Land policy reform in Rwanda: A Catalyst for Land Information Provision

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Abstract

One among the instruments forland information provision is policy. Since land administration organizations are not only operating in static environment, but also in dynamic and changing environment, land policy can also change following the new business opportunities and the aftermaths can impact on system provision of land related data and information. This research scrutinizes the effects of new land policy in Rwanda on land related organizational structures and land information provision. Public land administration organizations were highlighted as case study. Questionnaire, in-depth interviews and secondary data source were used for collecting data on policy change, induced effects on organization, and repercussion on land information. Open questions seeking opinions and close questions seeking intensity or proposing change alternatives were used for deriving facts and views. Respondents were composed of decision makers and technical/operational staff in the National Land Centre and in the six sampled district land bureaus. Findings showed that new land policy in Rwanda was resulted in changing the existing centralized and scattered land administration organizations into coordinated organizations with horizontal and vertical integration. Change in policy and organizational structures have induced change in system provision of land information and triggered land information projects. Nevertheless, all provisions are in transition phase and pending regulations hinder to attain targeted goals. Proposed integration is not yet achieved. Regional land offices are still based at national level, and land registration is spatially centralized. Since district land bureaus are technically under National Land Centre supervision and administratively depending on district authority, new land policy is conflicting with decentralization principle from working procedures perspective. Step in geo-ICT application for data handling was achieved, despite a big gap in technical and skills capabilities. Since new land policy coincided with decentralization policy, we recommend research on parallel implementation of policies with some similar dimensions.

Keywords: Land policy reform, organizational change, geo-ICT, land information provision

1. Introduction
The research on land policy reform can be conducted from various angles. In this paper, the land policy reform has been investigated for

understanding its effects on land information provision with reference to Rwandan case.

1.1 Context and background statement

Land policy consists of a whole complex of socio-economic and legal prescriptions that dictate how land and benefits from the land are to be allocated (UNECE 1996). According to the United Nations (1996), land management involves the implementation of fundamental policy decisions about the nature and extent of investments in land. Recent World Bank Publication on Land Policy for Economic Growth and Poverty Reduction (Deininger 2003) emphasized that, land policies are of fundamental importance to sustainable growth, and the well-being of and the economic opportunities open to rural and urban dwellers. Conversely, the failure to adopt at all levels, appropriate rural and urban land policies and land management practices remains one of the primary causes of inequality and poverty as stressed in the Handbook on Best Practices, Security of Tenure and Access to Land (Augustinus 2003).

As a guideline for land resource management, land policy requires appropriate supporting tools such as land information. Indeed, the management of land related processes such as registration, land valuation and evaluation, land (re)allocation, land suitability analysis and others requires reliable information provision system. Since land information system is considered as a core component of any land administration system, (Dale and McLaughlin 1999), the design and implementation of this component is likely to be a prerequisite for sustainable land information provision. UNECE (1996) stressed that appropriate land information provision is of vital importance for land management, whether for the development of sustainable agriculture, managing the rapid growth of cities, or for the protection of the environment. Likewise, appropriate land information is found as fundamental support for handling new complex humankind relationships with land, consisting of a bundle of rights, restrictions and responsibilities (Kaufmann and Steudler 1999; Williamson and Ting 2001) .

The provision of land related information involves a series of procedures and requires resources mobilisation. Indeed, land

information provision is not a simple standalone activity but, complete and interrelated activities and stakeholders in a defined system. Therefore, the concept of "land information system" is highlighted. The latter consists, on the one hand, of a database containing spatially referenced land related data for a defined area and, on the other hand, of procedures and techniques for the systematic collection, updating, processing and distribution of data (UNECE 1996). Land information provision implies the integration of information from various sources such as administrative and legal documents, information about land holders, parcel-based data and others. Therefore, appropriate tools are required for successful integration.

With the current advance in technology, the emerging tools such as geo-ICT are playing a tremendous role in handling spatial and non-spatial data and information related to land. Indeed, the development of geo-ICT offers possibilities of acquiring, processing, storing and managing of land related information in a digital and streamlined environment. As suggested by the United Nations (1996), land administration system should ensure that there is easy access, possibly through linked computer networks, to all important data relating to the ownership, value and use of the land. In fact, the recent advance in information technology offered the opportunity to develop a land information system, moving towards the construction of spatial data infrastructures and the creation of national land information services (Dale and McLaughlin 1999).

Within a land administration organization, land policy reform program can trigger new practice such as changing the work setting and imposing the adoption of new methods of carrying out business processes. The policy newly formulated and adopted for guiding the effective use and management of land resources can dictate the change in organizational structure and behaviour. Subsequently, organizations can be pushed to adopt technology as external trigger for enhancing the functional process and complying with some requirements imposed by the adopted programme. This influence can lead to the change in exiting system of carrying out activities including handling land information provision. Therefore, addressing such changes through research can allow a better understanding of causes and

effects relationships between antecedents and outcomes of policy reform programme.

