# Responsible Land Governance: Towards an Evidence Based Approach

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# SCALING UP A PILOT LAND MANAGEMENT INITIATIVE IN UGANDA TO A NATIONAL LAND INFORMATION SYSTEM (NLIS)

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**Abstract**

Land Administration and Management in Uganda faced serious challenges prompting the government to adjust laws and policies and implement a series of innovative initiatives. Following the successful implementation of the pilot Design, Supply, Installation, Implementation of the Land Information System and Securing of Land Records (DeSILISoR) Project 2010 to 2013, in 2015 the Government of Uganda with support from the World Bank commenced the implementation of a five year initiative known as the Design, Supply, Installation and Implementation of National Land Information System Infrastructure (DeSINLISI) Project to scale up the computerization of an integrated land management system nationally.  The paper and presentation will describe the experiences scaling up from a pilot programme to a National Land Information System (NLIS) detailing the massive data conversion and integration efforts, including the conversion of historical data and ongoing transactions in addition to valuation and other paper document scanning and indexing along with the scanning and vectorization of cadastral maps.

**Key Words:** Africa, Land Information System, Open Source, Land Registration, Cadastre, Land Administration, Land Tenure, Title, Uganda

## INTRODUCTION

Land Administration and Management in Uganda faced serious challenges in the 1980s with a significant deterioration in delivery of land services. Following land sector reforms with the promulgation of the 1995 Constitution, a new legislative regime and also development and implementation of the Land Sector Strategic Plan I (2002-2012). A key strategy under the Land Sector Strategic Plan I (LSSP I) through the PSCP-II to help scale-up critically needed land sector reforms in several priority areas establishing the Competitiveness and Enterprise Development Project (CEDP) was the introduction of a unified, relevant and accessible Land Information System (LIS) to increase accessibility, affordability and use of land information for the planning and implementation of development programmes.  The LIS also aimed at the faster resolution of land disputes and the prevention, reduction or elimination of 1) backdoor transactions, 2) forgeries and graft, and 3) challenges associated with missing land records.  In 2007, the Ministry of Lands, Housing and Urban Development (MLHUD) conducted a Baseline Assessment followed by a Preliminary Design and long term strategy for the development and implementation of a National Land Information System (NLIS) in Uganda.

Phase I of the implementation of the Design, Supply, Installation, Implementation of the Land Information System and Securing of Land Records (DeSILISoR) in Uganda from February 2010 to March 2013 with a period of 1 year of NLIS maintenance that ended in February 2014. A number of reforms that were introduced as a result of implementation of the LIS made a significant contribution to improvement of the land administration and management in Uganda. Building on the success and experiences of DeSILISoR, the Government of Uganda sought to scale Up a Pilot Land Management Initiative in Uganda to a National Land Information System (NLIS). The Ministry of Lands, Housing and Urban Development in conjunction with the consortium IGN FI/IGN (The French National Institute of Geographical and Forestry Information) is now implementing the second phase of the computerization of the Land Registry. The Design, Supply, Installation and
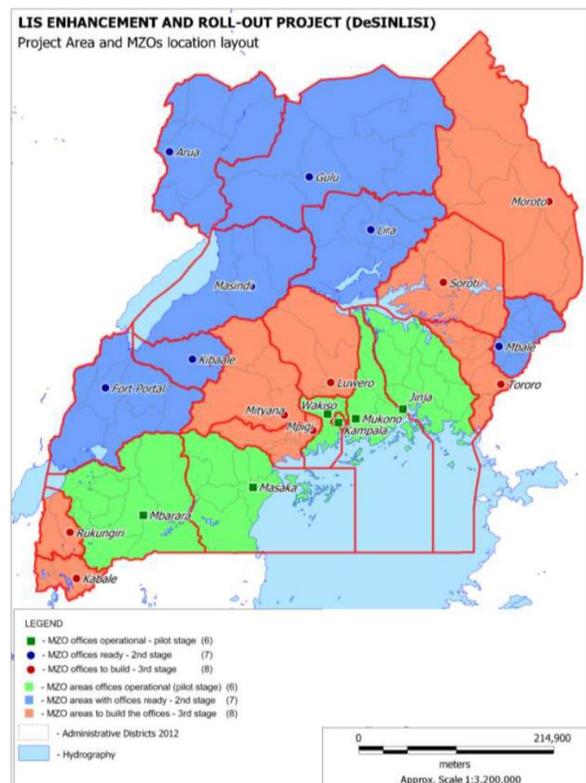


