ARDHI UNIVERSITY.

ROLE OF PARTICIPATORY MAPPING IN THE ADJUDICATION PROCESS FOR CUSTOMARY LAND RIGHTS

A Case Study of Lushoto District

BOKANI, MUSSA A.

BSc Geomatics

Dissertation

Ardhi University, Dar es Salaam

July, 2023

ROLE OF PARTICIPATORY MAPPING IN THE ADJUDICATION PROCESS FOR CUSTOMARY LAND RIGHTS

BY BOKANI, MUSSA A

A Dissertation Submitted to the Department of Geospatial Sciences and Technology in Partial Fulfilment of the Requirements for the Award of Science in Geomatics (BSc. GM) of Ardhi University

CERTIFICATION

The undersigned certify that they have proof read and here by recommend for acceptance by Ardhi University a dissertation entitled **"ROLES OF PARTICIPATORY MAPPING IN THE ADJUDICATION PROCESS FOR CUSTOMARY LAND RIGHTS. THE CASE STUDY OF LUSHOTO DISTRICT"** in fulfilment of the requirement for the Award of Bachelor of Science in Geomatics of the Ardhi University.

……

METHOD GWALEBA

(Supervisor)

Date……

DECLARATION AND COPYRIGHT

I, BOKANI MUSSA hereby declare that, the contents of this dissertation are the results of my own findings through my study and investigation, and to the best of my knowledge they have not been presented anywhere else as a dissertation for diploma, degree or any similar academic award in any institution of higher learning.

……

BOKANI, MUSSA A.

22809/T.2019

(Candidate)

CERTIFICATION

The undersigned certify that they have proof read and here by recommend for acceptance by Ardhi University a dissertation entitled **"ROLES OF PARTICIPATORY MAPPING IN THE ADJUDICATION PROCESS FOR CUSTOMARY LAND RIGHTS. THE CASE STUDY OF LUSHOTO DISTRICT"** in fulfilment of the requirement for the Award of Bachelor of Science in Geomatics of the Ardhi University.

……

METHOD GWALEBA

(Supervisor)

Date……

DEDICATION

I would like to dedicate this dissertation work to my lovely mother Rukia Hamisi khatibu and my father, Adam Juma Salim. Also, to my beloved sister Mwanahamisi Adam Juma and my beloved brothers Juma Adam Juma and Abdulrahman Maulid Athumani. Your presence, love and support always make me motivated, successful and well determined person.

ACKNOWLEDGEMENT

First and foremost, I thank the Almighty God the Most Gracious and the Most Merciful for enabling me to achieve this level of education. Also, I would like to express my deepest gratitude to Mr. Method Gwaleba my main supervisor for the patience, knowledge, guide and time he dedicated in the course of fulfilling this research. His patience I would always remember when things were not going as per scheduled activities at the time and all office duties required of him to complete but still was able to squeeze time for consultations, am honoured to be among his supervised students.

And lastly, my sincerely and deepest thanks to my fellow friends and student especially; Ally Burhan, Edgar Mlawa, Delphine Mahimbi, Marijani Kelvin, Hussein Mgalawe, Mohammed Mkeche, to mention a few, for their support and time they dedicated assisting in various site procedures together with the knowledge they shared up to my accomplishment of my study.

ABSTRACT

Over past two decades participatory mapping has emerged from a need for more inclusive methods of collecting spatial data with the main intention of democratizing the decision-making process. The Participatory mapping entails different techniques such as mental mapping, sketch mapping and participatory geographic information systems. The process of mapping can contribute to building community cohesion, help to engage participants to be involved in resources and land related decision making, raising awareness about pressing land-related issues and ultimately contribute to empowering local communities and their members .It is so obvious that adjudication process in Tanzania is done only by narrating words about the area of interest which might lead to misunderstandings or misinterpretation of data as well as loss of land rights since words only are not enough to prove the spatially needed evidence. Also, the process less involves indigenous citizens that led to loss of the trustworthy of the adjudication process. So, in this study the main objective was to assess the role of participatory mapping in the adjudication process for customary land rights in Malindi village, Lushoto District at Tanga region.

By the use of the cross-sectional research design with the total of non-random sample size of 70 respondents from Malindi village, data were obtained by implementing questionnaires and interviews as data collection tools and they were validated by the use of triangulation process. The results indicate that the method of participatory mapping in the adjudication process is of advantage in protection of customary land rights. Also, the method had helped indigenous citizens on solving and reducing land conflicts in the village. In addition, the indigenous citizens of Malindi village had found the method to be the tool for increasing their knowledge on land issues since they were able to fully participate throughout the whole project. Also, from the findings and conclusion it seemed that the method of participatory mapping is more preferable than the oral adjudication method which is mostly used in Tanzania.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

NLP	National Land Policy
NAS	Native Administration System
PGIS	Participatory Geographic Information System
PPGIS	Public Participation Geographic Information System
VGI	Volunteered Geographic Information
TP	Town Planning
SMD	Survey and Mapping Director
EDM	Electrooptical Distance Measurement Equipment
GPS	Global Positioning Systems
3D	3 Dimensional
PPM	Participatory Mapping

CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND

Many African countries are facing the problem of land administration (Sanga, 2009). This problem is due to colonial land policies invented by colonizers made only to favor themselves. During early 1990s Tanzania realized that there is need to develop new land policies that enable proper management and allocation of land in both urban and rural areas (Sanga, 2009). In 1995 The National land policy (NLP) was formulated containing 15 principles that were passed by parliament (Sanga, 2009). After the adoption of NLP document, the Village Land Act no. 5 of 1999 were enacted for the management and allocation of the land in rural areas.

The objective of Village Land Act was to ensure that existing customary land rights are legally protected, ensuring effective and efficient village land administration, enabling villagers to participate in land administration and ensure gender balance in land administration and ownership (Sanga, 2009). With the total of 9000 villages in Tanzania the responsibility for the adjudication, survey and registration of customary rights to village land is given to the elected Village councils and village adjudication committee (URT, The Village land Act No. 5, 1999). Also, these committees maintain the village land registries then submit them to district councils which issues the certificates.

The Adjudication is the process of final and authoritative determination of the existing rights and claims of people to land (FAO, 2002). According to the Land Act of 1999 On the matter of adjudication process it explains that;

> Section 28(4) of GN No. 85 of 4/5/2001
> (Made under s.59 and 179 of the Land Act, 1999) states that the procedure of land adjudication requires the adjudication team to walk around the land, tracing, ascertaining, verifying, determining and marking the boundaries of the land being adjudicated (URT, 2001).

As stated above on Land Act 1999, it shows that citizens are fully required to participate on the case of showing about what they understand as their land and features within it. However, the

government of Tanzania has kept it clear and just on matter of adjudication but mostly the adjudication process is made through narration of the information about the area of land, so it kind of make it unwell executed. So, to improve this process it is better to link it with participatory map which will improve the adjudication process.

Over past two decades participatory mapping has emerged from a need for more inclusive methods of collecting spatial data with the main intention of democratizing the decision-making process (Brown, 2020). The Participatory mapping entails different techniques such as mental mapping, sketch mapping and participatory geographic information systems.

The process of mapping can contribute to building community cohesion, help to engage participants to be involved in resources and land related decision making, raising awareness about pressing land-related issues and ultimately contribute to empowering local communities and their members (IFAD 2009).

Technological improvements have been taking over in the mapping world now days due to sophisticated devices and remote sensing equipment to record the physical world, but these techniques do not involve non-experts or indigenous at all (Fagerholm, 2015). So, over past two decades there has been progress of developing techniques or methods that will engage non-experts on mapping the world. *"Indigenous communities and conservation organizations are increasingly turning to mapping and spatial information technologies such as geographic information systems, photogrammetry and global positioning systems for implementing their strategies to strengthen tenure security over resources and improve natural resource management."* (Poole, 1995).

There have been different organizations that use the method of participatory mapping for some different purposes. For example, International Fund for Agricultural Development (IFAD) use this method to help the community on agricultural developments. But on this study the participatory mapping method is pointed to be used on the land issues concerning rights of occupancy specifically customary land rights since the study will base on rural areas. Concerning matter of adjudication which seems to be difficult dealing with by using those usual methods for adjudication which are tracing boundaries and talking about the areas without reaching to the

area or by just pointing fingers. So, this method will be used to improve and modify the adjudication process because it will provide room for the community to show their boundaries by maps and not narration and pointing fingers.

