EXPLORING THE INTEGRATION OF INNOVATIVE LAND TOOLS INTO THE CONVENTIONAL SYSTEM OF LAND ADMINISTRATION IN TANZANIA

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June 2020

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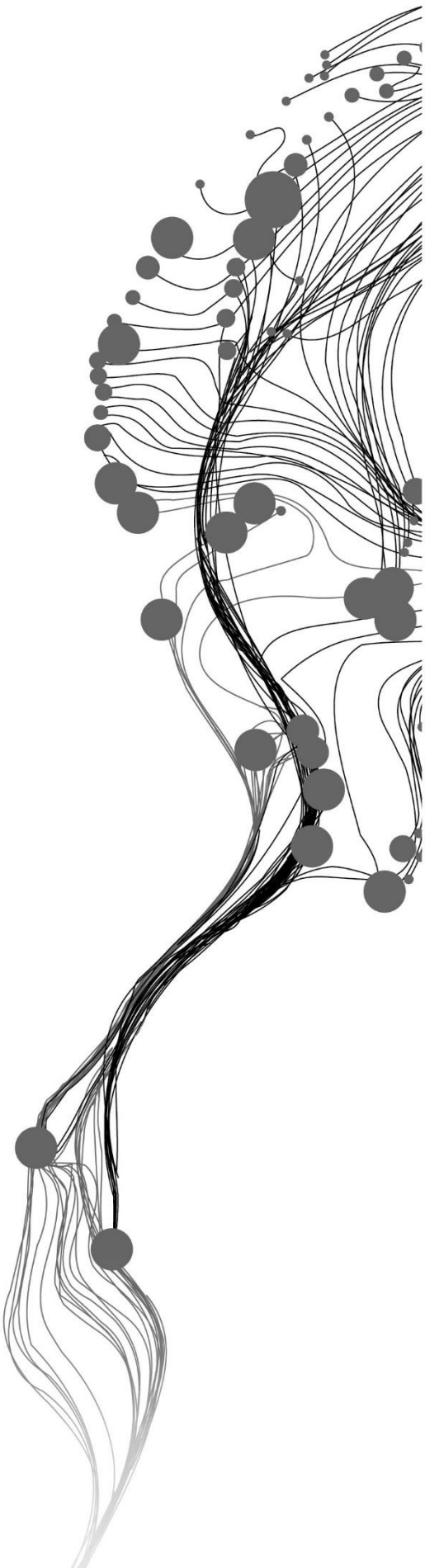

EXPLORING THE INTEGRATION OF INNOVATIVE LAND TOOLS INTO THE CONVENTIONAL SYSTEM OF LAND ADMINISTRATION IN TANZANIA

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ABSTRACT

The world, particularly in the Global South, is striving to scale up a low rate of land registration. This societal problem is mainly enhanced by the weakness of the conventional systems of land administration which have failed to give many landowners security of tenure. Besides, efforts are being made to develop innovative land tools that can offer a practical way of addressing the problem. These tools are being implemented in various areas across the world side by side with conventional systems to record land rights. However, little is known about how the tools integrate into the conventional systems of land administration. This study sought to explore integration in the case of the LTSP, a government of Tanzania project which adopted the MAST tool to issue CCROs in the rural areas of Kilombero, Ulanga and Malinyi Districts; all in Morogoro Region. It applied the qualitative methodological approach. The semi-structured interviews were used to obtain primary data from government and non-government land officials. Also, the analysis of the published and unpublished documents was used to obtain secondary data. This study found that innovative land tools integrate into the conventional systems of land administration. However, this can not be done fully because of the emerging differences in legal, institutional, and spatial registration requirements between two approaches. It was further realised that the emerging, gaps can be solved through the adoption of various transformation, replacement, and combination processes to make the systems more integrated. By addressing the gaps, it was found that there are potentials of realising the economic, institutional, social, technological, and legal benefits. Despite obtained benefits, addressing the integration gaps between the approaches revealed several constraints with multiple causes which required the adoption of the immediate and long-term solutions. The integration of innovative land tools into the conventional systems of customary land registration provides potential opportunities of scaling up the low rate of land registration, achievements that are likely to improve the security of tenure. However, to have fully integrated systems, the need to address fully the explored constraints which required long-term solutions, including amendment of the laws and regulations to accommodate the FFP solutions in the customary land registration in Tanzania, is of enormous significance. Based on the discussion, further explorative research on the integration of various innovative land tools into other forms of tenure is inevitable. Also, whether the realised benefits have influenced changes in the social-economic lives of various landowners, institutional performance and operation is a question that requires empirical evidence.

Keywords: *Land Administration*, *Land Registration, Innovative Land Tools, Conventional Systems, Integration, CCROs*

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Ahsanteni Sana.

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AfDB	-	African Development Bank
AU	-	African Union
CBOs	-	Community-Based Organisations
CCROs	-	Certificates of Customary Right of Occupancy
CL	-	Commissioner for Lands
CRO	-	Customary Right of Occupancy
CSOs	-	Civil Society Organisations
CVL	-	Certificates of Village Land
DANIDA	-	Denmark's Development Cooperation
DC	-	District Council
DFID	-	Department for International Development
DLO	-	District Land Office
DLUFP	-	District Land Use Framework Plan
DSM	-	Director of Survey and Mapping
DVSP	-	Detailed Village Settlement Plan
EA	-	Enterprise Architect
FAO	-	Food and Agriculture Organisation of the United Nations
FFP	-	Fit-for-Purpose
GIS	-	Geographic Information System/Science
GLTN	-	Global Land Tenure Network
GoT	-	Government of Tanzania
Gov.UK	-	Government of the United Kingdom
GPS	-	Global Positioning System
HHGPS	-	Hand-Held Global Positioning System
HRSI	-	High-Resolution Satellite Image
ICT	-	Information and Communication Technology
IIRR	-	International Institute of Rural Reconstruction
ITC	-	Faculty of Geo-Information Science and Earth Observation
KGCA	-	Kilombero Game Controlled Area
LADM	-	Land Administration Domain Model
LTA	-	Land Tenure Assistance
LTSP	-	Land Tenure Support Programme
LUPA	-	Land Use Planning Act
MAST	-	Mobile Application to Secure Tenure
MLHHSD	-	Ministry of Lands, Housing and Human Settlements Development
NBS	-	National Bureau of Statistics
NGOs	-	Non-Government Organisations
NLP	-	National Land Policy
NLUPC	-	National Land Use Planning Commission
QGIS	-	Quantum Geographic Information System/Science
SAGCOT	-	Southern Agricultural Growth Corridor of Tanzania
SARF	-	Systematic Adjudication Record Form
SDGs	-	Sustainable Development Goals
SIDA	-	Swedish International Development Cooperation Agency
SMS	-	Short Message Service
SQL	-	Spatial Query Language
STDM	-	Social Tenure Domain Model
TRUST	-	Transaction Utility for Secure Tenure
UML	-	Universal Mark-Up Language
UNECA	-	United Nations Economic Commission for Africa
UNECE	-	United Nations Economic Commission for Europe
UNHABITAT	-	United Nations Human Settlement Programme
US$	-	United States Dollar
USAID	-	United States Agency International Development
VAC	-	Village Adjudication Committee
VBS	-	Village Boundary Survey
VC	-	Village Council
VEO	-	Village Executive Officer
VLA	-	Village Land Act
VLC	-	Village Land Council
VLR	-	Village Land Regulations
VLUP	-	Village Land Use Plan
WDTs	-	Ward and District Land and Housing Tribunals

1.0 GENERAL INTRODUCTION

1.1 Background of the Research Problem

Currently, the world is striving to scale up the registration of land rights emanated from the weak land administration system. According to Zevenbergen, De Vries, & Bennett (2015), about 70% of the world's land tenures are not recognised in the formal land administration system. This low rate, particularly in the Global South, leaves most of the landowners vulnerable to land conflicts, evictions, and encroachments (https://cadasta.org/). Also, it has resulted into the challenges of insecure land rights, especially to women and other marginalised groups (Fourie, 2002; Salifu, 2018; UNHABITAT et al., 2012; van Asperen, 2014). Land registration is a part of land administration that concerns how the land-related rights and interests are registered (Zevenbergen, 2002). By considering the significance of land as a resource, a well-functioning land registration system is of enormous importance. Furthermore, UNECE (1996) recommends that land registration system needs to guarantee land ownership and ensure the security of tenure.

Toulmin (2008) explains that these systems failed because of being slow, costly, in favour of the elites and marginalising vulnerable groups, including women. In the developing countries, which adopted the same setups of the Western approach, the practice has not been efficient in scaling up land registration hence the ownership for those who cannot benefit from a conventional system remains in the extra-legal and undercapitalised as explained by de Soto (2000). Also, van Asperen (2014) clusters the four reasons behind the failure of this system as being intricate, expensive; not inclusive; ignores the diverse tenure types; and finally, it ignores the local institutional arrangements. Also, De Zeeuw, Dijkstra, Lemmen, & Molendijk (2019) doubts if the system can be useful because of being expensive and bureaucratic.

Because of that, the Global Land Tool Network (GLTN) in 2012 came out with an idea of having a toolbox approach that could combine innovative land tools and conventional systems to foster land registration (van Asperen, 2014). The reason is that these tools bring a practical way of solving the land-related challenges which are in perspectives of administration and management (UNHABITAT, IIRR, GLTN, 2012). They also entail operationalising land-related policies and legislation. According to van Asperen (2014), these tools do not replace the formal system but rather streamline it after being observed incapable. Enemark (2014) also argues that the tools advocate the spatial, legal, and institutional framework, which are the principles of FFP land administration necessarily to soften the actual technicalities and formalities of the conventional system. It enables the registration of land rights within a spectrum of the 'continuum of land rights.' This spectrum means not only the recordation of formal types of land tenures but also taking into consideration the informal and illegal land rights (UNHABITAT, 2008).

Furthermore, Enemark (2014) considers the affordability of the tool as to its operation and uses; advocating on a participatory approach; inclusiveness in coverage and related tenure; and proposing equitable access to land by also considering marginalised groups. Besides, several research studies evaluated the implementation of tools in different contexts. The contexts include characteristics and cross-cutting challenges (Lengoiboni, Richter, & Zevenbergen, 2019), institutional perspectives (Salifu, 2018), experiences of implementation of the fit-for-purpose approach in different countries (De Zeeuw et al. 2019) among others. However, there is a research gap regarding how these tools are integrating with the conventional system in registering land rights to solve the problem of a low rate of land registration in most developing countries. Hence, this study is intending to contribute to addressing the gap by studying the Tanzanian customary land registration context.

1.2 Justification of Research Problem

Currently, the adoption of innovative approaches in land registration has become more significant because awareness is rising. According to Lengoiboni, Richter, & Zevenbergen (2019, p.30), MAST, Social Tenure Domain Model (STDM), Landmapp, Aumentum Open-Title, among others are some of the initiatives implemented across the Global South. Even though the development and implementation of these tools are increasing, studies show that there is a need for improvements to make them useful and practical to scale-up land rights registration in line with the existing system (Enemark et al. 2014).

The USAID report (2016), raises a debate on how the tools can practically solve the problems of marginalised groups and cumbersome processes embraced by the laws in Tanzania. Similarly, Lengoiboni et al. (2019) identify a concern of different land tenures and how it influences the adjustments of registration processes and requirements; scalability and flexibility in practices; and legitimacy of collected digital data and produced documents as cross-cutting issues behind these initiatives. These challenges, in turn, raise questions of what types of documented tenures, for whom, at what requirements and for whose costs; and whether the tools can be developed and implemented alongside the conventional system. In general, Salifu (2018) suggests a need for an in-depth empirical study on how the tools integrate into the conventional system.

1.3 Statement of the Problem

Despite having legal, institutional, and spatial setups for land administration in Tanzania, the registration of land rights is at a low rate. The report by the Citizen (2019), shows that only 15% of the land is in a formal register. Also, a study by Alananga, Makupa, Moyo, Matotola, & Mrema (2019) remarks that the current land registration system in Tanzania is paper-based, expensive, in favour of the wealthiest group, and associated with a long chain of decision making. For them, the systems even though it passed through different legal regimes still reflects the slip-ups experienced in the 1980s some of the reasons being lack of proper methods to secure land rights and ignoring of the local and customary practices by embracing the conventional laws. Besides that, MAST technology was designed and adopted as one of the innovative land tools in the USAID Land Tenure Assistance (LTA) project to solve this problem since 2015 (Msigwa, Issa, Sullivan, Solovov, & English, 2018). The Government of Tanzania (GoT), adopted the MAST tool from LTA, to regularise customary land tenure in the rural areas of Morogoro region through the LTSP. The tool, despite integrating into the conventional system of customary land registration, the CCROs were also issued as legal documents for land ownership. The implementation has raised a discussion of how the tool integrates into the conventional system to register customary land rights in Tanzania. This study is, therefore, aiming at exploring how MAST integrates into the conventional system to register customary land registration in Tanzania.

1.4 Conceptual Framework

Figure 1.1 illustrates the conceptual framework of this study. It shows that land administration is a broad concept which involves the process of land registration. This study focuses on the land registration process used to record or register peoples' land rights. It explicitly addresses land registration based on conventional systems and innovative land tools. The conventional systems are governed by the legal, institutional, and spatial frameworks which based on a specific country's context. The frameworks governing the innovative approaches advocate for the principles of FFP land administration. The innovative approaches entail solving a societal problem of a low rate of land rights registration because the conventional systems have failed to scale up registration faster in most developing countries, like Tanzania. In this conceptual scheme, the research question is how innovative initiatives integrate into conventional systems in the issuance of CCROs**.** The illustrated dashed box/line/arrow coloured red shows the conceptual scope of this study.

The prominent concept is integration (bold red box) where this study intended to uncover how innovative land tools integrate into the conventional systems in the issuance of CCROs issuance in Tanzania.

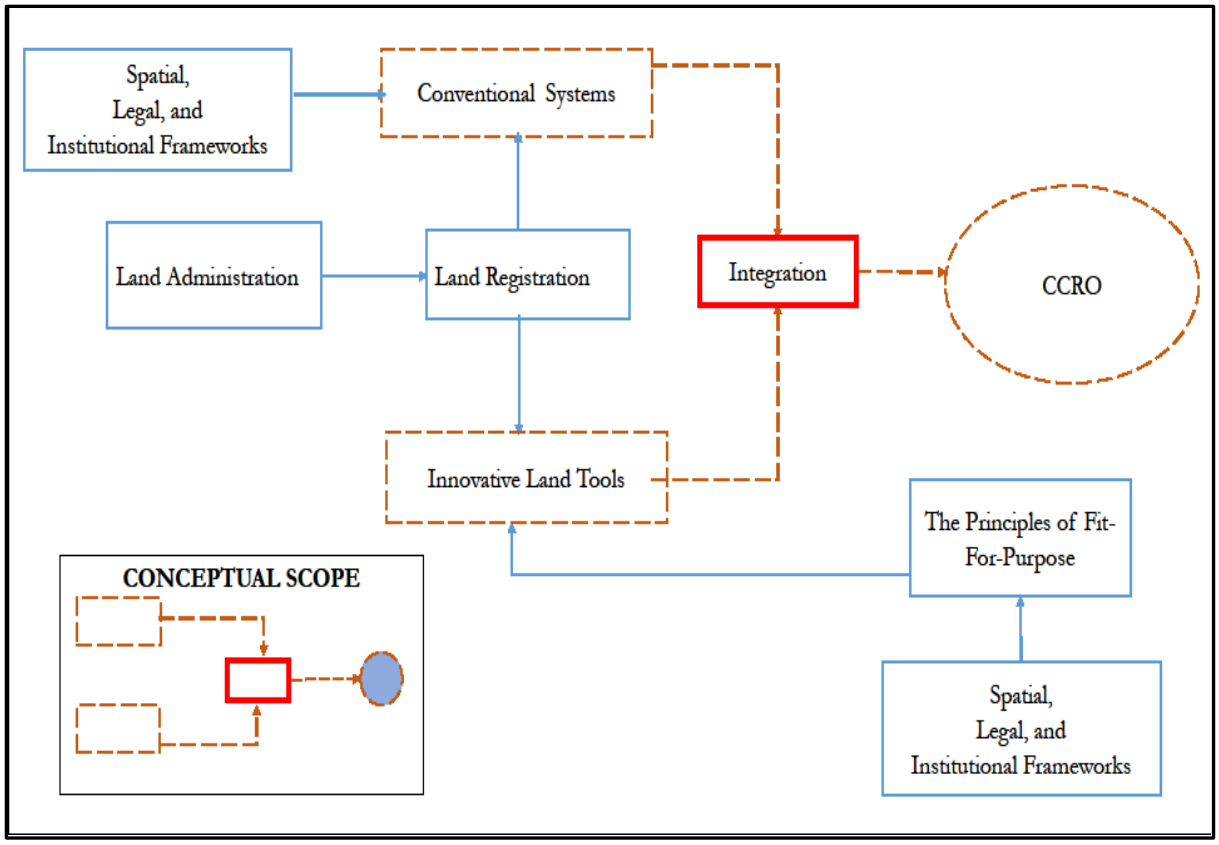

Figure 1.1: Conceptual Framework

1.5 Research Objectives and Research Questions

1.5.1 Main Research Objective

The main objective of this study is to explore how the MAST tool integrates into the conventional system of customary land registration in the issuance of CCROs in Tanzania.

1.5.2 Research Sub-Objectives and Questions

This study intended to address the following sub-objectives with corresponding research questions, as shown in **Table 1.1.**

Table 1.1: Research Sub-Objectives and Questions

Sub-Objectives	Research Questions
1. To compare the requirements of customary land registration using conventional systems and the MAST tool.	a. What are the legal, institutional, and spatial requirements for customary land registration using a conventional system? b. What are the legal, institutional, and spatial requirements for customary land registration using the MAST tool?
2. To identify the gaps in integrating the MAST tool into the conventional systems of customary land registration.	a. What are the legal, institutional, and spatial gaps of integrating MAST tool into the conventional system of customary land registration? b. How are the identified legal, institutional, and spatial gaps solved when integrating the MAST tool into the conventional system of customary land registration?

	c. What are the legal, institutional, and spatial advantages of solving the integration gaps between the MAST tool and Conventional systems of customary land registration?
3. To explore the constraints of solving the integration gaps between the MAST tool and the conventional system of customary land registration.	a. What are the legal, institutional, and spatial constraints for solving the integration gaps between the MAST tool and Conventional System of customary land registration? b. What are the causes of the constraints for solving the integration gaps between the MAST tool and the conventional system of customary land registration? c. What are the adopted solutions for addressing the constraints for solving the integration gaps between MAST tool and conventional systems of customary land registration?

1.6 Significance of the Study

Recently, the implementation of innovative land tools has gained much awareness, especially in developing countries. These tools are implemented in different dimensions, disciplines, and purposes, a situation that airs more debates and discussions. Several studies have been conducted about the implementation of the tools. It includes but not limited to cross-cutting issues to innovations in tenure documentation (Lengoiboni et al., 2019), the institutional perspective of the innovative land tools in Ghana (Salifu, 2018), and designing and implementation of the pro-poor system (UNHABITAT, 2019). On the other hand, empirical exploration studies of how these initiatives integrate with the conventional system during implementation are lacking. This study is relevant in contributing to fill this study gap by exploring the integration of MAST tool into the conventional system in the context of customary land registration in Tanzania.

Further, the aim of implementing innovative tools was to solve a societal problem of a low rate of land registration in Tanzania, a situation that endangers the security of tenure. So, findings of this study contribute to the improvement of the land registration systems in Tanzania; a development which in turn can improve the security of land tenure. This local action can contribute to attaining Sustainable Development Goals (SDGs) number 1.4 of increasing a proportionate population with secure tenure rights to land and 2.3 of doubling agricultural productivity and income of small-scale food producers through secure and equal access to land.

1.7 Thesis Structure

Figure 1.2 illustrates the structure of the research concerning chapters and phases. It is in six chapters undertaken into three phases of pre-fieldwork (chapters one and two), fieldwork (chapter three), and post-fieldwork (chapter four to six). Chapter one is the general introduction which presents the background of the research, justification of the research problem, statement of the problem, research objectives and question, significance of the study and thesis structure. The following chapter two presents the literature review of the theoretical framework and discussion about main research concepts. The subsequent chapter three of the research approach and methods, give an overview of the research and field approaches and methods, background of the case study area, limitations, and ethical consideration. Chapter four presents the obtained results of the integration of the MAST tool into the conventional system of customary land registration in Tanzania, necessarily to answer research sub-objectives. The obtained results in connection to the scientific literature are discussed in chapter five. The last chapter draws the research conclusions from the findings and gives recommendations for further study

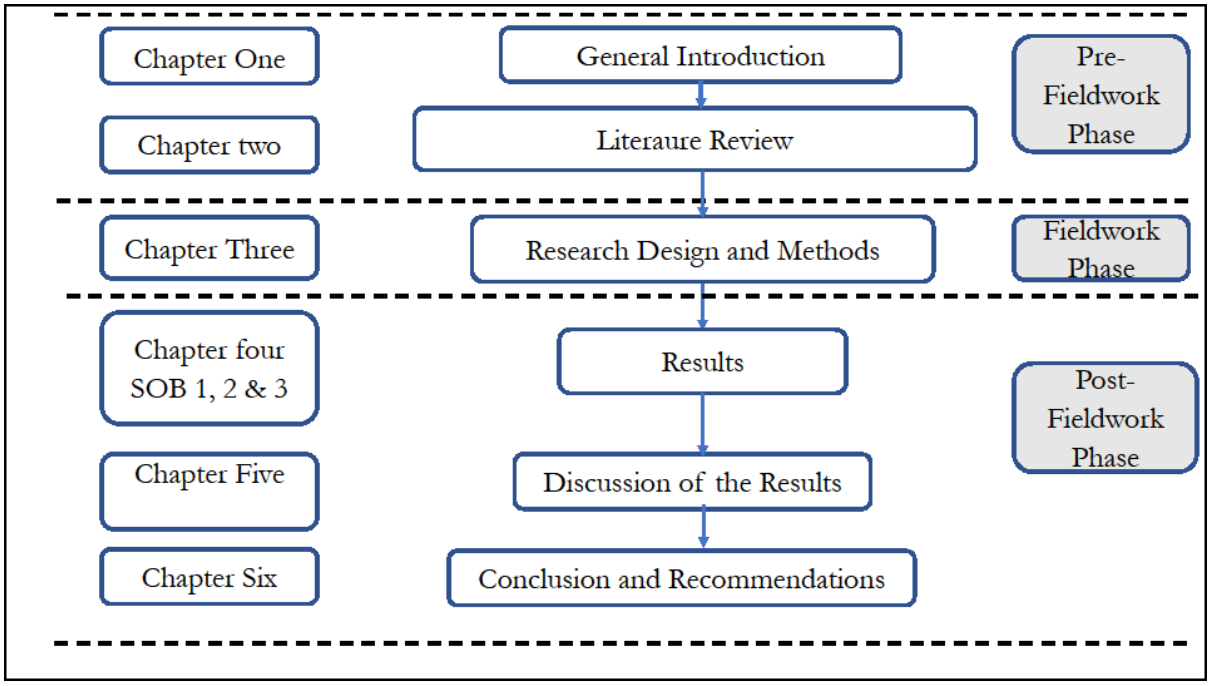

Figure 1. 2: Thesis Structure

2.0 LITERATURE REVIEW

2.1 Introduction

Recently the innovative land tools for land registration have gained much awareness. Its implementation in the Global South is alongside the conventional system. Whereas studies have revealed the implementation of various innovative land tools alongside the existing conventional system of land administration, the question has always remained how the tools integrate with the conventional system; a gap that this study aims to contribute to addressing. This chapter explains different theoretical backgrounds and discussions to build an understanding of the land registration systems and innovative land tools necessary to establish the requirements for exploring the integration. Section 2.2 gives an overview of land administration and land registration systems. The concepts of the conventional systems and innovative land tools are reviewed in Section 2.3 and 2.4 respectively. The legal, institutional, and spatial requirements for land registration are reviewed in Section 2.5. The chapter ends by defining the concept of integration applicable for land administration domain in Section 2.6.

2.2 Land Administration and Land Registration System

The need for a proper land administration is inevitable because of the essentiality of security of land tenure, increases of human needs for land, food, shelter, investment in agricultural production, among others. Therefore UNECE (1996) developed guidelines to protect the potentials of land in the market economy and ensure sustainable management of natural resources. The guidelines consider land administration as a process in which information about ownership, value, and use of land and its associated resources are put into a recognised register and can quickly be disseminated. "*It is a process of determining, recording and disseminating information about land tenure, value, and use of land when implementing land management policies*" (UNECE, 1996: p.14). The land administration system underpins the four elements of land administration that provides a platform such as institutional arrangement, legal framework, processes, and standards for implementing land policies and management strategies in support of sustainable development (Williamson, Enemark, Wallace, Rajabifard, 2009).

In connection to that, Zevenbergen (2002: p.27) provides a standard definition of land registration as "*the process of documenting recognised land-related interests about ownership and or use of land*". Land registration systems should safeguard, among other things, the information about land parcels and the ownership components (Zevenbergen, 2002 cited in Mburu, 2017). Zevenbergen characterises land registration based on the definition, interests in land and the way these are organised and identified in society. In exploring the integration of the conventional systems with innovative land tools, this study limits itself in the definition of land administration as defined by UNECE (1996) by focusing on the land tenure function only. It also adopts the land registration as defined by Zevenbergen (2002) by being specific on documenting recognised land-related interest about ownership of land.

2.3 Conventional Land Registration System

The term conventional system is regularly used in the land administration domain. According to Fourie (2002), this system reflects the guidelines put by the UNECE (1996), which provides the procedures of registering land parcels and is steered by the government through legislation to attain a specific policy goal. The decision-making process in these systems are centrally oriented and involves non-integrated and inflexibility of the institutional frameworks, which enhances the challenges of registering land rights particularly in Global South (Enemark et al., 2014; Enemark Mclaren, 2017). Indeed, Zevenbergen (2002) notes inadequate technical aspects, unclear laws, and weak institutions as challenges embedded in these systems. It does not include informal rights, and in many cases, the customary rights owned by many people

remain ignored (Fourie, 2002). In contrast to that, formalisation in Western countries transformed from informal property occupation followed by government recognition of the tenure system (Schaefer & Schaefer, 2014). In Central and Western Europe, it involved a change of land policy and tenure system to provide opportunities for individuals to access and benefit on land rights and their related interests (Barnes, Stanfield, & Barthel, 2000).