LIS ENHANCEMENT AND ROLL-OUT PROJECT (DeSINLISI)
Project Area and MZOs location layout

LEGEND
- MZO offices operational - pilot stage    (6)
- MZO offices ready - 2nd stage            (7)
- MZO offices to build - 3rd stage         (8)
- MZO areas offices operational (pilot stage) (6)
- MZO areas with offices ready - 2nd stage (7)
- MZO areas to build the offices - 3rd stage (8)
- Administrative Districts 2012
- Hydrography

0                          214,900
meters
Approx. Scale 1:3,200,000

Implementation of National LIS Infrastructure (DeSINLISI) project will fully integrate physical planning, surveying, valuation, land administration and land registration and finalise the process of transformation of land records into digital format. Once completed, a comprehensive, decentralized, self-contained one stop Ministry Zonal Offices will be operational in 21 locations across Uganda.

The computerization of the land information system has already been completed and is functional in 7 Ministry Zonal Offices (MZOs) established in Kampala, Jinja, Mukono, Masaka, Mbarara, Wakiso and Lira. New MZOs are currently being established in Kabarole (Fort Portal), Kibale, Masindi, Arua, Gulu, Mbale, Mityana, Luwero, Mpigi, Tororo, Soroti, Moroto, Kabale and Rukungiri.

The new system:

- Applies to freehold, leasehold, mailo titles and certificates of customary ownership (CCOs);
- Incorporates additionally the functionalities for valuation assessments, physical planning and district land management decisions;
- Prevents encroachment on wetlands, forests, road reserves and other public land reserves;
- Reduces the time required to check, update and transfer land;
- Increases the security of land tenure;
- Contributes to a reduction in corruption associated with checking, updating or transferring of titles;
- Delivers services closer to the public.

The DeSINLISI Project will secure land records in the context of a World Bank Loan for the implementation of the NLIS within the Ministry of Lands, Housing and Urban Development (MLHUD). This project is being implemented for a period of three years and two additional years of Warranty and Support. The project area is covering the entire territory of the country and all districts: twenty-one (21) districts (named Ministry Zonal Offices - MZOs), the National Land Information Centre, the MLHUD Headquarters (HQ) and the Department of Surveys and Mapping (DSM) in Entebbe. The overall goal of the DeSINLISI Project, based on the goal and objectives of the LSSPII and CEDP is established as follows: *to consolidate and scale-up the result of the first stage of the Land Information System development, improve, upgrade, include physical planning and valuation functions and roll-out the LIS Solution to establish the National Land Information System Infrastructure (NLISI) for Uganda and to achieve an efficient, reliable, transparent, corrupt-free and affordable land administration services provision for the population, businesses and government.*
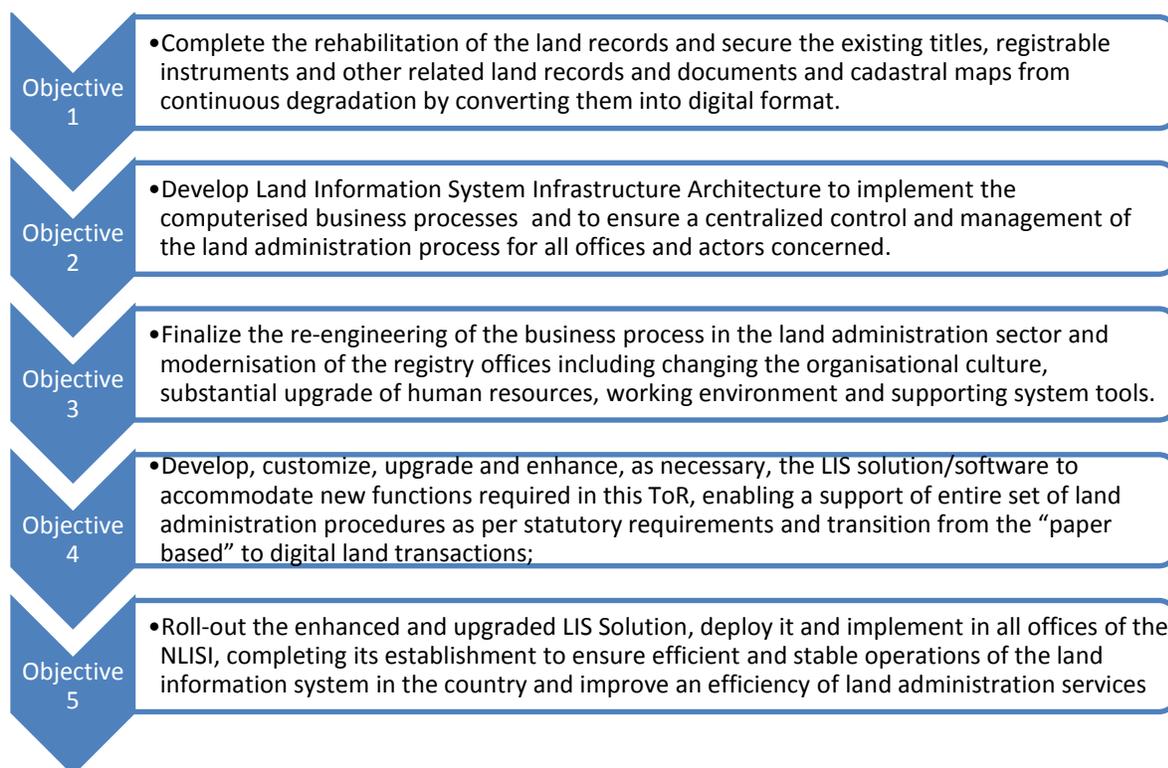
The objective of the National Land Information System Infrastructure (NLIS) will contribute to the establishment of a functioning, transparent and efficient land administration and the improvement of land tenure security in Uganda. The NLIS will serve as a main source of the land information for the physical planning and land development, land valuation, protection of the land resources and contribute to the economic growth of the country. The National Land Information System (NLIS) will integrate the spatial and literal aspects of land administration data managed by the Ministry Zonal Offices to achieve the following objectives:

