



Land Governance in an Interconnected World

ANNUAL WORLD BANK CONFERENCE ON LAND AND POVERTY
WASHINGTON DC, MARCH 19-23, 2018



AN OVERVIEW OF INITIATIVES TO INNOVATE LAND TENURE RECORDATION: 2011 TO PRESENT

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**Paper prepared for presentation at the
“2018 WORLD BANK CONFERENCE ON LAND AND POVERTY”
The World Bank - Washington DC, March 19-23, 2018**

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ABSTRACT

Fit-for-purpose inspired approaches to land tenure recordation are being developed and implemented mainly in the form of pilot projects in various countries and application contexts. These approaches combine mobile digital technologies and flexible database structures with community based approaches for capturing and managing tenure rights. We discuss 10 such initiatives. A basic commonality of the initiatives is the general approach to tenure recordation through community based digital data capture, in many cases via mobile applications – where formal land registration does not suffice or has failed and acknowledging the diversity of land tenure regimes. Looking at the initiatives in more detail a number of differences become apparent in terms of financing mechanisms and organizational characteristics, as well as process design and application domains. Our discussion provides a basis to point out directions for future research as well as points of consideration for evaluation of implementation efforts and the aim of achieving citizens' tenure security.

KEY WORDS:

Innovative land tools, Land Administration, Tenure Recordation, Open data, Legitimacy

ACKNOWLEDGEMENT

The authors thank the interviewees' for their time and insightful discussions as well as for their reviews of both the preliminary analysis and this paper. The members of the board of the Cadasta Foundation reviewed our overview table, which we thankfully acknowledge. We are also thankful to our PhD and MSc students for their in-class work as well as research conducted on the various tools and approaches discussed in this paper.



1. THE EMERGENCE OF INNOVATIVE TOOLS FOR TENURE RECORDATION

Developing countries experience multiple challenges in securing rights to land through processes and techniques of formal land administration. Problems of tenure insecurity, limitations of availability of tenure information, and the recognition of the high costs of implementing comprehensive, large scale land information systems (LIS) through public agencies or large scale international bodies - especially in developing countries – triggered dialogues that promote alternative approaches to generating and managing tenure rights on land. In how far formal registration of land rights is necessary and for whose benefits is one point of continued debate. Fourie (2001), for instance, highlights the need for formal registration systems and spatial information systems to be adapted to give the poor both tenure security and access to spatial information through appropriate spatial data infrastructure to accommodate a variety of parcels and multiple forms tenures (Fourie 2002). Especially the urgency and pressure on governments to improve infrastructure and services in regions with high rates of land conversion and urbanization, combined with the complex dynamics between “informal” and “formal,” “customary” and “modern,” “incremental,” and “master-planned” practices of urban land use and change (Benjamin, 2004; Hull, 2012; Kingwill, 2014; Roy, 2009), make it difficult if not impossible to establish a large-scale LIS and SDI, be it data for the water supply network, the location of individual buildings and their ownership, or patterns of land tenure and rights distribution.

In light of these difficulties Deininger (2003) and van der Molen & Lemmen (2006), for example, suggest that increasing security of tenure does not require issuing formal individual titles, because more simple and less costly measures could be better alternatives. Successive and extensive dialogues further evolved and presently culminated in the idea of fit-for-purpose approaches for land administration (FFP LA) (UN-Habitat, 2008; Zevenbergen et al, 2013). Fit-for-purpose promotes designing land administration systems with the explicit vision of prioritizing the needs of people and their relationships to land at a given point in time. In a FFP LA the underlying spatial framework for large scale mapping is designed to manage land issues at local or in country context, rather than strictly following bureaucratic and technical standards of the conventional registration systems (Enemark et al. 2014).

Progress has been made in advancing the FFP LA vision. First the Land Administration Domain Model (LADM) ISO Standard was adopted in 2012. This is a conceptual model that provides an overview of requirements and standard packages for organizing land administration information, including information



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about people and organizations, as well as tenure rights and spatial units (parcels) and documents to support the tenure rights. The development of LADM took place in parallel to the development of the Social Tenure Domain Model (STDM) as a philosophy and model for capturing tenure rights, including social tenures. Since then a number of innovative tools have been developed in support of the recordation of tenure rights and following roughly the basic notion of FFP LA.

Innovative approaches for tenure recordation have been piloted and implemented since approximately 2011. These approaches seek to address technical problems in collecting and managing tenure information by providing methods and solutions that are simple and affordable to use. Promoters and developers of innovative tools also advocate for openness of land tenure information for various reasons, for instance to improve data sharing for different uses in development and planning, to support improved decision making by third parties, including large-scale investors, but at the same time to increase transparency of land sector activities for vulnerable and poor groups, who have the greatest difficulties in accessing information administered by government and third parties. Another cornerstone of innovative land tools is the promotion and advocacy for participatory surveying methods and bottom-up approaches to data collection and storage about land access and use rights. Promoters aspire to and work with community driven and/or community generated digital data. In so doing, innovative tools step in, where administrative and legal statutory environments around the tenure recordation presumably have failed or are weak. This is partially reflected in the promoters' aims to capture the diversity in land tenure systems and rights, with special emphasis on women's and other vulnerable groups' rights.