Nevertheless, lack of clarity of land rights regarding multiple claimants, unidentified owners, missing parcels, and informal landholders, and institutional weakness associated with land adjudication and markets were the challenges during economic transformation. Efforts have been made by these countries to streamline the system with the inventions of the new technologies. The Netherlands, for instance, adopted the use of Global Positioning System (GPS) technology in survey fields since 2002 to enhance the processes of registering land (Wakker, van der Molen, Lemmen 2003). In contrast, developing countries have few to show the implementation of conventional systems. In countries like Ghana and Colombia, their systems lost trust because of failing to show the impacts on land rights registration (Zevenbergen, 2002). The conventional systems, particularly in Tanzania is bureaucratic, paper-based, and not harmonised to accommodate innovations. For instance, the Land Use Planning Act of 2007 (LUPA) and the Village Land Act of 1999 (VLA) provides a need for the Certificate of Village Land (CVL) and Village Land Use Plans (VLUPs) as prerequisites for the issuance of CCROs (Hendriks, Zevenbergen, Bennett, Antonio, 2019). Also, according to Hendriks (2019), these legal requirements are not effective in scaling up registration of people's land rights because of being slow and expensive. The same situation is observed by Sullivan, Solovov, Mushaija, Msigwa, and Issa (2019), who also add other challenges of inappropriate nationwide spatial data storage and protection in Tanzania. According to Salifu (2018), the rationale for the failure of the conventional systems in these countries is because of not being inclusive and have embraced the ambiguous statutory and customary land registration laws which have remained as the obstacles to the spatial coverage.

Hence, the conventional system reflects the guidelines by UNECE to steer the requirements of land registration through a pre-defined legal, spatial, and institutional arrangements to attain the goal of security of tenure. Even though it fetches numerous limitations, its performance indeed in Global North has been useful, unlike in the developing countries. It is this concern which enhances the emphasis of innovative land tools to unlock the limitations of the conventional system.

2.4 Innovative Land Tools for Land Registration

The innovative land tools have gained much awareness after the increase of global challenges related to land administration and management, occurs because of failure to enforce the land-related policies. According to UNHABITAT et al. (2012, p.8), these tools play a role in solving the challenges in a more practical or useful way in consideration of the local context. It is a practical way of solving land administration challenges to intensify the security of land tenure. That the effective and useful tools need to adhere to the summarised features in **Table 2.1**. below.

Table 2.1: The Characteristics of Innovative Land Tools

Characteristics	Remarks
Pro-poor	Need to be inclusive, alleviate poverty and raise the voice of the people in decisions making through a bottom-up and participatory approach
Equitability and Gender Responsiveness	Promote fairness of gender between men and women
Affordable	Reasonable costs and fees are affordable to both users and government.
Sustainability	Future implementation should not employ more inputs from outside. It should be self-financed through fees and taxes.
Subsidiarity	Are sensitive to local situations and needs (*by the community or at the lower level of local government*)
Governance	How the decision is made, and reconciliation of the determined interests should be taken into consideration during designing of the tools
Systematic, at a large scale	Is flexible with the ability to scale-up registration in a wide range of situations

Source: *(UNHABITAT et al., 2012, p.9)*

The implementation of innovative land tools is increasing in many developing countries to find a solution to the limitations of the conventional system. UNHABITAT et al. (2012) mention that the reason to adopt a toolbox approach was to fill the gap of land tools for implementing the pro-poor land policies developed since the 1990s in most of the African countries.

2.4.1 Fit-for-Purpose Land Administration Systems

The challenges of conventional land administration systems, as explained earlier, have contributed to the unsustainable use and management of land and its resources. The fit-for-purpose (FFP) land administration is an approach that ought to solve the challenges today and allow improvement over time (Enemark et al., 2014a). This approach is focusing on meeting a particular purpose instead of concentrating on technical procedures and high accuracy in spatial data acquisition. The FFP approach aims to build a wide land administration system, therefore should not be impeded by any other constraints which can later be solved (Enemark, 2017). The author further emphasises that a reliable FFP system immediately after being built needs to be upgraded. It is also required to consider the local needs and situations which are considered to have acceptable legal and societal practices to ensure legitimacy and legality (Zevenbergen et al. 2015). Hence, it is essential to conform to the underlaid principles of FFP land administration which are characterised as purpose-based, flexible and incremental improvement to make the tool useful (Enemark et al., 2014a). According to Enemark, McLaren, Lemmen (2016), the principles include the legal, institutional and spatial frameworks, as shown in Figure 2.2, which also summarises the requirements based on FFP land administration.

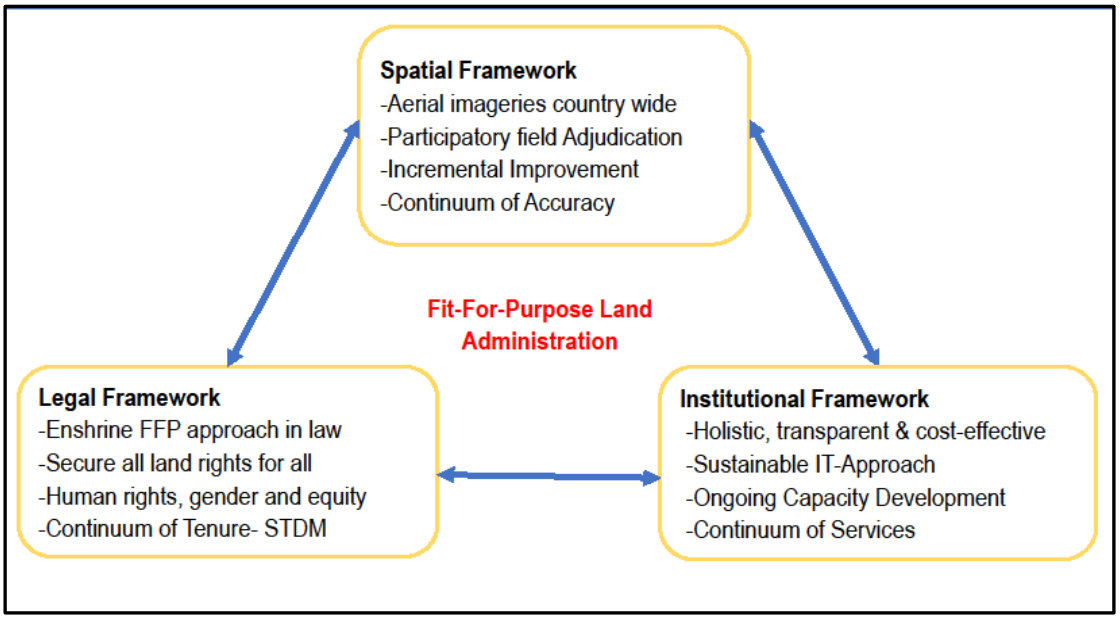

Figure 2.1: The Principles of FFP Land Administration. Source: (Enemark et al., 2016: p.17)

The implementation of innovative approaches has revealed some practical innovations in different countries. However, a challenge is on a common understanding of the concept "innovation", a situation that has remained contested. The theoretical contestation of the definition of the word innovation is summarised into three meaning as *"**substantive**: novelties such as new ideas, behaviours, objects; **action** in introducing or bringing in something new; and **process**: from invention to diffusion (commercialisation – the introduction of innovation commercially)"* (Godin, 2011, p.22). In Ghana, the implementation of the Landmapp tool was able to bring about technological innovations such as linking the database into a mobile application and use of eSignature (Salifu, 2018). Also, the solving of societal issues such as documentation of immigrant farmers and enabling them to have recognised investments, which are considered as social innovation.

2.5 Requirements for Land Registration System

Before registering a land parcel, it ultimately needs to meet requirements. Several studies put criteria by reflecting specific country context and mostly are relying on the limitations of the conventional systems and the emergence of innovative initiatives. Discussions categorise the requirements in respect of the legal, spatial and institutional frameworks while other adds the social-economic aspect such as gender inclusion and economic benefit of the landed property (FAO, 2002; UNHABITAT et al., 2012; UNECE, 1996). Also, for the effective land administration systems, the legal, institutional and technical arrangements need to accommodate the socio-economic forces, diverse land tenure and customary practices (Arko-Adjei 2011). This study categorises the requirements in terms of legal, institutional, and spatial frameworks. It places the social-economic aspects introduced by various authors under institutional requirements.

2.5.1 Legal Requirements for Land Registration System

According to UNECE (1996), the legal framework reflects the legal requirements of identifying and registering people's land rights. It emphasises on the laws that give power to the established authorities or actors to undertake registration based on prescribed requirements. Also, AU, AfDB, & UNECA (2010), suggest that the legal systems need to address the problem of insecure land rights to improve livelihoods. Besides that, for the practical and useful laws, it should strike a balance between formal and customary practices by safeguarding the clear procedures, affordable cost and done timely to empower rural communities in protecting their land rights (FAO, 2010). In case of any legal pluralism, AU et al. (2010), suggest the need to handle it positively to avoid uncertainty and confusion when formalising individuals

land rights. FAO further emphasises that the procedures should allow documentation and protection of the community using a systematic approach to exclusively identify and protect communal areas, customary rights, and other shared secondary land rights.

FAO (2002) classifies the land rights into either 'formal' (legally protected) or 'informal' (perceived to be against the laws). However, there is a discussion about the informal tenure types because some of them are in practice legitimate and secured. Thus UNHABITAT (2008: p.8) came out with the idea of a continuum of land rights which emphasises the registration of rights across the spectrum of formal, informal and customary to ensure the security of tenure. The land right is secured if it has legal, economic, social, individual and psychological influences (Simbizi, Bennett, & Zevenbergen, 2014; van Gelder, 2010). Besides that, land tenure is categorised as private assigned to private parties; communal where community members have independent right to use the land; open-access assigned to nobody so remains open to everybody; and state land allocated to public authorities. However, categories of land tenure still depend on the country-specific context. Simbizi et al. (2014) suggest that for land tenure security to exist, individuals and group rights should be legally and customarily recognised and perceived.

According to FAO (2002), customary rights include communal and exclusive rights to residential and agricultural land. It further suggests that in the event the customary rights are legally recognised, the practice shows that the rights are for the public and vested in the president as a trustee. In this scenario, the government needs to support land registration. Nevertheless, the ongoing discussion is whether the registration of customary rights intends to protect the poor or just to streamline the environments that favour those who have connections and enough resources. Sundet (2005), emphasises that the first-time registration should not be demand-driven instead, its approaches should be inclusive, comprehensive, and oriented from the community members themselves. Moreover, Mburu (2017) mention the simplicity of the processes (clarity); speedy and timeliness; fairness (equity); cost-effective; and security of tenure as legal requirements for the effective land registration system.

Thus, this study summarises the legal requirements for land registration as compliance with the existing laws and customary practices, clear registration procedures, minimal costs and time of registration and ensuring the security of land tenure. Also, the registration that cut across the range of continuum of land rights by ensures equal access to land, including women. In exploring the integration between conventional systems and innovative land tools, these requirements become the significant explicit variables to lead the discussion.

2.5.2 Institutional Requirements for Land Registration System

North (1994) defines institutions as the constraints that shape the interaction between actors within an organisation. According to him, it may include formal and informal arrangements and enforcing characteristics. Formal constraints include laws or rules; and informal constraints includes norms, customs, or code of conducts. North emphasises that institutions determine the transaction and transformation costs in the process of production. According to him, there is a close relationship between institutions and transaction costs, where the latter is affected by institutional matters or issues. In the land administration, this would mean that the more institutional arrangements become complicated and uncoordinated, the more the transaction costs are implied. Simbizi et al. (2014), group institutions into customary and public or legal are significant in ensuring the security of land tenure especially if they are not conflicting with each other as well as being recognised and trusted by the people. Furthermore, Enemark (2017), considers firm political and leadership commitments as critical pillars to achieve goals and outputs of the initiated land registration projects.

Similarly, Williamson (2001) determines institutions as necessary components to enhance the successful and practical land administration systems. However, it depends on the existing tenets of policy and legal development. Williamson explains that the institutional principle of land administration reflects how the government is structured and coordinated. He mentions the ministerial responsibilities; departments and its structure; decentralisation or de-concentration; public-private stakeholder's interactions and partnership; and professional operations as the pertinent institutional principle concerns. Furthermore, the institutional framework provides a room for stakeholders to interact and make decisions about land registrations (Williamson et al., 2009). This expression is like the guidelines put by UNECE, which implies that the framework should fill the gaps between the public and private sectors in managing the public sector. Importantly, Easterly (2008) thinks that the bottom-up institutional setup is likely to have positive impacts, unlike a rapidly top-down institutional change. This notion implies that the useful and practicable land administration systems are the one built and coordinated with the stronghold of bottom-up institutions. However, FAO (2010) recommends that state officials should play the roles and responsibilities of supervising and providing technical advice as well as capacity building of the local level institutions.

Moreover, institutions in customary settings, customary leaders are required to play the principal roles such as identification and allocation of land rights and disputes resolution (FAO, 2002). Apart from that, (Williamson et al., 2009) suggests the need for having a robust institutional arrangement that ensures good land governance, capacity building, institutional development, and meets the user needs. Also, Simbizi et al. (2014) consider public awareness and empowerment on people's land rights and responsibilities can improve their security of land tenure. The adequate institutional arrangements for making decisions on land-related matters should not only have legal acceptability but also embrace the local and social legitimacy and credibility (Arko-Adjei, 2011; Simbizi et al., 2014). Thus, the scholars' point of view about the institutional requirements for land registration provides an academic stance of this study when exploring the integration between land administration systems.

2.5.3 Spatial Requirements for Land Registration Systems

According to Enemark et al. (2014), the spatial framework encompasses the way land should be divided into units. Among other things, it provides a basis for recording and managing land tenure. The spatial framework is an essential element to accelerate the registration of land rights processes. It focuses on the approaches to which spatial data can be acquired and processed to the neighbouring object. McLaren, Fairlie, Kelm, & Souza (2018) categorises the spatial requirements as the approach for spatial data acquisition; the extent to which the parcel boundary is considered; and the preferred spatial accuracy and precision. Regarding the approaches for data acquisition, the authors suggest the use of an image-based approach through adoption of either printed or digitally linked orthophoto maps to overcome the spatial method objection of boundary delineation. Also, according to them "*geodetic accuracy may be a goal but not a point of entry"* (McLaren et al., 2018: p.12). Also, the general boundary principle is recommended in Zevenbergen et al. (2015) as the realistic way of delineating the parcel boundaries, especially in rural areas. However, this system may not be realistic for the areas with invisible line and non-permanent features (Zevenbergen, 2002).

Also, De Zeeuw et al. (2019) insist on consideration of user requirements over professional and technological standards; to ensure data quality; to operate under acceptable timeframe for data acquisition, and to provide an affordable price of development and maintenance of the tool. Similarly, FAO (2010), recommends on the system that use free or affordable new technologies to the users to reduce the expensive technical surveying methods. Thus, the spatial indicators include approaches, the extent of parcel boundary, accuracy, time, and costs for data acquisition. The same needs to consider users over professional and

technical standards. These indicators provide a significant and insightful stance to discuss the integration of the land registration system in this study.

2.6 Integration of Land Registration Systems

2.6.1 Definitions of the Term Integration and its Relevance to Land Registration System

The concept of "*integration"*, sometimes referred to as merging or matching, is not commonly used in the land administration domain as compared to other domains such as business administration and computer science. The reason could be that land administration has a combination of different aspects, including legal, technical and organisational; a situation that prohibits having a standard definition of integration (Fetai, 2015). The author suggests the necessity to borrow definitions from other domains when defining integration in land administration.

From a business perspective, Jacoby (2011) considers integration as "*a combination, replacement, and transformation of diverse procedures, systems, and structures of the organisation"* which always should entail improving the original situation. Also, Rutakyamirwa (2002), who borrowed the definition from business enterprises, defines integration as combining entities to form a synergistic whole or part of it. The author further considers integration as to break down the organisational barriers to have more significant combined effects. Both definitions from Jacoby's and Rutakyamirwa's have relevance in the land administration domain because of having different processes, systems, and institutions for administering the land and its resources. Therefore, integration could involve combining or replacing or transforming the procedures or systems or institutional setups to solve the challenges of land administration, also referred to as barriers by (Rutakyamirwa, 2002).

Moreover, in the computer science domain, integration is mostly used when dealing with information resources. According to Shvaiko & Euzenat (2008), integration is mainly influenced by semantic heterogeneity problems that require "*ontology matching to bring correspondences between semantically related ontologies".* The necessary component in this computer science definition is the ontological matching of which the main goal is to allow the interoperability of data between two computer-based systems. Besides that, the correspondences stand for similarities of the data which are not necessarily identical and other relations, including outcomes of the entities (Euzenat & Shvaiko, 2013). Considering the requirements, challenges, and characteristics of the conventional system and what innovative tools could offer in streamlining the situation, this computer science understanding of integration becomes relevant to the land administration domain. So, it may imply how the requirements of the two approaches or systems can be aligned to have a useful system.

However, integrating several standards into one, there should be consideration of the level and definition of each standard; concern of whether the aim of integration will help to achieve a particular goal and should suit the real-world complexities (Antaris, 2019). Also, it is advised to look at some commonalities that appear between the system standards when one must be chosen. It further explains that integration should be able to align with the existing objective(s) and need to cause an impact on system operation and process. It implies that integration should help to achieve the set plan and suit the size and complexity of the system as well. According to Antaris, such consideration will enable to attain required standards', improve efficiency and effectiveness, minimise costs, reduce replication, and bureaucracy.

Also, according to Rutakyamirwa (2002), integration is possible when integrated entities become coherent and consistent with the system. It means that in case integrated variables do not form a consistent pattern or show any similarities are unlikely to be integrated. Rutakyamirwa emphasises that the integrated objects

need to be modelled because it enables describing the business system, managing the system complexity and ensures better management of the system processes.

Based on the definitions and understanding of integration from the different domains, as explained, several components are highlighted. These include combination, replacement and transformation of procedures, systems and structure (Jacoby, 2011), a combination of entities and breaking down of organisation challenges (Rutakyamirwa, 2002) and matching the data standards between the system (Euzenat & Shvaiko, 2013; Shvaiko & Euzenat, 2008). Jacoby has emphasised on the need to improve the system during integration. The improvement in the land administration domain could mean solving the existing challenges associated with the existing systems. All these components are relevant and can be used to define integration in the land administration domain.

The components are also relating to spatial, legal, and institutional requirements for land registration, explained by FAO (2010), which mentioned clear procedures as legal requisites for registration. Also, North, 1994; and Williamson et al. (2009) who explained the essentials of institution and structure in land registration and McLaren et al. (2018) who have associated matching of data standards with the spatial requirements for land registration. By considering the definitions and how various related components by different authors, this study, therefore, defines integration in land administration domain *as the process of combining, replacing or transforming the spatial, legal and institutional requirements between two systems or approaches when solving land administration challenges*.

2.7.2 Challenges of Integration and Possible Solution

Integrating two approaches or systems is likely to experience some constraints in incompatible matching variables and therefore, require harmonisation. Such a mismatching in this study implies integration gaps. Flexibility in standards and use of gateways to link components or standards, for instance, gateways between computer and paper-based systems, between computer-based systems and data standards instead of technical standards are the proposed ways of addressing integration gaps (Braa, Hanseth, Heywood, Mohammed, & Shaw, 2007).

The Land Administration Domain Model (LADM) (Lemmen, van Oosterom, & Bennett, 2015) can be used as a standard in merging land administration systems. Also, Augustinus (2010) argues on the use of the STDM to solve the technical gap when documenting land rights. Also, Jacoby (2011) points out other constraints which might occur when doing integration. According to him, it becomes a challenge when the decision of what to keep, share or replace must be made. To avoid this challenge from happening, Jacoby insists on collaborative decision making between the organisations by taking into consideration the *practicability of the integrating variables and the goal to be attained*. Also, Simbizi, Bennett, and Zevenbergen (2014), adds that there is a challenge of merging customary and public institutions in most Sub-Saharan Africa. According to authors these institutions "operate in parallel or overlap" (p.235), the reason being lack of regulatory framework.

2.7 Concluding Remarks

Generally, this chapter has highlighted the main areas of discussion and perspective of different scholars about the main research concepts. This study will adopt the understanding developed in this chapter about the main concepts, registration requirements and integration of land registration approach as indicators to be measured. On the other hand, whereas the limitations of the conventional systems of land administration and enforcement of innovative land tools have been addressed in the various chains of literature, empirical exploration studies of how these two approaches integrate during implementation are scarce. This study is aiming at contributing to fill such a gap by exploring the integration of MAST with the conventional systems

for customary land rights registration in Tanzania. The next chapter provides design and methods for undertaking this study in the LTSP sites areas.

3.0 RESEARCH DESIGN AND METHODS

3.1 Introduction

This study aims at exploring the integration of MAST tool into the conventional systems of customary land registration in the issuance of CCROs in Tanzania. The chapter explains the adopted research design and methods in Section 3.2. It also gives an overview of the LTSP as a case study area in Section 3.3. The limitations of this study and the ethical issues are explained in Sections 3.4 and 3.5 respectively.

3.2 Research Design and Methods

3.2.1 Research Design

The *case study strategy* was adopted to explore how MAST tool integrated into the conventional systems of customary land registration. The choice of this strategy was mainly to understand empirically how the tool integrated into the conventional systems of customary land registration in Tanzania (Yin, 1994). The author has also suggested that this strategy becomes relevant, especially when the multiple variables or units of analysis exist. Thus, variables such as the legal, institutional, and spatial requirements, differences, processes, and constraints, were used as the units of analysis. Also, the case study strategy was selected because the MAST tool was implemented in the chosen areas of Kilombero, Ulanga and Malinyi through the government LTSP. Therefore, it helped to understand how empirically the integration was done, the associated challenges as well as adopted or proposed solutions. The details of the research design and operationalisation variables can be viewed in Appendices 1.0 and 2.0

3.2.2 Research Methods

According to Golafshani (2003), the qualitative approach is a method used to explore the understanding of real-life complexities. This approach indeed helped the researcher to collect relevant information using multiple techniques for data collection. Data collection for this study based on both secondary and primary sources. Also, the data collection technique was determined by the specific sub-objective of this study. Sub-Objective one, two and three used mixed methods to answer the specified research questions as follows: -

(a) Methods of Data Collection and Analysis

Sub-objective One

The document analysis and semi-structured interviews were done to collect data for the spatial, legal, and institutional requirements of customary land registration using the MAST tool and conventional systems. Documents such as MLHHSD (2016), (2019a) and (2019b); NLUPC (2013) and (2017); Tanzania National Land Policy of 1995 (the Tanzania NLP); Tanzania Village Land Regulations of 2001 (VLR); the Constitution of the United Republic of Tanzania of 1977 (the Constitution); the Land Act of 1999 (LA); and the VLA were reviewed. Also, a face to face and telephone semi-structured interviews were used to interview experts from the MLHHSD, NLUPC, LTSP implementers and Kilombero, Ulanga and Malinyi District Land Professionals. Data about the legal, institutional, and spatial requirements for customary land registration using both approaches were collected. The descriptive and thematic methods used to analyse the legal, institutional, and spatial requirements of customary land registration using the two approaches. The Enterprise Architect (EA) software was used to make Universal Mark-Up Language (UML) diagrams to show the procedures for customary land registration.

Sub-objective Two:

A face to face and telephone semi-structured interviews to informants from the LTSP, MLHHSD, Civil Society Organisations (CSOs), Kilombero, Ulanga and Malinyi Districts and analysis of MLHHSD (2019a) and (2019b) documents were used as sources of data. The legal, institutional, and spatial integration gaps, adopted processes, and advantages for solving the gaps between MAST tool and conventional systems of

customary land registration were collected. The descriptive and thematic methods used to analyse the legal, institutional, and spatial differences in requirements and processes for solving the integration gaps between the two approaches. The EPISTLE model used to analyse the advantages of solving the integration gaps between the approaches. This model can be used to analyse the impacts in term of Environmental, Political, Institutional, Social, Technological, Legal, and Economic (Rossini, 1983; Wilmoth, Jarboe, & Sashkin, 1984).

Sub-objective Three:

A face to face and telephone semi-structured interview was used to interview experts from the LTSP, MLHHSD, CSOs, Kilombero, Ulanga and Malinyi Districts. Also, a review of MLHHSD (2019a) and (2019b) documents were done. The data about legal, institutional and spatial constraints for solving the integration gaps, their causes as well as adopted solutions were collected. The descriptive and thematic analysis was used to analyse the legal, institutional, and spatial constraints, courses, and solutions for solving integration gaps between the MAST tool and conventional systems of customary land registration.

(b) Method of Data Presentation

The obtained results in this study were visualised in tables and figures and further described in texts. **Appendix 1.0** and **Appendix 2.0** show the research design and operationalisation matrices used in this study respectively.

3.2.3 Sampling Design

This study used a face to face and telephone semi-structured interviews technique for primary data collection. The methods used the key informants who were involved in customary land registration in Tanzania using both the MAST and conventional approaches. The purposive sampling used to identify the key informants from the MLHHSD Headquarter; Morogoro Zonal Land Offices; NLUPC, Kilombero, Ulanga and Malinyi District Councils and LTSP implementers (Etikan, 2017). The nature of the research problem influenced the selection of informants; type of data required; the qualities that the informants possess about this study, including their reliability and competence; and the adopted techniques for data collection (Tongco, 2007). With the support of LTSP officials, a total number of 14 informants were interviewed, as shown in **Table 3.1.**

Table 3.1: Sampling Frame of Number of Respondents involved in Semi-Structured Interview

Office	Location	Rationale	Respondents
NLUPC	Dar es Salaam	Responsible for VLUP and coordination	2
LTSP	Dar es Salaam	Implementers of MAST	4
Kilombero DC	Kilombero	Customary land registration institution	1
Ulanga DC	Ulanga	Customary land registration institution	1
Malinyi DC	Malinyi	Customary land registration institution	1
MLHHSD-HQ	Dodoma	Customary land registration institution	4
NGOs/CBOs	Morogoro	Advocating on inclusiveness and land rights	1
Total			**14**

3.3 Background of Case Study Areas

Table 3.2 shows the LTSP sites. It shows that there three sites with a total number of 191 villages and land coverage of about 3.7 million ha. There are three categories of land whereby the dominant land category is reserved land (41.9%) followed by village land (35.9%) and general land (22.1%). This study focused on the village land, which covers about 1.5 million ha regularised through the LTSP using innovative MAST tool.