1.1.1 The concept of land policy

According to Enemark (2005), land policy is part of national policy on promoting objectives including economic development, social justice and equity, and political and stability. Land policy is a guideline, a tool and the recommended starting point for land administration (Törhönen 2004). It is contained in texts issued by governments, and is further developed through legislation, decrees, rules and regulations governing the operation of institutions established for the purposes of land administration, the management of land rights, and land use planning. To be effective, land policy must propose a practical and coherent set of rules, institutions, and tools, which are considered both legitimate and legal, and appropriate for different context and interest groups (EU 2004). Williamson and Ting (2001) advocates that land policy principles could include a statement on roles and responsibilities of various land–related activities such land management, land reform, land registration, cadastre and particularly the role of land administration as an infrastructure. In addition, land policy framework could recognize the growing complexity of right, restrictions and responsibilities relating to land.

1.1.2 Factors influencing land policy reform

The necessity land policy change is most of time geared by land reform program which affects the land administration processes in a given country or region. The EU (2004) notes that political ownership, willingness and commitment are key factors for the definition and implementation of effective land policies. Depending on the context and objectives, a land policy reform program may include one or several of the following elements:

- new tenure legislation and revision of codes, to recognize and regulate new types of rights or forms of transfer (including women's, small farmers', pastoralists', minority groups or indigenous peoples' land rights);
- and registration and titling of existing rights;
- regularization (updating formal records by taking into account of changes and informal transactions) of existing land rights;
- land redistribution and land sharing process;

- the creation of new opportunities for land access;
- restitution of land rights alienated from the original owners or users; privatization of collective or state land;
- improvements to the efficiency and accountability of existing land administration systems;
- establishment of (new) institutions and structures with responsibility for land acquisition, administration and conflict resolution;
- setting up a land-based tax system;
- designing and enacting new land use and planning rules and procedures (EU 2004).

1.2 Land policy and land information provision in Rwanda: trends since 2005

The challenges which lie ahead for post-genocide Rwanda's economic, social and political development are closely related through the issue of land. The pressure from a high rate of population growth, added to the paucity of economic opportunities outside the agricultural sector, is forcing people off the land and into poverty (Van Hoyweghen 1999). The Rwandan Government, therefore, found it imperative and absolutely necessary to arm itself with a national land policy that would enable the population to enjoy a safer and more stable form of land tenure, and bring about a proper and well- planned utilization of land, while ensuring a healthy and efficient land management and administration (MINITERE 2007).

In 2005, new Organic Land Law has been adopted followed by orders and decrees and a land policy document has been compiled. The compiled land policy document is based on an umbrella Organic Land Law No. 8/2005 of 14/07/2005 Determining Use and Management of Land in Rwanda. This law is complemented by a series of decrees and orders regarding to the institutions in charge of land administration, and land registration and land use.

According to land policy, land information systems are required to support effective land registration and the concept of a decentralized national land information system based on shared information and open access is compelling (MINITERE 2004). Referring to the

strategies highlighted in the same document, one among the aim of National Land Centre is to register all lands in appropriate registers and issue land titles for land owners and to put in place thorough mechanisms for land rights transfer. Furthermore, the NLC has a specific mandate of monitoring the management and the use land, the collection and dissemination of information through information and communication technology (MINITERE 2007).

1.3 Rationale

Since 2000, the Government of Rwanda has embarked its long term objectives for economic development and poverty reduction in its vision 2020 and its Economic Development and Poverty Reduction Strategy (EDPRS). A wide ranging reform of land tenure and land management forms a central part of country's strategy to meet those objectives. In 2005, Parliament passed the Organic Land Law. For being implemented, the newly introduced land law is complemented by a series of presidential orders, ministerial decrees and other regulations related to legal framework and institutional arrangements with regard to land resource management. A set of these law, orders, decrees and related regulations constitute the new land policy. The latter has affected the aspects of land administration organizations and triggered land information projects. For a better understanding, there is a need to research on how the change of land administration organizations by new land policy has induced the change in land information provision. This paper will also look at how the new land policy and the current land information projects in Rwanda are changing the way that (local and national) organizations are coping with information handling, including geo-ICT handling.