**Objective 1**
- Complete the rehabilitation of the land records and secure the existing titles, registrable instruments and other related land records and documents and cadastral maps from continuous degradation by converting them into digital format.

**Objective 2**
- Develop Land Information System Infrastructure Architecture to implement the computerised business processes and to ensure a centralized control and management of the land administration process for all offices and actors concerned.

**Objective 3**
- Finalize the re-engineering of the business process in the land administration sector and modernisation of the registry offices including changing the organisational culture, substantial upgrade of human resources, working environment and supporting system tools.

**Objective 4**
- Develop, customize, upgrade and enhance, as necessary, the LIS solution/software to accommodate new functions required in this ToR, enabling a support of entire set of land administration procedures as per statutory requirements and transition from the "paper based" to digital land transactions;

**Objective 5**
- Roll-out the enhanced and upgraded LIS Solution, deploy it and implement in all offices of the NLISI, completing its establishment to ensure efficient and stable operations of the land information system in the country and improve an efficiency of land administration services

## PROJECT MANAGEMENT

The implementation of the DeSINLISI Project coordinated by IGN FI/IGN (The French National Institute of Geographical and Forestry Information) has been divided into four primary components:



The Project is being implemented over a five year period (February 2015 to February 2020) according to the schedule presented in the table below:

| Activities | Year 1 - 2015 | | | | Year 2 -2016 | | | | Year 3 - 2017 | | | | Year 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Half 1 | | Half 2 | | Half 1 | | Half 2 | | Half 1 | | Half 2 | | Half 1 |
| | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Qtr 1 |
| INCEPTION PHASE | | | | | | | | | | | | | |
| Component 1: Detailed design of LIS Roll Out and NLIS | | | | | | | | | | | | | |
| Component 2: Land records and Data conversion | | | | | | | | | | | | | |
| Component 3: Registration and Cadastral Data Integration | | | | | | | | | | | | | |
| Component 4: System Roll out and NLSI establishment | | | | | | | | | | | | | |
| PIAC | | | | | | | | | | | | | |
| Training and Capacity building | | | | | | | | | | | | | |

**COMPONENT 1: DETAILED DESIGN OF THE LIS ROLL-OUT AND THE NLIS**

The NLIS is a secure, scalable and sustainable system configured around an Open-Source and full-web global land and property management solution. Component 1 of the DeSINLISI Project comprises the design, configuration and deployment of the Uganda National Land Information System (NLIS) and is being guided by a carefully planned roadmap of ICT activities and milestones.