In these innovative approaches we see several policy and technological developments from the past 20 to 30 years converging. On the policy discourse side these include aims of improved efficiency (saving costs and time), open and transparent government, and the ideal of widespread participation of land stakeholders including citizens, politicians and actors from professional bodies. The aim of efficiency drives e-government and LIS development since at least the 1980s and 90s stemming from the new public management paradigm era (Homburg, 2008). Especially since the 2000s the visions of open and transparent government have been promoted through worldwide Freedom-of-Information (FOI) legislation and open data government initiatives inspired by the U.S. Obama government (Georgiadou, Lungo, & Richter, 2014). These global policy discourses and longterm aims stand in dialogue with parallel developments of the internet. This evolved during approximately the same time from a mostly read-only web 1.0 to the interactive and semantic web 2.0 and 3.0. Accompanied by a global spread of mobile internet and phone



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devices as well as urban sensor networks the technological environment now provides a wide spectrum of possibilities for the public to also provide data to the government, interact with authorities via the internet, and to publish data via internet based services and portals. Further, developments such as the growth of open source software community e.g. GitHub (Dabbish et al. 2012); lower costs, better access and improved accuracy of geospatial data, as well as the lower costs of computing power and storage space can be identified as catalysts that have contributed to this growth of innovative approaches for tenure documentation.

In sum, at least three trends gave rise to the development of innovative approaches to land tenure recordation. First, the difficulties in and the high costs of implementing comprehensive, large-scale land information systems through public agencies was recognized and led to continued debate on the pros and cons, but also the how-s of recording land rights and tenure regimes in developing countries consolidating around the notion of fit-for-purpose land administration. Second, the initiatives incorporate visions from policy discourse at international scale, including aims of improved efficiency, openness and transparency, as well as citizen participation. Third, the tools leverage new mobile and Web2.0/3.0 technologies that have emerged in the past 20 years for data collection, storage, and exchange, including mobile apps, online platforms, and cloud services.

In recent years innovative approaches have gained visibility through a variety of platforms, including traditional media, websites and social media; and through various events, such as professional meetings, conferences, workshops, seminars, and publicationsⁱ. However, as of yet, a descriptive overview of these tools is missing. Although a general trend in the emergence of innovative tools can be outlined as above, there are also various differences between initiatives in terms of financing mechanisms and organizational characteristics, as well as technological design and application contexts. The aim of the following sections is to describe both commonalities and differences and to discuss several themes underlying innovative approaches that are important for future development and research.

As such our study contributes by advancing the discussion on FFP LA by providing a first overview of the most recent innovative approaches for tenure recordation providing insights into the initiatives' aims, scope and the contexts, in which they are implemented.



2. METHODOLOGY

Our familiarity with the innovative approaches discussed here stems in large part from our work at ITC, the Faculty of Geoinformation Science and Earth Observation in the Netherlands, which runs an MSc program in Geoinformation Science for Land Administration. This program advocates for responsible land administration (Zevenbergen, de Vries, Bennett, 2015) and offers a course on “Innovative Approaches for Land Administration” in its curriculum. Since 2007 developers of innovative tools have been invited to lecture and demonstrate their tools to Land Administration graduate students and staff at the faculty. The developers are i) The Global Land Tool Network (GLTN) of UN-Habitat on the Social Tenure Domain Model – STDMⁱⁱ; ii) Food and Agriculture Organization (FAO) of the United Nations (UN) on SOLA; iii) Landmapp on Landmapp; iv) Cadasta on Cadasta; and v) Thomson Reuters on Aumentum Open-Title.

Further information was sourced from students as follows: i) MSc student assignments in 2015-2017, which explored the functions and applicability of innovative tools in support of FFP LA, as well as investigations of those innovative tools, which can be explored online, but have not been discussed by developers in class; and ii) from PhD students’ research investigating tenure recordation in different countries and online searches of initiatives. We also gained knowledge about initiatives and related discourses through our involvement in related workshops, conferences and seminars as well as regular communication with actors working in the field of FFP LA. In addition board members from the Cadasta foundation extended on the list of initiatives compiled by students; and we reviewed the initiatives’ websites, reports and documentation. In order to focus on specific questions developed for this descriptive study, we conducted in February – May 2017 a series of one to two hour semi-structured interviews (in person or via skype) with representatives from organizations involved in the development of six approaches: GLTN on STDM; FAO on SOLA Family of tools; Landmapp on Landmapp; Cadasta on Cadasta; and Thomson Reuters on Aumentum Open-Title as well as CaVaTeCo. (In the case of the latter representatives are involved in a FFP LA project with ITC in Mozambique). The topic guide for the interviews is included in appendix one. The interviews were recorded and subsequently transcribed.

Analysis involved identifying the core themes across initiatives based on a first reading of transcripts by the researchers. This paper is the outcome of a first qualitative content analysis (Hsieh & Shannon, S.E., 2005), where we identified differences between the initiatives in terms of financing mechanisms and organizational characteristics, as well as process design and application contexts, which are discussed in



section three of the paper. Furthermore, we identified four themes as common trends and challenges, which characterize the implementation process across various initiatives. These are discussed in section four of the paper. The first results were presented in a panel at the 2017 Conference TILting Perspectives 'Regulating a connected world' and shared with interview respondents to check for both factual accuracy in the more descriptive elements of the results summarized in the overview table of initiatives; and to receive input on our interpretation of the main themes related to trends and challenges of implementation. The first draft of this paper was sent to interviewees, who revised by correcting or adding information so that it best represented their perspectives in this article.

3. OVERVIEW AND DESCRIPTION OF INNOVATIVE LAND TENURE RECORDATION INITIATIVES

Table one below shows an overview of the six initiatives, representatives of which we interviewed and/or have worked with in the past. In appendix two we list an additional four initiatives that are similar in character, but which have not been included in interviews and the present analysis.