2. Field data collection Data collection and concepts operationalisation

The investigation was carried out at national and district levels. At national level, National Land Centre (NLC) was chosen, whereas at district level six district land bureaus across the country were sampled. The six visited land bureaus were selected based on purposive

sampling[1] method. The sample represents the situation of how local government are behaving vis-à-vis to policy change and to its (policy) effects. The selected district land bureaus are:
- Huye and Kamonyi in Southern Province
- Ngoma and Nyagatare in Eastern Province
- Musanze in Northern Province
- Nyarugenge in Kigali City

Data collection was carried out based on multiple sources of evidence in order to have various views on investigated phenomenon. Questionnaire, in-dept interviews, direct observation and secondary data source were used as techniques for gathering needed data and information. The use of multiple sources of evidence helped to examine the validity of collected data. Respondents and key informants were categorized in three groups. The first group consists of the staff working regularly in visited organizations. In this group two categories were highlighted namely:
- Either manager, planner, decision maker or policy advisor
- Either technical IT, geo-ICT or operational staff

The second group is composed of staff working in international consultancy agencies collaborating with Ministry of Natural Resources (MINIRENA), NLC and Kigali City Council in land related issues. In this group, staff working for Swede Survey Company, Dutch Kadaster, DFID, and OZ International[2] were among our respondents during data collection period. The third group of our respondents consisted of individual persons collaborating with land administration organizations through research and consultancy or former employees in land administration domain.

2.1. Methods for data organization and analysis
For easy interpretation, data collected by questionnaire were transcribed in survey monkey webpage, where frequencies of provided answers were generated. Subsequently, results were exported

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[1] The primary consideration in purposive sampling is the judgement of the researcher as to who can provide the best and required information to achieve the objectives of the study (Kumar 2005:179).
[2] OZ International is an American consultancy agency collaborating with Kigali City Council, in architecture domain, in the process of City Master Plan implementation.

in excel spreadsheet for quantitative analysis and easy presentation. By using qualitative approach, descriptive and interpretative analysis was carried out based on facts and opinions provided by respondents through interview sessions. Data and information collected by questionnaire and transcripts from interviews were combined with the interpretation of collected documents and observations for further analysis and for drawing conclusions.

2.1.1 Specification of evaluation model

For the purpose of this research, Goal-attainment was adopted as evaluation model for carrying out an assessment on effects induced by new land policy reform. As advocated by Vedung (1997), the goal-attainment evaluation model is applied by following three steps including:

- identifying the goals of a program, trying to understand their actual meaning and turning them into measurable objectives;
- determining to what extent these premeditated goals have been realized;
- ascertaining the degree to which the program has promoted or dampened goal realization.
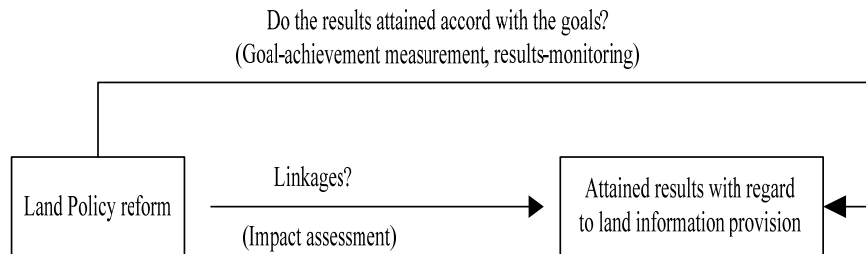

Figure 1: Goal-Attainment Evaluation Model (adapted from Vedung 1997)

In his publication on public policy and program evaluation, Vedung (1997) argued that goal attainment model is considered as the classical way of assessing the degree to which expected outcomes were achieved, when evaluating a particular policy or a program in public or private sector. Likewise, it is an effective model because; it asks questions about the substantive content, output and outcomes of the program. Since we are evaluating the impact of policy effects on land information provision, this evaluation model is fitting our purpose. Referring to our case, the establishment of a framework for land information provision was considered as the main goal proposed in the policy, whereas three sub-goals were

highlighted namely establishing legal framework for land registration and right transfer, setting up land administration organizations and building their capacity, and adopting and using geo-ICT for handling land related data and information. Strategies for goals achievement were turned into measurement indicators for analysis to which extent organizations are responding to policy requirements.

3. Land policy reform effects on land information provision

The initiation and implementation of new land policy in Rwanda (since 2005) has affected the existing aspects of land administration organizations. This section addresses the impact of induced changes on land information development and system provision of land related data and information. Discussion on triggered perspectives for land information development and new surveying practice are carried out. Furthermore, the new system of land registration process and land right transfer is highlighted.

3.1. Effects on lands records and on going land information projects

Before 2005, only 10% of parcels in Rwanda were formally registered in centralized public registry. Even if the current achieved step is narrow comparing to what should be done, the introduction of new land policy stimulated the land registration activities and issuing titles and lease contracts at local level for the first time. In addition, the existing land related records maintained previously at central level were transferred at district level where they are now kept in the district land bureaus. Furthermore, the initiation of new land policy has triggered project of land information development in Rwanda. In this perspective, trials on land tenure regularization (launched in 2006) and tentative of creation of digital registry were initiated under the auspices of DFID support. Likewise, Land Use Master Plan is now an on going project with support provided by Swede Survey Company. According to our respondents in all visited district land bureaus, citizens are very active to register their lands, some got already the official documents claiming rights on land (such as lease contracts, titles certificate and building permits) and many application are still pending. Table 4-10 shows the number of land related records registered after the creation of district land bureaus.