Table 3. 2: Land Categories in the LTSP Sites

NO.	District	No. of Villages	Land Categories ('000,000Ha)			Sub Total
			General land	Reserved land	Village land	
1.	Kilombero	99	0.1	0.7	0.6	1.5
2.	Ulanga	59	0.5	0.3	0.3	1.1
3.	Malinyi	33	0. 2	0.5	0.5	1.1
	Percentage (%)		**22.1**	**41.9**	**35.9**	**99.9**
Grand Total		**191**	**0.8**	**1.5**	**1.4**	**3.7**

Source: Fieldwork Data, 2020.

Figures 3.1 and 3.2 presents the population and household's population of the LTSP suites. The areas have a total population of about 772,660 people and 174,383 households. The figures show that Kilombero contributes the highest population as well as a number of households, followed by Ulanga and Malinyi Districts. Similarly, according to the survey conducted by the MLHHSD through LTSP in the year 2016 which also included the specific District Land Use Framework Plan (DLUFP) shows that Kilombero has the annual growth rate of 2.9% and Ulanga and Malinyi Districts both have 3.9%. It implies that the population is growing faster in Malinyi and Ulanga than Kilombero Districts.

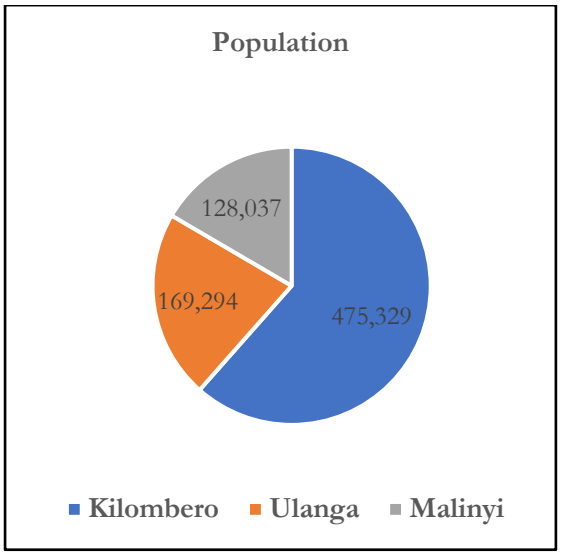

Figure 3.1: LTSP Sites Population Distribution. Source: (Fieldwork Data, 2020)

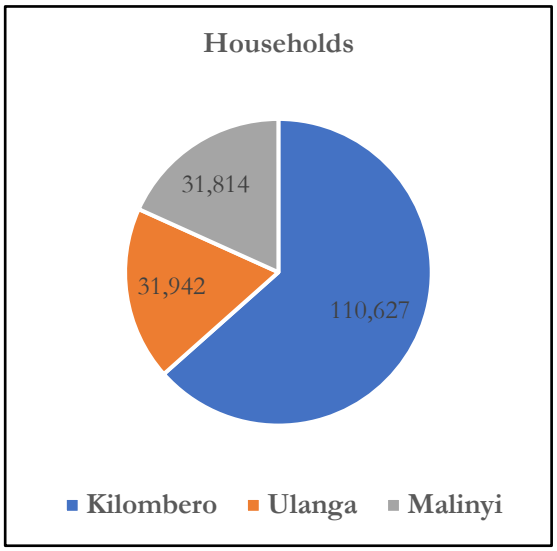

Figure 3.2: LTSP Sites Household's Population. Source: (Fieldwork Data, 2020)

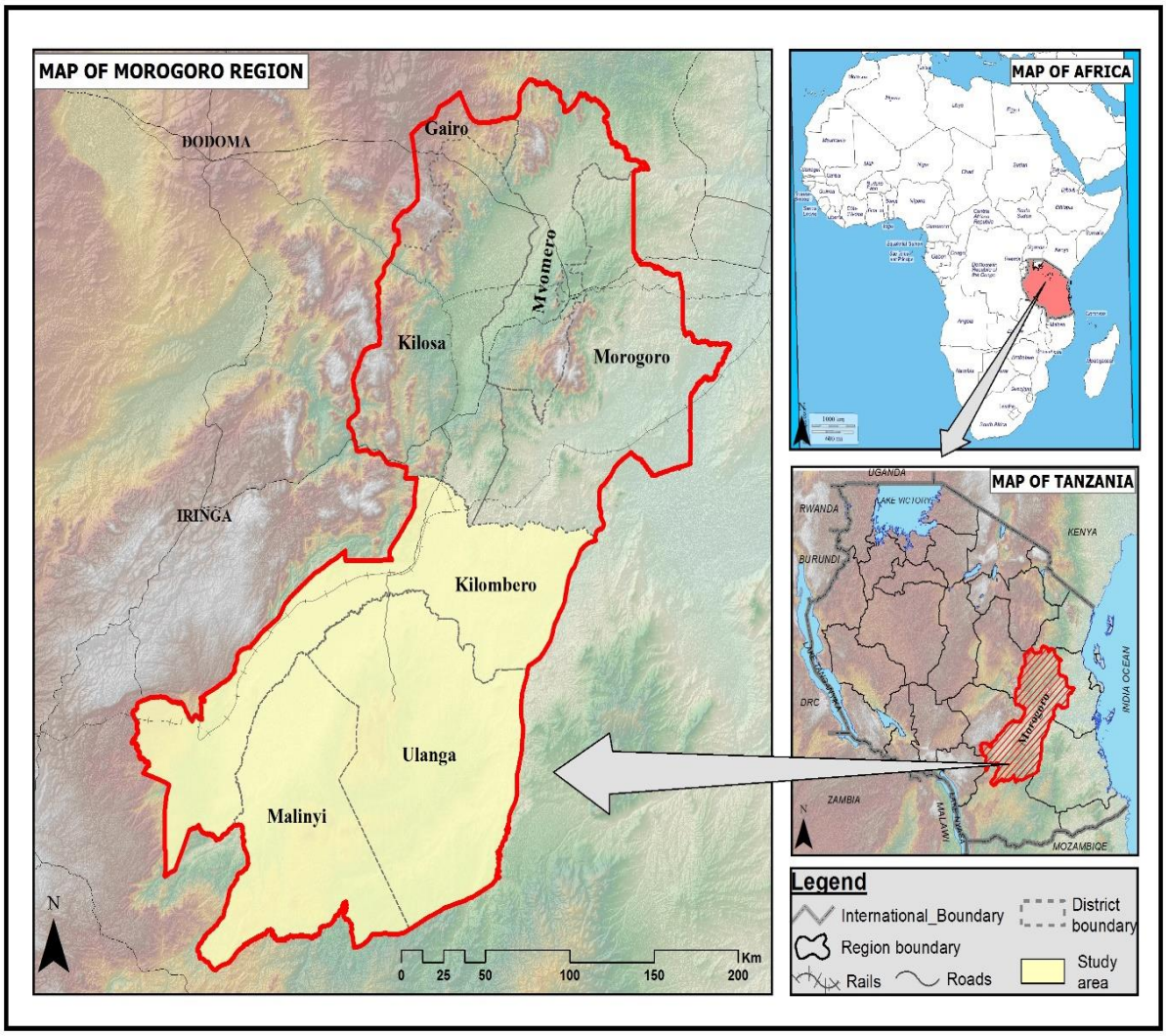

Figure 3.3: Showing the LTSP Site Areas in Morogoro Region. Source: (Author, 2020).

Figure 3.3 shows LTSP site areas in Morogoro Region, where the customary land registration was done using the MAST tool. The region is in the Eastern part of Tanzania about 500Km from the national capital city, Dodoma.

3.3.1 Relevance of the Study Area

Tanzania was considered a physical scope of this research because of having a low scale of registered land of approximately 15% and the existence of titling projects implemented using innovative initiatives. This research focused on customary land registration because, according to Sullivan et al. (2019), it has a high percentage of unregistered land, which serves about 70.4% of the rural population (Tanzania-NBS, 2020). According to the World Bank (2015), 90% of this land remained unregistered despite its potentials; hence the need to have a useful registration system is of vigilant concern. Also, the USAID (2016), proposed a digital FFP approach for customary land registration in Iringa Region, Tanzania, after observing this challenge. They proposed MAST tool as both the technology and system to ensure community engagement, digital way of planning, registering, and managing the customary land rights in the country.

It was worthy selecting LTSP because it was the GoT initiated donor fund project LTSP which adopted the MAST tool from LTA program in Iringa Region and customised it to regularise the customary land in the specified districts. The LTSP was a three years project which was started in the year 2016 after the GoT secured fund of about £8.8m jointly granted by DFID, SIDA and DANIDA to regularise land tenure in Tanzania (Gov.UK, 2020). Also, the LTSP areas of implementation are found in the Southern Agricultural

Growth Corridor of Tanzania (SAGCOT), which is clustered for agricultural improvement to ensure food security, albeit with insecure land tenure (SAGCOT, 2020). So, this case study area became useful in providing the empirical findings of how innovative initiatives, specifically the MAST tool integrated into the existing conventional systems of customary land registration in Tanzania.

3.4 Limitation of the Research

The aim of this study was to explore empirically how the MAST tool integrates into the conventional systems of customary land registration in Tanzania. It employed the case study strategy and qualitative approach to obtain the relevant data to answer the specific research questions. Although the research managed to justify how the approaches integrate by involving the identified informed experts, it would be ideal for conducting this study during the time where the LTSP was implemented to be able to observe practically the integration. The reshuffle of all District Councils Land officials in Morogoro Region and the disciplinary measures taken against some of the district officials who were involved in the implementation of LTSP project limited the conduct of face to face interview; however, a telephone interview was done.

3.5 Ethical Considerations

As stated earlier, this study employed both secondary and primary sources of data collection. It included data collected from both public and private experts who are involved in the registration of customary land using conventional and MAST, as already shown in **Table 3.1**. To avoid the ethical dilemma, the purpose of this study was explained to the respondents before conducting the interview. The interviewer sought the consent of the respondents before recording or using data provided. There is no any information obtained in either face to face or telephone interview or obtained as the official document or documents is disclosed unless stated otherwise, and the same shall be used for this study only. This study is conducted to fulfil the requirements of the Faculty ITC Examination Board Rules and Regulations (Faculty ITC, 2018); thus, the results presented are without fraud.

3.6 Concluding Remarks

The chapter explained the design and methods adopted in this study. It highlighted that a single case study strategy with multiple methods applied in data collection. The background and the rationales of selecting LTSP as a case study area of this study are explained. The next chapter explains the results obtained through the adopted methods.

4.0 RESULTS

4.1 Introduction

This study aims to explore how the MAST tool integrates into the conventional system of customary land registration in Tanzania. This chapter presents the findings based on the methodology explained in Chapter Three and requirements developed under Chapter Two. The chapter is organised according to the sub-objectives in Section 1.5 by comparing the legal, institutional, and spatial requirements for customary land registration using the conventional system and the MAST tool in Section 4.2 to answer sub-objective one. It presents the integration gaps between the two approaches under Section 4.3 to fulfil the requirements of sub-objective two. Section 4.4 describes the constraints for solving the integration gaps between the two approaches to answer sub-objective three. The chapter ends by summarising the obtained results to answer the research questions and sub-objectives in Section 4.5. For consistency, the results are presented in the order of legal, institutional, and spatial frameworks.

4.2 Comparison of the Requirements for Customary Land Registration Using Conventional System and MAST tool

This section compares the legal, institutional, and spatial requirements between the conventional system and the MAST tool. It is organised in three subsections 4.2.1, 4.3.2 and 4.2.3 to compare the legal, institutional, and spatial requirements of two approaches respectively.

4.2.1 The Legal Requirements for Customary Land Registration Using the Conventional System and MAST Tool

The customary land in both conventional system and the MAST tool is registered using similar formal legislation. The VLA is the principal law, responsible for governing the village land. According to Section 12 of this law, the village land is categorised into communal, individual or family and communal village land (Attachment No. 3). The VLA applied together with the Local Government (District Authorities) Act, 1982 (the Local Authority Act) which defines a registered village, boundary and areas of power of the Village Council (VC) which is mandated to manage the customary land (Section 8 of the VLA). The VLA is also implemented together with the Land Survey Act, Cap 324 (the Survey Act) which provides the spatial requirements for undertaking Village Boundary Survey (VBS), and the actual survey of the customary land if required. The LUPA is required to govern land use planning, administration, and management. Further, the Court (Land Disputes Settlements) Act, 2002 (the Dispute Settlement Act) defines institutions in charge of the settlement of land disputes and their power to do so.

Also, the Village Land Regulations, 2001 (VLR) provides the requirements for registering the customary land. The implementation of these land laws and regulations is guided by the MLHHSD guidelines of 2016. The interview with the LTSP representative revealed that the VLA, LUPA and Survey Act provides complex requirements for VBS, preparation of CVL and VLUP because of centralised approving mandates, subsequently causes a delay in the registration processes in both approaches (see procedures in Figure 4.1 below). The MLHHSD (2019b) also reports this as an outstanding legal constraint that impeded the implementation of LTSP, which adopted the MAST tool to register customary land.

Figure 4.1 illustrates the procedural comparison between the conventional system and MAST tool for customary land registration in Tanzania. It shows that the conventional systems have eight registration procedures compared to MAST tool, which has ten. It also shows that there are ten activities done in conventional systems while in the MAST tool, they are only twelve. This difference is because of public awareness-raising at the hamlet level and training activities added in MAST tool under procedure number four and six respectively. In the conventional system, the public awareness-raising ends at the village level. Also, training to the local level institutions such as para-surveyors, Village Adjudication Committee (VAC) members and village leaders are not conducted. The figure shows that the approaches are similar in doing the preliminary procedures, village council meetings, and notification to the public to begin the systematic adjudication. There are also differences between these approaches regarding the systematic adjudication, time for public display, preparation, registration, and issuance of CCROs. This difference can be seen in the fifth to the eighth procedure in the conventional system and seventh to the tenth procedure in MAST tool.

Moreover, the figure shows that systematic adjudication in the conventional system is predominantly done manually except in data processing compared to the MAST tool where the data capture and quality checking are done digitally. It also shows that in the conventional system public display of provisional adjudication record to allow various objections is conducted within thirty days to meet the requirements of Section 54(7) of the VLA. However, in the MAST tool, the time was minimised to fourteen days because of using MAST technology and improved means of communication, including the use of bulk SMS, traditional music, and dancing. A representative from LTSP said that *"During demarcation time, we were also recording their contacts using MAST App. We used the contacts as instruments for communication by sending bulk or push SMS. We informed them that their records would be published on a date, so they were invited for verification. They were attending massively. We prepared our staffs for helping them and showing their parcels and other information. Upon their satisfaction, they were required to sign. We made sure that everyone is participating in public displays. Objections were recorded and solved. So, within seven to fourteen days, this exercise was almost done. So, if we were to wait for the thirty days which are provided in the law, it would have been a wastage of time"* (a representative from LTSP, 4th March 2020). Another difference is in the CCROs preparation, registration, and issuance. Response from the MLHHSD official revealed that after training activity in the sixth procedure under MAST tool, the remained processes are done digitally unlike to the conventional system. After the registration, all CCROs are issued to the landowners in two different ways between the two approaches. While in the conventional system individual landowners are required to make follow-ups of their documents at the village office, it is unlike to the MAST tool where the CCROs are issued systematically to all available owners at the same time. In the MAST tool, the day for issuing the CCROs is communicated to the public using either bulk SMS or other simplified means, and the District Land Office (DLO) supervises this exercise.

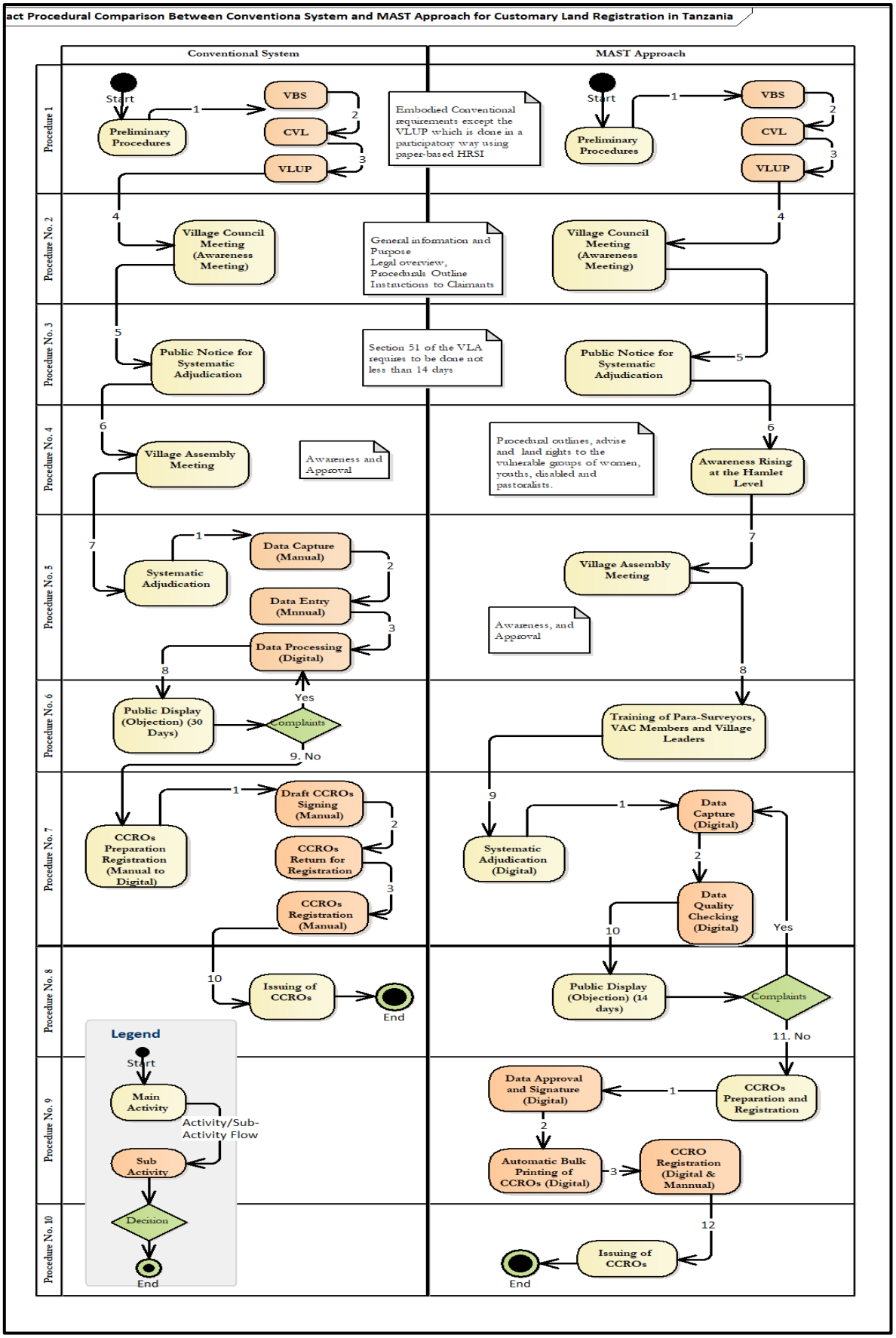

Figure 4.1: UML Diagram Showing a Procedural Comparison Between the Conventional system and MAST tool for Customary Land Registration (Source: Author's Construct Basing on the VLA, VLR and MLHHSD (2016) & 2019a)

Table 4.1 is a continuation of the comparison in legal requirements between the conventional system and MAST tool. It shows a similarity between approaches in recording the Customary Right of Occupancy (CRO) as a recognised form of tenure (Section 25 of the VLA). In both approaches, CCROs are registered for an unlimited term to meet the requirements of Section 27 of the VLA. However, there is a difference in recording specific tenancy types and social tenure relations between the approaches. Figure 4.2 is a MAST tool relational data model of land tenure recordation constructed based on the LTSP database management system. It illustrates the relationships between the recorded spatial units with other general information, part, and the associated rights. It also shows how the MAST tool has transformed the formal system by recording specific tenancy types and relations, e.g. co-occupancy (both joint tenancy and tenancy in common). The tool also records social tenure relations, e.g. children, grandparents, and other relatives.

Further, Table 4.1 shows a similarity between approaches in recording the secondary rights to meet the requirements of Regulation 69 of the VLR. However, in the conventional system, these rights are identified during VLUP without being recorded, compared to MAST tool where this is done practically by a contribution of three metres from landowners of the adjoining land parcels. According to the MLHHSD manual of 2019a, it states that "*The para-surveyors are required to lead the landowners and neighbours to agree with the proposed "public access road" so that they can set out a corridor with a total of 6 metres contributed equally from each side. After deciding on the road widths then a para-surveyor and VAC offsets 3 metres each side and then record the access road by using permanent markers" (p.110).*

Section 19 of the VLA requires registration of bundle of rights that comes out of first registration such as derivative rights[1] included a right to *lease* or *sub-lease;* and a CRO that is "*customary lease* "or "*customary sublease*" However, both MLHHSD officials and the LTSP implementers have confirmed non-existence of the guidelines for registering land transactions in Tanzania. The implementer of LTSP stated that "*Practically, the kind of registration done was just a first registration. That was the focus of the project. We have a challenge. The country does not have guidelines for undertaking second registration. We decided to focus on first registration, and then after we started designing the tool and formulating guidelines about the subsequent registration, which are still pending"* (a representative from LTSP, 04th March 2020).

Table 4.1 shows that registration in MAST tool is faster and cheap compared to the conventional systems. These two requirements show that the data collection method influences registration time and cost. Figure 4.3 shows that a paper-based HRSI method takes longer (about 85 days) to register CCROs compared to the MAST tool. The indicated time includes the legally required time of 40 days using paper-based HRSI and 25 days in MAST. The conventional (HHGPS) method has shown a difference in registration time by taking more time (100 days) compared to the MAST tool (see Figure 4.4). Figure 4.4 and Figure 4.5 show that the conventional methods (paper-based HRSI and HHGPS) take a long time in almost every procedure compared to the MAST tool except the time for public notice and village assembly meeting which looks similar in both approaches. The MAST tool has additional time for public awareness at the hamlet level (2 days) and training (1 day).

Also, Figures 4.5 and 4.6 compare registration cost between the conventional systems (HRSI and HHGPS) against the MAST tool. They show that a unit cost per CCRO in the conventional methods (paper-based HRSI and HHGPS) is higher compared to the MAST tool. The difference ranges from US $3 using paper-based HRSI to US $6 using HHGPS. However, based on the interview, this does not include cost for other expenses such as establishing District Register, printers/scanners, cartilages, smartphones, and satellite images. Response from LTSP and MLHHSD informants further justified that a unit cost per CCRO is

1 Derivative rights and other tenure types recognized in customary land administration systems in Tanzania are shown in the figure attached under Appendix 3 of this study.

derived from summing all operating costs divide by adjudicated land parcels. According to them, one village can produce an average of 1200 land parcels; thus, a greater number of land parcels are adjudicated per village, the lower the unit cost becomes. One of them stated that "a *unit cost per CCRO is a total cost incurred divided by the 1200 adjudicated land parcels produced per village*" (a representative from LTSP, 3rd March 2020).

In both approaches, there is a commonality in recognition of equal access to land, especially to women, to meet the requirements of Section 2.2 of the Tanzania NLP. However, the enforcement of this right in practice varies between the approaches. The policy requires the registration system "*to ensure that existing land rights, especially customary rights of smallholders (i.e. peasants and herdsmen who are the majority of the population in the country) are recognized, clarified, and secured in law*"(Tanzania NLP, 1995; p.5). However, the response from a representative from LTSP has revealed that women, youths, disabled people, and pastoral communities can neither access nor have secured land rights in the conventional settings because of little public awareness, traditional strongholds, and implementation of the laws. He stated that *"These groups are women, youths, disabled people and pastoral communities. They are deemed unfavourable because by considering our old system or tradition, these are the people whose direct access to land rights are denied. The legislation is very open, but everything lacks practical implementation. Nowhere they can access their rights. That is why under LTSP, we put much effort into these groups to make sure their land rights are factually enjoyed*" (a representative from LTSP, 5th March 2020).

Table 4.1 shows that the number of required registration documents differs between approaches. Similarly, the type and manner of filing and signing these documents differ. The combination of the registration forms, introduction of e-signature and the replacement of the crested papers by MAST tool augmented this difference.