1.2 HISTORICAL BACKGROUND OF CADASTRAL SURVEY IN TANZANIA

The history of cadastral survey in Tanzania is grouped into two phases; that is before and after independence in 1961 (Silayo, 2003) Before independence during the colonial rule, Tanganyika was under the German in the years between 1890 and 1914 and after the 1st World War was under the British in the years between 1919 and 1961. In 1893 the department of surveying and agriculture led by Dr. Franz Stuhlman (URL-1) conducted the first mainland survey for the European farmers, mainly the Germans who lived in Pangani, Usambara, Tanga-Mombo, Kilimanjaro, Meru, Kilosa and Morogoro. The survey conducted was based on the isolated triangulated networks that initially were established for the purpose of boundary survey.

There were a number of triangulation networks established in different time. For example, in the years between 1894 and 1911, the 1st triangulation network near Lushoto in Tanga with a local astronomical origin was established to cover Usambara Mountains and later on was extended to Pare areas, Moshi, Arusha (Mango, 2015). The 2nd triangulation network was established in 1898 with a local latitude origin covering Mbeya and Rukwa region. Another triangulation network was established in the years between 1902 and 1906 with the geodetic longitude origin of Zanzibar. Also, in 1907 a triangulation network with a local astronomical origin was established in the south west of the country (Mbamba bay). In the years between 1912 and 1914 a triangulation network in Morogoro area was established purely for cadastral purposes of the Europeans plantation (Caillard, 2003).

In 1919, British administration took over from German and established the Surveying Department under the Ministry of Land and Mine in 1920(Sami, 2014). Among others, the British decided to unify and coordinate all the survey of the past which were sporadic and unrelated. They used a triangulation network along the Arc of 30th Meridian: From North Cape in Norway to the Cape of Good Hope in South Africa to establish and connect all existing isolated networks. It should be noted that, this network system had already been done in the other nearby countries like the southern Rhodesia now Zimbabwe and Uganda. In 1933 Tanganyika had three

main east-west chains attached to the 30th Arc and four north – south chains between the others (Smith, 2006; Rowe, 1933). In 1944, the colonial survey and geophysical committee put forward the argument that a geodetic survey was essentially a matter that had to be planned for the whole geographical region. This made the Arc and its attached networks of triangulation to be the foundation of whole mapping system in the whole East and Central Africa.

In 1961 after independence, the Native Administration System (NAS) started by adopting the same existing survey system and kept changing by time so as to meet the current national and people's demands. As it has been observed before independence cadastral survey was done for the purpose of alienating land to colonial settlers (Lugoe, 2008). After independence the primary objective was to provide geometric descriptions, size and the location of the land parcels for equitable access of land and the registration of land rights (Silayo, 1997). Recently, cadastral surveys have evolved into economical business (fiscal purposes) such as collection of land rent, property tax and the collateral property. Also is used in property valuation, land allocation and many others to support land market (Silayo, 2003).

1.3 HISTORICAL BACKGROUND OF PARTICIPATORY MAPPING

The last two decades of the Western and non-Western world have witnessed increasing interest in the participatory mapping approaches, applied in a variety of fields of research and practice (Brown, 2020). Various terms have been used to describe these approaches, the most prominent being public participation geographical information systems (PPGIS), participatory GIS (PGIS), and volunteered geographic information (VGI) (Verplanke, 2016). Today, participatory mapping approach has roused the interest of academics and a wide user community. This is evident from the increasing number of academic publications, conferences, workshops, and journal special issues pertaining to this field (see, e.g., Brown and Fagerholm 2015, Mukherjee 2015, Brown and Kyttä 2018). Furthermore, participatory mapping now has an international professional society, comprising scholars and practitioners, invested in its integrity, accuracy, data collection, and the equitable distribution of knowledge (International Society for Participatory Mapping, 2020).

As noted by Brown and Kyttä (2014), PPGIS, PGIS, and VGI are related spatial terms with sufficient differences to warrant nuanced descriptions. PPGIS approaches promote the use of GIS and modern communication technologies to engage the general public and stakeholders to carry

out informed participatory planning and decision-making, particularly in the context of urban and regional development (Sieber, 2006). The term PGIS emphasizes empowerment and can be traced to the merger of Participatory Learning and Action methods with geographic information technologies in the Global South (Rambaldi, 2006). The term VGI, introduced by Goodchild (2007), describes a phenomenon where citizens voluntarily create, collect, validate, analyze, and disseminate geographic information. Collecting VGI is based more on contribution and communication of information, than on participation (Verplanke, 2016). Collecting VGI conceptually resembles PPGIS approaches owing to the use of typical online tools to harness spatial information (Hall, 2010).

PPGIS approaches seek to understand location-specific human values, perceptions, behavior, and preferences for future land use and development. Methods for analyzing spatially referenced data, collated using PPGIS, have been developed in diverse directions. Among others, these include analyzing sampling effects and response bias, representing diversity, abundance, or rarity of value points (Bryan, 2011); examining the level of overlap in values across different stakeholder groups (Muñoz, 2019), identifying the potential for value or preference conflicts (Raymond, 2014); assessing environmental justice issues and bridging the divide between experts and the public (Whitehead, 2014). Despite the plethora of analysis methods available to explore, explain, and predict spatial attributes collated using PPGIS, most published articles apply a specific subset of analysis that fails to situate the methods within a broader, more holistic context of research and practice (Fagerholm, 2015). Hence, the field currently lacks a methodological framework, making it essential to synthesize the various existing analysis methods to guide their processes and applications.

1.4 STATEMENT OF THE PROBLEM

It is so obvious that adjudication process in Tanzania is done only by narrating words about the area of interest which might lead to misunderstandings or misinterpretation of data as well as loss of land rights since words only are not enough to prove the spatially needed evidence. Regardless of what the government stated on the Village Land Act of 1999 about the process of adjudication but mostly it is not executed as it is required to be. Also, the process less involves indigenous citizens that led to loss of the trustworthy of the adjudication process. Also, the

current adjudication methods are outdated and require improvements that highly associate local citizens. So, to ease up and ensure the well execution of the whole process of adjudication as well as its modification and improvement it is better to introduce the use of the Participatory mapping.

The study therefore aims to assess the role of participatory mapping as the method of adjudication process for the benefit of customary land rights taking the case study of Lushoto District.

1.5 OBJECTIVES

1.5.1 MAIN OBJECTIVE

Roles of Participatory mapping on the adjudication process for the customary land rights. Case study of Lushoto District.

The study has the aim of showing how the Participatory maps will improve the adjudication process for customary land rights in rural areas.

1.5.2 SPECIFIC OBJECTIVES

i. To analyze importance of participatory maps in the local community for customary land rights.
ii. Comparison of the participatory mapping and the usual adjudication process for customary land rights.
iii. To assess the execution of the participatory mapping in the community.

1.6 SIGNIFICANCIES OF THE STUDY

i. It gives local people opportunity to share their thoughts on land so as to ease up the adjudication process.
ii. It may foster holistic thinking among people in the community and may make the relationship between different problems more easily understandable to them.

iii. It helps local governments to solve land conflicts since the members of the community will be participate on the process.
iv. It helps outsiders or investors to well investing on the area since participatory map not only show the areas but may be used as decision-making tool.

CHAPTER TWO
LITERATURE REVIEW

2.1 LAND

According to The United Nations Ad Hoc group of Experts on Cadastral Surveying and Land Information states that "Land is defined as an area of the surface of the earth together with the water, soil, rocks, minerals and hydrocarbons beneath or upon it and the air above it."

Land can be defined in two broad ways which are traditionally and non-traditionally (the latter so called the narrow definition of land). Traditionally the term land involves a wider meaning and application as it includes the surface of the land (soil) and all other things on the soil which are considered to be part of the land by nature; such as rivers, streams, lakes, lagoons, creeks, mines and minerals, trees like palm trees, or by being unnaturally fixed to it like houses, buildings and any other structures (Rwegasira, 2012). It also includes any estate, interest or any other right over the land for example, the right to collect hubs or to hunt (ibid). Considering this definition, a person that is not physically owning a piece of land may have a right to claim interests over it.

The non-traditionally definition of land as it has been defined in the Land Act of 1999 (Tanzania Land Act 1999) that "Land" includes the surface of the earth and the earth below the surface and all substances other than minerals or petroleum forming part of or below the surface; things naturally growing on the land, buildings and other structures permanently affixed to; or under land and land covered by water.