Table 1: *Land related records in district land registries from 2007-2008*

District Land Bureau	Surveyed and registered parcels	Registered parcels (but not surveyed)	Registered and delivered lease contracts	Registered and delivered titles
Nyarugenge	5200	0	261	Not indicated
Huye	1728	105	471	624
Kamonyi	45	Not indicated	45	Not indicated
Ngoma	3454	Not indicated	32	3
Nyagatare	Not indicated	Not indicated	Not indicated	Not indicated
Musanze	Not indicated	Not indicated	Not indicated	Not indicated

Most of district land bureau (including our case study) started in 2007. Therefore, data showed in above table are only the 2007 and 2008 records. Table 4-11 shows details on work completed during land tenure regularization trials.

Table 2: *Surveyed and registered parcels during Land Tenure Regularization Trials[3]*

District	Sector	Cell	Surveyed and registered parcels	Covered area (in ha)	Total area covered by district (in ha)
Karongi	Ruganda	Biguhu	3019	740	99303.22
Musanze	Rwaza	Kabushinge	7432	584	53038.06
Gasabo	Gatsata	Nyamugali	1040	66	42920.65
Kirehe	Mahama	Mwogo	2800	2058	118485.01
Total			**14291**	**3448**	**313746.94**

During the regularization process, 8 procedures were followed including
- Public information and appointment and training local committees and para-surveyors
- Demarcation of land
- Adjudication and recording of all detailed information
- Issuing a claim or objections receipts
- Recording objections and disputes
- Publication of records and objections, and correction period
- Mediation period
- Registration and titling

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[3] The provided number of surveyed plots covers only one sampled cell within chosen district. The area covered by the whole district in just informative and consists of parcels, forest, natural features such as rivers.

Figure 2: Parcels index map prepared by locally trained para-surveyors and adjudication committees (Source: NLC, November 2008)

Concerning Land Use Master Plan Project (launched in August 2007), the project team leader emphasized that *" land use master plan must be based on a sound baseline information about the physical suitability of land to a particular land use, the reason why our first task is to develop land information for our further analysis".*

At the time of fieldwork, it was revealed that the aerial survey mission has already started and 75% of the country was covered and ortho-photos with 25cm accuracy were produced. The ortho-photos produced will be used during systematic land registration. As highlighted by project deputy team leader, the tools for supporting the planning process are geographic information technology, GPS, satellite imagery and aerial photos.

3.2 Change in system of land information provision

The introduction of new land policy has changed the existing land registration system and land right transfer arrangements. Before the new land policy, registration was done on the demand. The ministry in charge of land was responsible for land registration countrywide; with the exception of Kigali city Council which has its authority for its own land administration and maintain its own land register since 1998. Provinces and districts did not have any structure of land administration. Such structure existed only in the municipalities where decentralization of land survey and registration responsibilities have commenced to be carrying out with the overall follow up by the ministry in charge of land. Those municipalities were supposed to send copies of land records to the Ministry in charge of land, where is based the Chief Registrar of Title Deeds[4]. For rural lands, no formal land registration was carried out at lower levels. Each District in the country was only authorised to charge variable fees according to their location and use for the annual rent of land parcels, and to retain the fees. Lease contracts were delivered by the Minister in charge of lands and districts should have only the relevant copies of contract papers relating to concessions and land titles in their respective areas.

In 2002, an outsourced contract from the City Council was initiated for the establishment of a modern cadastre and registry for land and revenue management. The contract was signed between the City and GEOMAP[5]; a Kenyan consultancy company. The outsourced contract provided geo-referenced locations of registered parcels, after field survey by using aerial photography and GPS equipment. The data were stored in a GIS system together with other relevant information about the parcels and their owners. Indeed, the targeted goal was carrying out the whole process of land surveying and registration and moving forward from paper-based methods and techniques to an automated and financially driven service that responds

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[4] The Chief Registrar of titles Deeds was commonly known in French as "Conservateur des titres fonciers"

[5] GEOMAP contract has expired in 2006. During fieldwork, staff in Kigali City Council revealed that an important part of collected data was lost because of misunderstanding between the City Council and the company.

to customer demands. Prior to the initiative, all registration issues for Kigali City (like in the other areas) were done manually with paper copies of all documents.

A similar self-financing automated land administration system could function in some other municipalities, such as Butare, Cyangugu, Gitarama, Gisenyi, Ruhengeri and Kibuye[6], because they have sufficient population paying taxes to finance the system. Apart from these highlighted cases, Government would have to support the development of any similar system elsewhere.