Table 4.1: The Comparison of the Legal Requirements for Customary Land Registration between Conventional systems and the MAST tool

Indicators	***Legal Requirements***	
	Conventional System	**MAST tool**
Registered Tenure Types	◦ Customary right of occupancy (CRO) only ◦ Right of ways are identified but not recorded	◦ CRO, tenancy types and social tenure relations ◦ Right of ways are identified and recorded
Registration Time	◦ 100 days (HHGPS) and 85 days (HRSI) including the legal time ◦ 55 days (HHGPS) and 40 days (HRSI) excluding the legal time	◦ 54 days including the compulsory legal time ◦ 25 days excluding the compulsory legal time
Registration Cost	◦ Unit costs per CCRO are US $13 to US $22 (HHGPS) and US $10 to US $18 (HRSI) ◦ Total cost per village US $15,000 to 25,000 (HHGPS) and US $12,000 to US $22,000 (HRSI)	◦ Unit cost per CCRO US $7 to US $15 ◦ Total cost per village US $8,000 to US $18,000
Access to Land	◦ Equal access to land, including customary land and security of land tenure are the legal rights but not enforced in practice ◦ Marginalised groups, especially women are not practically engaged in the registration processes	◦ Equal access to land, including customary land and security of land tenure are the legal rights and practically enforced ◦ Marginalised groups, especially women, are practically engaged in registration processes.
Registration Documents	◦ A copy of Application Form No. 18, (Appendix No.4), three copies of Systematic Adjudication Record Form (SARF) No. 49 and CCRO Form No. 21A (Appendix No. 5) ◦ Are filled and signed manually ◦ Special crested papers for CCROs documents	◦ Three copies of CCROs No. 21A and SARF No. 49 ◦ Combination of Application Form No. 18 with SARF No. 49 (Appendix No. 6). ◦ Are filled and signed electronically ◦ Ordinary papers for CCROs documents

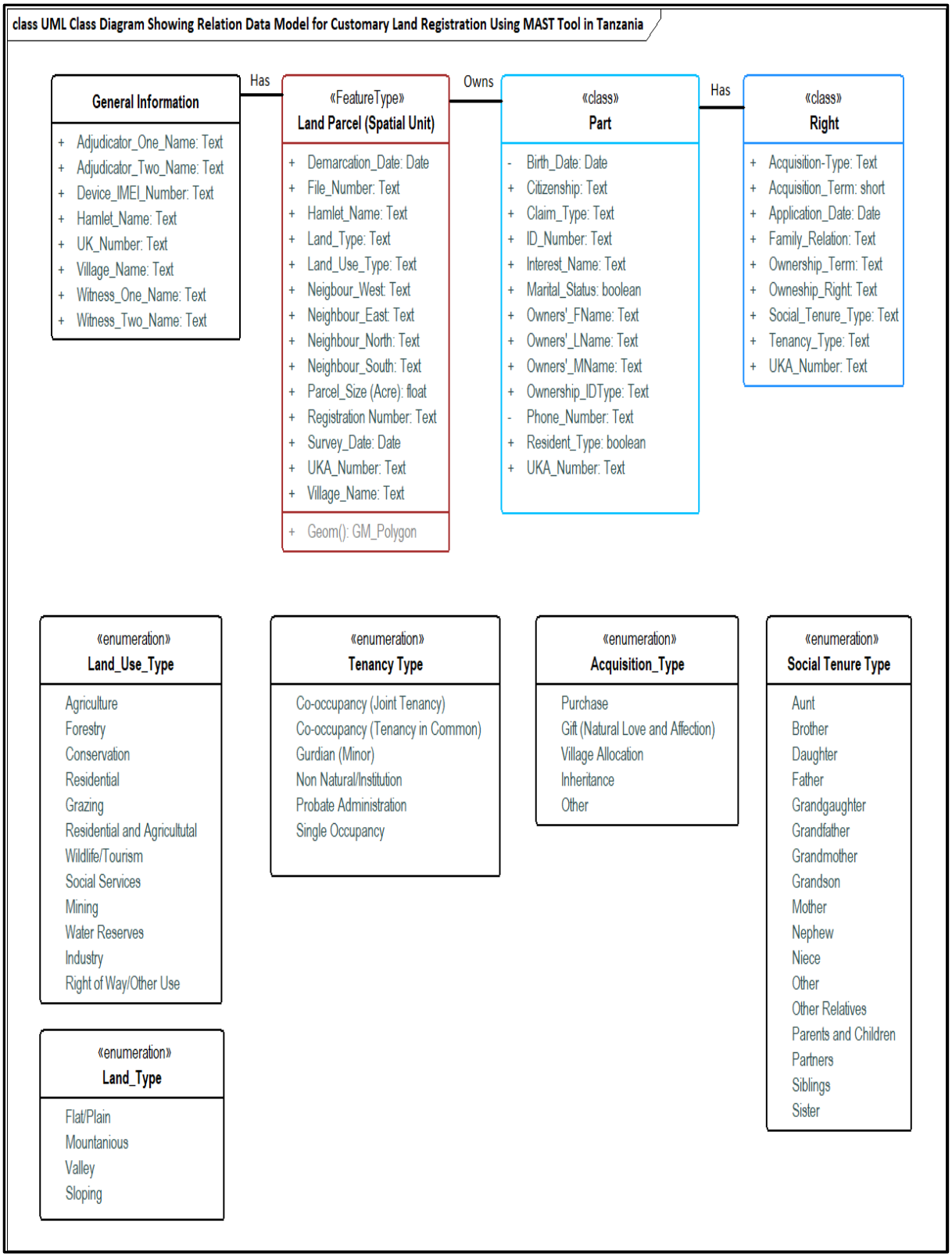

Figure 4.2: UML Class Diagram Showing the Relational Data Model for Customary Land Registration Using MAST tool (Author's Construct based on LTSP database management system)

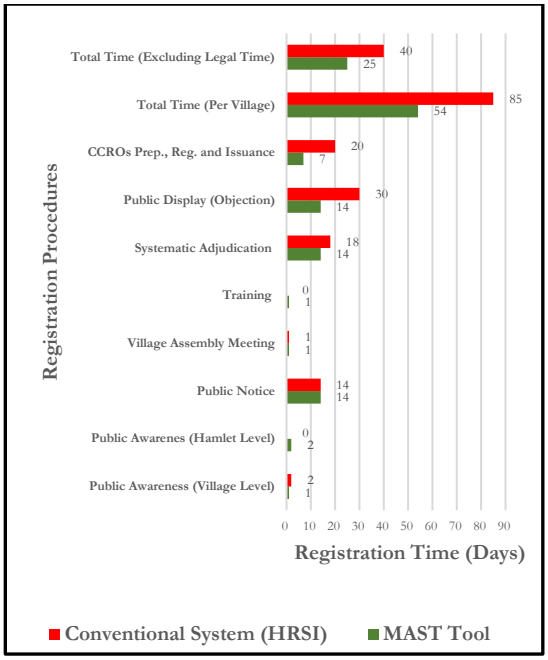

Figure 4.3: Comparison of Registration Time Between Conventional systems (HRSI Method) and MAST tool (Fieldwork Data, 2020)

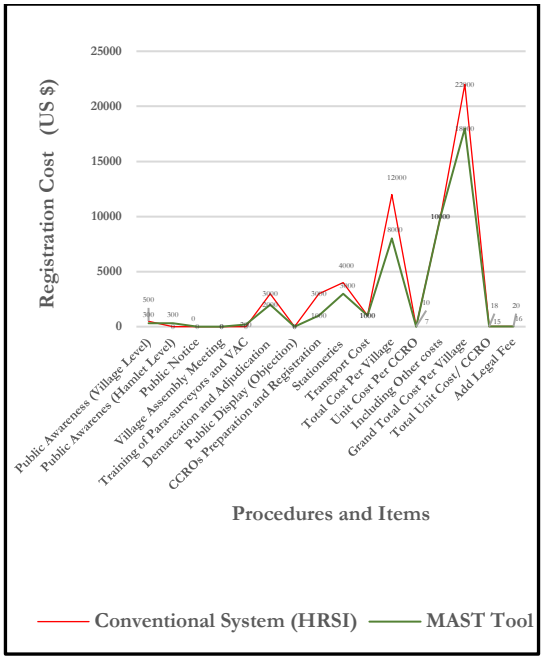

Figure 4.5: Comparison of Registration Cost Between Conventional System (HRSI Method) and MAST tool (Fieldwork Data, 2020)

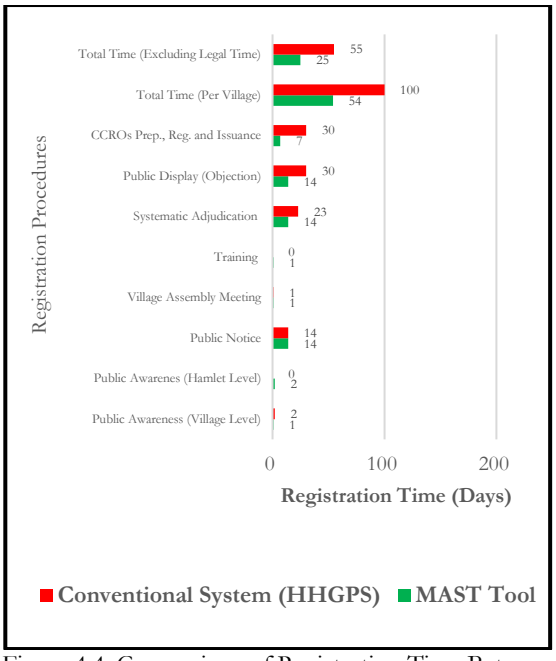

Figure 4.4: Comparison of Registration Time Between Conventional System (HHGPS Method) and MAST Tool (Fieldwork Data, 2020)

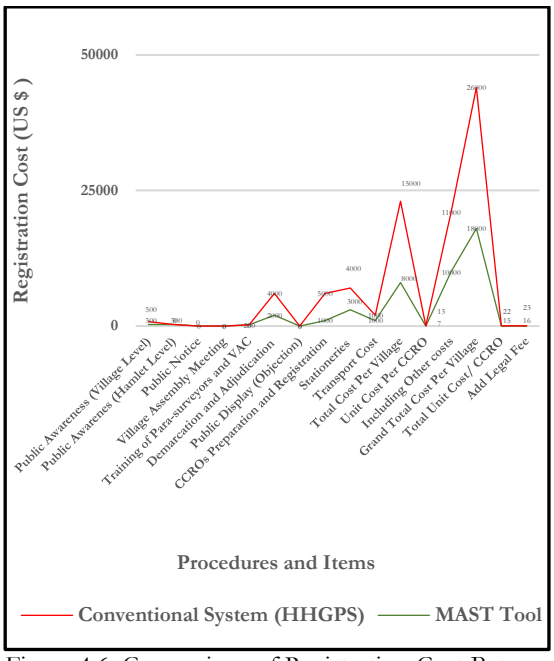

Figure 4.6: Comparison of Registration Cost Between Conventional System (HHGPS Method) and MAST tool (Fieldwork Data, 2020)

4.2.2 Institutional Requirements for Customary Land Registration using the Conventional System and MAST tool in Tanzania

Table 4.2 shows that the approaches are similar in the matter of the required legally prescribed actors (presented as basic actors) and differ on the requirements of the fieldwork and office actors. It also shows a difference in the number of the required field and office actors. Similarly, MAST has brought a difference by involving additional actors for public awareness-raising and sensitisation. Indeed, institutions for land disputes resolution vary between the approaches because of involving the administrative and political leaders in disputes settlement resolutions under MAST tool. Furthermore, there is a difference in terms of institutional capacity building requirement between the conventional and MAST tool. While under the formal system, neither capacity building nor training activities are carried out, it is contrary to the MAST tool, where these requirements are reported to be overemphasised and implemented.

Figures 4.7 and Figure 4.8 present institutional frameworks for customary land registration between the conventional systems and MAST tool respectively. The emerging commonalities are the existence of the DLO, which links central and local level institutions to provide technical support during systematic adjudication. Whereas this similarity is observed, several differences are identified. While in the conventional system, the interactions are top-down, starting from the ministerial level to the individual villagers, this is opposite in the MAST tool. The institutional relations reflect a bidirectional bottom-up interaction starting from the VAC to the Village Assembly and then to the DLO. Another emerging difference is observed in the improvement of field supervision where there is an addition of a Team Leader, Field Manager and Field Supervisor who form a supervision team. They supervise and facilitate the undertaking of systematic adjudication and completion of preliminary procedures of VBS, CVL and VLUP.

Table 4.2: Institutional Requirements for Customary Land Registration using the Conventional System and MAST tool

Indicators	Spatial Requirements	
	Conventional System	**MAST tool**
Institutional Actors	◦ Basic Actors (Many people): The landowner(s), Owners of the neighbouring parcel, Village Chairman, Village Executive Officer (VEO) and Village Assembly	◦ Basic Actors (Many people): The landowner(s), Owners of the neighbouring parcels, Village Chairman, VEO and Village Assembly
	◦ Field Team (5 people): One Technician Surveyor, One Adjudicator, Camera Man, and Two VAC members	◦ Field Team (4 people): One Para surveyor, One Adjudicator, and Two VAC members
	◦ Office Team (6 people): Authorized Land Officer, Data Entry Clerk, Three GIS Experts, Recording Assistant	◦ Office Team (2 people): Authorized Land Officer and One Senior GIS Technician
		◦ Sensitisation/Awareness Raising Team: (3 people and local CSOs District Community Development Officer, Communication Specialist and Social Expert
	◦ The Disputes Resolution Team: Are done by the legally defined institutions of Village Land Council (VLC)[2], Ward Tribunals, DLHT, High Court (Land Division) and Court of Appeal	◦ The Disputes Resolution Team: Involves the local and central levels leaders, including politicians.
Institutional Activities	◦ Legally prescribed activities include the Village Council Meeting, Public Notice, Village Assembly Meeting, Demarcation and Adjudication, Data Recording, Data Quality Checking, Public Display, Data Correction, CCROs Printing Approval, Delivery of	◦ Legally prescribed activities include the village Council Meeting, Public Notice. Village and Hamlet Level awareness-raising, Village Assembly Meeting, Training, Demarcation and Adjudication. Data Quality Checking, Public Display, Data Correction and Updating, Quality Checking and Approval of Data

2 Established under section 60 of the VLA as elders council panels responsible for mediation and assisting parties to arrive at a mutually acceptable solution on any matter about village land

	CCROs to the Village for Signing, CCROs Registration and CCROs Issuance.	Automatic CCROs Approval and Printing, CCROs Issuance.
	◦ Roles assigned to local level institutions such as demarcation and adjudication are performed by the trained technicians such as Technician Land Surveyor	◦ The local-level institutions themselves play systematic adjudication roles. Professionals play a supervisory role.
Interaction	◦ It applies a top-down approach.	◦ It applies a bottom-up approach.
	◦ Use of papers, meetings, and ICT	◦ Use of papers, meetings, ICT, traditional dancing, music
Capacity Building		◦ Trained People includes Villagers, Para-surveyors, Recorder, VAC, Land Council and Tribunals, Village Leaders, District and MLHHSD officials.
		◦ Areas of Training: Purpose, CCROs issuing cycle, the process, forms and quality checks for mapping and adjudication, promotion of the participation of women and vulnerable groups, basic dispute resolution principles and guidelines, work planning and reporting, and application of Modern Technologies.

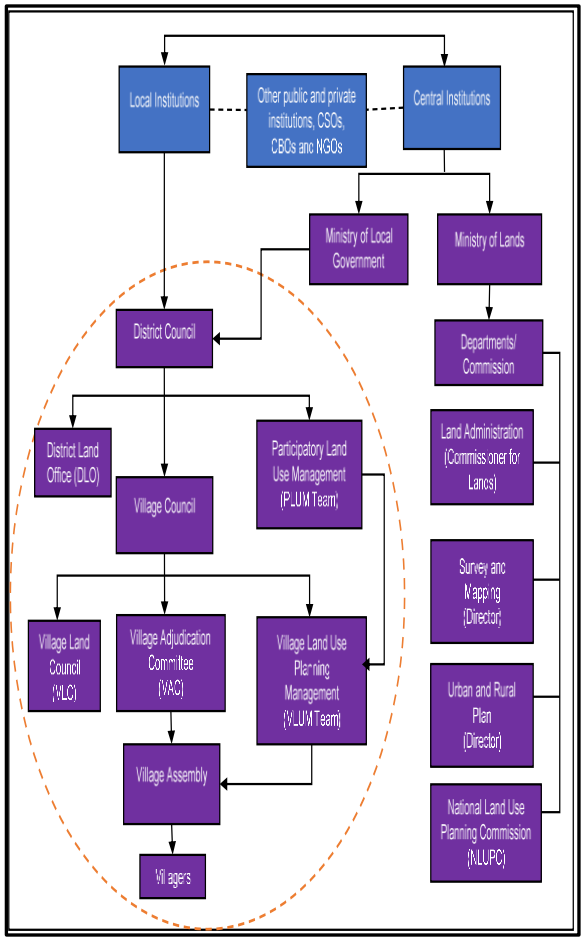

Figure 4.7: The Institutional Framework for Customary Land Registration Using Conventional System (Author's Construct Based on MLHHSD (2016) & (2019); and NLUPC (2013) & (2018))

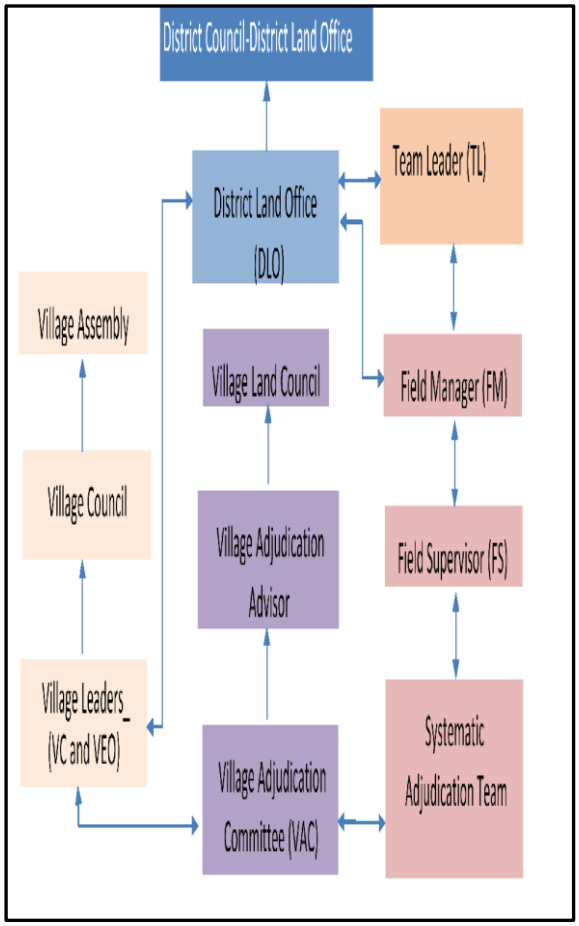

Figure 4.8: The Institutional Framework for Customary Land Registration Using MAST tool (MLHHSD, 2019a)

4.2.3 Spatial Requirement for Customary Land Registration Using Conventional System and MAST tool

Table 4.3 compares the spatial requirements for customary land registration between the conventional system and MAST tool. Both approaches use HRSI and GPS methods in two different ways. The HRSI method identifies the general boundaries of land parcels during Systematic Adjudication, and the HHGPS uncovers the features of the hidden boundaries or carries out the fixed survey if required by the applicant(s) under the conventional system. Similarly, MAST tool uses the HRSI and GPS, even though these are digitally linked with the application to delineate parcel boundaries. Also, the Garmin Glo device is used to improve positional accuracy.

In all approaches, a general boundary is a mandatory requirement for parcel boundaries delineation to meet the requirement of Regulation 62 of the VLR. For instance, the MAST guidelines state that "*Then Claimant or landowner will start showing parcel boundary points, and Para-surveyor will nod the icon for capturing position and proceed by tracking and capturing boundary points towards closing points. At the same time, the Para-surveyors asks VAC members, Hamlet leader, Recorder and neighbours to follow and walk the boundary of the parcel and identify and verify any markers, (plants, trees, any other acceptable permanent mark.). In each boundary point, the para-surveyor will take coordinates by using MAST application tools while maintaining the accuracy on MAST App. After closing the polygon, Para-surveyor must save the polygon" (*MLHHSD 2019b: p.109).

Besides that, the interview with a representative from the MLHHSD revealed that the base to consider general over fixed boundaries was to uphold the applicable customary practices of identifying the parcel boundaries which does not require precise measurements. However, it was reported by the MLHHSD official that though the base to consider general boundaries was to uphold the customary practices applied over a long time and across traditions in the country, they have never remained permanent because of various factors, including drying seasons or flooding. Thus, it causes land boundaries conflicts between individual landowners, two or more villages or villages and authorities responsible for managing the reserved lands.

Table 4.3 also shows the difference in the attained level of accuracy between the two approaches, even though according to Regulation 68 of the VLR accuracy is not required when demarcating a customary land. The MLHHSD official also confirmed this during the interview that when identifying the customary land, it does need to have precise measurements rather than to preserve the customary norms. *It does not need a precise measurement to identify it. "It is just to identify it and put a record in the forms or documents. So, accuracy is nothing here. Even if you use your own markers; either beacons or pin or whatever way, they will still not respect it compared to the traditional boundary features they are using*" (a representative from the MLHHSD, 11th March 2020).

Regarding means of spatial data access, analysis has shown similarity in the uses of physical and digital land registers. Unfortunately, the digital land information systems in both approaches, despite the difference of its sources, are stored at the DLO and access is limited to the trained people. Besides, the similarity is in the way spatial improvement is handled. The level of community participation in data acquisition is determined by the method used, and it is, therefore, different between the MAST tool and formal system.

Table 4.3: Comparison of the Spatial Requirement for Customary Land Registration using Conventional System and MAST tool

Indicators	***Spatial Requirements***	
	Conventional System	**MAST tool**
Spatial methods	◦ Paper-based Orthorectified HRSI ◦ HHGPS	◦ Open-source MAST application technology linked with orthorectified HRSI and HHGPS
Spatial standards	◦ Use trained surveyors and land officers for data acquisition.	◦ Based on the agreed purpose ◦ Trained individual community members to replace the professionals in data acquisition
Spatial Boundary	◦ Use the general boundary marks, e.g. tracks, ditches, fences, and plantations in delineating parcel boundaries.	◦ Use general boundary marks, e.g. tracks, ditches, fences, and plantations
Spatial Accuracy	◦ ±2m for HRSI and ±3m to ±2m for HHGPS ◦ Regulation 68 of the VLR requires no standard accuracy for demarcation of customary land	◦ Garmin Glo device use to improve accuracy to ±1m
Spatial improvement or upgrading	◦ The focus is on the first and second registration ◦ Manual recording of land transactions ◦ Transactions are for sub-division only	◦ The focus is on first registration only ◦ Transaction Utility for Secure Tenure (TRUST) designed to management transactions
The data access	◦ Through the Village and District Land Registers. ◦ It applies licensed ArcGIS technology as a database. ◦ Access to digital information is limited to trained people	◦ Through the Village and District Land Registers. ◦ Applies the open-source PostgreSQL and QGIS as databases ◦ Only the informed users access the digital information
Participation in Data Acquisition	◦ The level of community participation when using HRSI is high. ◦ Low level of community engagement when using HHGPS	◦ High level of community participation

4.3 Gaps in Integrating MAST Tool into the Conventional System of Customary Land Registration

The previous section compared the legal, institutional, and legal requirements for customary land registration using the conventional system and MAST tool. This section presents the identified legal, institutional, and spatial gaps resulting when integrating the approaches, the adopted processes to solve the gaps and realised advantages. It starts by identifying the legal, institutional, and spatial integration gaps in subsection 4.3.1, the adopted process to solve the identified gaps in subsection 4.3.2, and the realised advantages in subsection 4.3.3.

4.3.1 The Legal, Institutional and Spatial Gaps of Integrating MAST Tool into the Conventional System of Customary Land Registration

Section 4.2 compared the legal, institutional, and spatial requirements between the conventional system and MAST tool, as shown in Table 4.1, 4.2 and 4.3. Despite the similarities, the analysis revealed legal, institutional, and spatial gaps between the approaches. Table 4.4 presents the identified legal, institutional, and spatial integration gaps between these approaches. In table 4.4, the legal gaps reflect the additional and the way to operationalise registration procedures in MAST tool. It also shows the difference in the recordation of the specific tenancy types, social tenure relations and handling of secondary rights. The two approaches also have shown differences in registration time (30 days) and cost (US$ 6 to US$ 7). This difference reflects the time and costs in conventional methods minus that required in MAST tool. Another emerged difference is on how the legal recognition of equal access to land and practical enforcement of this right between the two approaches. Similarly, the approaches differ as to the number of documents used, types of the required signature and papers for registration.

Table 4.4 also shows the institutional integration gaps between the conventional system and MAST tool. It shows that the number of fields and the office team actors differ between the two approaches. Besides that, the MAST tool has brought a difference by adding new four actors for public awareness-raising and sensitisation activities which are not in the formal system. The MAST tool has also shown a difference by training the local-level institutions to replace the trained professionals in the formal system. The approaches show gaps in the way actors are interacting as well as the capacity building of both local and central-level institutions.

Spatially, Table 4.4 also shows the spatial gaps between the conventional system and MAST tool. The gaps reflect the way to use HRSI and GPS methods for data collection. Whereas all these methods are directly linked with MAST application to collect spatial data, it is unlike to the conventional systems where they work separately in a paper-based approach. The approaches have also shown a gap in spatial standards in data collection and planning of the developed village settlement areas. This difference occurred because of the training of paraprofessionals who replaced the role of the trained technicians in data collection. Also, because of the adoption of the MAST tool in planning and regularisation of the developed village settlement areas. There are also differences between the approaches about the registration focus and management of land transactions, source of technologies for database management and level of community participation in the data collection.

Table 4.4: The Identified Legal, Institutional and Spatial Integration Gaps between the MAST tool into Conventional System of Customary Land Registration

Indicators	Variables	Gaps	
		Conventional System	**MAST tool**
Legal Gaps	Registration Procedures	◦ Public awareness up to village level	◦ Public awareness up to the hamlet level
		◦ Are done manually	◦ Are done digitally
		◦ Relay on the trained professionals	◦ Training of paraprofessionals
	Registered Tenure Types	◦ It registers CRO only	◦ It registers CRO, specific tenure types and relations
		◦ Derivative right (customary lease or sublease)	◦ Base on first registration only
		◦ Secondary rights are identified but not registered	◦ Secondary rights are practically identified and registered
	Registration Time	◦ Long time (40 (HRSI) to 55 (HHGPS) days excluding the legal time)	◦ Short time (25 days excluding the legal time)
	Registration Cost	◦ High registration cost (US$ 13 to US$ 22)	◦ Low registration cost (US$ 7 to US$ 15)
	Equal access to land	◦ Lack of practical implementation	◦ Practically enforceable
	Registration Documents	◦ More documents signed manually and on special paper	◦ Minimised documents, signed electronically on ordinary papers
Institutional Gaps	Institutional Actors	◦ Field team actors (5 people)	◦ Field team (4 people)
		◦ Office team involve more actors (6 people)	◦ Office Team involves a few actors (2 people)
		◦ No sensitisation and awareness-raising team	◦ Addition of sensitization and awareness-raising team (4 people)
		◦ The disputes resolution team involve the structured legal actors	◦ The disputes resolution team involves the local and central level leaders
	Institutional Activities	◦ Village level awareness-raising	◦ Village and hamlet Level awareness-raising
		◦ No training of the local level institutions	◦ Training of the paraprofessionals
		◦ Manual approval and printing of the CCROs	◦ Automatic CCROs approval and printing
		◦ Trained professionals replace the local-level institutions	◦ Trained paraprofessionals perform the legally prescribed roles
	Interaction	◦ It applies a top-down approach	◦ It applies a bottom-up approach
	Capacity Building	◦ Limited capacity building through training to the local-level institutions	◦ The local and central level institutions undertake training
Spatial Gaps	Spatial methods	◦ Paper-based HRSI	◦ Digital-based MAST application linked with HRSI and GPS
		◦ Requires HHGPS to identify hidden boundary features	◦ GPS is directly linked with the MAST app
	Spatial standards	◦ Requires trained technicians in data acquisition	◦ Trained paraprofessionals for data acquisition
		◦ Requires town planning standards in the developed village settlement areas	◦ MAST tool used to plan and regularise the developed village settlement areas together
	Spatial Accuracy	◦ Low or no standard accuracy at all	◦ Require improved accuracy of ±1m
	Spatial improvement	◦ The focus is on the first and second registration	◦ The focus is on first registration only
		◦ Transactions are manually managed	◦ Transactions are temporarily managed in TRUST
	Data Access	◦ Licensed ArcGIS technology for database management	◦ Open-source QGIS and PostgreSQL technologies for database management
	Participation in Data Collection	◦ Low level of community engagement when using HHGPS	◦ High level of community participation

4.3.2 Process for Solving Legal, Institutional and Spatial Integration Gaps between MAST tool and the Conventional System of Customary Land Registration

The previous subsection described the identified legal, institutional, and spatial integration gaps between MAST tool and the conventional system of customary land registration. This subsection describes the processes adopted to solve such gaps. The developed definition of integration in Section 2.7 used as a framework for analysis. Three processes of transformation, replacement and combination of the requirements used as the indicators of the adopted solutions.

