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Updating land information systems created using unconventional approaches

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ABSTRACT

Context and background

Many are the suggestions on how to develop a new land information system or evaluate how successful is the existing system. However, guidance about how the created system can be kept up to date is shallowly mentioned in the literature while it is the key feature for its sustainability.

Goal and Objective

This paper is part of an extensive research done regarding the updating of land information systems that were created using unconventional approaches during systematic land registration. For these systems, huge database are created in a short period during the initial registration. To minimize uncertainties that may be in the updating phase, a framework was developed and presented in this paper.

Methodology

A refined traditional approach for system design was used in the development of this framework. The design requirements were extracted from literature and they were refined basing on the responses of land experts from nine case-study countries. These refined requirements were used to develop the updating framework and its validation was done by experts in the use of unconventional approaches in land registration.

Results

The developed framework explains what to consider in the updating to ensure the registration of changes in land records. The framework is composed of 'dimension' which is a group of parameters related to each other; 'parameters' of land information system that are worthy to consider in the updating and the 'requirements' describing how to design these parameters to ensure that changes in land records are being registered.

Keywords

Land records, land registration, systematic land registration, updating land records, unconventional approaches

1. INTRODUCTION

It is common to find frameworks suggesting how to design a land information system (LIS) to ensure that it serves a purpose such as ensuring tenure security, support property valuation and taxation, facilitate land use control, promote land development, etc. Different requirements are suggested in literature for LIS design for different purposes such as requirements for implementing the multipurpose cadaster (Dale & McLaughlin, 1988); designing land registration systems for developing countries (Hanstad, 1998); requirements for designing a pro-poor land recordation (Zevenbergen *et al*, 2012 & 2013; Hendriks *et al*, 2019); guiding principles for implementing a fit for purpose land administration (Enemark *et al*, 2014 & 2016); framework for effective land administration (UN-GGIM, 2021); and so forth.

Due to the dynamicity of LIS, other frameworks come to explain how the designed system can be evaluated to know whether it is fulfilling the intended purpose or not. Here, we can find criteria for measuring potential or actual success of a cadaster (FIG, 1995); framework for evaluating a well performing land administration systems (Steudler, 2004) or its effectiveness and efficiency (Burns, 2007); framework for measuring the performance of a cross-organization land administration process (Chimhamhiwa *et al*, 2009); land governance assessment framework with its indicators on a successful land administration (Deininger *et al*, 2012); to name a few.

There are also another category of literature that mention consideration in the updating of land records, such as removing any obstacles hindering the reporting of changes in land records (Larsson, 1991); easy procedures, decentralization of land services, low registration fees and system inter-connectivity (Hanstad, 1998); institutional and legal frameworks, mobilization and incentives (Enemark *et al*, 2016).

In the above frameworks, updating land records is sometimes mentioned as a step in the development process, while it constitutes a key feature for the sustainability of the created LIS. Bennett *et al* (2021) confirmed that updating phase used to be a second concern though it is recognized as important.

This paper is a contribution to knowledge gap in the updating of land records. The paper is part of an extensive research done regarding the updating of LIS, especially those systems that were created using cheap and fast methods, commonly known as 'unconventional approaches' during systematic land registration (SLR). These systems were chosen because, during the initial registration, a considerable amount of data is collected in a short period. And, as the programs are very often project based, there may be uncertainties about how the huge database will be updated. To minimize this gap, the current paper presents an updating framework developed in order to support countries that established their LIS by using unconventional approaches during SLR.

The design requirements used in the development of this updating framework were tested in nine (9) countries that used unconventional approaches in SLR. These countries are Cambodia, Ethiopia, Kenya,

Kyrgyzstan, Mexico, Namibia, Nepal, Rwanda and Thailand (more details are in Biraro *et al*, 2021). Recommendable practices in updating found in these case countries guided the development of the framework presented in this paper. These good practices include the existence of updating procedures and other facilities supporting this activity; simplified LIS; decentralization of registration services; accessibility of the database; awareness raising about registration; education capacity building; and so forth. That is why, when explaining the framework, reference is sometimes made to the study conducted in the nine case countries. The paper is divided into five sections that are introduction, methodology used, presentation of the updating framework, the explanations of the framework and a final conclusion.