The non-traditional definition of land may sometimes be referred as the statutory definition of land. With this definition, a person who physically owns piece of land does not own any minerals or petroleum existing there. For this case, if minerals or petroleum are to be discovered the owner shall be required compulsorily to transfer the land to the government.

2.2 EVOLUTION OF LAND TENURE IN TANZANIA

Before colonial era all land belonged to various tribes and the general characteristics of land holding was based on culture of each respective tribe. It is estimated that over 120 tribes inhabited the Tanzania mainland. The chiefs or clan head was the custodian of the rights and holds rights on behalf of the respective community. An occupant of a piece of land enjoyed the

usufructuary rights only (Kombe 1995; URT 1997). In many areas, there was and is still communal land for grazing and forests for cutting firewood. Generally, in Tanzania, the overriding principle to most tribes was that the land belonged to the tiller. When the clan or family was no longer using the land, it was alienated to another family (Mtetewaunga 1990).

Towards the end of the 19th century, the Germans colonized and created the German East Africa regime. The Germans imposed a regal declaration in1885 which stated that all land, whether occupied or not was regarded as unowned crown land and vested in the empire, except claims of ownership by private persons, chiefs or native communities which could be proved (Hayuma 2005). Settlers had plantations ownership titles and they could easily prove their ownership and that made them enjoy security of tenure, while the indigenous people could not prove their ownerships as a result they were left with permissive rights of occupancy (Hayuma, 2005). The Germans were conquered and evicted in 1919, when the British colonization began. Within four years, in 1923 the land ordinance (cap113) was enacted. Up to 1963, there were four categories of land tenure; freehold, leasehold, deemed rights of occupancy and granted rights of occupancy. Before the end of 1963 all freehold were abolished and converted into 99 years leasehold (Kombe, 1995). The granted right of occupancy was statutory while the deemed right was customary which is the use or occupation of land in accordance with traditions and custom. The system continued to work until 1999 when set of land laws were enacted and the land ordinance (cap 113) of 1923 was repealed, following the formulation of the National Land Policy in 1995.

2.3 LAND POLICY

Land policy addresses structural issues that will protect land tenure security, land rights and establish a regulatory framework to prevent undesirable externalities (Deininger 2003). According to UN-ECE, (1996) guidelines “land policy consists of a whole complex of socio-economic and legal prescriptions that dictate how the land and benefits from the land are to be allocated”. As such land management becomes a fundamental requirement for controlling and monitoring this economic good and to ensure the sustainable development. In general, the land policy is a guide line to use land for economic development, equity and social justice, environment preservation and sustainable land use (UN-ECE, 1996).

The NLP of any country need to reflect land tenure systems for clear formulation of tenure legislation. A nature of the government can be portrayed in country's land policy be a capitalist or communist, socialist or liberal government; this will determine whether the land and the benefits of the land are to be allocated to the wealthy or the poor, to large holders or small holders, or to individuals or the state (van der Molen 2003). No country can sustain stability within its boundaries, or economic development within the wider world, unless it has a land rights policy that promotes internal confidence between its people, its commercial enterprises, and its government (UN-ECE 2005). To the context of this research the elements that need to be reflected in land policy include Land tenure, Land tenure systems, Land administration systems, tenure security and means of access to land. These elements will be treated separately in the next subsections.

2.3.1. LAND TENURE

According to Dale and Mclaughlin (2000) land tenure is defined as the manner in which rights in land are held and defined by a broad set of rules, some of which are formally defined through laws concerning property while others are determined by custom. Payne (2001) defines land tenure as the mode by which land is held or owned, or the set of relationships among people concerning land or its product. UN-ECE (1996) defines land tenure as the way in which rights in land are held. Land tenure is an institution, i.e., rules invented by societies to regulate behavior. Rules of tenure define how property rights to land are to be allocated within societies. The major concept underlying all these definitions is the relationship between person and land; the relationship may be acquired through statutory or customary channels or informally and sometimes illegally. In simple terms, land tenure determines who can use what resources for how long, and under what conditions.

2.3.2. LAND TENURE SYSTEMS

A land tenure system comprises any or all the types of land tenure [statutory, customary, religious and informal] recognized by a national and/ or local system of established rules and customary relationships in a social organization (Dekker 2003). Different types of land tenure systems can be distinguished. They may be classified based on combinations of group, state and individual and they are often categorized as open access, communal, private and state (Feder and

Feeny 1991; Dale and McLaughlin 2000). This classification identifies who holds the land rights. The three types of land tenure systems will be discussed in the next paragraph excluding the religious type.

Statutory or formal tenure system: is a system whereby the rights to ownership or occupancy of land are defined according to formalized national legal or constitutional processes. They are most effective where land values are high and transactions among strangers are frequent.

Informal land tenure: This is a type of holding land where means of access is vested through unsanctioned occupation, allocation by local leaders, inheritance, and purchase from those who purport to own the land (Kironde, 1997). People obtain land rights without having acquired them through the customary or statutory channels and they frequently appear in developing countries.

Customary land tenure: The mode of holding rights in land that exists through historical agreement between people within community without written laws. These unwritten laws are often based on the experiences of the elders, and are aimed defending the interests of the group/tribe (Tuladhar 2006). Land belongs to the whole community or clan and not to the individual. The clan head is the custodian of the rights and holds the rights on behalf of the community. Once the rights are granted to an individual they are held in perpetuity as long as the grantee conducts himself in a manner satisfactory to the grantor (Kombe, 1995). Land holding under customary tenure is derived from continued occupation and is administered according to local custom and therefore varies from one area to another (Silayo et al. 2008).

However, common characteristics include: Individual or groups acquire guaranteed communal rights of access and use of community land by virtue of their kinship relations. Customary land tenure concepts have evolved from the needs of agriculture societies and are generally based on the notion that land initially belonged to the person who cleared it. Given its relative abundance, and the practice of shifting cultivation, land had no significant economic value other than means for production, so the need to retain or develop any system of rights to a particular area of land that could not be protected was both unnecessary and illogical when land was abundant (Feder and Noronha 1987). Community leaders play a major role when determining allocation, use, transfers and other activities related to land and they do this on behalf of the community

members, the determinant is according to needs rather than through payments, though some form of token amount is sometimes given as a sign of agreement. The distinction often made between statutory rights and customary rights is now becoming blurred in a number of countries, particularly in Africa, which provide formal legal recognition to customary rights (FAO, 2002).

2.4 LAND OWNERSHIP SYSTEM

Land tenure describes land ownership system in Tanzania. As derived from a Latin term tenure stands for “holding” or “possessing,” land tenure means the terms on which something is held: the rights and obligations of the holder. It is a legal term that means the right to hold land rather than the simple fact of holding land and therefore, one may have tenure but may not have taken possession (Bruce, 1998).

In Tanzania, the Land Ordinance Act, Cap 113, of 1923 (Revised in 1957), all land, whether occupied or unoccupied, belongs to the Republic of Tanzania and is Public Land. This means that land is under the control of the President and is held and administered for the use and for the benefit of the citizens of Tanzania.

The National Land Policy (NLP) of 1995 revised in 1997 promotes land tenure system to encourage the optimal use of land resources and to facilitate transport based social economic development. The policy led to the enactment of the Land and Village Land Act in 1999 which establishes three categories of land; Reserve Land as land set aside for special purposes, such as forest reserves, games parks, and land reserved as a land set for public utilities. General Land is the land which is outside the reserved and the Village land. The Village Land constitutes 70% of the total land in Tanzania followed by the reserved land that accounts for 28% and 2% for general land (Dinh & Monga, 2013).

Tanzania uses title registration system as the occupancy rights on land. Citizens can obtain occupancy rights on land issued by the President. Occupancy right is defined as a title to the use and occupation of land and includes the title of a native community lawfully using or occupying land in accordance with native law and custom (Tenga, 1992). The right of occupancy has two forms namely: the Granted Right and the Customary Right of Occupancy.

2.5 CUSTOMARY LAND RIGHTS

Customary land rights refer to the traditional rights and practices of indigenous or local communities to use, manage and control land and resources according to their customs and traditions (Sanga, 2009). These rights are often recognized and protected by national laws and international agreements, but they can also be challenged or ignored by outside interests. Customary land rights can include the right to use land for farming, hunting, gathering and other activities as well as to pass through generations. They can also include the rights to participate on decision making about the use and management of land and resources.