4.3.2.1 Legal process

Table 4.5 summarises the processes adopted by LTSP to solve the integration gaps between MAST tool and the conventional system. Variables used to measure the dimension of gaps between the approaches are shown in the first column of the table. The identified gaps are shown in the second and third column of the table respectively. Also, the last three columns of the table present the adopted processes in respect of the replacement, transformation, and combination of the varied requirements between the approaches. There was not any process related to replacement taken to solve the differences in requirements in terms of registration procedures, registered tenure types and equal access to land. In the same column, there is a similarity in the adoption of the use of legal papers to replace the expensive and limited crested papers when solving legal mismatching regarding registration cost and documents. Similarly, the use of electronic signatures to replace the non-digital signatures was adopted to solve the gap between these approaches in term of registration time, cost, and documents.

Furthermore, the fifth column of the table shows the most adopted solutions to solve the gaps in the legal requirement associated with transformation or improvement processes. Except in equal access to land, the MAST technology solved most of the legal requirement gaps. Also, public awareness and sensitisation at the very grassroots level managed to solve the gaps associated with registration procedures, cost and ensuring equal access to land by different groups, including women, youths, people with disabilities and pastoral communities. Response from the LTSP implementers revealed that these were the targeted groups because in the project areas they were considered more vulnerable

Except for the registration of tenure types variable under the transformation process, the adopted solution appeared to solve most of the mismatching in other variables. In the last column of Table 4.5, only two main solutions related to the combination process were adopted. The combining village strategy and minimisation of the registration forms used to solve the gaps relate to registration time, cost, and documents. It was reported by the LTSP implementer who is also a government official that "*For instance, we had the so-called KUM 4-3-3 system to mean 4 villages in Kilombero, 3 in Ulanga and Malinyi Villages at a time. This was our keyway of saving time which has a direct impact on cost. I can tell you that whatever strategy we adopted for time minimisation had a direct impact on cost too"* (repressive from LTSP, 3rd March 2020). This strategy used essentially to speed up registration by also making sure that the approach becomes cost-effective.

Table 4.5: Legal Process for Solving Integration Gaps Between the MAST Tool and Conventionals System of Customary Land Registration

Variables	Gaps		Process (Indicators)		
	Conventional System	**MAST tool**	**Transformation**	**Replacement**	**Combination**
Registration Procedures	◦ Public awareness up to village level ◦ Are done manually ◦ Relay on the trained professionals	◦ Public awareness up to the hamlet level ◦ Are done digitally ◦ Training of paraprofessionals	◦ Public awareness and sensitisation strategy up to the hamlet level ◦ Capacity building through training of paraprofessionals ◦ Adopted an open-source MAST technology to record data digitally		
Registered Tenure Types and Interests	◦ It registers CRO only ◦ Derivative right (customary lease or sublease) ◦ Secondary rights are identified but not registered	◦ It registers CRO, specific tenure types and relations ◦ Base on first registration only ◦ Secondary rights are identified practically and registered	◦ Recordation of the specific tenancy and social tenure relation digitally ◦ Focused on first registration while preparing guidelines for the second registration ◦ Adopted the MAST tool to ensure mutual agreement in offsetting 3m each side for road access		
Registration Time	◦ Long time (40 (HRSI) to 55 (HHGPS) days excluding the legal time)	◦ Short time (25 days excluding the legal time)	◦ Adopted an open-source MAST technology connected with HRSI and GPS to record data digitally ◦ Adopted open-source QGIS and PostgreSQL technologies to save the data management purpose	◦ Adopting the use of legal papers ◦ Adopting the use of eSignature ◦ Automatic CCROs bulk printing ◦ Reduced time for public display from 30 to 14 days	◦ Adopting of combined Village strategy in Systematic Adjudication
Registration Cost	◦ High registration cost (US$ 13 to US$ 22)	◦ Low registration cost (US$ 7 to US$ 15)	◦ Adopted an open-source MAST technology linked with HRSI and GPS to record data digitally ◦ Public awareness and sensitisation strategies Project programme timing	◦ Use of paraprofessionals ◦ Adopting the use of e-Signature to replace the manual way of signing	◦ Adopting of combined Village strategy in Systematic Adjudication
Access to land	◦ Lack of practical implementation	◦ Practically enforceable	◦ CSO engagement strategy ◦ Public awareness and sensitisation strategies to women, youths, people with disabilities and pastoral communities ◦ Adopted gender strategy to educate women about land rights		
Registration Documents	◦ More documents signed manually and on special paper	◦ Minimised documents, signed electronically on ordinary papers	◦ Adopted the use of MAST tool which is linked with HRSI and GPS for data acquisition	◦ Adopting the use of legal papers ◦ Adopting the use of e-Signature	◦ Combining of Form No. 18 with the SARF No. 49

4.3.2.2 Institutional Processes

Table 4.6 summarises the institutional process adopted by LTSP to solve the integration gaps between the MAST tool and conventional system. The last three columns of Table 4.6 show the adopted mechanisms are about the replacement, transformation, and combination of requirements between the approaches. Except for one mechanism of adopting the MAST technology to replace the workflow actors, training and capacity building of local-level institutions, actors appear to solve most challenges related to institutional activities and levels of interaction under replacement processes. There were no other mechanisms adopted to replace the system requirements about institutional activities and capacity building.

The fifth column of Table 4.6 under transformation or improvement process appeared to have the most adopted mechanisms. Transformation through public awareness and capacity building of the local level institutions was adopted to solve mismatching in all institutional variables. Besides that, the MAST tool was adopted to solve the differences in two main aspects; *first*, to transform the way to capture spatial and non-spatial data digitally and *second,* to provide a digital platform for bulk CCROs approval and printing. While there are several numbers of the transformation solutions shown in the fifth column, less related to the combination process are reported.

Table 4.6: Institutional Process for Solving Integration Gaps between the MAST tool and Conventional System of Customary Land Registration

Variables	Institutional Gaps		Process (Indicators)		
	Conventional System	**MAST tool**	**Transformation**	**Replacement**	**Combination**
Institutional Actors	◦ Field team actors (5 people)	◦ Field team (4 people)	◦ Adopted the use of MAST tool to capture both spatial and non-spatial data digitally	◦ Adopted MAST tool to replace the workflows actors such as photographers, data entry clerks, and GIS experts.	
	◦ Office team involve more actors (6 people) ◦ No sensitisation and awareness-raising team	◦ Office Team involves a few actors (2 people)			
		◦ Addition of sensitization and awareness-raising team (4 people)	◦ Public awareness-raising and sensitisation strategy up to the hamlet level		
	◦ The disputes resolution team involve the structured legal actors	◦ The disputes resolution team involves the local and central level leaders	◦ Training of land dispute resolution institutions such as VLC, Ward and District Tribunals (WDTs)		◦ Land Disputes Resolution by involving political leaders
Institutional Activities	◦ Village level awareness-raising ◦ No training of the local level institutions ◦ Manual approval and printing of the CCROs	◦ Village and hamlet Level awareness-raising	◦ Adopted public awareness and sensitisation strategies up to the Hamlet level		
		◦ Training of the paraprofessionals	◦ Capacity building at the local level institutions through training	◦ Adopting the training of paraprofessionals	
		◦ Automatic CCROs approval and printing	◦ Adopted the use of MAST tool to automatic approval and		

Variables	Institutional Gaps		Process (Indicators)		
	Conventional System	**MAST tool**	**Transformation**	**Replacement**	**Combination**
			bulk printing of CCROs		
	◦ Trained professionals replace the local-level institutions	◦ Trained paraprofessionals perform the legally prescribed roles		◦ Training of the paraprofessionals to replace the expensive professionals	
Interaction	◦ It applies a top-down approach	◦ It applies a bottom-up approach	◦ Training of the local level institutions ◦ Improve the central level supervisory and facilitation role	◦ Adopting the training of paraprofessionals to improve community inclusion	
Capacity Building	◦ Limited capacity building through training to the local-level institutions	◦ The local and central level institutions undertake training	◦ Training of the local level institutions ◦ CSO engagement strategy ◦ Adopted public awareness and gender strategies		

4.3.2.3 Spatial Process

Table 4.7 recaps the adopted process to solve the spatial gap emerged between the requirements of conventional and MAST approaches. The fourth and last columns show that there was no mechanism adapted to solve the variation except for spatial standard only. The contestation in this variable was either adopting standard accuracy or purpose-based accuracy. Interview with LTSP implementer revealed that the project was purpose-based. It intended to achieve three main targets. The targets were "*to improve land administration institutions at the district and local level, issue CCROs in a participatory and cost-efficient manner and policy and institutional development strengthening"*. This is the reason why they opted the use of trained paraprofessional from amongst community members to replace the role of the trained professional. Also, to adopt the use of MAST technology to ensure time effective and cost minimisation.

While a few or none of the adopted solutions related to replacement or combination processes, the fourth column shows that most of the actions taken were transformative. MAST technology linked with HRSI and GPS is the adopted way of solving most of the emerging spatial gap, especially related to method, accuracy, types of the acquired data. Similarly, Town Planners' mindsets got transformed to allow MAST technology to design and regularise the village settlement areas at the same time.

"Let me give you an example; I am a villager owning this land. But this area is a developed urban centre. The land-use planning also proposed other out skirted areas for future development basing on the detailed settlement plan. These Town Planners are just coming with their urban approaches without considering the existing ownership. They just sketch here and there in boxes and applying the colours without considering existing ownership. I told them their work is only possible in the urban areas. In rural areas, they will end up mismatching the existing land rights and cause conflicts. The villagers will tell them that before their arrival, people were safe, but now, they want to create chaos. In the end, we reached consensus after a very long-time debate. They did not think if MAST can plan and regularise at the same time. We convinced them. We changed their mindset. We told them that we are not preparing a detailed settlement plan. We are doing regularization. We must respect the existing land rights" (a representative from LTSP, 03 March 2020).

The column also shows that, though the purpose of MAST is to focus on first registration, TRUST as an extension of the MAST tool is designed temporarily to solve two gaps under spatial improvement variables. It was noted during the interview; however, that TRUST has limitations because it can not bring any changes to the MAST database in case transaction is done on a land parcel. It only records the reported transactions

Table 4.7: Spatial Process for Solving Integration Gaps between the MAST tool and Conventional System of Customary Land Registration

Variables	***Differences in Spatial Requirements***		***Process (Indicators)***		
	Conventional System	**MAST tool**	**Transformation**	**Replacement**	**Combination**
Spatial methods	◦ Paper-based HRSI	◦ Digital-based MAST application linked with HRSI and GPS	◦ Adopted MAST tool which is linked with HRSI and GPS for spatial and non-spatial data capture digitally		
	◦ Requires HHGPS to identify hidden boundary features	◦ GPS is linked directly with the MAST app			
Spatial standards	◦ Requires trained technicians in data acquisition	◦ Trained paraprofessionals for data acquisition		◦ Trained in paraprofessionals to replace professionals	
	◦ Requires town planning standards in the developed village settlement areas	◦ MAST tool used to plan and regularise the developed village settlement areas together	◦ Town Planer's mindset transformation on the use of MAST tool in planning and regularisation parallel	◦ Adopted MAST tool to design and regularise the developed village settlement areas parallel	
Spatial Accuracy	◦ Low or no standard accuracy at all	◦ Require improved accuracy of ±1m	◦ Adopted the MAST tool boosted with Garmin Glo to improve spatial accuracy		
Spatial improvement or upgrading	◦ The focus is on the first and second registration	◦ The focus is on first registration only	◦ Designed the TRUST to manage second registration		
	◦ Transactions are manually managed	◦ Transactions are managed temporarily in TRUST			
Data Access	◦ Licensed ArcGIS technology for database management	◦ Open-source QGIS and PostgreSQL technologies for database management	◦ Adopted the open-source QGIS and PostgreSQL technologies for data management		
Participation in Data Collection	◦ Low level of community engagement when using HHGPS	◦ High level of community participation	◦ Trained the paraprofessionals to use MAST technology		

4.3.3 The Spatial, Legal and Institutional Advantages for Solving Integration Gaps between MAST Tool and Conventional System of Customary Land Registration

This section identifies the spatial, legal, and institutional advantages resulted from solving the integration gaps between the MAST tool and conventional system. It is organised in three subsections of legal, institutional, and spatial advantages.

4.3.3.1 Legal Advantages

Table 4.8 shows the advantages resulting from solving the legal integration gaps between the MAST tool and conventional system partly. It is organised in four columns of variables, processes, advantages, and emerged themes. The advantages are grouped into five themes, as shown in the last column of Table 4.8. The first theme reflects the technological advantages such as data loss solution, an increase of land recordation, TRUST designing, decreasing work repetition and paper works. It also shows that MAST tool was customised to meet the requirements of the VLA and VLR. The second theme which emerged most is about economic advantages resulting from fewer operation costs because of the reduction of working hours, cost for procuring equipment and working allowances. It is also associated with a reduction of time for data capture, processing, and registration. The other theme is social advantages which include the increase of the level of community participation trust, the security of tenure especially to women by 52.67% (individual occupation by 36% and joint occupation by 16.67%) and awareness-raising. The other emerged theme is an institutional advantage because of improving local-level institutions. The last theme is legal advantages which reflect the recordation of the right of way.

Table 4.8: Advantages of Solving the Legal Integration Gaps Between the MAST tool and Conventional System of Customary Land Registration

Variables	Process	Advantages	Themes
Registration Procedures	◦ Adopting of regularisation approach over planning approach in DVSP	◦ Minimised data loss resulted from mismatching of parcel and owner's information	**T**
		◦ Minimised operation cost	**E**
	◦ Carrying out of public awareness and sensitisation strategy up to the Hamlet level	◦ Increased level of community participation	**S**
		◦ Improved security of land tenure especially to women	**S**
	◦ Training of paraprofessionals to replace the expensive trained expert	◦ Increased level of community participation	**S**
		◦ Built community trust on the approach and outputs	**S**
		◦ Reduced allowance cost from the US $30 to US $13	**E**
	◦ Capacity building at the local level institutions through training	◦ Improved the local level institutions	**I**
Registered Tenure Types	◦ Extending of registration by also record specific tenancy and social tenure relation digitally	◦ Improved security of tenure by recording a total of 301,246 land parcels.	**S**
		◦ Increased security of land tenure especially to women	**S**
	◦ Focusing on first registration while preparing guidelines for the second registration	◦ Improved recordation from 0 to 301,246 land parcels	**T**
		◦ Designed of TRUST to temporarily manage transactions	**T**
	◦ Landowners agreement to offsets 3m each side for road access	◦ Enabled the secondary rights recordation	**L**
Registration Time	◦ Adopting the use of ordinary papers to replace crested papers	◦ It reduced registration time to 25 days	**E**
	◦ Adopting the use of an electronic signature to replace the manual signing		
	◦ Automatic CCROs bulk printing		

Variables	Process	Advantages	Themes
	◦ Reduction of time for public display from 30 to 14 days		
	◦ Adopting of MAST tool	◦ Reduced time for the recording of non-spatial data separately	**E**
		◦ Supplemented the time for identifying the hidden boundary	**E**
	◦ Adopt of open-source QGIS and PostgreSQL technologies	◦ Minimised time for data entry and processing	**E**
		◦ Improved data storage and management	**T**
	◦ Adopting of combined village strategy in Systematic Adjudication	◦ Minimised data loss resulted from mismatching of parcel and owner's information	**T**
		◦ Saved time and registration cost	**E**
Registration Cost	◦ Use of paraprofessionals to replace expensive trained experts	◦ Reduced the allowance cost from US $30 to US $13	**E**
	◦ Adopting the use of an electronic signature to replace the manual signing	◦ Reduced registration cost and time	**E**
	◦ Adoption of MAST tool	◦ Reduced allowances paid to the extra staffs	**E**
		◦ It saved cost for procuring HRSI, HHGPS and camera.	**E**
	◦ Active public inclusion and timing	◦ It reduced work repetition	**T**
	◦ Combining village strategy	◦ Reduced registration time and cost	**E**
Access to land	◦ CSO engagement strategy	◦ Raised public awareness and improved community engagement	**S**
	◦ Adoption of public awareness and sensitisation strategy	◦ Improved community engagement in planning and decisions making	**S**
	◦ Adoption of the gender strategy	◦ Increased women ownership in the land by 52.67%	**S**
Registration Documents	◦ Adopting the use of MAST tool	◦ Customised the tool according to VLA and VLR	**T**
		◦ Reduced time and cost for land registration	**E**
	◦ Adopting the use of ordinary papers	◦ Reduced time and cost for land registration	**E**
	◦ Adopting the use of e-signatures	◦ Reduced time and cost for land registration	**E**
	◦ Combining of Application Form No. 18 with the SARF No. 49	◦ Reduced time and cost for land registration	**E**
		◦ Reduced the volume of paper works	**T**

T=Technological ***E=Economic*** ***S=Social*** ***I=Institutional*** ***L=Legal***

Figure 4.9 shows the systematic adjudication status after solving the integration gaps between the conventional system and MAST tool. It shows that systematic adjudication was in more than 100 villages and recordation involved a total of about 300,000 land parcels. Furthermore, the figure shows that the Kilombero District had the highest number of adjudicated villages and recorded land parcels, followed by Ulanga and Maliniyi. It is the same as the number of CCROs printed, registered, submitted and collected. The figure, however, shows that the total number of recorded land parcels decrease from the printed CCROs to those collected by the landowners. According to the interview with the LTSP, MLHHSD and District Officials, the reasons for decreasing include the completion of project time, limited attendance because of little knowledge about the documents and forfeiture risk or lack of safe places.

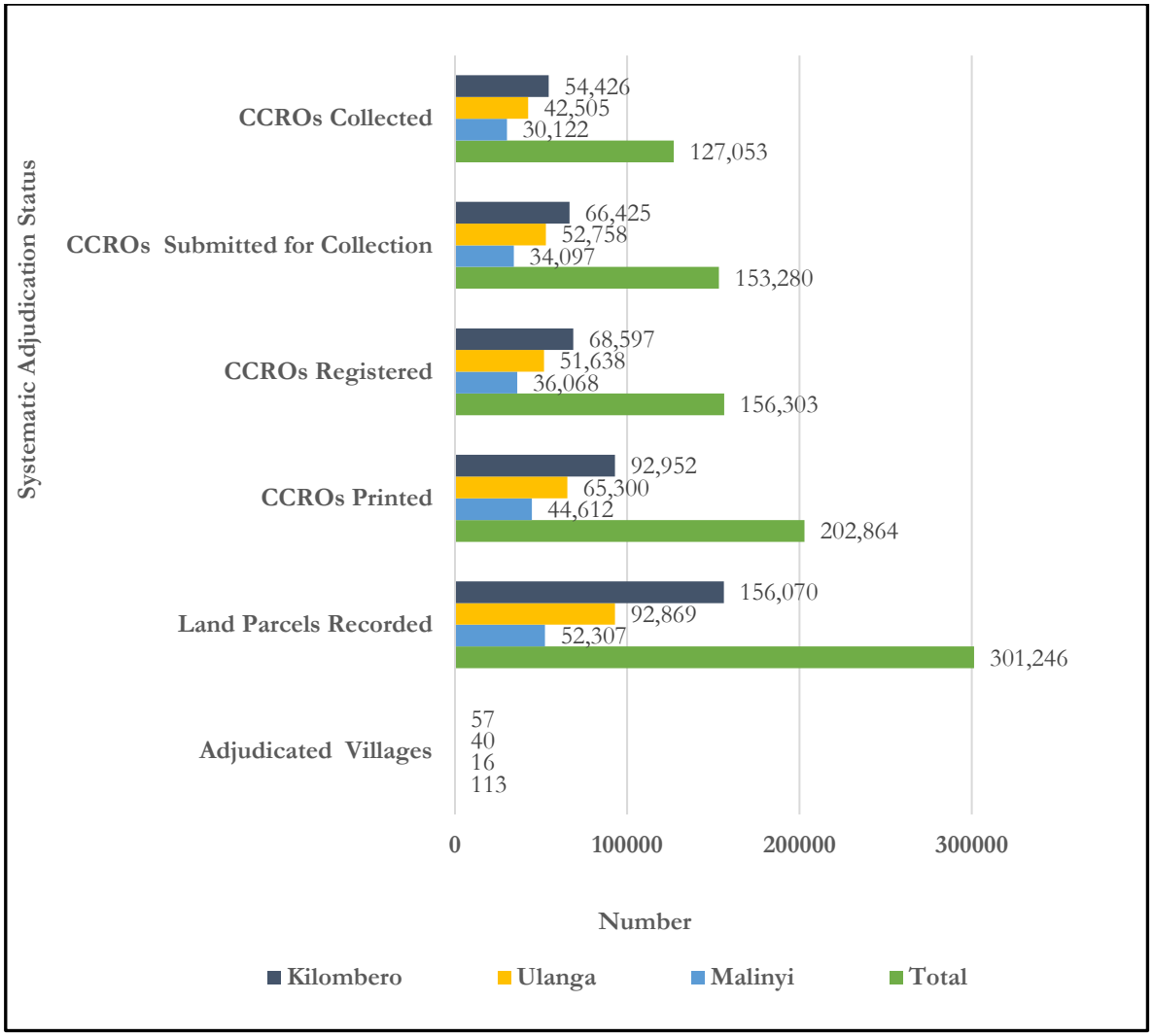

Figure 4.9: Systematic Adjudication Status After Solving the Integration Gaps between Conventional System and MAST Tool (Fieldwork data, 2020)

4.3.3.2 Institutional Advantages

Table 4.9 presents the advantages of solving institutional integration gaps between the MAST tool and the conventional system of customary land registration. The advantages are grouped into five themes, as shown in the last column of the table. The first theme is economic advantages, which include reduction of involved actors and their allowances from the US $30 to US $13 as well as shortened of time for data capture and registration of CCROs. The most emerged advantages are grouped into social themes mainly aggregated by the improvement of community participation and trust in registration activities, especially the marginalised groups and security of land tenure. Another theme is institutional, which includes improvement of the local level institutions. According to the LTSP implementers, awareness-raising and capacity building involved a total number of 164 villages. The active working population of about 327,825 people and a total population of 673,083 benefited. This also brought the legal advantages of decreasing the number of backlog cases filled in the VLC and WDTs. The last theme reflects the attained technological advantage of minimised of human errors in data collection.

Table 4.9: Advantages of Solving the Institutional Integration Gaps Between the MAST tool and Conventional System of Customary Land Registration

Variables	Process	Advantages	Themes
Institutional Actors	◦ Adopting of MAST tool to replace the workflows actors and capturing spatial and non-spatial data digitally	◦ Reduced the fieldwork and office teams from 5 to 4 and 6 to 2 people respectively	**E**
		◦ Minimised time for data capture from 30 to 14 days	**E**
		◦ Minimised errors in collecting data	**T**
	◦ Public awareness and sensitisation strategies up to the hamlet level	◦ Increased community participation	**S**
		◦ Improved security of tenure to women	**S**
	◦ Training of Land Dispute Resolution institutions such as VLC, WDTs	◦ The land dispute resolution institutions capacity building by 68%, i.e. Kilombero (38%), Ulanga (100%) and Malinyi (100%)	**I**
	◦ Land disputes resolution by involving political leaders	◦ Reduced the backlog of land cases	**L**
Institutional Activities	◦ Adoption of public awareness and sensitisation strategy at the Hamlet level	◦ Increased community participation	**S**
		◦ Improved security of tenure to women	**S**
	◦ Adopting the training of paraprofessionals to replace the expensive trained expert	◦ Increased community participation, particularly pastoralist, women, and people with a disability	**S**
		◦ Improved community trust on the approach and output	**S**
		◦ Reduced allowance cost from the US $30 to US $13	**E**
	◦ Capacity building at the local level institutions through training	◦ Improved the local level institutions	**I**
	◦ Adopt MAST tool to automatically CCROs approval and bulk printing	◦ Minimised registration time	**E**
Interaction	◦ Capacity building to the local level institutions through training to replace the expensive professionals	◦ Improved interaction of local levels institutions in performing their legally prescribed roles	**I**
		◦ Minimised central level intervention in Systematic Adjudication	**I**
	◦ Adopting the training of paraprofessionals to replace the expensive trained expert	◦ Increased community participation	**S**
		◦ Build community trust on the approach and outputs	**S**
		◦ Reduced allowance cost from the US $30 to US $13	**E**
	◦ Improve the central level supervisory and facilitation role to the local level institutions	◦ Speeded up the registration time	**E**
		◦ Minimised errors during data collection	**T**
Capacity Building	◦ Capacity building to the local level institutions through training	◦ Improved interaction of local levels institutions in performing their legally prescribed roles	**I**
		◦ Minimised central level intervention in Systematic Adjudication	**I**
	◦ Capacity building to the technical staffs	◦ Improved the supervisory role in the registration processes	**I**
		◦ Minimised errors in data collection and processing	**T**
		◦ Minimised time for registration	**E**
	◦ CSO engagement strategy	◦ Enhanced community participation	**S**
		◦ Enhanced capacity building	**I**
	◦ Adoption of public awareness and sensitisation strategy	◦ Increased community participation	**S**
		◦ Improved security of tenure to women by 52.67%	**S**
	◦ Adoption of gender strategy, especially to the disadvantageous groups	◦ Increased women ownership in the land by 52.67%	**S**

E=Economic ***I=Institutional*** ***S=Social*** ***T=Technological*** ***L=Legal***

4.3.3.3 Spatial advantages

Table 4.8 summarises the advantages of solving the spatial integration gaps between the MAST tool and the conventional system of customary land registration. The advantages appear in three main themes shown in the last column of the table. The first theme relates to technological advantages which include capturing both spatial and non-spatial data digitally, solving data loss problems and planning and regularisation of settlement areas at the same time. It also involves the temporary management of subsequent land transactions and data storage and access. The second theme is economic advantages related to the reduction of working hours, registration time and allowances. The final theme is social advantages which are predominantly the improvement of community participation and increase of trust on the process and output produced.