The new system comprises of 1) the modification and enhancement of existing functionalities, 2) a new critical functionality, and 3) the utilization of new technologies and InnoLA software framework by Innola Solutions, Inc. It is composed of the modules implemented during the Pilot Stage and reengineered software framework for optimisation of performance and rewritten using Open Source components and the LADM data model. The effort and resources required for roll-out, training, maintenance and upgrades are all eased by the fully web-based NLIS (utilizing HTML5/CSS3/JavaScript). Integration with external systems is supported by an Open API and the design of exchange file formats to which are added land valuation and physical planning modules as well as mobile office, mobile money services for fees and Daily Case Management system.

Key develops on the first pilot phase comprise the following:

- The new system will be based on Open Source components. The developments will also be delivered as such (sources code will be delivered to the MLHUD at the end of Implementation and at the end of Maintenance and Support periods).
- A unified database will be used for Registry and Cadastre, in order to ensure database consistency
- Full web architecture for the system implementation, excluding scanning module, which will be implemented using desktop application
- Improved operations & modules to reflect the user experience in phase 1 (and information collected during the pilot site visits)
- Improved data model (LADM compliant, simplified)
- Simplified transactions and workflows

Based on the analysis of the experience of Pilot Stage system operation and maintenance and the findings of the Inception Stage, the improvements of the system as follows are required:

- Scan module

    File size reduction

    Indexed PDF

- Reporting module

    Monitoring staff performance

    Registry performance (average delivery time, observance of deadline)

    System performance (availability, response time)

- Workflow optimization

    All business processes will be mapped with BPMN 2.0

    Support of parallel activities in the transactions.

    Optimization of the steps in the existing transactions.

    Use of timers and other features that BPMN 2.0 incorporates.

- Document tracking

- Simplification and improvement of the cadastre activities.

- Inclusion of Physical Planning and Valuation functions

- Inclusion of tools for input of Physical Planning Standards

- Use of standards in all components of the system.

## COMPONENT 2: LAND RECORDS AND DATA CONVERSION

The main goal of the Component 2 "Land Records and Data Conversion" is to complete the rehabilitation, conversion and securing of land records, cadastral and other land administration data started at the first stage of the LIS system development. This involves the production of the necessary digital data to be integrated into the NLIS in order to:

1. Secure the titles and registration documents (registerable instruments) by transferring them into digital form,
2. Prepare digital non-geographic documents for document management system,
3. Create a land information layer of topological land parcel polygons, and
4. Link land parcels to title registers data by unique parcel identifiers.

This section of the paper is focused on points 1 to 3 and point 4 will be covered in the section on "Data Integration methodology" elaborated below under Component 3 "Data Integration". The inputs required for the land records and data conversion comprise the existing Lands files (Department of Land Registration, Department of Land Administration, Department of Surveys and Department of Physical Planning) and documents including:

- Maps
- Property Registers
- Other registers like lodgement, allocation, movement and memorial books
- Physical planning maps and other data
- Job Records Jackets (JRJ)
- Microfilms
- Binders
- Various correspondences on a multiplicity of subjects
- Forms of various categories
- Certificates of Titles
- Registered instruments
- Valuation documents

Drawing on lessons learned from the Pilot Phase, the order in which the various operations involved in this component was revised. The operations involving maps sheet and titles could only be scheduled after the development of a stable version of the system to ensure that the data fed in is compliant with all the requirements and that the data integration can be successful. The Data Conversion Methodology was fully reviewed to ensure that lessons learned were assimilated. As some of the data (especially maps and LAFs) were not initially digitized during the Pilot Phase, work commenced with the Data Conversion for the initial six MZOs (Jinja, Mukono, Kampala, Masaka, Wakiso and Mbarara). Drawing furthermore on the experience of the Pilot Stage, the various data conversion operations for the national roll-out were prioritized differently with processing of the various types of input files for the data conversion in following order:

1. JRJs
2. LAFs
3. Titles

4. Map sheets

The Surveys and Mapping Department in Entebbe is at the core of the operations for this component, particularly regarding the processing of cadastral information (map sheets and JRJs). Teams were established and an assessment of the additional resources required to complete the operations were made comprising: operators for sorting and rehabilitation of the various inputs; operators for assistance during scanning; operators for QC after scanning; operators for geo-referencing plus staff for quality control; operators for vectorising plus staff for quality control. Local staff proved essential in the pre-scanning stages to assist with the identification of data and information to ensure accuracy especially the geo-referencing of maps.