In this ciconstance, the formal land registration was undertaken only by a small proportion in the country with the focus on urban areas and those in rural areas under commercial agriculture or owned by churches. At that time, Rwanda was carrying out a limited land registration on a centralized manual system on demand led basis in rural and urban areas. The land holder was addressing an application letter to the ministry of land. The letter was examined then sent to the registrar of titles. The latter designed a technical staff from the ministry who could carry out boundary survey and parcel plan preparation after taking ground measurements. Subsequently, paper based parcel plan was prepared in the ministry with all relevant information about land owner and other claimants. The registrar examined the parcel plan then, a provisional certificated of ownership was offered. After getting provisional certificate, the land holder should pay taxes for ten years before issuing the certificate of full ownership (title). In summary, the stakeholders represented in figure 4 were involved in the first registration of a property and deliver legal document (duplicate of title certificate) before issuing full certificate of ownership.

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[6] By the restructuration of administrative entities in 2006, these municipalities are no longer officially recognized
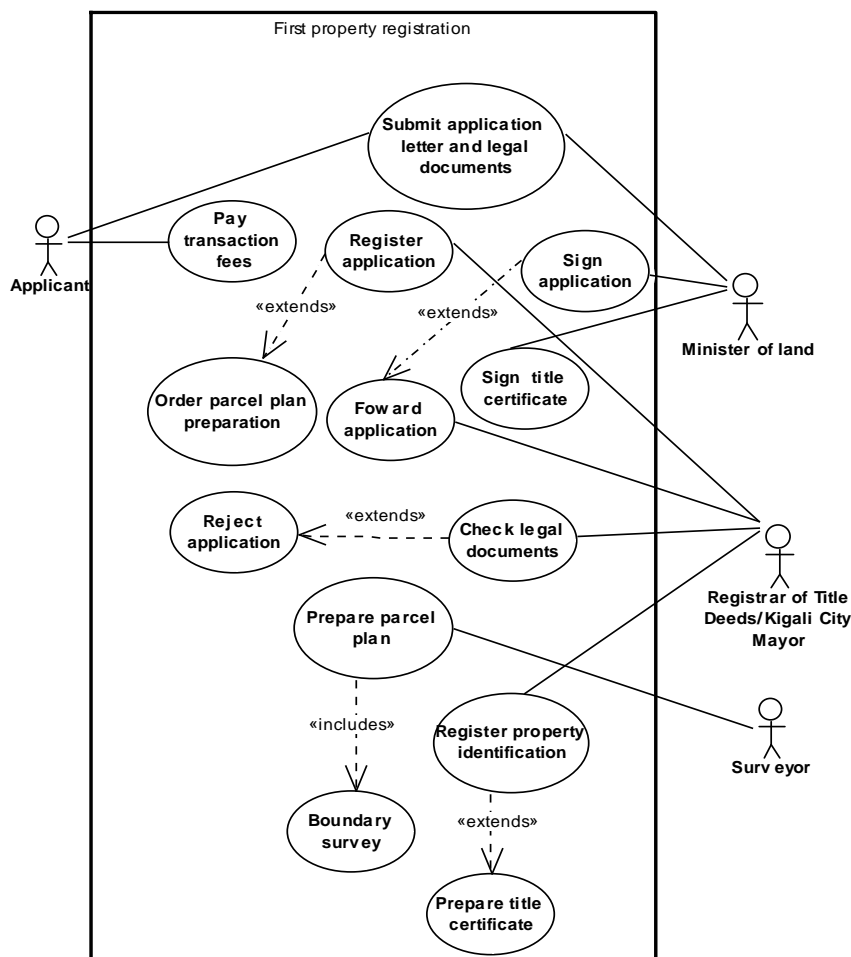
Figure 3: Use case model for first registration of a property before 2005
As illustrated by the use case model (see figure 3), there were four actors interacting with fourteen uses cases in registration system to which a boundary named "First property registration" were given. Even if the system were composed of few stakeholders, handling a case was used to delay while waiting for approbation, ordering a particular case signature, etc. The activities or duties to be carried out were several and centralized system was upsetting applicants especially those whose dwelling home was very far from Kigali. The following duties and steps were expected to be carried out before delivering title certificate.

- Applicant addressed an application letter with legal document to the minister in charge of land
- The minister approved the application and sent it either to chief registrar of title deeds (in case of rural land registration and registration in the secondary city) or to Kigali City mayor (in case of urban land located in Kigali City)
- Chief of title deeds/Kigali City mayor was checking the submitted file then ordered surveying the requested land (if there was no objection made on requested land) or reject application (in case of objection)
- Technical surveyor from the ministry or at municipal level carries field survey and prepared parcel plan
- Parcel plan with associated legal documents were prepared and submitted to the registrar of title deeds/Kigali City Mayor
- Approbation of parcel plan by registrar of land titles/Kigali City mayor
- The applicant cleared the transaction fees in the taxation department (before 2000) or in RRA (after 2000)
- Registrar of title deeds/Kigali City Mayor prepared provisional title deed
- Title deed was sent to the minister for signature
- Minister returned the file to Chief of title deeds/Kigali City Mayor after signature
- Applicant came in the office of Chief of titles deeds/Kigali to get his/her title deed
- A provisional title certificate was issued and applicant was expected to pay regularly location fees for 10 years
- Delivering full title certificate after 10 years

These procedures were most of time full of administrative burdens and full of discretionary decision especially at the ministry or Kigali City levels. The applicant was expected to waiting for more than six months, one year, even beyond. Thus, citizens were not interested in registering their lands except big holders who should compensate the spent effort and money in targeted project to be developed in requested land.