In Tanzania, village land is governed by Village land Act which provides two types of tenure including Granted rights of occupancy and Customary rights of occupancy (Lamba,2005). With the total number of 9000 villages in Tanzania the responsibility for the adjudication, survey and registration of customary rights to village land is given to the elected Village councils and village adjudication committee (URT, 2001). Also, these committees maintain the village land registries then submit them to district councils which issues the certificates.

2.6 CADASTRAL SURVEY

A cadastral survey is a land measurement activity whose purpose is to describe new or changed boundaries of land parcels and includes recovery and restoration of lost boundaries (Silayo, 1997). The description may be textual, numerical, graphical or a combination of these. The surveys provide basic information about geometric description (including spatial location, size and shape) of land parcels (Silayo, 2001). Such information is prerequisite to successful land registration in Tanzania.

The chapter 324 of the Land Survey Act of Tanzania, Part I (2) states “cadastral survey means any survey the purpose of which is to obtain information for recording the position of the boundaries of lands in separate ownership or intended to be the subject of any disposition or partition, or re-establishing such boundaries on the ground or setting out new boundaries on the ground” (URT, 1999).

The principal purpose of cadastral surveys in Tanzania is to give unambiguous spatial locations, sizes and shapes of land parcels (Silayo, 1997) specifically for land registration. Cadastral

information is important in the assignment, processing and transfer of interests in land, levying land tax, supporting land markets, land development planning and so on.

2.6.1 Types of cadastral survey in Tanzania

In Tanzania there are two types of cadastral survey which are;

i.) Urban cadastral survey.

Refer to the type of cadastral survey that conducted in urban areas that requires the approved town plan drawing (TP drawing) and the whole survey is done according to that TP drawing information (Silayo, 2005). In urban area cadastral survey relay on the town planning provided by planners. Planners are the one responsible for preparation of proposal for provision of plots depending on the demand of plots. The planning prepared usually shows the distribution of residential area, industrial area, commercial area, open spaces and so on. After the acceptance of the proposed town plan by director of urban development, the plan passes to the director of survey and mapping (SMD) and then to the Commissioner for land for implementation.

After the approval of town planning request for the survey and survey instruction is made, commissioner for land made request for survey by filling a part in a form number SF37 and the survey instruction is made by director of survey and mapping by filling the same form of SF37 (Silayo, 1997).

The request for survey permits the surveyor to enter the land and surveying according to the TP drawing, also the purpose for survey instruction is to confirm that there are no surveys that have been done in the respective area and if there is then, it should be nullified by issuing new survey instruction (Mango, 2015). Also, the survey instruction and request can be issued in the regions by the regional land surveyor on behalf of director of survey and mapping and commissioner for land.

ii.) Rural cadastral survey.

This is the type of cadastral survey that take place in rural areas where by surveyor sets out parcels from the sketch plans that show approximated locations and sizes of the land to be surveyed (Silayo, 2005). In rural areas the survey is initiated by the land owner who writes a letter for the need of surveying to the district land officer. The planners are consulted for advice and the survey for land can be done then the title for the land parcel is provided to the land owner (Katambi, 2009).

Procedures for land survey in rural areas are same as that of urban areas except for the issue of releasing survey instructions in rural areas may depend on the size of the area to be surveyed. Parcel that does not exceed 100 acres, the survey instruction can be issued by the district land development office, and for the parcel that does not exceed 500 acres the survey instruction can be issued by the regional land development office, while for the land parcel that exceeds 500 acres the survey instruction is issued by the ministry of land development in the country. In rural areas since there is no Town planning, the land owners are the ones responsible for showing surveyors boundaries of their parcel and adjudication should be done to avoid encroachments and boundaries conflicts after surveying (Silayo, 1996).

2.6.2 Steps of cadastral survey in Tanzania

Cadastral survey in Tanzania encompasses three mandatory stages that should be followed for the completion of cadastral work. These stages are main ones to which at some points they can be divided into some smaller steps, but in general those major steps are;

1. Request of Cadastral Survey

Request of the cadastral survey is done after some initial steps are taken. These prerequisites are intended to check and determine the existence of TP drawing(s) that will guide survey execution and the need for the survey. A satisfaction for these requirements leads to the request of survey to the District or Municipal/Urban authority as section 9 of the Government Notice No. 72 of 2001 directs (URT, 2001). Successful requests will be issued survey instructions and data access by the Director of Surveys and Mapping Division (SMD).

2. Cadastral Survey Execution

These are the medium steps for actual execution of cadastral surveys. They include; methods, techniques and the logistics on how to conduct the survey. Key functions in this step consider; Reconnaissance, planning and costing, establishment of the control network to be used, demarcation and coordination of the block, subdivisions of parcels, taking survey details, signing the boundary certificates, processing, preparing a draft cadastral plan and compiling the cadastral file ready the submission for approval (Mango, 2015). As the fact of project based, it is clear for how long it will take to complete these tasks contrary to the others that are dependent to unpredictable factors.

3. Submission of the Cadastral Survey Work

Compiled cadastral file and the draft of the cadastral plan in hardcopy format are to be checked by a licensed surveyor and once it passes, it will be submitted to the office of the Director of Surveys and Mapping (SMD) for further scrutiny and approval.

2.6.3 Cadastral survey methods

The options available to the surveyor for carrying out a cadastral survey are either Ground Survey methods or Photogrammetric methods (Mango, 2015). These methods differ in terms of equipment needed, techniques used, accuracy requirements, personnel, time and cost necessary to accomplish the surveys. Graphical and compass methods have been useful in the past. Scientific and technological developments, which are faster, more accurate and much cheaper, have rendered them (the plane table and compass surveys) obsolete. Numerical methods employ precise equipment and techniques to obtain accurate and reliable mathematical data from which numeric; textual and graphic records can be compiled (Silayo, 2009).

These methods use the traditional optical equipment; including theodolites, tacheometers, Electrooptical Distance Measurement Equipment (EDM), calculators; and the modern Global Positioning Systems (GPS), Total Station and Computers. These methods meet the requirements of fixed boundary surveys.

Photogrammetric methods are a form of graphical surveys. They are used to obtain accurate information about land from interpretation and measurements made from aerial photographs.

These methods are cost efficient if the area surveyed is extensive with air visible parcel boundaries. The methods are ideal for the description of general boundaries. Use of either ground or photogrammetric method, requires control frameworks.

2.6.4 Adjudication

Adjudication is the process of final and authoritative determination of the existing rights and claims of people to land (FAO, 2003). This may be in the context of first registration of those rights, or it may be to resolve a doubt or dispute after first registration. Adjudication is also a standard procedure prior to the operation of a land consolidation scheme.

The process of adjudication should simply reveal what rights already exist, by whom they are held and what restrictions or limitations there are on them. In practice, of course, the mere fact of a final and definitive recording of these rights is a significant change in those jurisdictions where previously there had been uncertainty (Hussein, 1998).

The process of adjudication may be sporadic or systematic, as with registration. Sporadic adjudication is a parcel-by-parcel approach, usually triggered by some specific event, like the sale of the property. Depending on the jurisdiction sporadic adjudication will then involve demonstrating that the title is basically sound before it is accepted and entered into the registration system. (UNECE, 1996.)

According to the land Act of 1999 of Tanzania on the matter of adjudication process it explains that;

> Section 28(4) of GN No. 85 of 4/5/2001
>
> (Made under s.59 and 179 of the Land Act, 1999) states that the procedure of land adjudication requires the adjudication team to walk around the land, tracing, ascertaining, verifying, determining and marking the boundaries of the land being adjudicated. (URT, 2001).

2.7 PARTICIPATORY MAPPING

Participatory mapping is a map-making process that attempts to make visible the association between land and local communities by using the commonly understood and recognized language of cartography. Participatory mapping emerged in the 1980s from participatory rural appraisal methodologies and has now gained prominence as a community-based mapping tool. Similar terms used to refer to participatory mapping in other domains are participatory GIS, community mapping, indigenous mapping, bottom-up GIS, and public participation. The terms have differences in their application, but fundamental to these is using the collective indigenous knowledge of a group to make maps.

The approach is widely adopted and used in many domains. In the domain of land administration, the approach is used to facilitate local land administration through identification (adjudication), delineating, and recording of communal or indigenous land rights (Di Gessa, 2008).