Table 1: An overview of six innovative approaches for tenure recordation

Initiative	Funding	Process design	Owner /organization	Tested/ Implemented	Application Context
STDM (Social Tenure Domain Model) http://stdm.gltn.net /	Not for profit ; donor funded external funding for specific components of the tool	Captures de facto/social tenure along the continuum of land rights Based on open source software	GLTN, UN Habitat in Kenya	Africa: Kenya, Uganda, Zambia, Angola, DRC, Sudan and Namibia Asia: Philippines, Nepal Middle East: Iraq Latin America: Colombia, Trinidad & Tobago, St.Vincent and St.Lucia	Recording land rights of urban (e.g. for slums and for municipal administration), rural communities (e.g. customary occupancy certificates, for monitoring farmer productivity) , and in post-disaster/conflict contexts for future upgrading along continuum of land rights and for access to other services
Open Tenure (part of SOLA family)	Not for profit ; donor funded	Captures de facto/social tenure Based on open source software	FAO in Italy	Africa: Uganda, Nigeria, Sierra Leone, Angola Asia: Cambodia, Myanmar	Supports governments in managing land tenure data, community recognized tenure rights/ claims



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http://www.flossola.org/index.php/solutions/Open-tenure				America: Guatemala	
SOLA Registry (part of SOLA family) http://www.flossola.org/index.php/solutions/registry	Not for profit ; donor funded	Adapts legal workflows for tenure registration Based on open source software	FAO, Italy	Africa: Nigeria, Sierra Leone, Lesotho Asia: Nepal Oceania: Tonga, Samoa	Provides enterprise wide support for registration and cadastral functions in a typical district land office including case management of applications
SOLA Systematic Registration (part of SOLA family) http://www.flossola.org/index.php/solutions/systematic-registration	Not for profit ; donor funded	Adapts legal workflows for tenure registration Based on open source software	FAO, Italy	Africa: Nigeria	Designed to support first registration through systematic adjudication & registration



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<p>SOLA State Land (part of SOLA family) http://www.flossola.org/index.php/solutions/state-land</p>	<p>Not for profit ; donor funded</p>	<p>Adapts legal workflows for tenure registration</p> <p>Based on open source software</p>	<p>FAO, Italy</p>	<p>None</p>	<p>Aims to record the land owned by the state with specific issues related to state land</p>
<p>Cadasta http://cadasta.org/</p>	<p>Not for profit ; donor funded</p>	<p>Captures de facto/social tenure</p> <p>Based on open source platform and tools</p>	<p>Headquartered in Washington, D.C. (with employees remotely based in Europe, North America, and Asia)</p>	<p>Africa: Kenya, Nigeria, Tanzania, Mozambique, Zambia, DRC</p> <p>Asia: India, Bangladesh, Nepal, Indonesia</p> <p>Latin America: Dominican Republic, Colombia, Honduras, Haiti</p>	<p>Develops and promotes the use of simple digital tools and technology to help partners efficiently document, analyze, store, and share critical land and resource rights information. Cadasta supports flexible data schemas per partner/project, so they can be adapted to the specific needs of the context (urban or rural, household surveying or community profiling, agriculture or community planning).</p>



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				<p>North America: USA Europe: Kosovo</p>	
<p>CaVaTeCo</p>	<p>Not for profit ; donor funded</p>	<p>Adapts legal workflows for tenure registration and development of land use (change) documentation processes</p> <p>Based on open source platform and tools</p>	<p>Terra Firma, Mozambique</p>	<p>Africa: Mozambique</p>	<p>Recording of land tenure rights at levels of community boundaries, and within these boundaries at individual/family parcels are drawn. Existing land uses are also mapped, including anticipated land use changes in the near future - obtained through participatory mapping. Tenure information is overlaid with future community land use plans, an approach that reveals any unused or underutilized spaces. Pockets of underused spaces are used to engage in dialogue with potential large scale investors.</p>



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<p>Landmapp http://www.landmapp.net/</p>	<p>For Profit</p>	<p>Adapts legal workflows for tenure registration</p> <p>Based on commercial/proprietary software and services</p>	<p>Landmapp, - the Netherlands</p>	<p>Africa: Ghana Asia: Indonesia</p>	<p>Focus on land tenure recordation for smallholder farmers, peri-urban residential landholders – individual – e.g. for access to loans</p>
<p>Aumentum Open-Title https://tax.thomsonreuters.com/aumentum/Opentitle/</p>	<p>For Profit</p>	<p>Captures de facto/social tenure</p> <p>Based on commercial/proprietary software and services</p>	<p>Thomson Reuters - USA</p>	<p>Africa: Ghana, Liberia Latin America: Bolivia</p>	<p>Configured to support different project requirements; Ghana, issuance of paralegal titles as part of a micro-finance loan offering to schools (loans supported construction and the procurement of learning materials); Liberia, securing paper archives (scanning the national Deeds registry); Bolivia, documenting rural tenure rights in target communities</p>



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The initiatives have similar points of departure in the context of land recording techniques and regulatory environments as outlined in the introduction. One commonality of the initiatives is the general approach to land tenure recordation through community based digital data capture, in many cases via mobile applications. Two fundamental drivers across the initiatives are to support land tenure recordation where formal land administration's work does not suffice or has failed, as well as to acknowledge and move onto the radar of land policy processes the diversity of land tenure regimes. Especially important in this respect is the promotion of rights of women and of groups of people, who are especially vulnerable to evictions and to losing their land, and access or use rights.

Looking at the initiatives in more detail a number of differences become apparent in terms of financing mechanisms and organizational characteristics, as well as technological design and application contexts. The main distinction in financial terms is between for-profit and not-for profit initiatives, where the former need to finance their own efforts through the paid provision of land tenure recordation and data services. In the case of not-for-profit sustainability of funding depends on donor agencies or organization internal funding. In addition, the different sizes of the organization, in which an initiative is embedded, influences financial means of the respective initiative.