Table 4. 10: Advantages of Solving the Spatial Integration Gaps between the MAST tool and Conventional systems of Customary Land Registration

Variables	Process	Legal Advantages	Themes
Spatial methods	◦ Adopting the MAST too linked with RSI and GPS for spatial and non-spatial data acquisition	◦ Enabled capturing of spatial and non-spatial data digitally	**T**
		◦ Saved time for data collection from 30 to 14 days	**E**
		◦ Reduced the number of working hours	**E**
		◦ Reduced the number of working staffs,	**E**
Spatial standards	◦ Replacement of trained professionals with the trained paraprofessionals	◦ Enhanced community participation	**S**
		◦ Increased the community trust on the approach and output	**S**
		◦ Reduced allowance cost from the US $30 to US $13	**E**
	◦ Adopting the MAST tool to design and regularise the village settlement areas together	◦ Solved a data loss problem resulted from mismatching of parcel owners' and information	**T**
	◦ Town Planner's mindset transformation on the use of MAST tool in planning and regularisation	◦ Helped the adoption of MAST application to design and regularise the developed village settlement areas together	**T**
Spatial Accuracy	◦ Use the Garmin Glo technology to boost spatial accuracy	◦ Improved accuracy level to ±1m, which supplemented the requirements of the general and fixed boundaries.	**T**
Spatial improvement	◦ Designing of TRUST to manage second registration	◦ Enabled temporarily managing of land transactions	**T**
Data Access	◦ Adopting the open-source QGIS and PostgreSQL technologies for data management	◦ Facilitated spatial and non-spatial data storage and access at the DLO	**T**
		◦ Enabled data backup; thus, prevent data loss, assure history and security of data in case of any change	**T**
Participation in Data Collection	◦ Training of recruited paraprofessionals and VAC members from the village community themselves to use MAST technology	◦ Increased community participation	**S**
		◦ Increased community trust on the approach and outputs	**S**
		◦ Reduced allowance cost from the US $30 to US $13	**E**

T=Technological ***E=Economic*** ***S=Social***

4.4 Constraints for Solving the Integration Gaps Between the MAST Tool and Conventional System of Customary Land Registration

This section explains constraints, causes and solutions adopted to address the legal, institutional, and spatial integration gaps between the MAST tool and conventional system of customary land registration. The section is organised in three subsections. Subsection 4.4.1 explains the types of legal, institutional, and spatial constraints for solving the integration gaps. Subsection 4.4.2 explains the causes of the constraints. Finally, Subsection 4.4.3 explains the adopted solution to address the explored constraints.

4.4.1 Types of Legal, Institutional and Spatial Constraints for Solving Integration Gaps between MAST Tool and Conventional System of Customary Land Registration

Table 4.11 presents the legal, institutional, and spatial constraints of solving the integration gaps between MAST tool and the conventional system of customary land registration. The third column of the table shows the explored legal, institutional, and spatial constraints. The legal constraints can be generalised into two main types. First, is about lack of clarity of registration procedures because of centralisation of mandates as well as long and expensive processes. Response from the informants and evidence shown in MLHHSD (2019b) revealed that mandates to either initiate or approve the preliminary procedures of customary land registration are left upon the Director of Survey and Mapping (DSM), Commissioner for Lands (CL) and NLUPC. The DSM, CL and NLUPC initiate and approve the VBS, CVL and VLUP respectively. The second challenge is about the land-use conflicts between landowners; farmers versus livestock keepers; farmers and pastoralists versus Kilombero Game Controlled Area (KGCA); and villages. Response from informants have revealed that there was a backlog of about 1,208 individuals land conflict cases filed at the tribunals, and 14 villages in Malinyi District had a boundary conflict with KGCA. According to Sections 7 and 48 of the VLA, the CVL and CCRO can not be registered if the boundaries and interests in land are not clearly distinguished and agreed between interested parties.

The third column of Table 4.11 shows an explored institutional constraint when solving institutional gaps between conventional and MAST approaches. It relates to the delay in solving land-related conflicts. It is a legal mandate to make sure that the registered land parcels are free from any encumbrance. According to Sections 7 and 48 of the VLA, the CVL and CCRO can not be registered if the boundaries and interests in land are not clearly distinguished and agreed between interested parties. The delay in solving the outstanding conflict affected the undertaking of the land registration directly. A representative of LTSP who is also a government official stated that *"Several numbers of land conflicts were already registered in various tribunals. We can say that it is because the land in that region is valuable for farming. It has accommodated a lot of native and immigrant landowners. That is why many conflicts are also reported. If these conflicts are not solved on time, it affects the systematic adjudication process. So, you need to skip the parcels until the resolution is achieved" (a representative from LTSP 11th March 2020).*

The explored spatial constraints are also shown in the third column of Table. 4.11. Based on the analysis the types of spatial constraints can be generalised into time spent in data processing, the complexity of the technology, user acceptability and perspective; and the limitation of which the MAST technology can be used in the preliminary procedure of VBS which require high positional accuracy. Response from informants has revealed that the initial period of adopting MAST technology, these kinds of constraints kept repeating. However, the improvements were made as more solutions were developed.

4.4.2 Causes of the Constraints for Solving the Integration Gaps Between the MAST tool and Conventional System of Customary Land Registration

The fourth column of Table 4.11 presents the causes of the constraints when solving the integration gaps between MAST tool and the conventional system of customary land registration. It shows that the legal causes of the constraints were related to the limitations of the customary land registration legislation. The

shortage of land for farming and grazing, which causes land conflicts between different land users, brought another cause of constraints for solving integration gaps. Also, the table shows that various institutions do the land disputes settlement in Tanzania. These institutions have overlapping mandates and roles in decision making, which causes a delay in resolving land conflicts. The spatial causes reflect the precision in collected data or reliability of the data provided by the landowners. Aside from that, because the technologies at the initial stage were not customised well, they brought complexity to the users and a data loss problem. A representative of the LTSP said that "*So, later on, we shifted to QGIS even though it became difficult for most of the technicians to operate"* (LTSP implementers 3rd March 2020). Another informant from the LTSP said that "*in the beginning, we had a challenge with MAST application. When we wanted to upload the field data into a server, we realised that the application could not store data of high capacity because landowners' photos were lost"* (a representative from LTSP, 8th March 2020). Besides that, the professional standards brought a challenge on the acceptability of MAST technology at its initial stage to undertake the village settlement planning and carryout VBS. According to the informants, it was noted, however, that the MAST tool is not accepted to carry out VBS.

4.4.3 Adopted Solution for the Constraints of Solving the Integration Gaps Between the MAST tool and Conventional System during Customary Land Registration

The last column of Table 4.11 summarises the adopted solution for addressing the constraints of solving the integration gaps between MAST tool and the conventional system of customary land registration. The table shows that the adopted solution corresponds to the types and causes of constraints explained in the previous subsections. It shows that there were immediate and proposed long term solutions for legal and institutional constraints only. Besides, it shows that most of the spatial constraints were solved instantly. At the same time, the legal limitations were proposed for amendment.

LTSP ensured the decentralisation of mandate to the local level under the District Land Office (MLHHSD, 2019b). They also promoted participatory land-use planning preparation by improving the field supervision in all preliminary procedures. However, these were all done without the amendment of the laws and regulations. Response from the informant revealed that the program ensured a strong relationship between the implementers, local, and central level authorities. Therefore, it simplified the undertaking of the complex procedures, although the amendment of the laws to decentralise mandate to the District Councils as well as to allow the undertaking of VBS using FFP methods are still proposed. Through training, the disputes settlement institutions managed to solve about 723 land-related cases filled at the DLHT. Besides that, the local and central level administrative leaders, including politicians, were involved in mediating the disputes amicably a situation that minimised the number of conflicts. The solution to spatial constraints can be generalised into the improvement of the training and capacity building to the technology users and professionals to solve the merged challenges as well as change perception about the innovative technologies.

4.5 Summary of the Results

In summary, there are similarities and differences in the spatial legal and institutional requirements for customary land registration using the conventional system and MAST tool. The similar legal requirements include the use of statutory laws for customary land registration. Also, the approaches show commonalities in the preliminary procedures, meetings, public notice, and legal recognition of equal access to land (Figure 4.1). In contrast, the approaches differ in terms of the involved registration procedures activities. Also, the difference is in the required tenure types and rights as well as registration time, cost, forms, signature, and papers (Table 4.1). Indeed, the institutional requirements have shown similarity in the use of legally prescribed actors. However, these approaches have shown differences in the required operating actors, the level of interactions and capacity building to the local-level institutions (Table 4.2). Spatially, while these approaches are similar in the use of the general boundary and mechanism for paper-based and digital data access, the differences are on the use of HRSI and HHGPS methods in data collection, required standards, accuracy, registration and management of customary land transactions. Also, a difference in the level of community participation (Table 4.3).

Moreover, the legal, institutional, and spatial differences reflect the identified integration gaps between the two approaches for customary land registration shown in Table 4.4. Various solutions related to the process of either replacing, transforming or combining of the varied requirements were adopted to addressing these gaps. *Legally*, the adopted solutions reflect five themes related to social, technology, legal, economic and institutions, for instance, the public awareness and sensitisation strategies: combining of villages and registration forms (Table 4.5). *Institutionally*, it includes three themes of technology, social and institutional solutions, which include the training, and capacity building of the local-level institutions and solving of land disputes amicably (Table 4.6). *Spatially*, it reflects two themes of technological and institutional solutions, e.g. the adoption of open-source MAST technology, the use of trained paraprofessional in data collection, changing of Town Planners' mindset and designing of TRUST (Table 4.7). In solving the legal, institutional, and spatial integration gaps, several benefits could be expected. *Legally* it reflects five themes of technological, economic, social, institutional, and legal advantages, e.g., less operation cost, an increase of the level of community participation, improving the local level institutions and recording of the right of way (Table 4.8). *Institutionally*, it reflects five themes of economic, social, institutional, legal, and technological advantages, for instance, the reduction of workflow actors and their allowances, increase of community participation and the improvement of the local level institutions. (Table 4.9). *Spatially*, it reflects three themes of technological, economic, and social advantages, e.g. capturing of both spatial and non-spatial data digitally, reduction of working hours, TRUST designing, and improvement of community participation (Table 4.10).

Despite the adopted solution and realised advantages, various constraints for solving the integration gaps were explored (Table 4.11). The legal constraints reflect the limitations in the registration laws and regulations, severe land conflicts between various users which were slowly resolved, and prolonged data verification and validation. Also, the complexity of the MAST tool in data collection and the acceptability and perceptions of the innovative technologies by professionals limited its application in VBS. The constraints were caused by the legal weaknesses, pressure on land between various users, the quality and reliability of the collected data, the extent of which the technology for data collection was calibrated and practically accepted by the users. The adopted solution to solve the constraints included improvement of field supervision, administrative resolving of land disputes and training of the local and central-level actors. Also, MAST technology design was customized to accommodate the challenge of data loss. This went together with the establishment of the backup server. These results are discussed further in the next section.

Table 4.11: Constraints for Solving the Gaps Resulted from the Integration of MAST Tool into the Conventional System of Customary Land Registration

Indicator	Variables	Types (constructs)	Causes (constructs)	Adopted/Proposed Solution (constructs)
Legal Constrains	Registration Procedures	The centralisation of VBS, CVL and VLUP approval mandate.	Provisions of the Land Survey Act, VLA and LUPA to centralise the approval process	Decentralised the legal mandate, process, and responsibilities in land registration at the local level
				Proposed the amendment of the Survey Act and VLA empower District Authorities with approval mandate
		Prolonged and expensive customary land registration procedures	Bureaucracy provided by the VLA on a mandate to carryout VBS, CVL, and VLUP before registering customary land	Promoted participatory VBS and VLUPs preparation to avoid land conflicts
				Improved field supervision and oversight by providing material and technical support
				Proposed the use of the improved MAST technology to carry out VBS and VLUP
				Proposed amending of the Survey Act and VLA to empower District authorities with approval mandate
	Registered Tenure types	Outstand land-related disputes	Shortage of land for farming and grazing	Improved facilitation of VLC. and WDT to determine/dispose of backlog cases
				Resolved land disputes amicably
				Participatory land-use mapping
	Registration time	Long time for public display (Objection)	30 days legal requirement of Section 54 (7) of the VLA for Public Display (Objection)	Negotiation with the village communities and MLHHSD to reduce the time to 14 days
Institutional Constraints	Institutional Activities/Roles	Delay in land dispute resolution	Overlapping of roles and mandates among institutions for land disputes settlement	Capacity building of VLC, WDT.
				Resolved land disputes amicably
				Proposing the harmonisation of laws to emphasise coordination
Spatial Constraints	Spatial methods	Prolonged time for data verification and validation	The precision in spatial data collection	Improved training to the par surveyors on the proper use of MAST technologies
				Improve fieldwork supervision
			Provision of wrong information by landowners	Contacted the conflicted parties and VAC members to resolve the problem
				Ensure active community participation
		The complexity of open-source software and technologies	Complex designing which do not suit the specific context and users.	Improved training of the GIS experts on the proper use of MAST tool during data collection.
				Improved of MAST initial design
		Non-spatial data loss, e.g. photos and videos when adopting the MAST tool	The incapable initial design	Improved initial MAST design.
				Establishment of backup server to upload the collected data immediately after the fieldwork
	Spatial standards	The unacceptability of MAST tool by professionals	Rigidity on accuracy than purpose standards	Improve training and capacity building about innovation and FFP land administration
	Spatial Accuracy	The demand for high accuracy (±15cm) in VBS	Legal requirement	The proposed amendment of the Survey Act
				Proposed the improved MAST version linked with GPS to carry out VBS.

5.0 DISCUSSION OF THE RESULTS

5.1 Introduction

This chapter discusses the results of the integration of the MAST tool into the conventional system of customary land registration in Tanzania in connection to is the known requirements in the literature in Chapter Two. The chapter discusses the three sub-objectives based on three dimensions of the requirements of the conventional system and MAST tool in the registration of customary land, the process for solving the integration gaps between the approaches and the constraint of solving the gaps. Section 5.2 discusses the requirements of customary land registration using the conventional system and MAST tool to address Sub-Objective One. Section 5.3 discusses the adopted process to solve the integration gaps between the approaches to address Sub-Objective Two. The constraints of solving the integration are discussed in Section 5.4 to address the Sub-Objective Three.

5.2 The Comparison of the Requirements for Customary Land Registration Using Conventional System and MAST Tool

This section discusses the obtained results regarding the comparisons of the requirements for customary land registration in Tanzania using the conventional system and MAST tool in connection to the literature. Registration of customary land in the conventional system and MAST tool requires similar state laws and regulations. The legal basis for customary land registration is the VLA and VLR together with their supplementing laws governing the preliminary procedures for VBS, CVL and VLUP. The registration of customary land using similar state laws, aside from simplifying the integration between the two approaches, responds to what FAO (2010) and AU et al. (2010) suggested that the systems need to protect customary land rights to ascertain the security of land tenure. However, there is a concern of whether the customary land registration superstructures are still relevant in the formal and democratically elected leadership, a discussion which is also raised by Alananga et al. (2019). Also, the reported limitations of the laws in fostering preliminary procedures of VBS, CVL and VLUP may be contrary to what FAO (2010) and Mburu (2017) suggested on simplicity and cost-effectiveness of the process, a challenge that not only widens the integration gap but also makes the registration processes more protracted and expensive. The impact of the laws in the registration procedures and cost can also be reflected in Table 4.1 and Figures 4.3 and 4.6, which shows the increase in registration time because of complying to the legally required activities such as time for public display and public notice.

In Figure 4.1, both approaches are similar in conducting village council meetings and notification of the public about the intention to begin the systematic adjudication. These activities provide a more feasible solution by raising awareness to the local leaders and the entire community about the purpose of registration and include them in the systematic adjudication process, as suggested by Sundet (2005). It also responds to what Williamson et al. (2009) and Arko-Adjei (2011) suggested about ensuring good governance, seeking legitimacy and credibility of undertaking the registration. There are also the additional activities and changing of the ways of operationalising the registration procedures in the MAST tool. The additional activities are public awareness-raising to the hamlet level as opposed to the conventional system, which ends at the village level and training of the paraprofessionals to replace the trained land survey technicians and land officers. These activities imply that the MAST tool is pro-poor and has improved the registration system by offering FFP solutions which will engage more people from the grassroots, the achievement that will have impact on their socio-economic lives (UNHABITAT, 2012; Zevenbergen, Augustinus, Antonio, & Bennett, 2013). Besides that, with the differences in the procedures due to the additional activities, it increases the uncertainty of integrating these approaches which demand more integrative solutions, as Shvaiko & Euzenat(2008) clarified.

Table 4.1 has shown similarity in registering CCROs for an indefinite time. However, there is a difference between the two approaches in the identification and recordation of specific tenancy types and social tenure

relations. These findings imply that there is integration between the approaches which implies the security of customary land tenure as suggested by Simbizi et al. 2014 about recognition of people's land rights as well as leaving them to enjoy them regardless of duration. Recordation of specific tenancy types and social tenure relations by MAST tool suggests two things. First, it is about widening the integration gaps between the two approaches (Rutakyamirwa, 2002; Shvaiko & Euzenat, 2008). The second thing implies that the registration cut across the continuum of rights, where multiple relations and specific tenure types are recorded (Figure 4.2). It suggests that the tool is inclusive by also ensure certainty of land rights possessions between parties or members of the family, a situation that has impacts on their security of tenure (Zevenbergen et al., 2015). It also implies that the system is pro-poor as it intended to ascertain people's ownership rights that will improve their security of land tenure (Augustinus, 2010; Simbizi et al., 2014; UNHABITAT, 2008; Zevenbergen et al., 2013). However, findings show that the Tanzania guidelines for registering customary land transactions are lacking, a challenge that limits the extent of enjoying the rights, especially in the economic aspect. The absence of the guidelines may not comply to the suggestions given that the land registration systems should be able to accommodate economic forces (Arko-Adjei, 2011), improve the livelihoods (AU et al., 2010), and alleviate poverty (UNHABITAT et al., 2012).

Table 4.2 reveals the reduction and addition of actors in the MAST tool compared to the conventional system. It shows that the actors of field and office teams were replaced by the MAST technology, which can collect both spatial and non-spatial data digitally. This transformation reduced the number of involved actors. Besides that, there are additional actors for sensitisation and public awareness-raising. Reduction of actors has direct impacts on registration costs and community participation. Although the new actors imply costs, their roles are of enormous importance in engaging people, improving local-level institutions and empowering the marginalised groups as suggested by Arko-Adjei (2011) Simbizi et al. (2014) and Williamson et al. (2009). Similarly, the capacity building is done in the MAST tool only. However, this may not be a challenge because the conventional system has the trained professionals over a long period whereby according to (FAO, 2010), their supervision and facilitation roles, including capacitating the local level institutions, should not be left aside.

Table 4.3 has shown the commonalities of the conventional system and MAST tool in using HRSI and HHGPS as the methods for data collection. However, there is a difference in the way these methods are applied. In conventional systems, the imagery is paper-based. The HHGPS and other survey techniques are applied to uncover the hidden boundary features or provide the actual survey. It is unlike the MAST tool where both the HRSI and GPS are directly linked to the tool to capture spatial and non-spatial data simultaneously. Although both methods can offer FFP solutions as suggested by Enemark et al. (2016), and McLaren et al. (2018), the MAST tool is cheaper and more time effective because it is technology-intensive and also supplements the fixed survey requirements. Also, both approaches rely on the general boundaries to meet the requirements of Regulation 69 of the VLR and upholding the customary way of identifying the land parcels. However, in Tanzania, there is a challenge of boundary disappearance during dry season or flooding, which causes disputes among landowners. It implies that the approaches offer realistic solutions in delineating the boundaries of the customary land as recommended by Enemark, Bell, Lemmen, and McLaren (2014b); Enemark et al. (2016); McLaren et al. (2018); and Zevenbergen et al. (2015). Also, legalising the general boundaries, which also uphold the customary way of boundary identification infers that the approaches have struck a balance between formal and customary practices in response to what FAO, (2010) and UNHABITAT (2008) recommended. However, the challenge of the disappearance of these boundaries because of the stated reasons suggests that this is not a sufficient way of boundary delineation, therefore, supplementing it with the improved measurements is of enormous significance. The challenge of boundary disappearance also responds to the disadvantages of general boundaries identified by Zevenbergen (2002). The next section discusses the results of the identified integration gaps, adopted processes to address the gaps and the realised advantages.

5.3 The Integration Gaps between MAST Tool and the Conventional System of Customary Land Registration

This section discusses the results of the identified integration gaps, the adopted ways to solve the gaps and the realised advantages with relevant literature. However, the previous section discussed some of the integration gaps in terms of the emerging differences; therefore, they may not appear in this discussion. Figure 4.1shows that approaches differ in the way of undertaking the registration procedures. The digital way of operationalising the procedures in MAST tool even though it has widened the integration gaps it suggests that the approach is cheap, time effective and has brought a technological way of customary land registration. It also implies that the tool entails improving the formal system by replacing the existing way of registration with technology. This improvement responds to the definition of integration and what Rutakyamirwa (2002) and Shvaiko & Euzenat (2008) recommended about the goal of integration. Table 4.1 shows that MAST tool has also brought differences in registration by being time effective and providing affordable methods for data collection, processing, and management compared to the formal system. This difference suggests that the tool managed to provide attainable and affordable methods; however, the integration gap. It, therefore, induces the integration of the tool into the formal system to address the long time challenges of bureaucratic and expensive methods of land registration. The equal access to land by the marginalised groups, especially women, has revealed a difference whereby in the formal system this right is legally recognised but practically cannot be realised compared to MAST tool. Though it reflects the existence of legal security of tenure, it does not respond to what Simbizi et al. (2014) and van Gelder (2010) say on how the legal, de facto and perceived rights need to influence each other.

Institutionally, the addition and reduction of the number of actors and activities as discussed earlier widened the requirements gap between the approaches. Table 4.4, together with Figures 4.7 and 5.8, have also shown a difference in the level of interactions between various institutions for customary land registration. The gap in the formal system predominantly reflects the top-down approach, unlike the bottom-up one adopted by the MAST tool, which enhanced the participation and interaction of the local-level institutions during systematic adjudication. The top-down approach may not provide a useful and practicable land administration system compared to the bottom-up approach. It, therefore, suggests more integrated approaches similar to what Easterly (2008) thought. Aside from the differences discussed in the previous section. Table 4.4 has revealed a gap as regards the requirements between the approaches. The gaps reflect the difference in spatial standards. Specifically, the contestation is about relying on the use of the qualified surveyors and land technicians under the conventional system or trained paraprofessionals under MAST tool. The other spatial gaps were on the level of spatial accuracy and community participation in data collection. Jacoby (2011) defines integration as the processes of combining, replacing, transforming the "diverse" procedures, system, and the structures of the organisation. The identified integration gaps between MAST tool and the formal system partly responds to this definition in terms of diverse requirements which suggests the the more integrated approaches. These variations also respond to what Shvaiko & Euzenat (2008) considered as heterogeneity problems which are subject to integration. Jacoby has emphasised the successful integration to be that which improves the earlier situation of the existing system.

Several solutions can address the integration gaps between MAST tool and the conventional system. The solutions can be generalised into social, institutional, and technological (Tables 4.5, 4.6 and 4.7). The social solutions include public awareness, sensitisation, CSOs engagement and adoption of gender strategy. In all tables, the solutions reflect the requirements of the MAST tool, which transformed the formal system of customary land registration. The fact that MAST tool requirements used to transform the formal system responds to the definition developed in Section 2.7, which implies that the two approaches are integrated. Besides that, the adopted social solutions imply that the registration was done to the informed community, a situation that influences their participation and the overall legitimacy of the adopted approach (Simbizi et al., 2014; Sundet, 2005; UNHABITAT et al., 2012). Besides, the involvement of the CSOs suggests that the system manages to accommodate the role of the public and private sector in the registration of customary

land as also suggested by UNECE (1996) and Williamson et al. (2009). However, it still requires empirical facts from the communities themselves evidencing on the effectiveness of these adopted social solutions. The institutional solutions infer the replacement of the professionals by the paraprofessionals, training of the local and central-level institutions, including those responsible for land dispute resolutions, administrative solving of the land-related conflicts and professional's mindset transformation. In Tables 4.5, 4.6 and 4.7, all these solutions reflect the requirements adopted by the MAST tool during the registration of customary land. The solutions respond to the developed definition of integration. They also suggest that the tool was participatory (Enemark et al., 2016; Zevenbergen et al., 2015) the local-level institutions were improved (Williamson et al., 2009) and offered FFP solution by solving the land-related conflicts amicably (Enemark et al., 2014b, 2016).

The adopted technological solution was the use of open-source MAST application and other GIS technologies (QGIS and PostgreSQL) for data processing, management, and dissemination. Results in Tables 4.5, 4.6 and 4.7, show that these technologies addressed most of the identified legal, institutional, and spatial gaps. The technological solution implies that the MAST tool is integrated into the formal system by transforming the formal way of registering the customary land. Also, the use of open source technologies suggests a cheap way of solving the registration challenges, although it can associate to challenges relating to data security. All the technological transformation responds to the McLaren et al. (2018) suggestions about investing on open-source technology to address the challenge of expensive equipment and Enemark et al. (2016) who emphasised the sustainability of ICT approach.