**COMPONENT 3: REGISTRATION AND CADASTRAL DATA INTEGRATION**

The primary objective of Component 3 has been to prepare and supply each MZO with an integrated, complete and consistent dataset containing Registration, Land Administration, Cadastre, Physical Planning and Valuation data allowing them to perform their daily duties using the new system. The primary inputs are data from the Pilot Phase, the results of the Component 2 "Data Conversion" and other relevant data provided by external stakeholders.

**Update of the data integration methodology**

The activities required to update the Methodology of the Title Registration, Cadastral Data and Physical Planning and Valuation Data Integration have comprised the following:

- Study of the input gathering process,
- Review of Quality Control of inputs, Mass Linkage, linkage from Parcels to Titles, linkage from Titles to Parcels,
- Study of how wider level planning data is linked to parcel data,
- Study of the site-delivery process,
- Study of the Quality Control process and indicators gathering mechanism, and
- Piloting, Finalizing and delivery of the Document.

Details and statistics on the quality of the integration and the errors and issues discovered, resolved and unresolved/left for further resolution have been closely monitored and Methodological Guidelines are being developed for handing over land survey and cadastral data to the MZOs, including requirements, data

exchange formats, procedures, data validation and control in addition to guidelines and procedures of the physical planning and land valuation data.

## COMPONENT 4: SYSTEM ROLL-OUT AND NLISI ESTABLISHMENT

The main objective of this component is the roll-out the NLIS to all twenty-one Ministry Zonal Offices (MZOs), Ministry of Lands, Housing and Urban Development (MLHUD) HQ, Surveys and Mapping Department (SMD) and the National Land Information Centre (NLIC) and to improve the security and reliability of the title registration and cadastral services provided to the customers. The inputs comprise the implementation, procured hardware and general software, databases released by the Component 3, staff trained and capacitated within Training and Capacity sub-component will constitute the inputs for the Component 4.

The full system roll-out into the defined locations is dependent on:

- The availability of the MZOs facilities.
- The ICT procurement, delivery, and installation.
- The operational acceptance of the Solution. (Component 1)
- Completion of the conversion of land records, cadastral, valuation, physical planning and all other required land administration data and their integration into the land administration system (Component 2)
- The hiring and training of staff in the MZOs.

The System roll-out and NLISI establishment encompasses the following steps:

**Test of the Solution:** Development of the program code and adaptation of the database schema to provide the additional functionality. This approach ensures that the project stays on target and allows for incremental adjustments as testing progresses.

**Training:** Training has been provided during implementation and again at the end of Solution delivery. Experienced trainers, instructors and software specialists who bring expert knowledge of specific software modules and applications have been engaged to assist with all aspects of system roll-out working closely with the Technical Communications department assuring inclusion of specifics in the 'Help' module and in training materials.

**Deployment:** A series of User Acceptance Tests have been conducted to ensure the NLIS product solution supports day-to-day tasks and generates required operational and other mandatory reports.

**Transfer to Operations' Environment:** At the end of system roll-out the solution will be transferred to the maintenance and support team. Guidelines, design documents, support procedures, contact information, and project documentation will be reviewed and delivered to the maintenance and support team.

A rigorous development methodology that meets both product and industry standards, based on an iterative release strategy has been adopted. Periodic versions of the product suite are made available to the central project team for validation and testing to ensure that the project stays on target and allows for incremental adjustments as testing progresses. The Quality Assurance team controls when releases are made available for initial viewing, and once satisfied that new application code has been implemented.  Data conversion deliverables from Component 2 and 3 are being incorporated and the centralized team is continuously testing the NLIS.