2. METHODOLOGY USED

The refined traditional approach for system design (Yeates & Wakefield, 2004) was used to design the updating framework following these four steps: *requirements specification; requirements validation and refinement; framework design; and framework validation*.

First step: Requirements specification: As a starting point, the requirements were generated from literature based on what different authors think should be considered in order to have an effective LIS. This exercise led to sixteen (16) parameters that were found to be relevant in updating land records when unconventional approaches were used in SLR. These parameters were broken into 'indicators' which were used to design a questionnaire used to assess updating system in nine (9) case study countries. Each question represented a requirement that an updating system may have.

Second step: Requirements validation and refinement: The assessment was conducted on nine (9) case study countries that used unconventional approaches in SLR. These countries are Cambodia, Ethiopia, Kenya, Kyrgyzstan, Mexico, Namibia, Nepal, Rwanda and Thailand (Biraro *et al*, 2021). The questionnaire was sent to at least two (2) LIS experts from each country. The purpose was to see in which way the set updating requirements were workable based on the situation from these countries. Twenty eight (28) LIS experts provided their responses to the questionnaire. The data collection provided information in relation to the set requirements. Additional insights were obtained and used in the refinement. As this part of the methodology was published (Biraro *et al*, 2021) comments that were received from reviewers of that article were also considered in the refinement of the requirements.

Third step: Framework design: To design the framework to update LIS established using unconventional approach during SLR, the refined requirements were used. One parameter among the sixteen (16) parameters tested in the case study countries (suitability to the circumstance) was left out as it was found difficult to assess (Biraro *et al*, 2021). Other remaining parameters were refined and restructured which led to nineteen (19) parameters composing the current framework. The developed framework provides guidance on how the updating system can be designed in case unconventional approaches were used in SLR and why it is worthy to consider that.

Fourth step: Framework validation and refinement: The purpose of this step was to assess if the designed updating framework is workable. The framework was sent to eleven (11) land experts in the use of unconventional approaches in land registration. The updating framework was summarized in a

table that contained a space where expert could write their review and/or comment. Additionally, a document providing explanations about the developed updating framework was also sent together with the table so that these experts can consult it in case they need more details. Eight (8) land experts out of eleven (11) contacted provided their reviews in due time. These reviews were compiled, analyzed and used to refine the updating framework to get the version as presented in this paper.

3. THE DESIGNED UPDATING FRAMEWORK

The updating framework, as designed, explicitly explains what to consider in the updating in order to ensure that changes in land records are being registered. The validation process provided constructive insights that allowed to come up with the current version of this framework. The framework comprises three major parts being 'dimension', 'parameters' and 'requirements' about how the LIS components should be designed to ensure that changes in land records are being registered.

The first part, which is about 'dimension', is a categorization of the parameters. Parameters were grouped based on how they are related to each other. 'Institutional design' groups those parameters that are linked with the organization of the LIS, including the legal aspect. 'Technical design' includes the technical part of the LIS (e.g. LIS structure, data security, etc.). The 'operational design' concerns the functioning of the updating system (e.g. registration procedures, fees, etc.).

The second part is composed of 'parameters' includes the components of LIS that should be considered in the updating of land records. This part was developed based on three suggestions from literature that are: (i) what should not be left out in the initial development of a LIS, especially in case unconventional approaches are used (e.g., simplicity, speed); (ii) what should be used to assess how the established LIS is performing (e.g. security, accessibility); and (iii) what to consider in the updating of LIS (e.g. short registration procedures, low registration fees). The literature was complimented by comments and reviews received from thirty six (36) experts (28 LIS experts from the case countries and 8 land registration experts who did the validation).

The last part of the framework is about 'requirements'. This part clearly describes how the parameters of the LIS have to be designed to ensure the updating of land records. For example, laws and policies that should be regularly reviewed; the format of land records that should be digital whenever/wherever possible; land registration procedures that should not use technical jargon so that ordinary citizens can follow them without support, and so forth.