Currently, the change of land administration organization and new institutional arrangement induced the change of the existing land registration process and land rights transfer. Comparing to the system before, there is new stakeholders involved in Registrar office and the mayor is no longer playing registrar role for urban land registration in the Kigali city .The steps followed for first registration and involved stakeholders are presented in the figure 4.
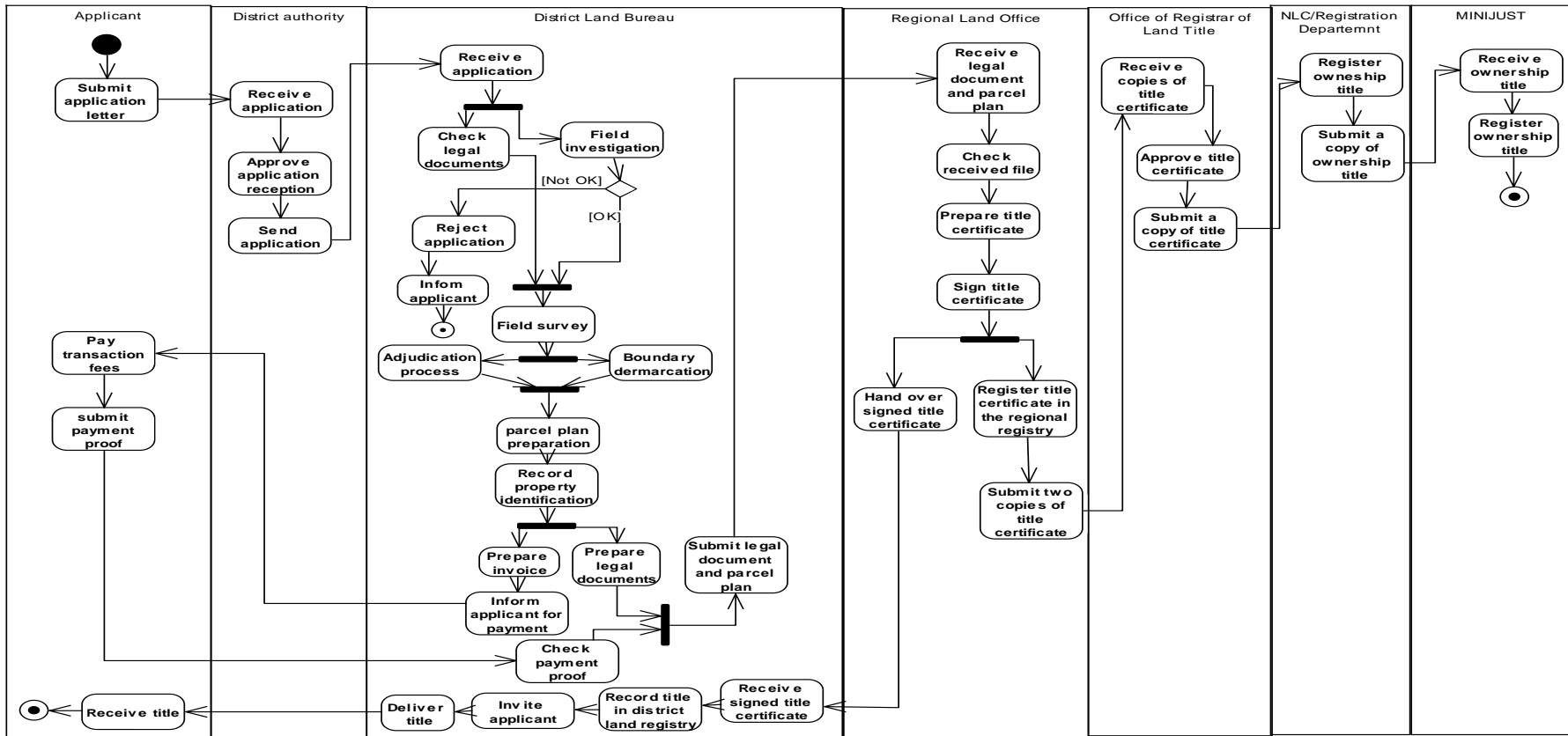
Figure 4: Activity diagram for first registration of a property after 2005

Some documents such as building permits, purchase contracts are signed and issued at district level. In the case of dispute, the new claimant is given an objection claim and the case is pending. The formal land registration recognized in the new land policy is not applied at local level. Referring to what is proposed in the policy, the new proposed system in not yet fully implemented. It seems that the system is still somehow centralized. But the innovation comparing to the former system is that all activities are done as quick as possible and a lease contract or a titles can be issued for instance within one week in the districts located near Kigali City (where NLC is based) and in one month in the district located far away from Kigali.