There are several advantages for solving the integration gaps between MAST tool and the conventional system of customary land registration. The advantages can be generalised into economic, institutional, social, technological, and legal advantages. Tables 4.1, 4.8, 4.9 and 4.10, shows that the economic advantages include the reduction of registration cost from the US $22 to $7 per CCROs and registration time from 55 to 25 days per village. It implies that integrating the innovative land tool into the formal system provides a cheap and time-effective way of registering customary land which complies with FAO (2010) recommendations. Besides that, the institutional advantages include improvement of local and central-level institutions, an increase of the level of interactions and minimisation of central level intervention. These advantages have implications on efficiency and coordination between central and local-level institutions (Easterly, 2008; FAO, 2010; Williamson et al., 2009). The social advantages infer the increase of the level of participation, improvement of security of tenure and built community trust on the approaches and outputs. The elements of social and technological advantages, as discussed in section 5.2 above. However, there is a need to uncover whether the government can achieve the same advantages attained when integrating MAST tool into the formal system in the absence of donors' support. Also, a discussion is whether the realised social advantages of security of tenure reflects the three tripartite of legal, de facto and perceived tenure and these can influence each other as suggested by Simbizi et al., (2014) and van Gelder (2010).

5.4 The Constraints for Solving the Integration Gaps between MAST tool and Conventional System of Customary Land Registration

There are constraints for solving the integration gaps between MAST tool and the conventional system of customary land registration in Tanzania. The constraints reflect the centralised mandates on preliminary procedures; land-use conflicts; prolonged data verification and validation and the acceptability and perceptions of the tool by professionals. The legal limitations, pressure on land between various users, the quality and reliability of the collected data, the extent of customisation and acceptance of the tool caused the constraints. The constraints suggest that when integrating customary land registration systems, it is necessary not to overlook the role of central authorities because of their roles in registration procedures. Also, the centralisation of mandates, aside from affecting integration when carrying out registration at the local level has impacts on registration time and cost as well as governance of customary land. It is similar to what North (1994) already emphasised about the position of institutional arrangements in influencing the transaction costs. Also, Salifu (2018) observed the same constraints when enforcing innovation in land

documentation through Landmapp in Ghana. Also, Alananga et al. (2019) identify Tanzania to have the dispersed institutions responsible for land administration with the overlapping mandates, which complicate the registration of land rights. The adopted solution included improvement of field supervision, administrative resolving of land disputes and training. Also, MAST technology was customized to accommodate the challenge of data loss. This went parallel with the establishment of the backup server. The use of administrative and political leaders in the mediation of land disputes provided more FFP solution because it prevents the use of tribunals and court systems which have mandates to arbitrate instead of mediating (Enemark et al., 2016).

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This study aimed to explore how MAST integrates into the conventional system to register customary land registration in Tanzania. This chapter presents the conclusion and recommendations for further study. The conclusions are organised concerning the research objectives.

6.2 Conclusion

6.2.1 To explore the Integration of MAST Tool into the Conventional System of Customary Land Registration

The main objective of this study was to explore how the MAST tool integrates into the convectional system of customary land registration in Tanzania. The LTSP, a government project which adopted the MAST tool to register the customary land in the rural areas of Kilombero, Ulanga and Malinyi Districts all in Morogoro Region, was used as a case study. It was done through document analyses and semi-structured interviews to the land professionals to compare the legal, institutional, and spatial requirements of registration between the two approaches, explore the integration gaps and constraints for addressing them. This study found that innovative land tools can integrate into the conventional systems of customary land registration by either transforming, replacing or combining the requirements between the approaches. The transformation involved the collection and management of both spatial and non-spatial data using open-source GIS technologies, ensure capacity building to the local and central-level institutions and awareness-raising at the grassroots level. The replacement included replacing of the trained professionals with community recruited paraprofessionals, non-digital with digital signatures, and special crested papers with ordinary papers. The combination process involves joint village strategy during systematic adjudication, engaging administrative local and central leaders in land disputes settlements resolutions and combining of registration forms. The processes solved the emerging challenges of prolonged registration time, expensive costs, weak and uncoordinated local-level institutions, non-participatory approaches, unequal access to land and insecure land tenure. However, integration could not be done fully because of the mismatch in requirements between the approaches. The gaps were solved; however, the constraints emerged. Despite integration, the questions are whether the formal Tanzanian laws are sufficient to register customary land rights; the same realised benefits can still be achieved and operationalised without donors' support, and integration can be done with other forms of tenure aside customary occupancy. Besides that, the effectiveness of the adopted solutions to solve the integration gaps between the innovative land tools and the formal systems still demand empirical evidence from the community members themselves. Also, a remaining question is whether the realised benefits have influenced changes in individual's social-economic lives and local-level institutional operations and performances.

6.2.2 To Compare the Requirements of Customary Land Registration using the Conventional System and MAST tool

There are similarities and differences in the legal, institutional, and spatial requirements for customary land registration using the conventional system and MAST tool. The legal requirements are similar in the registration laws, preliminary procedures, village council meetings, issuing of a public notice, and legal recognition of equal access to land. Institutionally, they are similar in the required legally prescribed actors. Spatially, the approaches are similar in relying on the general boundary principle and mechanism for paper-based and digital data access. In contrast, the legal differences are in several procedures and manner to carry out registration; recordation of specific tenancy types and relations; handling of secondary rights. Also, registration time, cost, recognition, and enforcement of equal access to land, and documents used differ between the two approaches. Institutionally, the differences are in the involved actors, level of interactions and undertaking of capacity building. Spatially, the gaps involve the use of HRSI and HHGPS as data

collection methods, standards, accuracy, management of customary land transactions, and the level of community participation in data capture.

6.2.3 To identify the gaps of integrating the MAST tool into the conventional systems of customary land registration

Through the comparison of the requirements between the conventional system and MAST tool, differences were identified. The differences were regarded as integration gaps. The social, institutional, and technological solutions used to solve integration gaps between the two approaches. The social solutions include public awareness, sensitisation, adoption of CSOs and gender strategies. The institutional solutions reflect the replacement of the professionals with paraprofessionals, training of the local-level institutions, administrative solving of the land-related conflicts and professional's mindset transformations. The adopted technological solutions involved the use of open-source MAST application and other GIS technologies for data collection, management, and dissemination. With the solutions, several advantages were realised. The advantages reflect economic, institutional, social, technological, and legal themes. The economic theme includes the reduction of registration cost from the US $22 to $7 per CCROs and registration time from 55 to 25 days per village. The institutional theme includes the improvement of the local-level institutions central level supervisory and facilitation roles as well as increasing of the local level interactions. The social theme includes the increase of the level of participation, improvement of security of tenure and built of community trust on the registration process and outputs. The technological advantages include improvement of land recordation, data storage and management and level of accuracy. Other advantages are designing of TRUST to manage land transactions temporarily and customisation of the MAST tool to meet VLA and VLR requirements for systematic adjudication and CCROs registration and issuance, however, the existed constrains.

6.2.4 To Explore the Constraints for Solving the Integration Gaps between the MAST Tool and Conventional System of Customary Land Registration

There are constraints for solving the integration gaps between MAST tool and the conventional system of customary land registration. They include a centralised mandate on preliminary procedures; land-use conflicts; prolonged data verification and validation and the acceptability and perceptions of the tool by professionals. The legal weaknesses, pressure on land between various users, the quality and reliability of the collected data, the extent of customisation and acceptance of the MAST tool caused the constraints. The adopted solution included improvement of field supervision, administrative resolving of land disputes and training. Also, MAST technology was customized to accommodate the challenge of data loss. This went parallel with the establishment of the backup server. However, the constraints related to the ambiguities of the laws are proposed to be amended.

6.2 Recommendations

This study explored the integration of innovative land tools into the conventional systems of customary land registration in Tanzania. The findings of this study provide useful insights to the practitioners and policymakers on how the tools can integrate into the conventional system of customary land registration to scale up a low rate of land registration. However, to have fully integrated approaches, addressing the explored constraints which required long-term solutions, including amendment of the laws and regulations to accommodate the FFP solutions is of enormous importance. This study further recommends that because the focus was on the integration of MAST tool into the conventional system of customary land registration, another empirical study using similar methods can be done to explore the integration of various innovative land tools into other forms of tenure aside the customary right of occupancy in Tanzania. Also, because land administration differs based on specific country context, a similar study can be done in other countries to explore the integration of the tools into conventional systems. The studies will help to broaden the understanding of the integration of the innovative land tools into conventional systems in different specific country contexts and forms of land tenure. Aside from that, integration of the MAST tool into the conventional systems of customary land registration has revealed several advantages, including the

improvement of security of land tenure. Another explorative study can be done to uncover how the realised advantages have influenced changes in social-economic lives of the landowners, institutional performance and operation, and whether the changes are sustainable.

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APPENDICES

Appendix 1.0: Research Design Matrix

Research Sub-Objectives	Research Question	Indicators (or variables) – what is to be measured	Data Required	Required source of data	Techniques of data collection	Techniques of data analysis	Anticipated Result
To compare the requirements of customary land registration using conventional systems and the MAST tool.	What are the legal, institutional, and spatial requirements for customary land registration using a conventional system? ?	Legal requirements	• Registration legislation	• Policy • Laws • Guidelines • Literature • MLHHSD • LGA	• Document analysis • Literature Reviews • Semi-Structured Interviews	• Descriptive analysis • Use of Enterprise Architecture software to model registration procedures • Thematic analysis	• List of legislations
			• Registration procedures				• Clarity of procedures
			• Registered land tenure types				• List of registered tenure types
			• Registration time				• Speed and timeliness
			• Registration costs				• Unity cost of registration
			• Access to land by groups				• % of access to land by groups e.g. women
			• Registration documents				• Lists of registration documents
		Institutional requirements	• Institutional Actors	• Policy • Laws • Guidelines • Literature • MLHHSD • LGA	• Document analysis • Literature Reviews • Semi-Structured Interviews	• Descriptive analysis • Use of Enterprise Architect software to model registration institutions and activities • Thematic analysis	• List of Actors
			• Organisational activities				• List of Activities/Roles

			• Institutional interaction				• Means of interaction
							  ○ ICT
							  ○ Database
							• Software, et

			• Institutional Capacity buildings				• Number of trained people • Areas of training
							•
		Spatial requirements	Spatial methods	• Policy • Laws • Guidelines • Literature • MLHHSD LGA	• Document analysis • Literature Reviews Semi-Structured Interviews	• Descriptive analysis • Thematic analysis	• List of spatial methods
			Spatial standards				• List of spatial standards
			Extent of boundaries				• Type of boundaries
			Spatial Accuracy				• Level of accuracy
			Spatial improvement				• Mechanism of spatial improvement
			Data Access				• Mechanism for data access
			Types of Data				• Types of Data

			Participation in data acquisition				• Level of participation
	What are the legal, institutional, and spatial requirements for customary land registration using a MAST tool in Tanzania?	Legal requirements	• Registration legislation •	• Policy • Laws • Guidelines • Literature • MLHHSD • LGA	• Document analysis • Literature Reviews Semi-Structured Interviews	• Descriptive analysis • Use of Enterprise Architecture software to model registration procedures • Thematic analysis	List of legislations •
			• Registration procedures				• Clarity of procedures
			• Registered land tenure types				• List of registered tenure types
			• Registration time				• Speed and timeliness
			• Registration costs				• Unity cost of registration
			• Access to land by groups				• % of access to land by groups e.g. women
			• Registration documents				• Lists of registration documents
		Institutional requirements	• Institutional Actors	• Policy • Laws • Guidelines • Literature • MLHHSD LGA	• Document analysis • Literature Reviews • Semi-Structured Interviews	• Descriptive analysis • Thematic analysis	• List of Actors
			• Organisational activities				• List of Activities/Roles
			• Institutional interaction				Means of interaction
			• Institutional Capacity buildings				• Number of trained people
			•				•
		Spatial requirements	• Spatial methods	• Policy • Laws • Guidelines • Literature • MLHHSD LGA	• Document analysis • Literature Reviews • Semi-Structured Interviews	• Descriptive analysis • Thematic analysis	• List of spatial methods
			• Spatial standards				• List of spatial standards
			• Extent of boundaries				• Type of boundaries
			• Spatial Accuracy				• Level of accuracy
			• Spatial improvement				• Mechanism of spatial improvement
			• Data Access				• Mechanism for data access
			• Participation in data acquisition				• Level of participation
To identify the gaps in	What are the legal, institutional and spatial gaps	Legal Gaps	• Differences in Legal requirements	• LTSP • LGA • MLHHSD	• Semi-Structured Interviews	• Thematic analysis • Descriptive analysis	Differences in legislations •
							• Differences in Clarity of procedures

integrating the MAST tool into the conventional systems of customary land registration.	of integrating MAST tool into the conventional system of customary land registration?			• NLUPC • Policy • Laws • Guidelines	• Literature reviews		• Differences in registered tenure types
							• Differences in Speed and timeliness
							• Differences in registration cost
							• Difference in access to land by groups e.g. women
							• Differences in registration documents
		Institutional gaps	• Differences in institutional requirements	• LTSP • LGA • MLHHSD • NLUPC • Policy • Laws • Guidelines	• Semi-Structured Interviews • Literature/document reviews	• Thematic analysis • Descriptive analysis	• Differences in actors
							• Differences in Activities
							• Differences in means of interaction
							• Differences in capacity building
			•				•
		Spatial gaps	• Differences in spatial requirements	• LTSP • LGA • MLHHSD • NLUPC • Policy • Laws Guidelines	• Semi-Structured Interviews • Literature reviews	• Thematic analysis • Descriptive analysis	• Differences in spatial methods
							• Differences in spatial standards
							• Differences in the extent of boundaries
							• Differences in the Level of accuracy
							• Differences in mechanism of spatial improvement
							• Differences in Mechanism for data access
							• Differences in Types of Data
							• Differences in Level of participation
	How are the identified legal, institutional, and	Legal Processes	• Combination, transformation or replacement of legal requirements	• LTSP • LGA Policy • MLHHSD	• Semi-Structured Interviews • Literature reviews	• Semi-Structured Interviews • Literature reviews	Combination, transformation or replacement of legislations
							• Combination, transformation or replacement of procedures

	spatial gaps solved when integrating the MAST tool into the conventional system of customary land registration			• NLUPC • Laws Guidelines	•		• Combination, transformation or replacement of registered tenure types
							• Combination, transformation or replacement of Speed and timeliness
							• Combination, transformation or replacement of registration cost
							• Combination, transformation or replacement of access to land by groups, e.g. women
							• Combination, transformation or replacement of registration documents
		Institutional process	• Combination, transformation or replacement of institutional requirements	• LTSP • LGA Policy • MLHHSD • NLUPC • Laws • Guidelines	• Semi-Structured Interviews • Literature reviews •	• Descriptive analysis • Thematic analysis	• Combination, transformation or replacement of actors
							• Combination, transformation or replacement of Activities
							• Combination, transformation or replacement capacity building
		Spatial process	• Combination, transformation or replacement of spatial requirements	• LTSP • LGA Policy • MLHHSD • NLUPC • Laws • Guidelines	• Semi-Structured Interviews • Semi-Structured Interviews • Literature/document reviews	• Descriptive analysis • Thematic analysis	• Combination, transformation or replacement of spatial methods
							• Combination, transformation or replacement of spatial standards
							• Combination, transformation or replacement of the spatial boundaries
							• Combination, transformation or replacement of Level of accuracy
							• Combination, transformation or replacement of mechanism for spatial improvement
							• Combination, transformation or replacement of Mechanism for data access

							• Combination, transformation or replacement of types for Data
							• Combination, transformation or replacement of Level of participation
	What are the legal, institutional and spatial advantages as a result of solving the integration gaps?	Legal advantages	• Registration legislation •	• LTSP • LGA Policy • MLHHSD • NLUPC Laws • Guidelines	• Semi-Structured Interviews • Literature reviews •	• Descriptive analysis • EPISTLE Model	• Advantages in legislations •
			• Registration procedures				• Advantages in registration procedures
			• Registered land tenure types				• Advantages in registered tenure types
			• Registration time				• Advantages in Speed and timeliness
			• Registration costs				• Advantages in the registration cost
			• Access to land by groups				• % of land by groups, e.g. women advantages
			• Registration documents				• Advantages in registration documents
		Institutional advantages	• Institutional Actors	• LTSP • LGA • MLHHSD • NLUPC	• Semi-Structured Interviews • Document review	• Descriptive analysis • EPISTLE Model	• Advantages in actors
			• Organisational activities				• Advantages in registration activities
			• Institutional interaction				• Advantages in term of interaction
			• Institutional Capacity buildings				• Advantages in term of capacity building
		Spatial advantages	• Spatial methods	• LTSP • LGA Policy • MLHHSD • NLUPC • Laws Guidelines	• Semi-Structured Interviews • Literature reviews	• Descriptive analysis • EPISTLE Model	• spatial method advantages
			• Spatial standards				• spatial standard advantages
			• Extent of boundaries				• spatial boundary advantages
			• Spatial Accuracy				• Advantages in the level of accuracy
			• Spatial improvement				• Advantages in the mechanism for spatial improvement
			• Data Access				• Advantages in the mechanism for data access

			• Participation in data acquisition				• Advantages in the level of participation
To explore the constraints of solving the integration gaps between the MAST tool and the conventional system of customary land registration.	What are the legal, institutional, and spatial constraints for solving the integration gaps between the MAST tool and Conventional System of customary land registration?	Types of constraints	• Legal constraints • Institutional constraints • Spatial constraints • Other constraints	• LTSP • LGA • MLHHSD • NLUPC	• Semi-Structured Interviews • Document review	• Descriptive analysis • Thematic analysis	• List of legal methods • List of institutional constraints • List of spatial constraints • List of other constraints
	What are the causes of the constraints for solving the integration gaps between the MAST tool and the conventional system of customary land registration?	Causes of constraints	• Legal causes • Institutional causes • Spatial Causes • Other causes	• LTSP • LGA • MLHHSD • NLUPC	• Semi-Structured Interviews • Document review	• Descriptive analysis • Thematic analysis	• List of causes of legal methods • List of causes of institutional constraints • List of causes of spatial constraints • List of other causes of constraints
			•	•	•		
	What is the adopted solution for addressing the constraints for solving the	Solution for constraints	• Legal solution • Institutional solution • Spatial solution	• LTSP • LGA • MLHHSD • NLUPC	• Semi-Structured Interviews • Document review	• Descriptive analysis • Thematic analysis	• List of legal solution • List of institutional. solution • List of legal solution

	integration gaps between MAST tool and conventional systems of customary land registration		• Other solution				• List of other solution

Appendix 2.0: Operationalisation of Variables Matrix

Research Main Objective	Research Sub-Objectives	CONCEPT (Level 1 of abstraction)	Constructs (Level 2 of abstraction)	Indicators (what is to be measured)	VARIABLES (deriving measurements)	Interview Questions
The main objective is to explore the integration of MAST tool into conventional systems of customary land registration in Tanzania.	1. To compare the requirements for both the conventional systems and MAST for customary land registration in Tanzania.	• Convectional systems	• Spatial requirements	• Spatial methods	• List of spatial methods	1. (a) Between the use of aerial imagery or survey techniques which one is the preferable methods for customary land registration in Tanzania? (b) Why is the chosen method above preferred? (c) What are the other spatial methods applied? (d) Do you have other opinions about spatial methods/techniques?
				• Spatial standards	• Considered standards	1. Are you considering purpose accuracy or technical accuracy? Why?
				• Spatial boundary	• Type of boundaries	1. In mapping, do you rely on the use of fixed boundaries or general boundaries?
				• Spatial accuracy	• Level of accuracy	1. (a) What is the required level accuracy if it uses Fixed or General Boundary is used? (b) How is the method used to determine the level of spatial accuracy?
				• Spatial improvement or upgrading	• Mechanism of spatial improvement	1. (a) Do you have any mechanism required for information updating during post-registration? YES/NO (b) If in an (a) above is YES, what is the mechanism or tool? (c) What kind of information is required to be updated? (d) If the 6(a) above is NO, how are the acquired information is updated?

Research Main Objective	Research Sub-Objectives	CONCEPT (Level 1 of abstraction)	Constructs (Level 2 of abstraction)	Indicators (what is to be measured)	VARIABLES (deriving measurements)	Interview Questions
				• Data Access	• The mechanism for data access	1. (a) How can the produced information be accessed? (b) Who can access the information?
				• Participation in Data Acquisition	• Level of participation	
		MAST Tool	• Spatial requirements	• Spatial methods	• List of spatial methods	Similar Question Asked in Convectional systems Concept
				• Spatial standards	• List of spatial standards	
				• Spatial boundary	• Type of boundaries	
				• Spatial accuracy	• Level of accuracy	
				• Spatial improvement or upgrading	• Mechanism of spatial improvement	
				• Data Access	• The mechanism for data access	
				• Participation in Data Acquisition	• Level of participation	
		Convectional systems	Legal requirements	• Registration Procedures	• List of procedures • Clarity of Procedures	1. What are the required procedures for issuance of CCRO?
				• Registered Tenure types and interests	• List of registered tenure types and interests	2. (a) What types of tenure are required to be registered? (b) Is the registered tenure formal or informal? (c) Are there any other registered rights or interest to land?
				• Registration time	• Number of required days/months for registration	3. How long does it require to register customary land?
				• Registration costs	• Indicative Cost for registration	4 (a) What is the required cost for issuing CCRO? (b) What constitutes a cost? (c) Who bears the cost?
				• Access to land by groups	• Recognition and inclusion of groups	5. (a) How are the disadvantageous groups such as women recognized during registration?
				• Registration documents	• Lists of registration documents	6. What are the required registration documents?

Research Main Objective	Research Sub-Objectives	CONCEPT (Level 1 of abstraction)	Constructs (Level 2 of abstraction)	Indicators (what is to be measured)	VARIABLES (deriving measurements)	Interview Questions
		MAST tool	Legal requirements	• Registration Procedures	• List and Clarity of procedures	Similar questions asked under conventional systems
				• Registered Tenure types and interests	• List of registered tenure types and interests	
				• Registration time	• Number of days/months	
				• Registration costs	• Indicative Costs for registration	
				• Access to land by groups	• Recognition and inclusion of groups	
				• Registration costs registration documents	• Lists of registration documents	
		Convectional systems	Institutional requirements	• Institutional Actors	• List of involved Actors	1. Who is involved/included in the process?
				• Institutional Activities/Roles	• List of Activities/Roles	2. What are the responsibilities/activities of the people involved?
				• Institutional Interaction	• Level of interaction	3. What is the approach of inclusion? Is it bottom-up or top-down approach? Why?
					• Means of interaction	4. What is the approach of the interaction of actors? Is it paper-based or computer-based? How?
				• Institutional Capacity buildings	• Number of trained people	5. (a) Is there any capacity building done? (b) Who is involved in capacity building?
					• Areas of training	6. What are the areas of capacity building?
		MAST tool	Institutional requirements	• Institutional Actors	• List of involved Actors	Similar questions asked under conventional systems
				• Institutional Activities/Roles	• List of Activities/Roles	
				• Institutional Interaction	• Level of interaction	
					• Means of interaction	
				• Institutional Capacity buildings	• Number of trained people	
					• Areas of training	

Research Main Objective	Research Sub-Objectives	CONCEPT (Level 1 of abstraction)	Constructs (Level 2 of abstraction)	Indicators (what is to be measured)	VARIABLES (deriving measurements)	Interview Questions
	To identify the integration gaps existing as a result of the integrating MAST tool into conventional systems of customary land registration in Tanzania.	Integration gaps	Spatial gaps	Differences in spatial requirements	• Spatial methods	Findings will depend on the Sub-Objective two results
					• Spatial standards	
					• Spatial boundary	
					• Spatial accuracy	
					• Spatial improvement or upgrading	
					• Data Access	
					• Participation in Data Acquisition	
			Legal gaps	Differences in legal requirements	• Registration Procedures	
					• Registered Tenure types and interests	
					• Registration time	
					• Registration costs	
					• Access to land by groups	
					• Registration documents	
			Institutional Gaps	Differences in Spatial requirements	• Institutional Actors	
					• Institutional Activities/Roles	
					• Institutional Interaction	
					• Institutional Capacity buildings	
					•	
			Spatial processes	Replacement, Transformation or Combination	• Spatial methods	How were the emerged integration gaps solved?
					• Spatial standards	
					• Spatial boundary	
					• Spatial accuracy	

Research Main Objective	Research Sub-Objectives	CONCEPT (Level 1 of abstraction)	Constructs (Level 2 of abstraction)	Indicators (what is to be measured)	VARIABLES (deriving measurements)	Interview Questions
					• Spatial improvement or upgrading	
					• Data Access	
					• Participation in Data Acquisition	
			Legal processes	Replacement, Transformation or Combination	• Registration Procedures	
					• Registered Tenure types	
					• Registration time	
					• Registration costs	
					• Access to land by groups	
					• Registration documents	
			Institutional processes	Replacement, Transformation or Combination	• Institutional Actors	
					• Institutional Activities/Roles	
					• Institutional Interaction	
					• Institutional Capacity buildings	
			Advantages	Spatial Advantages	• Spatial methods	1. (a) Where there any advantages resulted from solving the integration gaps? (b) Can you mention some of the advantages?
					• Spatial standards	
					• Spatial boundary	
					• Spatial accuracy	
					• Spatial improvement or upgrading	
					• Data Access	
					• Participation in Data Acquisition	
				Legal Advantages	• Registration Procedures	

Research Main Objective	Research Sub-Objectives	CONCEPT (Level 1 of abstraction)	Constructs (Level 2 of abstraction)	Indicators (what is to be measured)	VARIABLES (deriving measurements)	Interview Questions
					• Registered Tenure types and interests	
					• Registration time	
					• Registration costs	
					• Access to land by groups	
					• Registration documents	
				Institutional Advantages	• Institutional Actors	
					• Institutional Activities/Roles	
					• Institutional Interaction	
					• Institutional Capacity buildings	
	To explore the constraints of integrating the MAST with the conventional systems of customary land registration in Tanzania.	Integration constraints	Type of constraints	Spatial constraints	• Spatial methods	1. (a) What were the challenges/constraints emerged when solving the integration challenges? YES/NO (b) If YES, can you mention some of the challenges?
					Spatial standards	
					• Spatial boundary	
					• Spatial accuracy	
					• Spatial improvement or upgrading	
					• Data Access	
					• Participation in Data Acquisition	
				Legal constraints	• Registration Procedures	
					• Registered Tenure types and interests	
					• Registration time	
					• Registration costs	
					• Access to land by groups	
					• Registration documents	

Research Main Objective	Research Sub-Objectives	CONCEPT (Level 1 of abstraction)	Constructs (Level 2 of abstraction)	Indicators (what is to be measured)	VARIABLES (deriving measurements)	Interview Questions
				Institutional constraints	• Institutional Actors	
					• Institutional Activities/Roles	
					• Institutional Interaction	
					• Institutional Capacity buildings	
				Other types		
			Causes of Constraints	Spatial Causes	• Spatial methods	1. What were the causes of the constraints mentioned above?
					• Spatial standards	
					• Spatial boundary	
					• Spatial accuracy	
					• Spatial improvement or upgrading	
					• Data Access	
					• Participation in Data Acquisition	
				Legal causes	• Registration Procedures	
					• Registered Tenure types and interests	
					• Registration time	
					• Registration costs	
					• Access to land by groups	
					• Registration documents	
				Institutional Causes	• Institutional Actors	
					• Institutional Activities/Roles	
					• Institutional Interaction	

Research Main Objective	Research Sub-Objectives	CONCEPT (Level 1 of abstraction)	Constructs (Level 2 of abstraction)	Indicators (what is to be measured)	VARIABLES (deriving measurements)	Interview Questions
					• Institutional Capacity buildings	
				Other Courses		
			Solution for Constraints	Spatial solution	Spatial methods	1. How have you solved the emerged constraints when solving integration gaps?
					Spatial standards	
					Spatial boundary	
					Spatial accuracy	
					Spatial improvement or upgrading	
					Data Access	
					Participation in Data Acquisition	
				Legal Solution	Registration Procedures	
					Registered Tenure types and interests	
					Registration time	
					Registration costs	
					Access to land by groups	
					Registration documents	
				Institutional Solution	Institutional Actors	
					Institutional Activities/Roles	
					Institutional Interaction	
					Institutional Capacity buildings	
				Other Solution		

Appendix 3.0: Tanzania Tenure Types and Forms

According to the Tanzania NLP, all land is for public, and its ownership is vested to the president as a trustee. It recognizes "*the occupancy"* as the only form of tenure. It can either be a "*statutory right of occupancy*" (GRO) or "*customary right of occupancy"* (CRO). While the statutory right is granted to the general land or village land if the legal transfer of the land category is done, the customary right is granted to the village land. The village land is divided into three categories of the communal land, customary or family land and communal village land. The communal land is held in common by different groups in the community such as pastoralists, farmers, hunters, gatherers. The individuals or clan members hold the customary land. The other relevant category of village land is the communal village land recognized under Section 13 of the VLA. This land is available for being granted to individual members or a group of people in the village community, clans, investors, immigrants, etc.