**Current Activities**

The current activities being implemented under this component comprise:

- Activity 1: Upgrade of the MZO offices running the current version of the NLIS,
- Activity 2: Full roll-out of the remaining MZO offices, and
- Activity 3: Transition operational MZO offices into Support.


**PUBLIC INFORMATIONA AND AWARENESS CAMPAIGN**

In addition to the focus components, and another essential aspect of the implementation of the DeSINLISI Project is the implementation of an effective Public Information and Awareness Campaign (PIAC) to inform stakeholder and the general public about the campaign to ensure their "buy in" and ownership of the initiative.  The key objectives of the Public Information Campaign are to:

- Increase the public awareness regarding advantages of the formalisation of property rights;
- Inform the public about the advantages of a new system for land acquisition and  registration;
- Promote new registration and cadastral services and encourage the citizens of Uganda to formalise their property rights;
- Receive feedback on public acceptance and evaluate of the land administration services provided;

- Inform the project stakeholders including MLHUD staff, government agencies and business about the project progress, achievement and benefits for the stakeholders.; and
- Inform the public of the benefits of Physical Planning and permitted development rights

The Public Information and Awareness Campaign Plan is being coordinated with other components of CEDP in close cooperation with MLHUD. The PIAC also includes measures to inform the MLHUD staff about the project activities and involvement of the personnel in decision making to increase the project ownership by the Client (Internal Information Campaign).

The MLHUD provides formal approval of all PIAC materials before they are publically disseminated and activities comprise the following:

- **Project Launch:** The Project Launch involved over 75 individuals from across MLHUD, other ministries, professional bodies and associations, development partners, civil society and the media.
- **Technical Workshop:** The Project Technical Workshop involved over 75 individuals from across MLHUD, the MZOs and districts, other ministries, professional bodies and associations, development partners, civil society and the media.
- **Development of The PIAC Plan:** A comprehensive and detailed PIAC plan was developed in close cooperation with the MLHUD,
- **Baseline and End of Project Survey:** A baseline and end of survey was conducted in 1 or 2 districts in each of the MZOs at the start and end of the project to ascertain public perceptions of land administration services provided by the government.
- **Opening Ceremonies of The MZOs:** Ceremonies were held to launch each of the MZOs. Participants in the opening ceremonies will comprise the MZO staff, district officials (LC5, CAO, District Land Officer), Members of Parliament from each District (MP and women MP) from each of the districts within the jurisdiction of the MZO, and appropriate individuals from central government and MLHUD Headquarters.
- **Publications:** Every effort has been made to ensure articles are published regularly in the local newspapers. Journalists are actively engaged and the newsletters presented as press briefings outlining the activities and key developments of the project will be disseminated to each of the major media houses on a quarterly basis.

- **Leaflets:** A4 sized leaflets with information about registration services and procedure has been developed in the appropriate languages as detailed below and disseminated in around each of the MZOs, District Land Offices (DLOs) and other appropriate offices.

- **Posters:** Posters providing information to the public explaining the registration procedures have also been developed and displayed in the MZOs and DLOs.

- **Radio and Television:** Maximum use has been made of national and local radio and television stations to sensitize the population on land tenure and raise awareness of the DeSINLISI initiative and the new services and procedures through radio spots and talk shows.

- **Internal Information Dissemination for the MLHUD Staff and Offices:** Single page A4 newsletters providing relevant information on the implementation of the DeSINLISI initiative have been disseminated amongst MLHUD staff on a monthly basis.

- **Public Briefing:** Public briefings providing relevant information on the implementation of the DeSINLISI initiative have been disseminated amongst key stakeholders on a quarterly basis. The public briefings have been disseminated amongst media houses, banks, surveyors, real estate agents, the Uganda Law Society, the judiciary, and NGOs/CBOs.

- **Project Webpage:** The Consortium continues to maintain a project web-site (http://www.nlis.go.ug) to provide the information about the project, its activities & progress; publish the articles.

- **Language Translation:** Materials have been translated and the language/s spoken in the vicinity of the each MZO. The precise languages for each MZO has been decided in collaboration with MLHUD based on the predominant languages as listed below.