In case the applicant wants to develop a project requiring environmental impact assessment such as construction of commercial building with more than two floors, schools compound and others, the highlighted steps should also include additional steps of evaluation of impact of the activity to develop. Therefore, the soil structure is examined in the laboratory and the approval document is signed and issued by Rwanda Environment Management Authority. During fieldwork, it has been remarked that these substantial activities are only done in Kigali City.

Even if the current process involves several steps, the title or lease contract is delivered with one or two weeks if there is no objection made on claimed land. However, applicant in district located far from Kigali (where NLC is located) can wait for one month before receiving their title certificate or lease contract as Advocated by one staff in Musanze District Land Bureau.

Current process of land right transfer (immovable property mutation) is including the following steps:
    -The buyer and seller prepare purchase contract
    -Purchase contract is submitted to the district notary for authentification
    -The buyer addresses an application letter to the district mayor
    -Mayor examines the application and sends it in the district land bureau
    -District land officer sends the application to district registration officer
    -The application is registered
    -Field verification of the claimant evidence of ownership is done
    -Payment of transaction cost in the bank
    -Registration officer update the records in the registry
    -Registration officer prepares deed transfer
    -Registration officer send deed transfer to district land officer
    -District land officer sign it
    -Issuing of deed transfer to new property holder

Apart from formal arrangement of right transfer, the informal right transfer is still observed in the rural areas not only in case of inheritance through families or gift, but also in case of buying and selling.

3.3 Assessment on effects related to legal framework and institutional arrangements

As remarked in visited organizations, current status of legal framework is contributing to the promotion of land information provision on one hand, and impeding to attend the target goals on other hand. The enacted and initiated laws are applied in different visited organizations and they are contributing to the initiatives towards land information development. The new Organic Land Law offered possibilities to enact associated laws/decrees/orders in line with land information. In addition, strategic actions in favour of land information development were launched such as strategic road map for land tenure regularization and land use master plan.

Nevertheless, some essential decrees to support registration and titling process are not yet gazetted. For instance, the ministerial order determining the modalities of land registration which establishes the registration system by setting out principles and parameters is due to submission to the Prime Minister (MINITERE 2008). Unless the highlighted ministerial order passes very quickly, otherwise the systematic registration planned to start in early 2009 will be only supported by OLL and this is found as a gap in the regulation. The gap in regulations is also witnessed by laws either under revision or still being drafted. In the new policy, it is emphasized that the law determining land surveying modalities and standards is essential for registration process. However, this law is still under revision. The current status of proposed organizations shows that the targeted goal is not yet achieved. As a result, suggested provision system for land information is partly implemented in practice. According to new system, thirty district land bureaus, five regional offices of deputy registrar of land titles bureaus were supposed to exchange mutually data and information in hierarchical way with the NLC in vertical and horizontal integration perspective (see figure 5). Given that regional offices of deputy registrar are still spatially centralized, the number of days needed for signing lease contracts and titles is increased. Travel made by district land officers from their respective districts to NLC is negatively impacting on the rapid service delivery at district level and on transaction cost such as time spent, financial resources used for transport and uplifting money dedicated to land officers missions.

Figure 5: Proposed flow of land related data and information

3.4 Assessment on effects related to geo-ICT adoption, diffusion and use

Kling (1990:82) argued that *"more computing is better than less, and there are no conceptual limits to the scope of appropriate computerization"*. This assumption can guide us to confirm that there is a step achieved in geo-ICT

adoption and diffusion in visited organizations but, the change is incremental. Indeed, creating NLC and district land bureaus and providing GPS and computers to them is found as an achievement towards technology diffusion. Nevertheless, maintaining these infrastructures only when there is a problem, outsourcing most of geo-ICT related tasks, and depending on the external companies/individual person for IT support (as noted in most of visited organizations) is not a promising strategy for internal strengths. It was found that a big gap in IT infrastructure and skills is hindering goal realization of IT enabled infrastructure for handling land related data and information. Moreover, assessment in term of IT infrastructure requirements was only conducted in the NLC, whilst at regional and district levels, only capacity needed in term of human resources has been evaluated. Thus, one can question how land related data collection, processing and maintenance will be carried out, given that it is proposed in the policy that most of tasks related to handling land related data and information will be done at district level.