The STDM initiative is championed by GLTN partners at the country level with co-funding by GLTN and given partners on the ground. Initiatives based on the SOLA-family of tools for land tenure recordation are guided by and based in the Food and Agriculture Organization (FAO), as such being part of a large organization with a long history as global actor in the land governance domain. Both are not-for-profit initiatives. Landmapp, Cadasta, Aumentum Open-Title and CaVaTeCo, on the other hand, are developed by relatively small organizations and have different financing mechanisms. Landmapp, a for-profit company, was kick-started by two engineers and has since grown to ten employees and is regarded as a sort-of follow-up of Thomson Reuters's Aumentum Open-Title. Landmapp is a relatively small organization that is solely dedicated to the development of the tools described here and was founded as a social entrepreneurial company in the market of land tenure recordation. Cadasta is a relatively small not-for-profit and donor funded enterprise. CaVaTeCo is developed by a private company - Terra Firma in Mozambique and employs a value chain approach to tenure recordation. It is financed by the Department for International Development (DFID) (United Kingdom), under the LEGEND fund. Regardless of organizational character and financing mechanisms all organizations act globally not only in terms of the places, in which tools are being piloted and implemented, but also intra-organizationally. Cadasta's staff,



for example, is located in different countries across the world and holds meetings mostly through digital networking.

For brevity and given this paper's purpose we have simplified the characteristics of process design of the initiatives into two categories: in technological terms and in terms of how the process aligns with established legal and administrative workflows in a given implementation context. Regarding the first, some initiatives rely on proprietary software and others deploy non-proprietary software and open-source applications. There is a link here to initiatives' financing mechanisms: for-profit initiatives deploy proprietary software and services as part of their product suite; not-for-profit initiatives rely more on open source and non-proprietary technologies. The initiatives can also be categorized into two groups according to another characteristic of the process design. One group aligns recordation processes relatively closely with established legal frameworks and administrative workflows regarding the types of land rights being recorded (most of SOLA family based initiatives by the FAO, CaVaTeCo, and Landmapp). Another group, focuses on capturing de facto or social land rights and seek to introduce the resulting recorded tenures into the formal registration system for recognition by government (Open Tenure part of FAO's SOLA solutions, Aumentum Open-Title, Cadasta, STDM).

Application contexts also vary between initiatives, not only in terms of geographic or national regions. A basic differentiation is between urban and rural contexts. In urban and peri-urban areas, initiatives focus especially on land tenure recordation of poor and socially disadvantaged groups, and contexts where land tenure recordation coincides with data collection efforts in the course of urban housing and infrastructure development projects. In rural areas initiatives contribute to land tenure recordation in association with cash crop production or for communities to access financial loans for a variety of community level improvements, e.g. in building construction and maintenance; as well as to the management of land in irrigation schemes and monitoring the impact of agricultural development programs for improving farmer productivity. The application context is closely interlinked with the three characteristics of an initiative, which we have briefly discussed above, namely an initiative's financing mechanism, organizational reach, and process design. For example, for-profit initiatives need to find a balance between recording multiple land rights, including de facto, but at the same time developing a feasible business strategy. Financial feasibility requires evidence of a market for the offered solutions and/or adjustment of the products to the market of customers. A not-for-profit initiative, on the other hand, may be relatively free for the time being from proving financial viability as the Cadasta representative explained. But in this case dependence on



donors may come to influence application context in the longer run through donor expectations and accountability requirements. Furthermore, the application focus also depends on the local partners' financial situation, which is often insecure and often also dependent on larger donor agencies:

“So, we have more or less the security to be stable for a while, but the NGOs, it’s terrible, because they don’t know if they can, are able to start a project, uh, they depend [on whether] the World Bank is going to spend money or not.”(Cadasta representative, 20 April 2017 interview)

As such application domains, focus and context have to be flexible and adjusted in response to a variety of dynamic factors, which are local as well as global in nature.

Initiatives embedded in organizations of a large reach and relative financial stability and sustainability also show more diverse application contexts ranging from rural to urban and supporting land rights recordation on part of the communities as well as government, for example STDM and FAO.

4. CROSS-CUTTING TRENDS AND CHALLENGES IN IMPLEMENTATION

In the following we turn to four main themes, which emerged from initial data analysis as trends and challenges in implementation across the various initiatives. These are important in that they offer entry points for research questions related to the nexus between the kind of initiatives presented in this paper and the institutional frameworks of land governance, in which they (are supposed to) work. As such the themes also provide first pointers for practical focus in future implementation processes.

4.1. DIGITIZING THE PLURALITY OF LAND RIGHTS

A common trend across the initiatives and relatively independent of their respective process design, business strategy or organizational history and financing mechanisms is that they promote *explicitly the digital documentation of land tenure*. This is important to note, because the digitalization of land documentation adds further complexity to the question of recording land rights in terms of data access, protection, and the need to provide both paper based documents as well as digital databases to potentially different actors. The reasons for digitalization of land records are more or less explicitly those cited in e-government and later open data government debates elsewhere, and include speed and ease of data



collection, more efficient data management, and greater transparency. While following this general trend towards digitalization, however, the initiatives emphasize an additional dimension specifically related to tenure and land rights recordation. During community based discussions, in liaison with government officials and customary authorities, the promoters of innovative approaches emphasize the need to record the plurality of land rights, including informal and customary land rights, temporary land uses and negotiated access to land, as well as rights as per statutory law. In so doing, especially women's rights and rights of groups that have in past been marginalized from land tenure formalization efforts, are moved to the foreground of discussions and subsequent data collection and recordation efforts. The initiatives all take a bottom-up approach working with local civil society organizations and NGOs and advocate for community-based and participatory approaches to land rights recordation:

“It is important to emphasize the importance of the 'people' component i.e. getting the buy-in from the stakeholders including the intended beneficiaries, building capacity and bringing out the fact that high-end technological tools and techniques do not always offer the required solution - pragmatic and 'unconventional' approaches are key.” (GLTN representative in e-mail correspondence, 11 May 2017)

By aligning needs and objectives of the communities being engaged in negotiation with other actors, especially government and customary authorities in charge of legitimizing land tenure records, the initiatives also adjust to the legal pluralist environments they encounter. This approach requires advocacy also for surveying techniques that are less precision oriented than those prescribed by administrative procedures. It is important to note that none of the initiatives currently actually record overlapping land rights and instead do so through parcel-by-parcel approaches and visualization and in many cases adjust to administrative workflows and requirements in order to produce officially legitimate and government recognized land tenure documents. However, due to the general vision of community-based rights delineation and data capture the initiatives – intended or not – act as catalysts in discussing the role of multiple and sometimes overlapping land rights and the protection of vulnerable groups' rights and land uses. These discussions move out of the realm of policy and theoretical debate in so far as they take place in direct relation to the practices of collecting and managing paper documents as well as digital data in association with implementing actors.