The entire updating framework comprises three (3) dimensions, nineteen (19) parameters, and forty three (43) design requirements which may facilitate the registration of changes in land records. The table 1 below provides a summarized structure of the framework while more explanations are provided under section four (4).

Dimensions	Parameters	Requirements
Institutional dimension	Political support in registering changes in land records	<ul style="list-style-type: none"> Decision makers understand the benefits of registering changes in land records; Registering changes in land records is part of the national strategic plan;
	Legal support in registering changes in land records	<ul style="list-style-type: none"> Laws and policies are regularly reviewed to adapt them to the existing needs; Registering land is compulsory; Registering changes in land records is encouraged;
	Security when transacting	<ul style="list-style-type: none"> Issued land documents provide a minimum security;
	Institutions participating in registering changes in land records	<ul style="list-style-type: none"> There are no overlaps in responsibilities for institutions involved in the registration of changes in land records; There is collaboration among institutions involved in the registration of changes in land records;
	Location of registration services	<ul style="list-style-type: none"> Land registration services are geographically accessible; The distance to reach the registration services is low or none (online services);
	Financial sustainability of the LIS	<ul style="list-style-type: none"> There is a financial plan guiding the process of registering changes in land records; The money received from the land services are covering the necessary budget to operate the LIS or the government is providing necessary budget to operate the LIS;
	Training of professionals involved in registering changes in land records	<ul style="list-style-type: none"> Trainings for staff involved in the registration of changes are planned and updated regularly; Trainings for staff involved in registering changes in land records are budgeted and done; Staff involved in registering changes in land records are enough and have the required capacity;
Technical dimension	Simplicity of the LIS structure	<ul style="list-style-type: none"> Whenever and wherever possible, the land records are in digital format; LIS structure complies with international and national standards; Multi-form languages are used in the LIS (all official and native languages, graphical and audio-visual illustrations, etc.);
	Systems interoperation	<ul style="list-style-type: none"> Cadastral and legal land records are interoperated; The land records database is interoperated with other information systems (e.g. population register, taxes authority, business register);
	Facilities to process applications for registering changes	<ul style="list-style-type: none"> There are necessary facilities to process the application for registering changes in land records; Facilities used in the registration of changes have the required capacity;
	Technical sustainability of LIS	<ul style="list-style-type: none"> Local (as opposite to foreign) technical staff is among the key designers of the LIS; Local technical staff is maintaining the LIS; The system structure is coping with technological advancement;
	Data security	<ul style="list-style-type: none"> Land documents and land records are protected from potential fraudulent actions; Land records have a back-up;

	Accessing land records	<ul style="list-style-type: none"> • Local land officers and citizens have access to land records; • Where there is a digital database, land records can be accessed remotely (through website, mobile phone); • The access is provided at low cost or free of charge;
Operational dimension	Simplicity of updating procedures	<ul style="list-style-type: none"> • There are official updating procedures; • The updating procedures are presented in multiform languages (written in all official and native languages, graphical and audio-visual illustrations, etc.); • The updating procedures do not use technical jargon; • Citizens can follow the procedures without support; • Staff supporting in registering changes are also available;
	Affordability of the registration fees	<ul style="list-style-type: none"> • The fees to register changes in land records are determined based on fees paid to register land in the initial registration or on aspects like type of transaction, land value, etc;
	Speed in processing the application	<ul style="list-style-type: none"> • Updating procedures are short; • Feedback on applications to register changes is provided in a short period; • All registered co-holders of land are informed about any change happening in their land records;
	Mobilization about registering changes	<ul style="list-style-type: none"> • Mobilization about registering changes in land records is done and updated regularly; • Various communication media are used in mobilization;
	Incentives in registering changes	<ul style="list-style-type: none"> • Incentives or promotional periods are offered when registering certain changes in land records;
	Effectiveness of the registration services	<ul style="list-style-type: none"> • There are means to continuously assess how effective is the registration of changes in land records;

Table 1. : Framework for updating LIS designed using unconventional approach in SLR

4. EXPLAINING THE UPDATING FRAMEWORK

This section provides detailed explanations on the updating framework as summarized in the table 1 above. The section has three sub-sections corresponding to the three 'dimensions'. Under each dimension, there are explanations about why each parameter should be considered in the updating of land records. As mentioned, the situation in the case study countries are sometimes referred to in order to emphasize on the necessity of considering the set parameters.