In the process of developing geospatial data about land, it was mentioned by NLC based GIS specialist that standards with regard to data model and data collection are still a big challenge. Because of using different standards during cadastral plan preparation, merging and overlaying data sets from various district land bureaus will be challenging at the time of creating central database. Actually, districts are using different GPS configuration set up during boundary survey. Coordinates recorded are not with the same format. Some surveyors are using coordinates in meters, whereas others are relying on decimal degree (DD) or degree, minute, second (DMS) systems. In some cases, some cadastral plans do not have parcel unique identifier. The variation in spatial reference system was also found between the current system used in the NLC (used also during NLTRP) and the one used by Swede Survey Company in Land Use Master Plan Project. The NLC is using the local datum (Arc_1960) and Swede Survey is using global datum (ITRF2005). Therefore, the data integration will require additional transformation work.

Applying technology such as geo-ICT necessitates standards for data model, data processing and storage for making interoperable the designed land information system. Since it is propose in the policy that national database for land related data and information is to be set up, the interoperability issue should be one among factors on top agenda so that data and information from various district land bureaus can be integrated in a streamline environment. However, it was noted that standards in data models, data collection and processing is still a big challenge. While, *"in both paper*

based systems and computerized systems, standards are required to identify objects, transactions, relations between real estate objects (e.g. parcels) and persons (also called subjects in some countries), classification of land use, land value, map representations of objects (Van Oosterom and Lemmen 2003:13), current methods used for data collection seem not to be in line with integrated land information development. Indeed, each district land bureau is conducting boundary survey in its own way without standards provided for GPS configuration and coordinates system to be used. In case geo-ICT related tasks are outsourced, the work in district land bureau is a hard copy report. One can question what would happen at the time of integrating all data and information in a single national database. It seems that the alternative way is to repeat all the completed surveys so that every parcel can be assigned a single parcel identification number for avoiding the challenge of non identified parcel or duplication of parcel identification number.

4. Conclusion

New revision of tenure regulations, new projects for land titling, the need for restructuring the existing land administration institutions, and the design of new land use planning rules and procedures were found as advanced motivations for land policy reform. However, we found that these motivations are not similarly shaped across different regions. The explanation provided for this difference is grounded in the historical background of tenure system and envisioned rational land use by decision makers. Pertaining to Rwandan case, our findings showed that land policy reform was geared by three main reasons. First, the need for setting up a sound land related regulations for replacing the old ones which were not coping with the current country land management perspectives. Second, the need for establishing new land administration institutions by replacing centralized organizations by decentralized system at local level. Third, the elaboration of land use master plan for efficient management of land which are becoming scarce and degradated because of high population density.

Land policy reform has lead to the introduction of new system of land information provision in Rwanda. New legal framework for land related processes has changed the old registration process and property right transfer and triggered the initiatives for land information development but, things are still in transition. Our findings demonstrated that new land related regulations have incited the increase in registration. The changes in policy also lead to the redefinition of the duration for delivering long term lease contracts and title of ownership. In addition, new policy has stimulated the need for creating land information with the initiation of two main land

information projects including National Land Tenure Regularization and Land Use Master Plan.

Even if the policy was enacted and initiated, some laws/orders/decrees are still being either drafted, others are to be prepared or under review in the parliament. We cannot confirm that the highlighted effects are only the result of new land policy, because it has been found that decentralization policy and Rwanda long term development plan known as vision 2020 are also playing an important role. Therefore, the introduction of new land policy was a coincidence with an ongoing decentralization process and is integral part of Rwanda vision 2020. Beyond Rwandan case, standardizing working procedures, data model and technology adoption and diffusion are found as complex process in the newly created institutions with rapid changing environment.

Recommendations
We cannot pretend that all dimensions in line with causes and effects of policy reform were explored and analysed. Since our unit of analysis was public land administration organizations, further researches can allow understanding the degree of policy readiness from citizens' side and civil society. Land policy reform in Rwanda coincided with ongoing decentralization process and environmental policy and some similar aspects are found in the respective contents of these three policies. Thus, research on parallel implementation of policies with some similar dimensions could allow a better understanding on how they are either completing or conflicting. In addition, analysis on cost efficiency and effective on land registration with reference to Rwandan case could be an attractive research theme given that systematic land registration is to kick off early 2009 in Rwanda.

It was remarked that new policy is more understandable in public services whilst citizens are still reluctant on provisions related to land registration and land consolidation. Thus, sensitization through media, meeting, and intensive campaigns through sector and cell land committees are highly needed especially before launching systematic land registration envisioned in the near coming future. For enhancing standardization process and allowing easy overlay of data collected, the National Land Centre as a technical supervisor should emphasize and enforce that GPS handed to district land bureaus should have the same setting. In case of outsourced geo-ICT related tasks, district land bureaus would oblige external companies/individual personnel to use the same spatial referencing system and data model standards, and to hand over not only hard copy but also softy copy of surveyed land. This will facilitate easy integration and processing of

data at the time district land bureaus will be equipped with IT facilities and skilled staff in geo-ICT.

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