## TRAINING AND CAPACITY BUILDING

Training is one of the important aspects of the DeSINLISI Project and essential to sustainability. The activity comprises all the tasks of educational support, information, raising awareness and transfer of know-how, which represents one of the main purposes of the project. The objectives are multiple:

- Facilitate learning amongst beneficiaries at each stage of the project whilst the components are being implemented.

- Transfer essential technical elements of know-how to allow the beneficiaries to use and maintain the systems, and software conveniently and sustainably.

- Coach trainers and monitor the transfer of know-how.

The primary objectives of the training are to provide sufficient technical proficiency in the following topics:

- Master the fundamental knowledge of the GIS data management;
- Database management systems (including proposed in System solution);
- Data Conversion;
- GIS and spatial data analysis;
- Spatial data management and dissemination, metadata, etc.
- Managing data replication from the MZOs;
- Provision of technical support to the MZOs (Level 1 support);
- Relational database management system (RDBMS) (back up, restore, etc) and use of 3rd Party back up software; and
- NLIS Management and Administration

A comprehensive Training Program to ensure all trainees will get appropriate training and be able to operate the system is being provided. This activity is composed of trainings and of On-The-Job trainings (OTJ). Training and capacity building is essential to ensure uptake and use of the system. Taking into account the lessons learnt during phase 1, to increase the time allocated to training activities the number of trainees has been increased significantly compared to the pilot phase and the staff trained at that time have received refresher courses to introduce the new functionalities of the NLIS. The capacity building have included workshops, seminars and study tours on the subject for the managers and technical personnel of the MLHUD, NLIC , MZOs and District Land Offices (DLOs).

The training plan builds an efficient operational network of collaborators for the MLHUD, the NLIC and the MZOs intended to become the reference in NLISI use for Ugandan stakeholders in different fields: land administration, GIS systems, spatial data integration, satellite imagery, digital map for cadastral data management, property valuation, environment, sustainable development, land use, planning, GPS, etc.

The proposed principle is to ensure that theoretical and practical knowledge are correctly and sustainably passed on to all participants. Particular importance has been given to dialogue between trainees & teacher during and between the classes. The "Teaching strategy"relies mainly on an active method of autonomy

(independence and pro-activeness) based on the needs, motivations and expectations of the beneficiaries, thus proposing techniques and ways to create, produce and look for solutions by themselves.

Four Study Tours were organized in during the first year of project implementation to Georgia (Register), Australia (Land Equity), UK (HM Land Registry) and France.

| Study Tour | Duration | Date | Participants |
|---|---|---|---|
| **Georgia** | 4-6 days | September | 8-10 high level officials and managers from the MLHUD and other stakeholders |
| **Australia** | 6-7 days | November-December | 10-12 professionals including registrars from the MZOs and central office, cadastral experts, land valuation experts, planners from the MZOs, private surveyors. |
| **UK** | 6-7 days | September | 10-12 professionals including registrars from the MZOs and central office, cadastral experts, land valuation experts, planners from the MZOs, private surveyors. |
| **France and UK** | 5-9 days | October | 8-10 people, system administration expert, GIS experts and key personnel from NLIC. This study tour should be of mostly technical nature and oriented to provide the participants with information regarding the development and use of ICT in the land administration sector |

**CONCLUSION**

A significant improvement in delivery of land services has already been observed in land governance as a result of decentralization of land administration and management services to the six Ministry Zonal Offices (MZOs) of Jinja, Mukono, Wakiso, Kampala, Masaka and Mbarara that currently handle 60-70 % of land transactions in Uganda. Client interface was enhanced, through the appointment of customer care officers and making the MZOs one stop centers for delivery of land services and problems of double plotting and double referencing for titles, common with the manual system of operation, were identified and eliminated.

Intimate knowledge of the Phase 1 pilot system and lessons learned through the implementation of the initial phase has allowed the consortium to design, customize and configure a new NLIS that will function more effectively and efficiently. The pilot initiative served its intended purpose and it is now the joint responsibility of MLHUS and the Consortium to improve, extend and scale the ICT solution to meet, not only the land registration and cadastral management business needs, but also other land administration and data consumer (corporate and public) business processes.

The new system replaces existing cadastral management tools with a tightly integrated cadastral management functionality. It extends the functionality and data model to include the cadastral surveying tasks, land valuation and physical planning requirements for land registration review and approvals.