4.2. FLEXIBILITY IN PROCESS DESIGN, FLEXIBILITY IN VISION

Because the emphasis in these initiatives rests on working with local communities and various governmental stakeholders across local to national scales, the *original aims of the initiatives may become adjusted and diversify in the process of implementation*. Therefore, a second common trend across the initiatives is the association between flexibility in process design and data collection, on one hand, and flexibility in terms of an initiative's original visions and aims.

This pertains to longer term societal visions, but also in some cases to the initiatives' internal visions and philosophy. For example, the common interest in protecting women's lands rights and access to land for vulnerable groups (whichever way these may be defined) hints towards a social justice vision for societal development across the initiatives. At the same time, however, an explicitly stated vision to implement innovative approaches are economic and market growth. Both of these are large-scale, longer term and normative visions for societal development. In practice, however, these two are often inconsumable. Transparency and openness of governance processes are also visions driving the initiatives, especially in association with the promotion of digital technologies. Here too a contradiction can present itself in the practices of implementation between the protection of vulnerable groups and their data, on one hand, and the vision of publishing the data to third parties, including large-scale investors.

Thus, the broader and longer term visions for societal developments are interpreted and translated in practice in different ways depending on a variety of factors, including application context, but also related to the initiatives' characteristics, for instance, whether an initiative has to make own profit or not. Obviously, for-profit initiatives need to proof viable business strategies and a market of customers for their product. This introduces a de facto differentiation of land rights holders into customers of the certificate and/or data services being offered and those land holders, who do not wish to buy the product or cannot afford the services. In some cases, the change in original aims changed quite explicitly. For instance, in Landmapp's case the original idea was to support local farmers in recording their land rights in order to support farmers' role as environmental stewards. In this case the original aim combined with the start-up's spirit of entrepreneurship was motivated by environmental protection concerns and nature conservation. Through the course of time, however, and with the need to develop a customer base and business strategy, the vision changed into objectives driven by local community needs and market potentials. In Ghana Landmapp now focuses on cocoa farmers to support them to get land documentation, which in turn may be



used for accessing loans or other services. Across initiatives the aims behind land rights recordation become adjusted depending on implementation context, local and global actor constellations, and associated actor interests.

How local actors, aims and strategies also influence the process of aim translation in practice is illustrated by the types of data collected. For example, in many cases, data collection is not limited to land tenure data, but includes various socio-economic data depending on the needs of NGOs and the requirements of government induced community development projects. In these cases, land rights related data are collected alongside other information as explained by the representative of Thomson Reuters:

“I think it’s really about how to be intelligent about how you collect the data, because you know how many survey teams are going into those communities...And what you want to be doing is a bit more strategic, right? If we are doing health, or if we are doing land – we might as well collect health and education at the same time.” (3 March 2017 interview).

In how far objectives for land tenure recordation become implemented also depends largely on the funding situation and financial stability not only of the initiatives themselves, but of their local partners as well. Especially when data collection and database set up are driven by the data needs for a temporary local project, e.g. to gain access to a government provided service, the effort of land tenure recordation becomes (at least temporarily) limited to this context as well.

It is therefore not only the original legal pluralist environment, which requires database design and data collection to be flexible, but also the nature of the initiatives themselves, societal visions of involved stakeholders, as well as the changes in objectives arising from an engagement with a variety of local and global actors, which require a data technology design *“for flexibility to document evidence as defined by users – legal, customary, other.”* (Cadasta additional e-mail correspondence, 15 May 2017).

4.3. HOW TO LEGITIMIZE INNOVATION?

A general challenge encountered by the initiatives, albeit addressed differently by each, is the question of *how, when and by whom both the analogue documents as well as the digital data are considered legitimate and for what purposes* they can be legitimately used. Initiatives approach this issue in different ways, for



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instance by adjusting to the government's administrative requirements for data collection and required content of documents, or by enrolling both community level and other land sector authorities early on in the process.

The process design is constituted of a combination of the technologies developed and deployed and the regulatory and procedural requirements, which a given initiative supports or aligns with. Some initiatives follow closely government procedures and legal frameworks in data collection and database design. As such, formal tenure rights as defined in the land laws or the administrative practices of government are recorded on the parcels. The aim is to provide the tenure data to the government for the ultimate issuance of official documents, as information for land use planning and identification of community development priorities (e.g. GLTN) and/or for customary and statutory actors to sign documents at various stages in the process of documentation (e.g. Landmapp in Ghana). In this category, all approaches, except Landmapp, use a general boundary approach for mapping parcel boundaries giving room for a continuum of spatial accuracy.

On the other hand, some tools record tenure rights that are more diverse than those recognized in the statutory law, i.e. de facto tenure rights. The de facto tenure rights are delineated on small lots through piecemeal parcelization for individuals, or on community land. The recordation of de facto tenures, according to the implementers of the tools, support the GLTN's idea of incremental improvement of tenure rights from de facto to legal – continuum of land rights, as well as of spatial accuracy - due to demands in high accuracy surveys in the formal registration systems. The aim of recording de facto tenures is to transfer land documents and data into government holding to allow for dialogues on recognition of the tenure rights and for issuance of official documents later on.