Participatory mapping emerged from a need for more inclusive methods of collecting spatial data with the intention of democratizing the decision-making process. It encompasses a range of methods including mental mapping, sketch mapping, and participatory geographic information systems.

2.8 METHODS OF PARTICIPATORY MAPPING

2.8.1 Hands-on mapping

Description: Hands-on mapping includes basic mapping methods in which community members draw maps from memory on the ground (ground mapping) and paper (sketch mapping). These maps represent key community-identified features on the land from a bird's eye view. They do not rely on exact measurements, a consistent scale or geo-referencing, yet they do show the relative size and position of features.

Uses:

i. They can help provide a broad picture of issues and events covering a large area and can be useful to introduce and acquaint a community with maps and build confidence in using the cartographic medium.

ii. They can help plan subsequent mapping activities and engage non-expert users. This approach to mapping is especially useful when engaging non-literate communities and those from marginal livelihood systems including indigenous people, forest dwellers and pastoralists.

Strengths:

i. Hands-on mapping techniques are low-cost and not dependent on technology.

ii. They can be delivered in a short time frame and provide tangible short-term outcomes.

Drawbacks:

The final map outputs are not geo-referenced and can only be transposed onto a scale map with difficulty. This makes them less useful when locational accuracy is important (e.g., when there is a need to determine the size of an area or make other quantitative measurements). This lack of cartographic accuracy undermines their credibility with government officials and thus diminishes their potential for advocacy. Although the final map can be photographed, the long-term usefulness of ground maps is further undermined by their impermanence and fragility.

2.8.2 Participatory mapping using scale maps and images

Description: Local knowledge is identified through conversation and then drawn directly onto a photocopied map or remote-sensed image (or else onto clear plastic sheets placed on top of the map). The position of features is determined by looking at their position relative to natural landmarks (e.g., rivers, mountains, lakes). This method is commonly used where accurate and affordable scale maps are available. This method also works well with aerial and satellite images, which can be particularly helpful when working with people who cannot read a topographic map and with non-literate communities, including those from marginal livelihood systems (e.g.,

indigenous peoples, forest dwellers and pastoralists). Additional information can be located on the map using GPS data gathered in the field.

Uses:

i. Scale mapping techniques are a good format for communicating community information to decision-makers because they use formal cartographic protocols (e.g., coordinate systems and projections).

ii. Information can be incorporated into other mapping tools (including GIS) and GPS data can be easily transposed onto these scale maps. When accuracy is required but scale maps are not available, they can be made using survey equipment including compasses and GPS tools. This approach to participatory mapping is important in regions where accurate topographic or other scale maps are not available, such as in remote and marginal areas which often tend to be inhabited by indigenous peoples, forest dwellers and pastoralists. The time and energy required to create scale maps from scratch are considerable.

Strengths:

i. This mapping approach is relatively cheap and fast and still provides an accurate spatial representation of local knowledge (particularly if the information drawn on the map is 'ground-truthed' using a GPS).

ii. The resulting map can be used to determine quantitative information (e.g., distance and direction).

Drawbacks:

i. In some countries, access to accurate scale maps is regulated and difficult. Furthermore, maps in some areas might not be accurate or up-to-date.

ii. A final drawback is that using scale maps requires understanding formal cartographic protocols (e.g., scale, orientation and coordinate systems) which can be challenging for non-literate people.

2.8.3 Participatory 3-D models (P3DM)

Description: Participatory 3-D modelling is a community-based method that integrates local spatial knowledge with data on land elevation and sea depth to produce stand alone, scaled and geo-referenced models. Participatory 3D Models are scale relief models created from the contours of a topographic map. Sheets of cardboard are cut in the shape of the contour lines and pasted on top of each other to create a three-dimensional representation of topography. Geographic features can be identified on the model using pushpins (for points), colored string (for lines) and paint (for areas). Data depicted on the model can be extracted, digitized and incorporated into a GIS. On completion of the exercise, the model remains with the community.

Uses:

i. As with many forms of participatory mapping, P3DM can be used to encourage the re-discovery and visualization of local community knowledge. This is particularly the case with the models in their encouragement of intergenerational dialogue.

ii. The process requires a large degree of community involvement, which can help build a greater sense of community cohesion, especially when used as part of a community land-related planning process. The model can accommodate overlapping layers of information (i.e. it functions like a rudimentary GIS) and the data depicted on the model can be extracted, digitized, plotted and incorporated into a GIS.

iii. The finished 3-D model can become a permanent installation depicting community spatial knowledge and is often displayed in a community Centre. The models are reusable for multiple planning exercises and their sheer size means that they cannot be removed from the location where they were created.

Strengths:

i. The 3-D aspect of the model is intuitive and understandable. This is important for non-literate groups.

Drawbacks:

iii. Creating the model is labor intensive and time-consuming, yet the time required to create the model can also be interpreted as a strength of the activity because people spend time together during which discussion of important spatial knowledge takes place.

iv. Storage and transport of the model can be difficult, which makes it more difficult to immediately communicate community information to decision-makers.

2.8.4 Geographic Information Systems (GIS)

Description: GIS are computer hardware and software technologies that are used for storing, retrieving, mapping and analyzing geographic data. GIS technology has been long regarded as complicated, costly and used primarily by experts. Since the 1990s, the participatory GIS (PGIS) movement has sought to integrate local knowledge and qualitative data into GIS for community use. PGIS practitioners (who are often technology intermediaries from outside the community) work with local communities to democratize the use of the technologies. GIS technologies increasingly are being used to address land-related issues with examples springing up around the global South. Interestingly, these applications usually have been adopted without significant redesign of GIS. To an extent, this reflects the flexible nature of GIS software.

Uses:

i. GIS are used to store, retrieve, analyze and present spatial (or land-related) information.

ii. They can integrate local spatial and non-spatial data to support discussion and decision-making processes.

iii. Their strength in working with precise geo-referenced information makes them very attractive for project management.

Strengths:

i. The analytical functionality of GIS can be used for designing the management of natural resources and lands.

ii. Maps produced using GIS also convey a sense of authority which makes them a valuable tool for advocacy (especially important for indigenous peoples, forest dwellers and pastoralists) and for influencing land-related decision-making processes.

Drawbacks:

GIS have a steep learning curve, even for people with extensive computer knowledge. They require continual updating of software and re-training. Projects and other users need to recognize that there are long-term operating costs – not just start-up outlay. These expenditures make GIS too expensive for many communities to buy and maintain.

2.8.5 Multimedia and Internet-based mapping

Description: Maps are frequently supplemented with the written word, but this can be an imperfect medium to represent local knowledge, especially for indigenous peoples, forest dwellers and pastoralists who are more likely to be non-literate and accustomed to communicating orally. Much local knowledge about the land is transmitted in the form of stories and legends that use metaphor and sophisticated terminology that might be lost if the information is transcribed. Multimedia and Internet-based mapping can combine the usefulness of maps with other embedded digital media, such as video, images and audio, which can be better at documenting the complexities and the oral and visual aspects of local knowledge. This form of participatory mapping is becoming increasingly popular in either stand-alone systems or through the Internet and can be used to communicate complex, qualitative local knowledge related to the landscape.

Uses:

i. This form of mapping supports local communities in expressing, documenting and communicating their traditional and contemporary land-related knowledge using a medium that is closer to traditional oral systems of knowledge transfer.

ii. It integrates local spatial and non-spatial data to support discussion and decision-making processes.

iii. It facilitates communicating land-related traditional knowledge with outsiders and within the community (particularly between generations) in an accessible and engaging format (especially video).

Strengths:

i. This is an excellent system for communicating local knowledge in a very engaging format, combined with effective transfer of tangible computer-based skills to community members.

ii. It is easy for the end user to access and learn about local knowledge. It is also easier and cheaper than the more complex GIS.

Drawbacks:

i. This approach remains expensive for many communities.

ii. Training is required to understand the computer equipment, as well as video production, photographic editing and file management software.

iii. This approach is more complex to grasp than using scale maps or making sketch and ground maps.

iv. There is a danger that practitioners focus too much on the technology to the detriment of the participatory process.

v. In many remote communities, access to the electricity required to run the equipment is intermittent or totally unavailable.