4.1. Institutional dimension

This category includes parameters related to how the LIS is organized, including the legal aspect backing this organization.

(a) Political support in registering changes in land records

During the FIG e-working week 2021 keynote¹, Dr. Emmanuel Nkurunziza, the current Director General of the Regional Centre for Mapping of Resources for Development (RCMRD) and who actively participated in the national land tenure regularization program in Rwanda, stressed that political support is the cornerstone to undertake land registration. He also explained that during this registration program, some orders and regulations were flexible so that their revision was not requiring lengthy processes. This shows how political support is important for registration. Same is for the updating of land records as it is a continuation of the initial land registration. As all decision makers are not experts in land registration, there is a need to get their buy-in by informing them about the benefits of land registration and more specifically of the updating of land records. Champions or influencers at the highest political level should be identified so that they support and/or lobby for updating activities. To include the updating of land records in the national strategic plan, the decision makers have to understand the necessity of having rights kept up to date. Some may think that first registration was enough and nothing more.

(b) Legal support in registering changes in land records

Legal framework is among the essential components supporting land registration and more specifically the updating of land records. As it is often the case for the initial registration, there should be laws and regulations clarifying what change in land records has to be registered and how it has to be done. Having this clarified would ensure security when transacting, as explained below. These laws and regulations have to be dynamic, i.e. they need to be regularly reviewed to suit the existing needs. A part from making it an obligation to register land, the regulation should also encourage the registration of any other change in land records. This may add more emphasis on the updating of land records because 'registering land' sounds more like first registration or registration of right transfer (e.g., through sale)

¹ <https://www.youtube.com/watch?v=SCKuvlXKUy4> accessed on 7th October 2021

than the registration of other changes in land records (e.g., changes in annotation). During SLR, encouraging landholders to register their land is done in all its forms. The same should be done for the updating. Registering changes in land records may be mentioned in the regulation to give this activity more value.

(c) Security when transacting

One benefit of having a well-functioning LIS is to support the land market (UN-GGIM, 2021; Williamson *et al*, 2010). Parties involved in land transaction (e.g. the buyer, the bank) need to feel secured that the deal is based on correct information. Even though the aim of registering land is to provide tenure security, any evidence proving land rights should provide a minimum security for landholder(s). This is the case in the nine explored countries where the issued document provides legal protection, i.e. decisive in case of diverging claims (Biraro *et al*, 2021). This may motivate those who acquired new land to register the transaction so that they benefit from this security. At the same time, any other change in land records may be reported as soon as it occurs in order to have correct and complete information on the evidence proving rights on land.

(d) Institutions participating in registering changes in land records

One aspect that affects the operational budget of the LIS is the number of agencies participating in land registration (Burns & Fairlie, 2018). The institutional structure can either be one agency is doing the whole work or the same agency has multiple branches; or there are other involved agencies. The more the number of agencies, the higher the cost for running the system (*ibid*). Similarly, the way the registration services are managed (one agency or multiple agencies) will have an impact on how the updating is done. When the institutions involved are many, there is high possibility of having longer updating procedures, overlapping responsibilities or/and difficulties in collaboration. To minimize the cost and ensure better service provision, one agency involved in the registration process with centralized database and decentralized offices, less hierarchy and more capability of doing online registration may be the way to go (*ibid*).