Another approach is what we might call “avoidance of the legitimacy question” in the sense that an initiative may position itself explicitly as external to land governance processes and policy making to focus on specific, temporarily bounded project needs. For example, Thomson Reuters's Aumentum Open-Title has moved out of the land governance and policy making domain and positions itself strictly as an IT solution provider. Cadasta and Landmapp representatives emphasized on being cautious not to engage in land litigations and situations of contestation or conflict. On the other hand, GLTN explicitly emphasizes that their implementation efforts seek to adhere to GLTN's - and more broadly, UN's - values and principles.



4.4. HOW TO BE RESPONSIBLY OPEN?

Another challenge encountered and tackled by initiatives in different ways relates to the question of openness of data and land governance processes.

Promoters and developers of innovative tools also advocate strongly for openness of land tenure information for various reasons, for instance decision making by third parties, but also to increase transparency of the land sector for the benefit of vulnerable groups, who have difficulties in accessing government information and are hit hardest by opaque land deals. Openness has different meanings to the people we interviewed, but also to different communities, with whom implementers work. Many of these meanings have a positive connotation referring to efficiency due to sharing data for different purposes, cost savings because of use of open source technology and free licensing and pricing mechanisms, the ability to include local knowledge in governance processes by opening up “mental maps” of local community members, openness in terms of updating data regularly, if not continuously; and importantly the aim of creating a transparent land governance regime, where openness means improved access to information especially for less powerful and vulnerable groups of society.

However, the ideas of “openness” and “open data” are met with many challenges. What matters here is, who gains access and for what uses of data considering local sensitivities and needs regarding the types of data being collected. Especially the FAO representative emphasized differing local sensitivities towards the idea of “openness” with indigenous people, for instance, who do not wish to expose sacred places. Secrecy and place knowledge held by only special members of the community in these cases constitutes the very essence of sacredness. In FAO’s initiatives the term “OpenTenure” created a lot of discussion and concern among local communities; and the organization has considered changing the name of the approach:

“So when you go in the field you have also to agree and to inform about the terminology e.g. when we say OpenTenure ... we had a workshop in Guatemala and they asked ‘what’s open, what’s tenure?’ So you also have to tailor your language, terminology so to agree on the meaning of that single word. This is important. In fact we are working on this name actually because it is confusing. The open was intended to because it is an open source system. And it is also open because it is open to the use by communities who are not yet empowered. So in that sense it is open... But still it can cause ambiguity and confusion. So we were thinking to change that name.” (19 April 2017 interview with FAO representative).



Similarly challenging are discussions with local stakeholders regarding the nature of technologies in relationship to data storage, sharing, and publication. For example, cloud technology, used by many of the initiatives, is problematic to explain to land holders. Landmapp has prepared charts and sketches of how “the cloud” works for purposes of explaining the concept to farmers, for instance.

The issue of privacy in the context of open data also gains a more complex meaning beyond individual rights as it relates to the socio-economic networks of people as expressed in the following note by Landmapp, an initiative that chose to locate its servers in Germany because of Germany’s existing data protection laws:

“Land documentation, I think, generally per definition, is, uhm, public domain data...So, the data that we consider private is actually much more: it’s socio-economic data – how many children do you have, are you married, what are your income streams, how old are you – all this kind of stuff, cause that is much ... more risky, to put out there; and then their [farmers’] production data, which is pretty much 90% of their income ... and there is huge social risk in sharing how much income you have, because your uncle might come and take your couch or your TV or tell you to pay for the education of his kids. So, this is very private.”
(10 May 2017 interview)

In this respect, changes in types of data collected, flexibility in database design and collection as described above merge with concerns about which of the various types data to share, not only with whom. Because of these questions, STDM opted for community based database storage, which however, poses its own challenges of requiring additional capacities at community level.

5. CONCLUSION: FUTURE CONSIDERATIONS TO ACHIEVE TENURE SECURITY

The overview of approaches and four themes discussed in the previous sections point to challenges in future implementation and upscaling of the initiatives and as such offer entry points for both future research and possibilities for sharing and cross-learning by the initiatives.

The different combinations of technology, financing mechanism, organizational characteristics, and application context, which we briefly described in section 4.1. influence in a dynamic way how developers of approaches perceive of the landholders, who participate in data generation and receive different types of



land tenure documents. They may be viewed and treated as customers, as beneficiaries and community members, or as clients and end users. These perceptions are important to note for further analysis and discussion as they allow for a better understanding of the nature of relationships that are being created between service provider (initiative together with or in parallel to government) and landholders; and thus the role of innovative approaches within the broader institutional landscapes of governance in different contexts.

As discussed for the first theme in section 4.2 above, while none of the initiatives actually record all overlapping land tenure rights in every possible situation and need to adjust to existing administrative workflows and procedural survey requirements in order to produce officially legitimate documents in many cases, they do act as catalysts in discussing the role of multiple and sometimes overlapping land rights and the use of faster and easier technologies for land tenure recordation. The question for implementation and research here is how a balance can be found between the need to adjust to existing institutional requirements, many of which serve important land administrative functions, on one hand, and how to develop innovative, but also feasible and responsible socio-technical processes in the long-run.

Second, as discussed in section 4.2., the initial aims of the initiatives become adjusted and diversify in the process of working with various stakeholders and their respective aims and interests. This is important to take into consideration in the evaluation of the initiatives' outcomes both in the shorter and longer term, because the stated aims at the beginning of implementation may not suffice for an assessment at a later point in time. In so far as initiatives engage in evaluations and given the recent nature of these approaches, the diversity in contexts, and the potentially long-term endeavor, a practical recommendation includes the development of supporting documentation of the processes of implementation as basis for a sustained analysis across time rather than relying on a before-and-after quantitative assessment of output.

