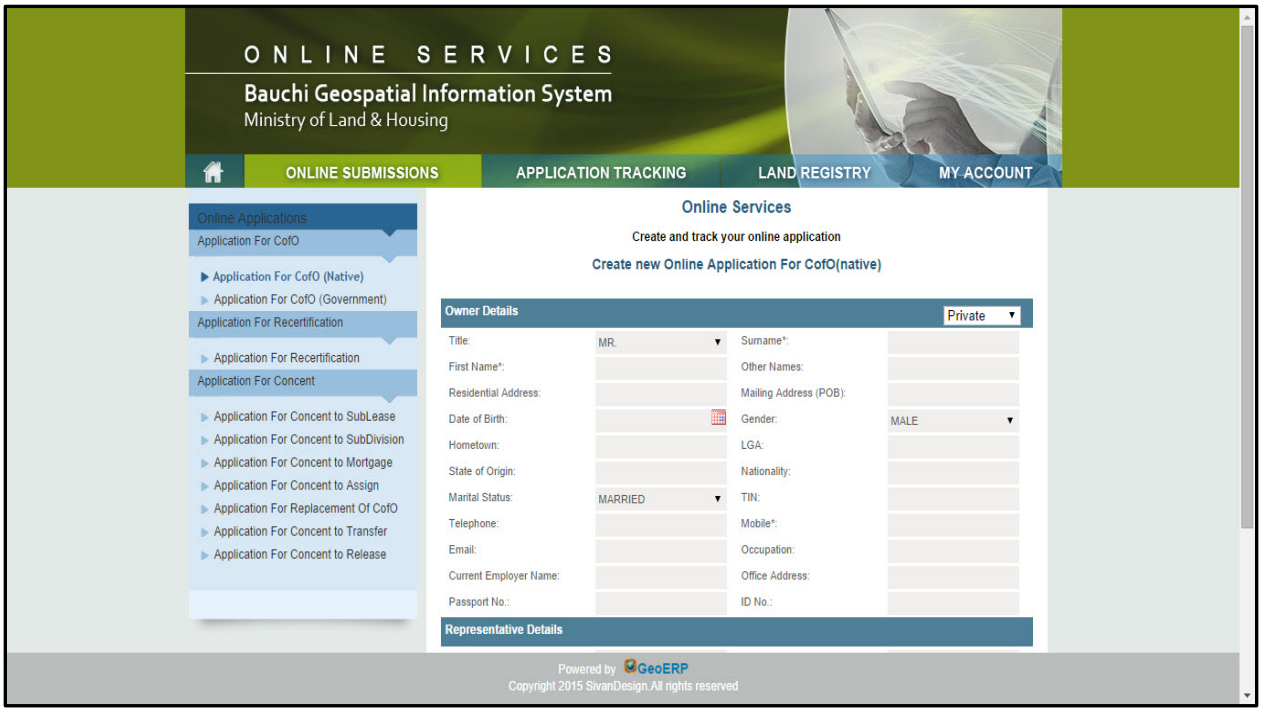
In terms of physical system architecture, the main system servers are located at the HQ in Lusaka with a back-up recovery site located at the national data center (also in Lusaka). Ndola site which is a main site is independent and host its own set of servers. The two sites (Lusaka – Ndola) are connected with full dual (master – master) database replication both for the GIS, main database and EDMS (Electronic Document System) database. Other 9 provincial offices are configured to work with the Lusaka H.Q as the main database and the Ndola database as the sub database (redundant servers).



ZILMIS Architecture



Main system interface – at the background are the list of main tasks, File tracking (Covered) and direct connectivity to EDRMS for the extraction of a Survey Diagram



Web interface for on-line services (Public access – this example is from another use case of Bauchi state in Nigeria

5.4 Current status

Since 06-2014, ZILMIS is in full production stage with more than 200 con-current users in 11 sites (2 main sites and 9 provincial offices). The entire data from the old system (500,000 Land records with millions of sub records) was migrated and some scanned documents were indexed. The old LIMS was officially shut down on 07-2014.

The ministry is in the process of procuring additional professional services to improve system functionality, especially concerning on-line services to the public. Among these are improving on-line services hardware backbone, better facilitation of the SMS mechanism to communicate with the public, digital signature in title documents, on-line payments services, direct interface between ZILMIS and the banking sector and more.

6. Land Audit second stage – mapping and NSDI

As part of the Land Audit framework, the second stage which is national mapping and NSDI (National Spatial Data Infrastructure) is under execution. The contract was awarded to Sivan Design JV Ofek Aerial Photography and contract was signed on 08-2015. Since its kick-off meeting held on 09-2015, several activities were already delivered, among them the NSDI inception report, NSDI SRS first draft, 50% of the aerial mapping, survey of major MRPs and more.

The outcome of the mapping and NSDI will greatly serve the nation in general, and the Land Audit program in specific, and will lay the foundation for the Demarcation and Systematic Land Registration exercise.

7. Summary and conclusions

ZILMIS is a success story, greatly due to client's full commitment for successful implementation. The followings are some key highlights that should, in my opinion, be in the focus while executing a LIS project:

- First and above all – change management. Without a proper change management, the chances for a successful project are low. This should be done through a proper change management process design and implementation.
- Client's involvement in the process from its beginning to the commissioning is essential. This should include, among others, governing committees, joint decisions, installation and implementation through an iteration approach (vs. Waterfall approach), proper STR (System Tests Reviews) and UAT (User Acceptance Test) procedures etc.
- Competent and professional client's project manager (project coordinator) can make the difference between a successful and unsuccessful project. The PC should have the capacity to lead the project

in its ups and downs, solve administrative problems, and make sure that the project moves forward.

- ICT – a local devoted ICT unit is part of a successful LIS project. Indeed, the decision of "who should lead" the project, either Land department or ICT, remains unsolved, and in my opinion, it is mainly a persona question. Nevertheless, in any scenario, ICT should have a major role in the project's life cycle.
- System provider (Consultant/Contractor) should have adequate experience. This experience should be a combination of software development/IT/ICT and Land matters.
- A devoted and professional on-site project manager is a key stone for success. The project manager should have, among others, background in Land related processes, vast experience in the implementation of enterprise and land organization systems, good background in technology and more.
- A good proven technology can have great influence on the project success. Taking into consideration other activities that have to be done when acquiring and implanting an LIS project, a stable, well test system that can be the foundation for the new system, can be the difference between a success and a failure.