Furthermore, the village land category is held under the customary right of occupancy and certified with CCROs as a legal document of ownership except a right to occupy or use the land that comes out of this tenure type. This secondary right, according to **S.1** of VLA, is referred to as the "*derivative right"*. The derivative right is granted out of subsequent or second registration of the communal village land as provided in Section 19 of the VLA which includes a "*right to lease"* or "*sub-lease"* a CRO that is "*customary lease* "or "*customary sublease*". It is worth noting that Section 18 (1) of the VLA define CRO to have "***equal status and effect to"*** the Granted Right of Occupancy (GRO). **Figure A.1** summarises the recognized formal tenure types with respect to its land categories.

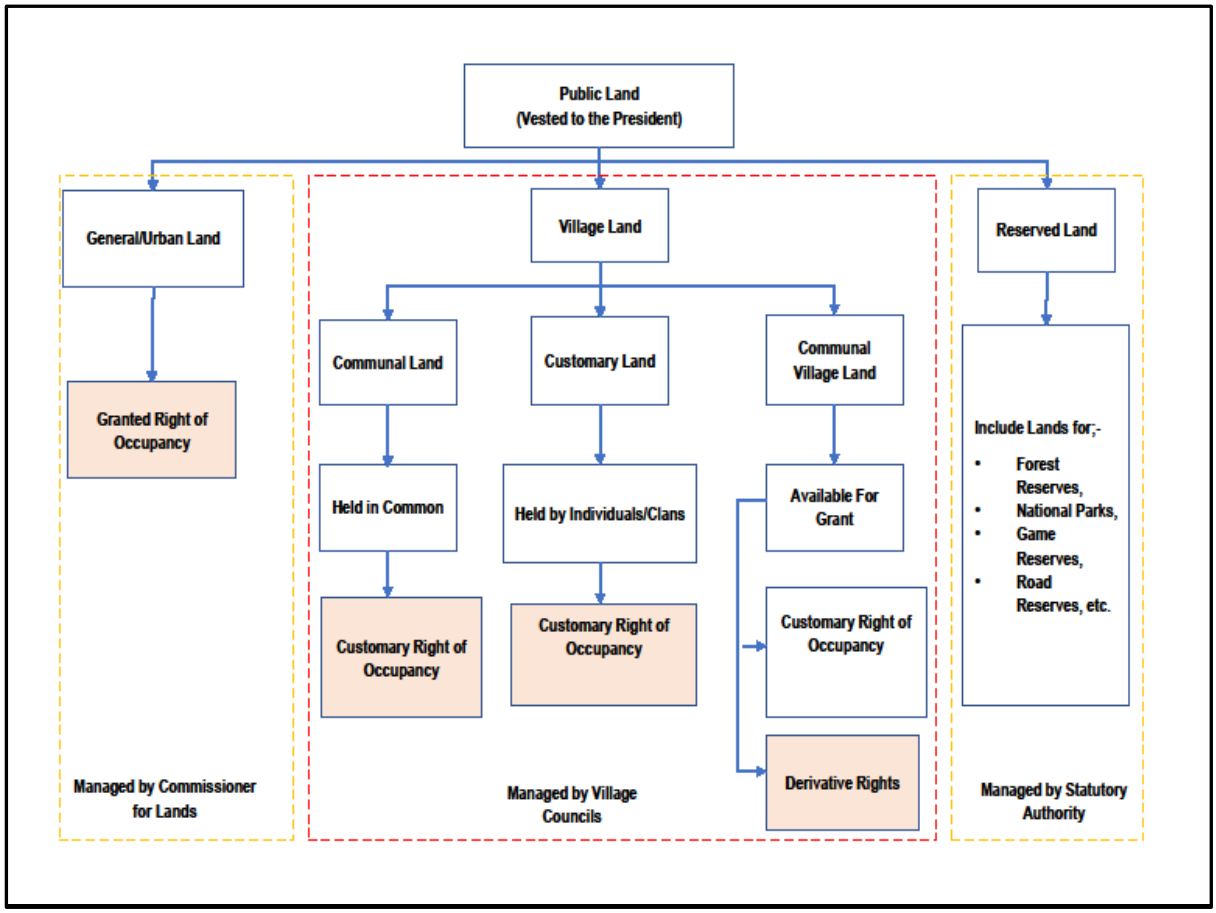
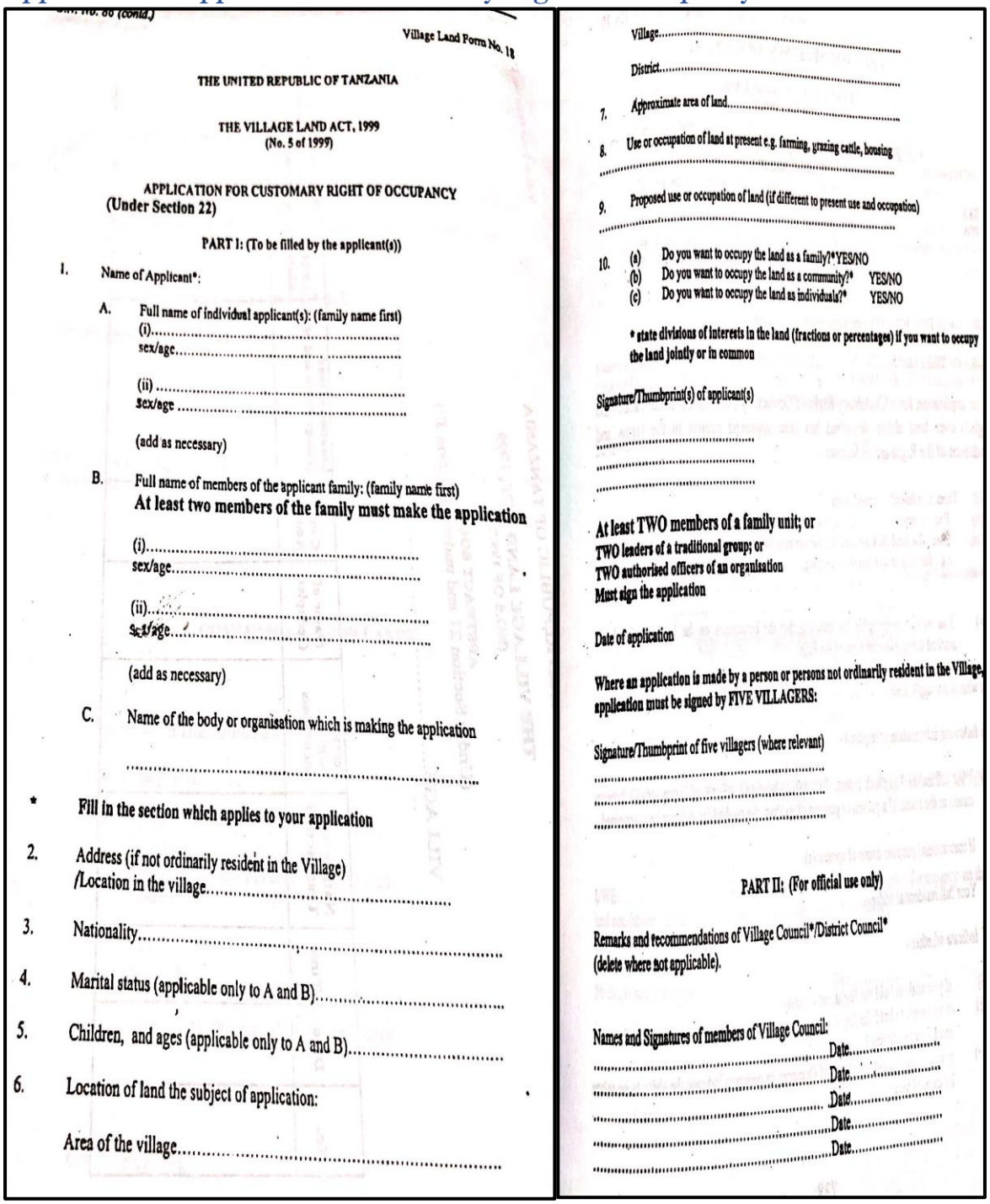


Figure A. 1: Land Categories and Tenure Types (Source S.12 of the VLA; World Bank, 2015)

Appendix 4.0: Application of Customary Right of Occupancy Form



G.N. No. 80 (contd.)

Village Land Forms No. 18

THE UNITED REPUBLIC OF TANZANIA

THE VILLAGE LAND ACT, 1999
(No. 5 of 1999)

APPLICATION FOR CUSTOMARY RIGHT OF OCCUPANCY
(Under Section 22)

PART I: (To be filled by the applicant(s))

1. Name of Applicant*:

A. Full name of individual applicant(s): (family name first)
(i).....
sex/age.....

(ii).....
sex/age.....

(add as necessary)

B. Full name of members of the applicant family: (family name first)
At least two members of the family must make the application

(i).....
sex/age.....

(ii).....
sex/age.....

(add as necessary)

C. Name of the body or organisation which is making the application

.....

* **Fill in the section which applies to your application**

2. Address (if not ordinarily resident in the Village)
/Location in the village.....

3. Nationality.....

4. Marital status (applicable only to A and B).....

5. Children, and ages (applicable only to A and B).....

6. Location of land the subject of application:

Area of the village.....

Village.....

District.....

7. Approximate area of land.....

8. Use or occupation of land at present e.g. farming, grazing cattle, housing
.....

9. Proposed use or occupation of land (if different to present use and occupation)
.....

10. (a) Do you want to occupy the land as a family?* YES/NO
(b) Do you want to occupy the land as a community?* YES/NO
(c) Do you want to occupy the land as individuals?* YES/NO

* **state divisions of interests in the land (fractions or percentages) if you want to occupy the land jointly or in common**

Signature/Thumbprint(s) of applicant(s)

.....
.....
.....

At least TWO members of a family unit; or
TWO leaders of a traditional group; or
TWO authorised officers of an organisation
Must sign the application

Date of application

Where an application is made by a person or persons not ordinarily resident in the Village, application must be signed by FIVE VILLAGERS:

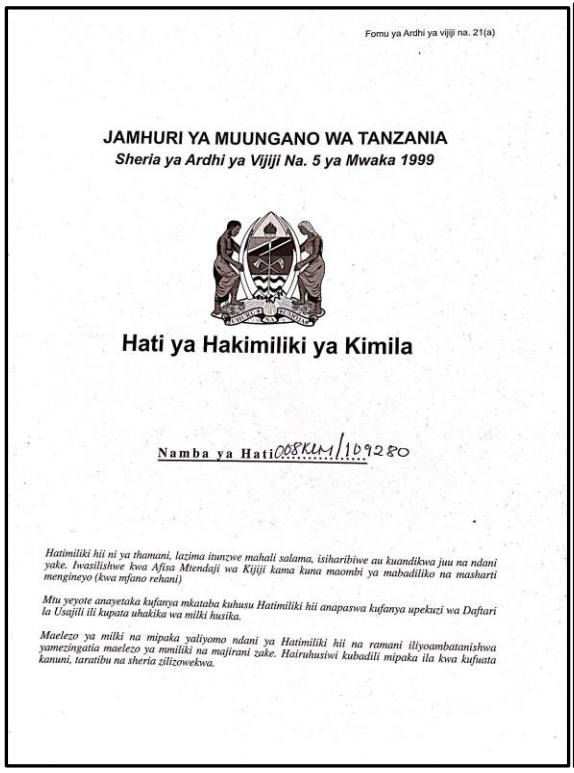
Signature/Thumbprint of five villagers (where relevant)
.....
.....
.....

PART II: (For official use only)

Remarks and recommendations of Village Council*/District Council*
(delete where not applicable).

Names and Signatures of members of Village Council:
..... Date.....
..... Date.....
..... Date.....
..... Date.....
..... Date.....

Appendix 4.0: Certificate of Customary Right of Occupancy Form



Fomu ya Ardhi ya vijiji na. 21(a)

JAMHURI YA MUUNGANO WA TANZANIA

Sheria ya Ardhi ya Vijiji Na. 5 ya Mwaka 1999

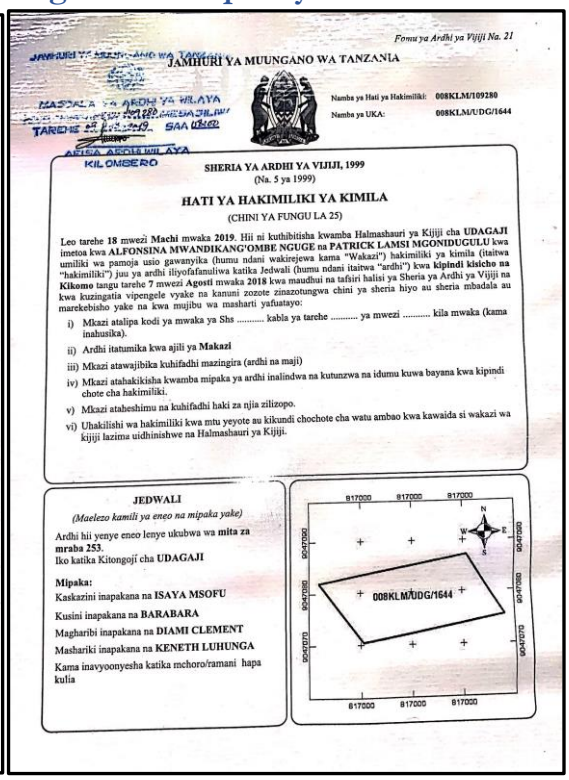
Hati ya Hakimiliki ya Kimila

Namba ya Hati 008KLM/109280

Hatimiliki hii ni ya thamani, lazima itunzwe mahali salama, isiharibiwe au kuandikwa juu na ndani yake. Iwasilishwe kwa Afisa Mtendaji wa Kijiji kama kuna maombi ya mabadiliko na masharti mengineyo (kwa mfano rehani)

Mtu yeyote anayetaka kufanya mkataba kuhusu Hatimiliki hii anapaswa kufanya upekuzi wa Daftari la Usajili ili kupata uhakika wa milki husika.

Maelezo ya milki na mipaka yaliyomo ndani ya Hatimiliki hii na ramani iliyoambatanishwa yamezingatia maelezo ya mmiliki na majirani zake. Hairuhusiwi kubadili mipaka ila kwa kufuata kanuni, taratibu na sheria zilizowekwa.



Fomu ya Ardhi ya Vijiji Na. 21

JAMHURI YA MUUNGANO WA TANZANIA

MASHALA YA ARDHI YA WILAYA KILOMBERO

Namba ya Hati ya Hakimiliki: 008KLM/109280

Namba ya UKA: 008KLM/UDG/1644

SHERIA YA ARDHI YA VIJIJI, 1999
(Na. 5 ya 1999)

HATI YA HAKIMILIKI YA KIMILA
(CHINI YA FUNGU LA 25)

Leo tarehe **18** mwezi **Machi** mwaka **2019**. Hii ni kuthibitisha kwamba Halmashauri ya Kijiji cha **UDAGAJI** imetoa kwa **ALFONSINA MWANDIKANG'OMBE NGUGE** na **PATRICK LAMSI MGONIDUGULU** kwa umiliki wa pamoja usio gawanyika (humu ndani wakirejewa kama "Wakazi") hakimiliki ya kimila (itaitwa "hakimiliki") juu ya ardhi iliyofafanuliwa katika Jedwali (humu ndani itaitwa "ardhi") kwa **kipindi kisicho na Kikomo** tangu tarehe **7** mwezi **Agosti** mwaka **2018** kwa maudhui na tafsiri halisi ya Sheria ya Ardhi ya Vijiji na kwa kuzingatia vipengele vyake na kanuni zozote zinazotungwa chini ya sheria hiyo au sheria mbadala au marekebisho yake na kwa mujibu wa masharti yafuatayo:

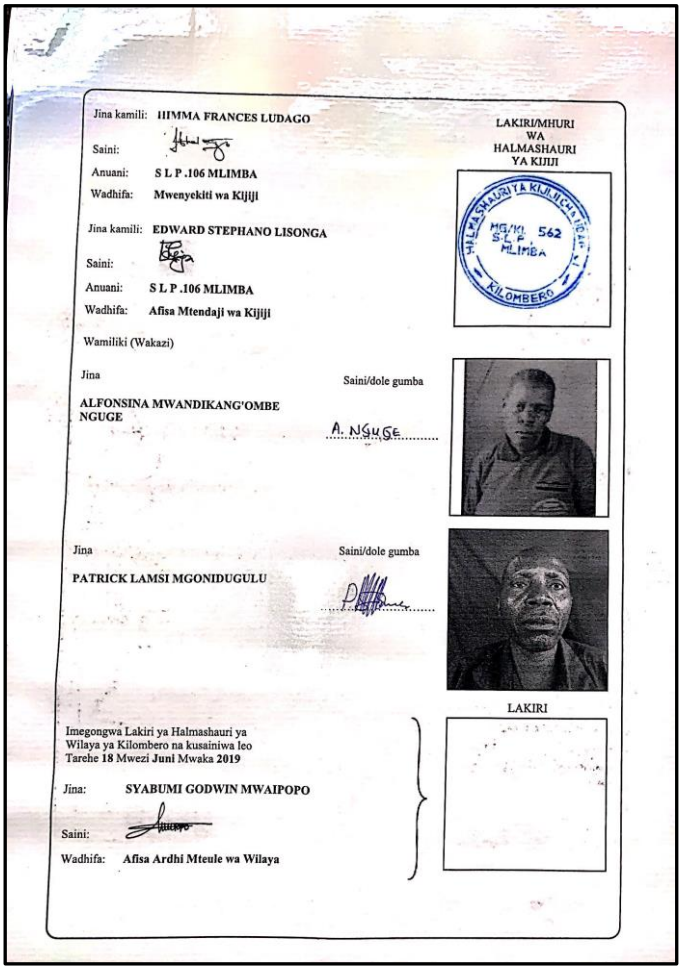
i) Mkazi atalipa kodi ya mwaka ya Shs ..... kabla ya tarehe ..... ya mwezi ..... kila mwaka (kama inahusika).
ii) Ardhi itatumika kwa ajili ya **Makazi**
iii) Mkazi atawajibika kuhifadhi mazingira (ardhi na maji)
iv) Mkazi atahakikisha kwamba mipaka ya ardhi inalindwa na kutunzwa na idumu kuwa bayana kwa kipindi chote cha hakimiliki.
v) Mkazi ataheshimu na kuhifadhi haki za njia zilizopo.
vi) Uhakilishi wa hakimiliki kwa mtu yeyote au kikundi chochote cha watu ambao kwa kawaida si wakazi wa kijiji lazima uidhinishwe na Halmashauri ya Kijiji.

JEDWALI

(Maelezo kamili ya eneo na mipaka yake)

Ardhi hii yenye eneo lenye ukubwa wa **mita za mraba 253.**
Iko katika Kitongoji cha **UDAGAJI**

Mipaka:
Kaskazini inapakana na **ISAYA MSOFU**
Kusini inapakana na **BARABARA**
Magharibi inapakana na **DIAMI CLEMENT**
Mashariki inapakana na **KENETH LUHUNGA**
Kama inavyoonyesha katika mchoro/ramani hapa kulia



Jina kamili: **IIMMA FRANCES LUDAGO**
Saini:
Anuani: **S L P .106 MLIMBA**
Wadhifa: **Mwenyekiti wa Kijiji**

Jina kamili: **EDWARD STEPHANO LISONGA**
Saini:
Anuani: **S L P .106 MLIMBA**
Wadhifa: **Afisa Mtendaji wa Kijiji**

LAKIRI/MHURI WA HALMASHAURI YA KIJIJI

MG/KL 562 S.L.P MLIMBA

Wamiliki (Wakazi)

Jina: **ALFONSINA MWANDIKANG'OMBE NGUGE** — Saini/dole gumba: A. NGUGE

Jina: **PATRICK LAMSI MGONIDUGULU** — Saini/dole gumba:

LAKIRI

Imegongwa Lakiri ya Halmashauri ya Wilaya ya Kilombero na kusainiwa leo Tarehe **18** Mwezi **Juni** Mwaka **2019**

Jina: **SYABUMI GODWIN MWAIPOPO**
Saini:
Wadhifa: **Afisa Ardhi Mteule wa Wilaya**

Appendix 5.0: Systematic Adjudication Record Form

SHERIA YA VIJIJI NA.5,1999 — Fomu na 18 & 47

FOMU YA UHAKIKI WA MASLAHI KWA MPANGILIO

(Chini ya fungu la 54 & 25)

MAOMBI

Tarehe ya Maombi:	18/11/2017
Tarehe ya M/Kijiji:	18/11/2017
Jina la Kijiji:	Njage
Jina la Kitongoji:	NGAVALYA
Namba ya UKA:	046KLM/NVL/415
Hali ya Mazingira:	Milima

Aina ya Umiliki:	Milki ya pamoja isiyogawanyika
Ukomo wa Miliki:	Kwa kipindi kisicho na Kikomo
Eneo kwa Ekari:	0.177
Matumizi ya Ardhi (ya sasa):	Makazi
Matumizi ya Ardhi (Yaliyopendekezwa):	Makazi

Jina la Mdhamini/Wadhamini na Sahihi

1.
2.
3.
4.
5.

UHAKIKI

Jina La Kwanza	Jina La Pili	Jina La Ukoo	Namba ya Kitambulisho	Aina ya Umiliki	Jinsia	Umri	Ndoa	Uraia	Anuani	Mkazi	Simu	Hisa
ASHA	RASHIDI	MBINJI	T-1000-6778-319-5 (Kitambulisho cha mpiga kura)	Mmiliki	kike	44	ndoa	Mtanzania		Ndiyo	0784234517	
EXAVERY	ATANIEL	MPWAGA	T-1000-6778-205-9 (Kitambulisho cha mpiga kura)	Mmiliki	kiume	52	ndoa	Mtanzania		Ndiyo	0784234517	

Majirani	Jina	Saini	Jina la Wahakiki/ Kamati ya Maamuzi	Saini
Kaskazini	EXAVERY MPWAGA		1. JOHAN JOBAPO	
Kusini	EXAVERY MPWAGA			
Mashariki	EXAVERY MPWAGA P		2. OPTA NDIKWEGE	
Magharibi	BARABARA			

Haki ya njia na matumizi mengine :

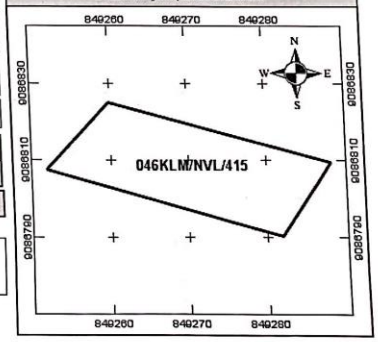
#	Mtu/Watu wenye maslahi	Uhusiano na mmiliki	Jinsia	Umri
1	ATANIEL EXAVERY MPWAGA	Mwana	kiume	

#	Marehemu jina

Msimamizi/Mmiliki wa Ardhi Jina: **ASHA RASHIDI MBINJI (Mmiliki)** Saini _____ Tarehe_____

Msimamizi/Mmiliki wa Ardhi Jina: **EXAVERY ATANIEL MPWAGA (Mmiliki)** Saini _____ Tarehe_____

Ramani ya kipande cha ardhi



Kwa Matumizi ya Ofisi:

Maoni ya Halmashauri ya Kijiji ☑ **Apewe** ☐ **Asipewe**

Uamuzi wa Mkutano wa Kijiji ☑ **Apewe** ☐ **Asipewe**

Jina la Mwenyekiti: **MATHEW CHAWALA** Saini Tarehe **13/10/2018**

Jina la Katibu: **JONAS JOHN KIGAWA** Saini Tarehe **13/10/2018**

Jina la mpimamsaidizi: **Agatha**