A third point we discussed in section 4.2. pertains to the issue of legitimacy of documents. Tackling this issue in practice also requires longitudinal engagement by both implementers and researchers to explore the various purposes that both documents and digital data are deployed for. In other words, we need to ask not only fit-for-what-purpose, but for whose purposes and at what point in time? For example, as one anecdote from an interviewee illustrates, a document may not be considered a legitimate proof of a person's or group's tenure right by government or large international banks, but it may well be accepted as a proof of identity and assets by local loan agencies, who then provide financing on the basis of these documents.



If this money is used to finance the construction of a building, for example, de facto tenure may be gained indirectly via the process of construction in some legal regimes, where construction endows land holders with higher levels of tenure security even without formal rights registration. Similar questions arise for the uses of the digital data, which lead to the next and final point for consideration in implementation and evaluation of initiatives.

Land tenure recordation, whether through digital or analogue technologies, whether carried out by government or on community basis, always entails the drawing of boundaries. This process is not only a technical question, but one that is closely linked to the governance of society and nature-society relations; and the uses of land and related resources are tightly knit into the associations between governmental and non-governmental actors (Meinzen-Dick & Mwangi, 2009). With the use and promotion of digital data technologies, matters become arguably more complex as land tenure data can now be shared much faster and at greater distances if so desired at a global scale. Concerns regarding data and privacy protection, potential misuses of data, and the risks of commercializing people's data and information have found renewed resonance among land governance researchers and the surveying community (Georgiadou in interview with Durk Haarsma, 2017). Land tenure related data is highly sensitive. Yet, at the same time, the arguments for transparency and openness of data cannot be discarded. The initiatives we have described here, have begun to discuss and tackle these concerns in different ways ranging from communication with local communities about data storage to organization-internal discussions about the choice of data centres to host data and services. Finding a fair balance between openness and protection – of people, land and related data – will continue to be a significant concern in endeavors to innovate land tenure recordation on the basis of digital technologies. A scaling up of initiatives in terms of services, areas, and actors would coincide with an increase in data quantities and types, for which organizations are responsible if they become positioned as nodal points in new digital data flows and networks related to land governance. Sustainability of organizations and their respective responsibilities in data publication, uses, and protection are important future considerations.

In the final instance, these five considerations are essential to consider during the implementation and evaluation of innovative approaches to tenure recordation, because they influence which and whose rights to land will be recognize at different scales, localities and points in time. How these questions play out will in turn influence the degrees and types of land tenure security that can be achieved through innovative approaches to recordation.



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REFERENCES

- Benjamin, S., 2004. Urban land transformation for pro-poor economies. *Geoforum* 35 (2), 177–187.
- Dabbish, L., Stuart, C., Tsay, J., & Herbsleb, J. 2012. Social coding in GitHub: transparency and collaboration in an open software repository. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work* (pp. 1277-1286). ACM.
- Deininger, K. (2003). *Land Policies for Growth and Poverty Reduction* (Vol. 7). World Bank and Oxford University Press. <http://doi.org/10.1007/s00784-003-0213-8D>
- Enemark, S., Williamson, I., & Wallace, J. (2005). Building modern land administration systems in developed economies. *Journal of Spatial Science*, 50(2), 51-68.
- Enemark, S., Clifford Bell, K., Lemmen, C., & McLaren, R. (2014). *Fit-for-purpose land administration*. FIG Denmark.
- Fourie, C. (2001). *The Use of New Forms of Spatial Information, Not the Cadastre, to Provide Tenure Security in Informal Settlements*. Nairobi.
- Fourie, C., & Africa, S. (2002, April). Cadastral reform for good governance and poverty alleviation. In *Proceedings FIG XXII International Congress* (pp. 19-26).
- Georgiadou, Y. in interview with D. Haarsma (2017). Geo-ethics Requires Prudence with Private Data. *GIM International*, October 2017: 16-19.
- Georgiadou, P.Y., Lungo, J.H. and Richter, C. (2014) Citizen sensors or extreme publics? Transparency and accountability interventions on the mobile geoweb. In: *International Journal of Digital Earth*, 7 (2014)7 pp. 516-533.
- Homburg, V. (2008). *Understanding E-Government - Information systems in public administration*. London and New York: Routledge.
- Hsieh, Hsiu-Fang & Shannon, S.E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research*, Vol. 15(9): p. 1277-1288. DOI: 10.1177/1049732305276687
- Hull, M.S., 2012. *Government of paper: The materiality of bureaucracy in urban Pakistan*. University of California Press, Berkeley/Los Angeles/London.



Kingwill, R., 2014. Papering over the cracks: An ethnography of land title in the Eastern Cape. *Kronos* 40 (1), 241–268.

LADM ISO Standard (2012) accessed in September 2017 at <https://www.iso.org/standard/51206.html>

Meinzen-Dick, R., & Mwangi, E. (2009). Cutting the web of interests: Pitfalls of formalizing property rights. *Land Use Policy*, 26(1), 36–43. <https://doi.org/10.1016/j.landusepol.2007.06.003>.

UN-Habitat. (2008). *Secure Land Rights for All*. Nairobi

van der Molen, P., & Lemmen, C. (2006). Unconventional approaches to land administration: a point of view of land registrars and land surveyors. In FIG 2005: *Secure land tenure: new legal frameworks and tools in Asia and the Pacific: proceedings of an expert group meeting held by FIG commission 7, December 8-9, 2005, Bangkok, Thailand*.

Roy, A., 2009. Why India cannot plan its cities: Informality, insurgence and the idiom of urbanization. *Planning Theory* 8 (1), 76–87.