2.9 RELATIONSHIP BETWEEN PARTICIPATORY MAPPING AND CUSTOMARY LAND RIGHTS

Participatory mapping is the method of mapping that involves local community to map their areas by using recognized language of cartography. So, in this method indigenous are directly

involved to which it makes easier for the local governments to control and preserve customary land rights of their citizens since they are the ones who made map of their own land.

As during the adjudication of the boundaries where existing rights are determined it is better to link it with the indigenous mapping since it creates awareness and trustworthiness. Indigenous communities will have much trustworthy of the process because they are involved and with that there will be less land conflicts in the community and thus customary land rights will be maintained in the community.

CHAPTER THREE
METHODOLOGY

3.1 INTRODUCTION

This chapter explains how data was collected as well as the methods and theories used during data collection. On this dissertation data required are those that led to the analysis of the participatory mapping method as well as its assessment. So, in order to get these data, there must be people who have done the participatory mapping thus assessment and analysis of the process with the aim of identifying its roles can be done. In addition, the chapter demonstrates the case study area where this dissertation was conducted as well as the timeline.

3.2 RESEARCH DESIGN

The research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring you will effectively address the research problem (Trochim, 2016). The function of the research design is to ensure that the evidence obtained enables you to effectively address the research problem as unambiguously as possible (New York University, spring 2006). Research design gives proper direction and time-table to research activity, it keeps adequate check on the research work and ensures its completion within certain time limit and keeps the whole research project on the right track (Godwin, 2005). It introduces efficiency in investigation and generates confidence in the final outcome of the study (Rwegeshora, 2006).

This study used the cross-sectional research design type since this approach according to Leverage Edu (2021) it examines data from a population or a representative sample of the population at a specific point in time. Considering the budget of the study and the time provided for the study being small, this design appears to fit in. the main strength of cross-sectional studies is that they are relatively quick and inexpensive to conduct (Xiaofeng, 2020).

3.3 CASE STUDY AREA

Lushoto is located in the Eastern Arc Mountains in the Tanga region in northeast Tanzania (Braslow Juliet, 2016). There were several researches concerning participatory mapping that was done in lushoto district among of those researches was done at Malindi village. So, doing this

research in this particular area was appropriate since the data acquired will be relevant due to the previous research.

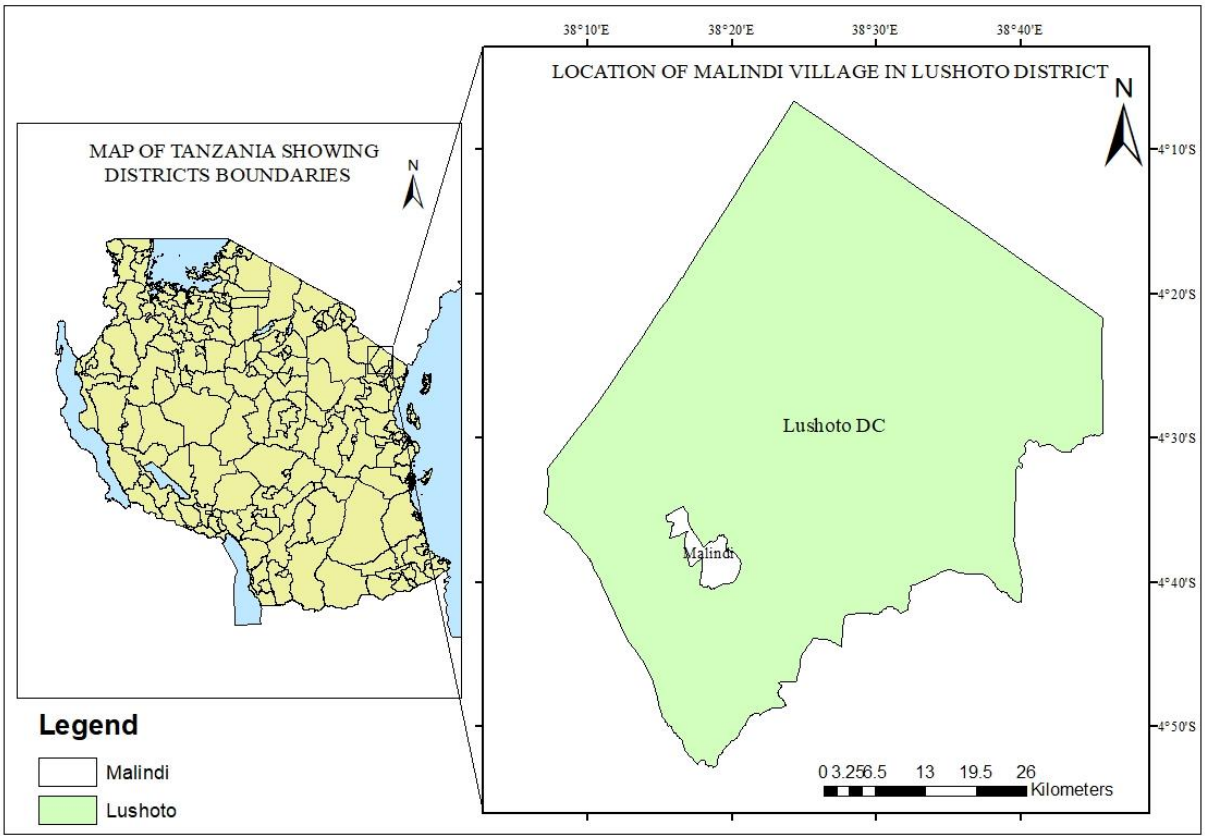

Figure 1: Map showing case study area of Malindi village in Lushoto district.

3.4 SAMPLING

Sampling is a subset of population used to represent the entire group of a whole population (Bartlett, 2001). The sampling is an important feature of any empirical study in which the goal is to make inferences about a population from the sample (Babbie, 1990). In order to answer the research questions, it is doubtful that researcher should be able to collect data from all cases. Thus, there is a need to select a sample (Hamed, 2016).

Regarding literature reviews that a researcher has done, then in this study a researcher decided to come up with stages on the process of sampling and data collection. The following stages were followed during the sampling and data collection as shown in the figure below;

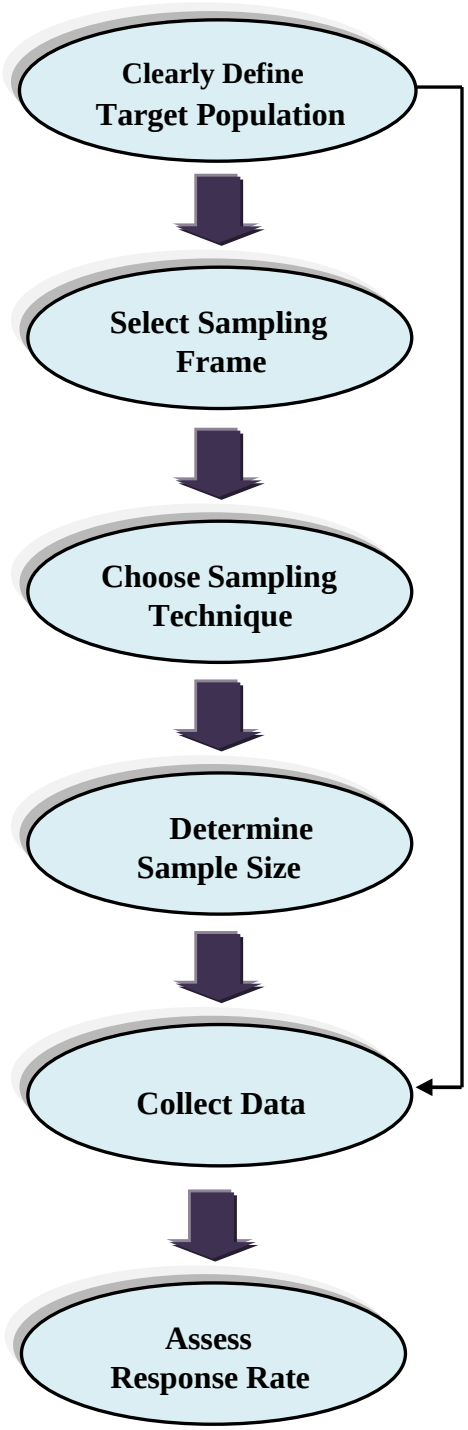

Figure 2: Sampling process steps

3.4 STUDY POPULATION

Considering the nature of the research design which is cross sectional research design then the study has to examine data from population or representative sample of the population. Study population is the group considered for a study or statistical reasoning usually have the common characteristics. In this study the population targeted was people live in Lushoto district council at Malindi village. Due to the fact that the village has already done a participatory mapping so the researcher target was to examine and asses the method in order to determine the role played by the method in adjudication process for customary land rights.