(e) Location of registration services

Very often, for land registration programs that use unconventional approaches during SLR, the registration is done locally through participatory approach. Offices are opened at lower level to reduce the distance travelled by landholders when coming to register their land. This positive action should be kept during the updating phase so that the registration services remain closer to those seeking for them or even introduce online services and have zero distance between landholders and registration services. Local land community representatives can also be used to play a role in the updating process as they participated in the initial registration. However, for areas where electricity and/or internet are/is an issue, these offices can be opened where there are other government services or community center to simplify accessibility.

(f) Financial sustainability of the LIS

Very often, the land registration programs that use unconventional approaches in SLR are project based and this can be proven by the situation in the majority of the case countries (six out of nine countries). Though the funds may remain until the beginning of the updating phase, the LIS should not depend endlessly on donor support. It should gradually mature and be financially autonomous. The financial plan should be set from the beginning to guide the registration process. By estimating how much is needed to run the system (operational cost) and how much can be generated from land revenues, it may be possible to know what is needed to have a self-financed system (Burns & Fairlie, 2018). As highlighted by some LIS experts from the case countries, the LIS autonomy can be determined in two ways. On one hand, the revenues received from the land covers the budget needed to run the LIS. On the other hand, the money generated from land goes in the national treasury and comes back as government allocated budget to the agency(ies) in charge of LIS. In both cases, the LIS is not depending on donors funds to operate and its financial sustainability may be ensured. Moreover, even if these funds from donors come, they would be an addition budget to what is already there.

(g) Training of professionals involved in registering changes in land records

Trainings to explain the registration procedures are often planned during the SLR that uses unconventional approaches to allow local participation. They should not be one-time trainings but rather continuously planned, budgeted for and done. This is in order to have enough experts, as it may be difficult to have a sustainable system without a sound and adequate education (Ali, 2013). As it was understood by all the case countries, both short and long-term trainings are essential for the updating of land records because they allow keeping land professionals up to date and to adapt their knowledge to technological advancements. However, the latter will be achieved if the training materials are updated on regular basis to incorporate innovations. The trainings have to be planned ahead of time so that the budget is made available. Additionally, the trainings have to be done. The plan and budget may be there but, because the necessity of doing trainings is not felt, the money may be used for other projects. Besides, staff turnover may be another pushing factor to offer these trainings continuously to make sure that anyone working for the LIS is up to date. Collaboration may be created between land agencies and training centers to maintain the skills of the staff on the required level (Bennett *et al*, 2021). When the personnel involved is enough and has the required skills, the registration procedures may go smoothly. It is unfortunate to have infrastructure that cannot be used due to unskilled and/or insufficient staff.

4.2. Technical dimension

This category combines all the parameters in relation with technical dimension of the LIS.

(a) Simplicity of the LIS structure

The land records are among the components of the LIS that are important (Dale and McLaughlin, 1999). Apart from facilitating data capturing; digitizing land records has many benefits like smoothing data processing and storage (Bennett *et al*, 2021); easing access to and sharing of data; track changes easily; or even perform a database backup or system upgrading. With these advantages, whenever and

wherever possible, efforts should be made to keep the land records in a digital format. However, the structure of the database within the LIS should comply with international and national standards to facilitate interoperation with other information systems (e.g. establish a spatial data infrastructure). For those records that were, originally, paper based (e.g. sketch maps, surveyors field books), an indexing system may be created to facilitate data retrieving. The situation in the case countries confirmed the importance of having a digital database where eight countries out of nine have digitalized their land records.

The language used can be a barrier for the system users. That is why multi-form languages may be used to reach all categories of users including those with disabilities, i.e. all official and native spoken language(s) included, graphical and audio-visual illustrations provided, and so on. Even though some technical terms may be difficult to translate, it is worthy to try considering these multi-form languages when designing LIS. The user interface should provide options of selecting language (not only spoken languages) for those using online services. This would allow everyone to understand and/or to use facilities offered by the system without any hindrance (e.g. online services). It is good to note that all the case countries included, at least, native language(s) among languages used in the LIS.