Zevenbergen, J., Augustinus, C., Antonio, D., & Bennett, R. (2013). Pro-poor land administration: Principles for recording the land rights of the underrepresented. *Land use policy*, 31, 595-604. (Enemark, Clifford, Lemmen, & McLaren, 2014).

Zevenbergen, J.A., de Vries, W.T., & Bennett, R.M. (2015). *Advances in responsible land administration*. CRC Press: Boca Raton .



APPENDIX 1:

Topic Guide for Interviews

General questions about issues addressed, data use, and history of the project:

1. Can you tell us a bit about the history of the project¹, especially how the idea came about and what issues in land administration you mostly address through the project?
 - a) Was the project triggered by a specific event or need?
 - b) What are the main aims of the tenure documentation process supported by your tools?
 - c) Who defined the aims?
 - d) What were the main challenges you encounter before, during and after tenure documentation exercise?
2. What data is currently being produced, by whom and how is it used?
 - a) What short-term benefits do citizens and actors receive for contributing data?
 - b) What long-term benefits do you expect or observe?
 - c) What other uses of the data do you anticipate or would like to see in the near future?
 - d) Who is storing/managing the data that has been collected?

Questions related to experiences with and perceptions of regulatory environment as it pertains to project implementation:

How have you experienced the regulatory environment in the places where you implemented the project?

- a) What kind of regulations do you mostly deal with in the places of implementation? e.g. pertaining to land administration, survey techniques, data protection, agencies' mandated roles(?)
- b) Experiences more positive or more negative and in how far positive/negative, examples?

¹ By "project" – both as pilot or roll-out - we mean the combination of technologies, including software developed, but also the organizational actors involved in the tenure documentation process that your tools support.



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APPENDIX 1 - Topic Guide for Interviews (cont.)

Questions pertaining to possibilities and desirability of change in regulatory environment and organization's own role in this

How would you like regulatory environment change to better support implementation of your project?

- a) What are, in your view, the most constraining aspects of the regulations?
- b) What are, the most enabling aspects of regulation?
- c) Do you see changes in regulatory environment as possible? Why or why not?
- d) How do you see your own organization's role in making these changes?
- e) What do you see as your main responsibilities as an innovator in the field of land administration in the countries you work in or in general terms? – before, during, and after the implementation of a tenure documentation process?



APPENDIX 2:

Table 2: Innovative Tools that exist but have representatives have not been interviewed as part of this study

Initiative (Tool)	Funding	Process design	Owner /organization	Tested/ Implemented in (list still being compiled)	Application Context (beneficiaries and/or customers)
MAST https://www.land-links.org/tools-and-mission-resources/mobile-apps-to-secure-tenure-mast/	<ul style="list-style-type: none"> • Not for profit • Donor funded 	<ul style="list-style-type: none"> • Semi-crowd sourced methodology • Based on open source software • Adjustable to follow legal workflows 	USAID	Africa: Tanzania, Zambia, Burkina Faso	Support of government in recording land rights in a simpler and more affordable manner and land right simply and affordably
MEDEEM http://medeem.com/parcelcert.html	<ul style="list-style-type: none"> • For Profit 	<ul style="list-style-type: none"> • Adapts legal workflows for tenure registration • Based on commercial/proprietary software, including services 	MEDEEM Zambia	Africa: Zambia	Smallholder farmers, and the economically disadvantaged to promote more equitable access to the land tenure formalization



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<p>INNOLA Solutions http://innola-solutions.com/</p>	<ul style="list-style-type: none"> • For profit 	<ul style="list-style-type: none"> • Adapts legal workflows for tenure registration • Collaboration between open source and commercial software 	<p>INNOLA Ukraine & USA</p>	<p>Asia: Armenia, Uzbekistan, Azerbaijan, Georgia, Qatar, Pakistan, Ukraine, North America: USA Latin &S.America Jamaica, Bahamas, Nicaragua, Puerto Rico Africa: Egypt, Zambia, Uganda, Nigeria,</p>	<p>Working for clients i.e. USAID, World Bank, MCC and numerous public and private sector organizations.</p>
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ⁱ Example references <http://gltn.net/index.php/publications/publications/publications-list/send/2-gltn-documents/2353-implementation-of-responsible-land-governance>
<https://www.land-links.org/tools-and-mission-resources/mobile-apps-to-secure-tenure-mast/>
<https://usaidpubs.exposure.co/certifying-zambias-future>

Annual World Bank Land and Poverty Conferences

Land portal news - <https://landportal.info/news/2017/05/rural-tanzanians-map-their-country%E2%80%99s-future>

FIG Conferences www.fig.net

Webinars on fit-for-purpose land administration <http://go.esri.com/fit-for-purpose>

ⁱⁱ STDM was first designed and developed at ITC in collaboration with the Dutch Kadaster in 2007-2009, and was taken up for further development by GLTN as from 2010

BIOGRAPHICAL NOTES

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	Christine Richter is assistant professor in organizing land information at ITC, University of Twente. She has worked in government, private industry, and academia in the U.S.A. and in the Netherlands. Her PhD research focused on Indian cities and explored the processes of geo-ICT implementation in urban land administration and government housing programs. Since 2016 she has been member of the organizing committee of the annual LANDac conference in the Netherlands. Her research and teaching focus on the organizational and political dynamics of geo-ICT implementation in land and urban governance.
	Jaap Zevenbergen is professor of Land Administration at ITC (Faculty of Geoinformation Science and Earth Observation), University of Twente in the Netherlands. is professor in land administration systems at the University of Twente, Faculty. He holds Master degrees in geodetic engineering and law and defended his PhD on systems of land registration in 2002. He has published extensively on land administration and land registration. He is a board member of the Cadasta Foundation, an advisory board member of GLTN, and has been a cochair of Commission 7 Working Group 2 for the period 2011-2014.