3.5. SAMPLING TECHNIQUES

Prior to examining the various types of sampling method, it is worth noting what is meant by sampling, along with reasons why researchers are likely to select a sample. Taking a subset from chosen sampling frame or entire population is called sampling. Sampling can be used to make inference about a population or to make generalization in relation to existing theory (Hamed, 2016). In essence, this depends on choice of sampling technique.

In this study the sampling techniques used were non-probability sampling since they seem to fit the nature of the study in the process of sampling and data collection.

3.5.1 Non-probability Sampling

Non-probability sampling is often associated with case study research design and qualitative research. With regards to the latter, case studies tend to focus on small samples and are intended to examine a real-life phenomenon, not to make statistical inferences in relation to the wider population (Yin, 2003). A sample of participants or cases does not need to be representative, or random, but a clear rationale is needed for the inclusion of some cases or individuals rather than others.

3.5.2 Quota sampling

Quota sampling is a non-random sampling technique in which participants are chosen on the basis of predetermined characteristics so that the total sample will have the same distribution of characteristics as the wider population (Davis, 2005).

3.5.3 Snowball sampling

Snowball sampling is a non-random sampling method that uses a few cases to help encourage other cases to take part in the study, thereby increasing sample size. This approach is most applicable in small populations that are difficult to access due to their closed nature, e.g., secret societies and inaccessible professions (Breweton and Millward, 2001).

3.5.4 Convenience sampling

Convenience sampling is selecting participants because they are often readily and easily available. Typically, convenience sampling tends to be a favored sampling technique among students as it is inexpensive and an easy option compared to other sampling techniques (Ackoff, 1953). Convenience sampling often helps to overcome many of the limitations associated with research.

3.5.5 Purposive or judgmental sampling

Purposive or judgmental sampling is a strategy in which particular settings persons or events are selected deliberately in order to provide important information that cannot be obtained from other choices (Maxwell, 1996). It is where the researcher includes cases or participants in the sample because they believe that they warrant inclusion.

3.6 SAMPLE SIZE

Sample size refers to the number of participants or observations included in a study (IWH, 2008). The size of the sample influences two statistical properties which are; the precision of our estimates and the power of the study to draw conclusion (IWH, 2008). Sample size is the group of people, objects, or items that are taken from a larger population for measurement and it should be representative of the population so that we can generalize the findings from the research sample to the population as a whole (Taherdoost, 2016). The sample size is an important feature of any empirical study in which the goal is to make inferences about population (Babbie, 1990).

In this study sample size was 70 people from Malindi village selected considering their experience on participatory mapping. The sample size of 70 people was due to the number of people participated in the previous project of participatory mapping and also regarding cost and time on the stage of data collection planned in this research.

3.7 TYPES AND SOURCES OF DATA

Data are the individual pieces of factual information recorded, and it is used for the purpose of the analysis process (Hamed, 2016). It can be numbers, words, measurements, observations or even just descriptions of things (Human Resources, 1991). Data can be qualitative or quantitative (ibid). Qualitative data also called categorical data, is used to categorize something in a descriptive, expressive way, rather than through numerical values. Qualitative data can be gathered through interviews, questionnaires, focus groups and so on. Quantitative data is information that can be counted or measured, or in other words, quantified and given numerical value.

For the case of data sources often there are two types of data sources and both types were used in this research. Those sources are Primary data and Secondary data sources which are described below;

3.7.1 PRIMARY DATA

These are data collected directly from the field from the respondents (Rwegeshora, 2006). Primary data are those, which are collected for the first time, and thus they were original in character (ibid). Considering primary data are those data collected directly from the respondents. The primary data was collected through structured interviews and questionnaires based on examining and assessing the role of participatory mapping in the adjudication process for customary land rights.

3.7.2 SECONDARY DATA

Secondary data are collected by someone other than the user (American Heritage Dictionary of English Language, 2000). Common sources of secondary data for social sciences include censuses, organizational records and data collected through qualitative or quantitative research (Babbie, 1990). Therefore, secondary data are not original because they are not collected for the first time, they have already been processed and used by others (Bartlett, 2001). In order to increase accuracy of the study, secondary data are used to prove the primary data obtained thus increasing the value of the data. In this study a researcher collected secondary data of documented materials include books, articles, papers and journals from previous reports and dissertations.

3.8 DATA COLLECTION TOOLS

Data collection is the process of gathering and analyzing accurate data from various sources to find answers to research problems, trends and probabilities. According to Human Resources (1991) data collection is the process of preparing and collecting data for the purposes of obtaining information to keep on record and get reality about a certain matter. Sometimes it helps to make decisions about important issues (Manheim, 1977). There are several data collection tools or methods include observations, experiments, clinical trials, interviews, documentation, administrative surveys and questionnaire. As of protocol of collecting data involving society there must be a signed permission from the district council to allow a researcher to collect data in that district. So, all protocols were followed and permission was granted to a researcher and then the process of collecting data continued.

The methods used in this study were questionnaire and interview for the collection of required data. On this part methods used are explained accordingly and how they were used on collection of data.

3.8.1 QUESTIONNAIRE

A questionnaire is a research tool featuring a series of questions used to collect useful information from respondents. According to Hader and Lindman (1987), questionnaire means list of research questions asked to respondents and designed to extract specific information.

In this study closed questionnaires was used in which 70 questionnaires were prepared in Swahili language so that they were simple to be understood by indigenous citizens in the village. The method was selected by the researcher since it avoids bias and also guiding respondents to focus on the topic to which the researcher is examining. Also, during the data collection by using questionnaires respondents were given a chance to answer questions based on their own thoughts and there were no middle man or researcher himself influence on answering questions.

3.8.2 INTERVIEWS

Interview is the process consisting of dialogue or verbal responses between two people or persons or between several persons (Hader and Lindman, 1987). An interview is an interaction process between the interviewer and interviewee in the course of data collection for a particular

subject of study or objective (Fowler, 1996). This method shall be used because it is useful to obtain detailed information about personal feelings, perceptions and opinions about the study, allow more detailed questions to be asked and usually achieve a high response rate including ambiguities can be clarified and incomplete answers followed up. Lastly the interview helps to set in depth information about the study.

3.9 DATA ANALYSIS AND PROCESSING

In qualitative research, data analysis is concurrent with data collection and it is a process of transforming data into findings (Patton, 2002). That is, one begins analyzing data with the first finding obtained from the first interview, the first observation, the first document accessed in the study. Simultaneous data collection and analysis as Bryman (2004) termed it as iterative. To be precise, interaction between data collection and analysis enable the researcher to make modification on the data collection methods before finalizing the whole process. This enables qualitative researcher to use the opportunity to gather more reliable and useful data. That is, one begins with a unit of data (any meaningful word, phrase, narrative, etc.) and compares it to another unit of data, and so on all the while looking for common patterns across the collected data (Patton, 2002).

In case of data processing, the researcher has used Microsoft excel software to process his data and presenting them into tables, charts and graphs.

3.10 RELIABILITY

Reliability is a measure of degree to which a different researcher if applying the same procedure as a previous researcher in repeating and not replicating the same case the findings and conclusion will be consistent (Yin, 2009). The aim of doing reliability check is to minimize errors and biases in research. In order to achieve reliability, this research used a tactic of documenting the research procedures as among the tactics suggested by Yin (2009) to achieve reliability.

3.11 VALIDITY

Validity is concerned with the accuracy of the data obtained and how it represents the concept of the study. It aims at minimizing subjectivity during data collection and analysis (Mugenda and

Mugenda, 2003). Validity in research is important because it can help to determine what types of tests to use, and help to make sure researchers are using methods that are not only ethical and cost-effective, but also a method that truly measures the idea or construct in question (Davidson, 1999). In this study the researcher applied triangulation method to achieve validation. Triangulation method is a process of collecting data by using multiple sources where by the information or facts obtained from each source are corroborated with each other. Since case study usually applies multiple data collection methods (Sheuya, 2004) triangulation was easily achieved.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 OVERVIEW

This chapter presents study findings and discussion. The aim of the study was to assess the role of participatory mapping in the adjudication process for customary land rights, so through this research the data was collected from local citizens in order to achieve the aim. This chapter focused on analyzing importance of participatory mapping, assessment of the execution method of participatory mapping and analyzing the comparison of participatory mapping and the oral adjudication.