(b) Systems interoperation

As said above, one advantage of having land records in digital format is to facilitate data sharing. With the multipurpose LIS concept, records on land are used in various domains (e.g. physical planning, environmental management, justice, business) and vice versa, some of the information needed in the LIS are stored by other information systems (e.g. person identification). From both sides, data sharing would facilitate the work of everyone. In addition, when the database is designed using known international and national standards, interoperation may be easier. Although among the case countries only Kyrgyzstan and Rwanda managed so far to connect their database of land records with other databases, this parameter should be considered as it facilitates the updating process. Some steps may be removed (e.g. going to the bank to pay, filling in personal identification information, etc.) while other steps can be combined, thus making the registration process short and fast. Cadastral (spatial) and legal databases are concerned, also, by this interoperation in case their management is done by separate agencies. However, performing system interoperation may be influenced by other factors like having a national information strategy, digital database, well set security measures and legal and institutional frameworks in order to ensure that everything is standardized. Having everything set may delay or make difficult the implementation of this interoperation.

(c) Facilities to process applications for registering changes

During SLR, all efforts are put together in order to have adequate facilities allowing for fast and simple registration process. Because many data are being collected, offices are equipped with necessary materials with strong processing capacity. Unfortunately, the plan may often be for the initial registration and not for the updating phase while technical resources used to process the application for change registration have an impact on the quality of the service. In case these facilities do not have

the required capacity, the waiting time will be long leading to the queues in processing the applications (Chimhamhiwa *et al*, 2009). One interviewee from Namibia (case country) explained how land professionals have to queue to get a computer in order to enter the field data in the system. In this case, delays in processing the application are inevitable. To make the registration procedures fast, necessary facilities to process the application should be available and have required capacity depending on the workload. This include offices equipped with electricity, computer, and internet. It is unfortunate to have skilled and enough staff but who cannot be optimized because of insufficient and weak resources.

(d) Technical sustainability of LIS

There is a time frame for project-based programs and everyone's aim is to meet the deadline. In case there is no local expertise to perform the technical design of the LIS, a shortcut may be opted for and foreign staff hired to do the work. Sometimes, local technical staff may get short trainings to be able to assist in the design but nothing more. However, this knowledge gap, if not addressed from the beginning, may affect the technical sustainability of the system. In the majority of the case countries, the design and the maintenance of the LIS are done by local and foreign technical staff. The inclusion of foreigners may indicate limitation held by local IT experts. Involving local people is among the aspects characterizing unconventional approaches. This participation should be in all levels, including system design and not only at grassroots level where the data on land are collected by citizens themselves. Local staff should be among the key designers on the system so that they are also able to do the maintenance. This is because they are the ones to operate the system after the project team has left. Besides, local expertise should be considered when selecting the technical approach to be used (Flores *et al*, 2020; Bennett *et al*, 2021) so that, later on, it copes with the advancement in the domain. Though the time and budget may not allow it, it is worthy to invest in creating local expertise ahead of time to have it ready when the program starts. They may even be the one to suggest what upgrades to do on the system and implement them because they master the existing system structure.

(e) Data security

For the land documents to be reliable, the database of land records generating them should be protected from potential fraudulent actions. Any edits in the database should be controlled. As did Rwanda and Thailand, different access levels should be set for the system users. For example, citizens may have the right to visualize their own properties' records without changing anything, while land officers may be given access rights depending on their role in the registration process. Additionally, either in digital or paper based format, backup of land records has to be done in order to be able to restore the data in case of disaster or system collapsing. This will avoid starting from scratch if this happens. The data should be backed up continuously, to have a copy of everything, more importantly a copy of the daily-recorded changes as reported by landholders. It may be easier to do a backup for digital database than for paper based database. For the latter, with time, space for paper storage may become an issue. But still a backup is essential. Every document may have a duplicate or a scanned copy, which could serve as reference in case the original copy is lost. It is advised to have an offsite backup, i.e. the backup located,

geographically, at a different place of the agency(ies) producing the data. With the existence of national information strategy with other governments, the backup can even be moved to another country.

(f) Accessing land records

When a database is accessed by various users, it may facilitate its updating. The data are checked by many people with different interests and probable errors may be detected quickly. As it is the case in all the countries explored, the access should be given to those providing land services at local level (if they exist) in order to facilitate service provision; and to landholders who may need to know information written on their names. Local officers would be able to check the authenticity of submitted documents and to confirm, early, if the transaction is possible. This will allow providing feedback as soon as possible. In the same way, landholders would be able to verify whether the recorded information are correct. Besides, it will help those who want to acquire land to check if no restriction is attached to the desired parcel. Though the access may be provided easily when there is a digital database, it is also possible to provide access for paper based system. For example, an 'open day' can be organized where (potential) landholders may consult the registers or a toll-free number may help those having inquiries related to records in the registers. In case the database is in digital format, for both users (local officers and citizens), the access should be possible remotely, i.e. through website, mobile apps or by simply dialing an USSD² code on their mobile. Nevertheless, security and privacy issues should be taken into consideration when providing access. Accessing the land records should not require only going to the agency managing the land records, as it may delay service provision or discourage some for using the registration service. While local officers will access the database free of charge, landholders should access this service at low cost or for free as managed to do the case countries providing online access (Kyrgyzstan, Mexico, Rwanda and Thailand).

4.3. Operational dimension

Operational dimension groups parameters which are related with the daily functioning of the LIS.

(a) Simplicity of updating procedures

As it was felt by the case countries, guidance is needed for those registering changes in land records. They need to know, from the beginning, how to proceed in case there is a change in land records. For instance, where to go, what to bring, who to meet, how much to pay, how long the request will last. As did all the case countries, this information will be described in the formal land registration procedures to be followed when updating land records as provided and documented by the institutions mandated for this. Having them allows uniformity in tasks performed when updating land records and monitoring whether any improvement is needed. To avoid language barrier, multi-form languages should be used to reach all categories of users including those with disabilities. The procedures will be translated into

² USSD: Unstructured Supplementary Service Data: a quick code dealt using mobile phone in order to get information (e.g. deal *111# to know the remaining credits for mobile phone users)

all official and native languages(s), use graphical and audio-visual illustrations. Contrary to the explored countries, the procedures should be 'customer oriented', i.e. designed in way that allows an ordinary citizen to follow them independently (without support). That is why technical jargon will be avoided otherwise, citizens may need always support from professionals who can understand the procedures, as it is the case in some of the case countries. Nevertheless, support may be availed in case someone needs it. For example, professional brokers who can help those who are not available or helpdesk for those who are stuck somewhere in the process.

(b) Affordability of the registration fees

Cost of the registration, either for the landholders or for the government, is among the key factors in selecting unconventional approach to be used in the initial land registration program (Rahmatizadeh *et al*, 2018). The same consideration should be for the updating phase to make sure that landholders are able to pay, the registration is not a burden to the government and the system is financially stable. Often, during the initial registration that used unconventional approach in SLR, landholder pays little or nothing as the government or donors subsidized the registration cost (six case countries out of 9 received support from donors). Whilst this may not be feasible for the updating of land records because financial support is no longer there and yet the LIS has to be financially stable, the registration fees should be kept low at least in the beginning (Larsson, 1991) and can change gradually when needed. Though the financial plan will determine operational cost and land revenues so as to know what is needed to have a self-financed system (Burns & Fairlie, 2018), the fees to register a change in land records may be determined based on the amount paid by the landholder during the initial registration. This would remove some barriers for citizens registering these changes in land records. By taking reference to the case countries, the registration fees were kept low (less than US\$ 10) in five countries (out of nine). However, it may be difficult to keep the registration fees low, especially when there is no budget to subsidize the cost. In this case, the registration fees may be calculated based on other considerations like type of transaction or parcel value/location/use/size as it is the case in Cambodia and Nepal. For example, as some transactions do not involve money (e.g. donation, inheritance, changes in annotation) the charges may be less; whereas the land value will be different depending of the size, use and location of the parcel.

(c) Speed in processing the application

The time it takes to complete the registration process is another reason why unconventional approach in SLR are preferred to conventional ones (Rahmatizadeh *et al*, 2018). Speed should be aimed in the updating of LIS to motivate those reporting changes in land records. Even though it is still an issue in most of the case countries, speed can be achieved by shortening the registration procedures, for instance by removing some steps or combining processes (Biraro *et al*, 2015). In addition to this, citizens may be encouraged if they get, in a short period, feedback about the application they submitted. When applied for change registration, the application is either accepted or rejected. After submission, the applicant should be informed if their application was accepted, thus wait for the new land document; or if it is

rejected, thus get an explanation about reasons for rejection and what to do. Therefore, the period between submitting and getting this feedback should be as short as possible for the applicant to plan further. The payment may also consider this feedback, as it may seem unfair to pay for the service that you are not sure to get (Biraro *et al*, 2015). To avoid potential disputes that may arise for land which are co-held (because the transaction was not initiated by all co-holders), all the co-holders of land should be informed about any change happening in their registered records. For this to be possible, contact information has to be recorded during the initial registration. Human and technical resources used to process the application also have a big impact on the registration speed. Thus, they should be taken into account as discussed above.

(d) Mobilization about registering changes

Mobilization is an essential tool used during SLR as a way to engage all stakeholders including landholders so as to inform them about the planned activities. This is done before and during the registration activities to raise public awareness and the message is adapted to the program stage (Lamb & Endo, 2016). Awareness raising should be kept during the updating phase and done regularly because registration of changes is a continuous activity due to the dynamicity of the LIS. As it is the case in the initial registration, during the updating phase all forms of communication media should be used and regularly updated in order to reach all categories of stakeholders (UN-GGIM, 2021). The communication media used in the case countries include broadcasting (radio or television), public meetings, written materials (e.g. brochures), social media or word of mouth. The type of communication should be adapted to the concerned group. Even though the formal procedures are developed and documented to inform citizens how the changes in land records should be registered, mobilization would come to even tell them that these procedures exist.

(e) Incentives in registering changes

Mobilization about registration can be strengthened by some promotion offers for those registering any changes in land records. In the data collected, some of the case countries offer promotional periods as a way to raise awareness about the importance of registering change in land records. This can be another form of mobilizing people by offering advantages for some transactions (Enemark *et al*, 2016) or when the registration is done as soon as the change occurs. However, measures should be taken to make sure that people are not registering changes only during the promotional periods or changes which do not receive any incentives are not reported.

(f) Effectiveness of the registration services

The effectiveness of LIS in general and of the registration services in particular should be continuously monitored. Case study countries have understood this and have established various ways to assess how effective the registration services are. Obstacles that may hinder citizens to report change in land records can be depicted in this assessment. That is why it has to be done on regular basis. Any approach that would allow having information about how the registration services are being offered should be

used. It is unfortunate to introduce a new service or upgrading an existing one without basing this on the feedback from the assessment, or more specifically from the users. The assessment can base on the number of received applications and/or the set goals for the registration.

5. CONCLUSIONS

The framework developed in this paper is not the ‘silver bullet’ that will address all the updating challenges. It is neither a ‘one-size-fits-all’ approach for recording changes in land records. It is, however, a piece of work that may call for talking deeply and writing about the registration of change in land records. Contemporary researches has also made strong arguments on the actual underlying activities for the initial registration and for the updating phase are (not) so different from each other. Nevertheless that should not be the reason for not discussing deeply about the updating phase. It is believed that first registration and updating are two phases of the LIS which go hand in hand. Thus each should be given due attention. The failure of one will lead to the failure of the other.

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10. KEY TERMS AND DEFINITIONS

Land records: Spatial (cadastral) and non-spatial (legal) information on land collected and registered during the initial/first land registration.

Land registration: The activity of collecting and recording information of land.

Updating land records: The activity of collecting and registering any change (spatial or non-spatial) that happened in the information on land recorded during the first/initial land registration.

Systematic Land Registration (SLR): The collection and recording of information on land done plot by plot to cover the entire area under registration.

Unconventional approaches: cheap and fast ways of recording land information.