4.2 DEMOGRAPHIC CHARACTERISTICS

The following are demographic characteristics results from respondents of Malindi village in Lushoto District.

4.2.1 EDUCATION LEVEL

Among the demographic character asked was the education level of the respondent. In order to check on education level of the local citizens who had participate on the execution of the method of participatory mapping. The following results represented on the Table 1 below was acquired;

Table 1: Showing the results on Education levels.

EDUCATION LEVEL	FREQUENCY	PERCENTAGE
PRIMARY EDUCATION	27	38.57%
SECONDARY EDUCATION	26	37.14%
NON-FORMAL EDUCATION	11	15.71%
OTHER FORM OF EDUCATION	6	8.57%

Source: Field work 2023.

Author’s illustration.

According to the results above it seems that mostly people have accessed formal education which might lead them to be more positive and seek for development concerning land issues.

4.2.2 AGE

Age of respondents was also asked so as to assess the age of people who participated in the project of participatory mapping since the method highly involves the decision making, so it is better to know the age of respondents who participated. The following results on Table 2 show the frequency and percentage age of the respondents.

Table 2: Showing results of age of respondents participated

AGE INTERVAL	FREQUENCY	PERCENTAGE
18-30	11	15.71%
31-50	33	47.14%
51-80	26	37.14%

Source: Field work 2023.

Author's illustration.

The results above show that people aged 31-50 are the ones who participated the most in the participatory mapping project that was conducted at Malindi village. So, regarding this result it shows that mostly people aged between 31 and 50 are mostly participating in the matter concerning land followed by people aged 51-80 and last people aged 18-30 participated in low percentage.

4.2.3 GENDER

Gender of the respondent was also asked in the demographic characteristics. The followings are results showing the percentage and frequency of the gender of respondents as clarified on Table 3 below.

Table 3: **S**howing results of respondents ' genders

GENDER	FREQUENCY	PERCENTAGE
MALE	54	77.14%
FEMALE	16	22.86%

Source: Field work 2023

Author's illustration.

Regarding the results above, it shows that mostly male are participating on matters like this. The reason behind this might be because mostly men own land compared to women.

4.3 ANALYSIS OF THE IMPORTANCE OF PARTICIPATORY MAPPING

In order to analyze the importance of the participatory mapping in the adjudication process for customary land rights a researcher consider importance of the method in two issues; protection of customary land rights by practicing a participatory mapping, solving land issues by using participatory mapping method and analyzing if the method helped local citizen on understanding more about their land rights.

The following results based on the question asked if the method of participatory mapping helped on solving land issues and protection of customary land rights. The figure 3 below shows percentage of respondents who agree that the method helped as well as those who disagree.

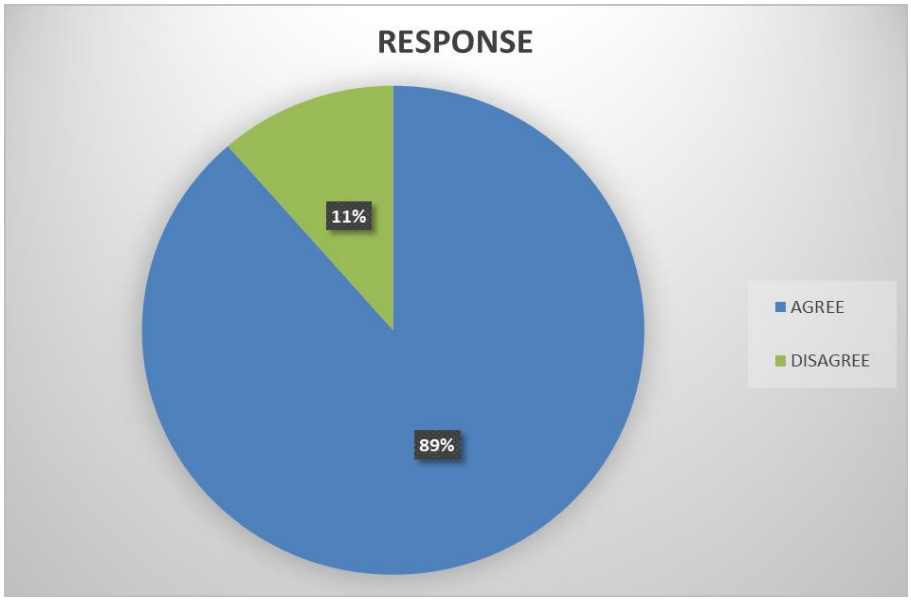

Figure 3: number of respondents for land protection.

On the matter of increasing the understanding of local citizens, the figure 4 shows the response of respondents when they were asked if the method of participatory mapping increased their understandings on matter of land and its rights. Those who said YES agreed that the method helped them to boost their understanding and those who said NO denied that the method did not boost their understandings.

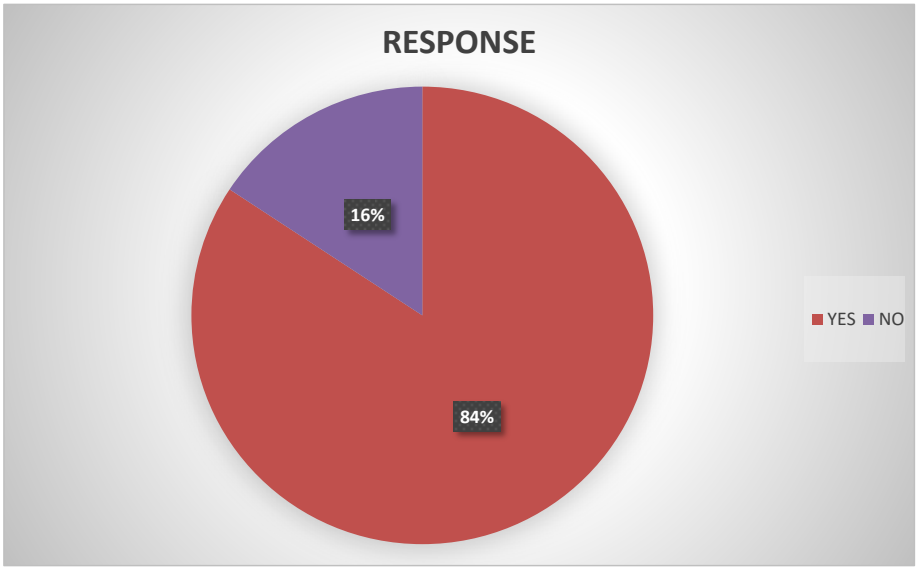

Figure 4: number of respondents on increase of understanding of land matters.

Above pie charts are results of data collected by using questionnaires on the matter of importances of participatory mapping in the adjudication process for customary land rights. According to the results shown above, most people found participatory mapping method to be of great important on matter of protection of customary land rights and on solving land disputes. Also, many people agreed that the method helped them on understanding more on land issues after they participated.

Also, by interviewing these indigenous citizens on matter of importances of doing participatory mapping, they had few things to say;

i. The method showed that, matters concerning land can be solved by cooperation of villagers together toward the issue since they had focusing groups during the execution of the method and everybody was allowed to contribute his/her thoughts.

ii. By doing participatory mapping people are being assured on the protection of the customary land rights since they fully participated on the whole process of adjudication.

4.4 ASSESING THE EXECUTION OF THE METHOD

On the assessment of the execution of the method through questionnaires and interviews people were asked if they fully participated on the execution of the method, if they understood all procedures during the execution of the method and lastly they were asked on difficultiness of the method. The actual reason for assesing the execution of the method was to see if the method is well implemented and if it is of advantage to the community.

The following table showing the response of the local citizens when they were asked about their participation and understanding of the method.

Table 4: showing participation and understanding amount in the execution of the method.

		FULL PARTICIPATION	NO FULL PARTICIPATION	TOTAL
PARTICIPATION		66	4	70
UNDERSTANDING	YES	66	0	66
	NO	0	4	4

On the other hand, people were able to give out their opinions on the difficultness of the method considering four given levels which were simple, very simple, difficult and very difficult. These levels of difficultness were based on the execution of the method, to measure if people are comfortable with the method or not. The figure 5 below shows the results of the difficultness of the execution of the method as proposed by local citizens who have done it.

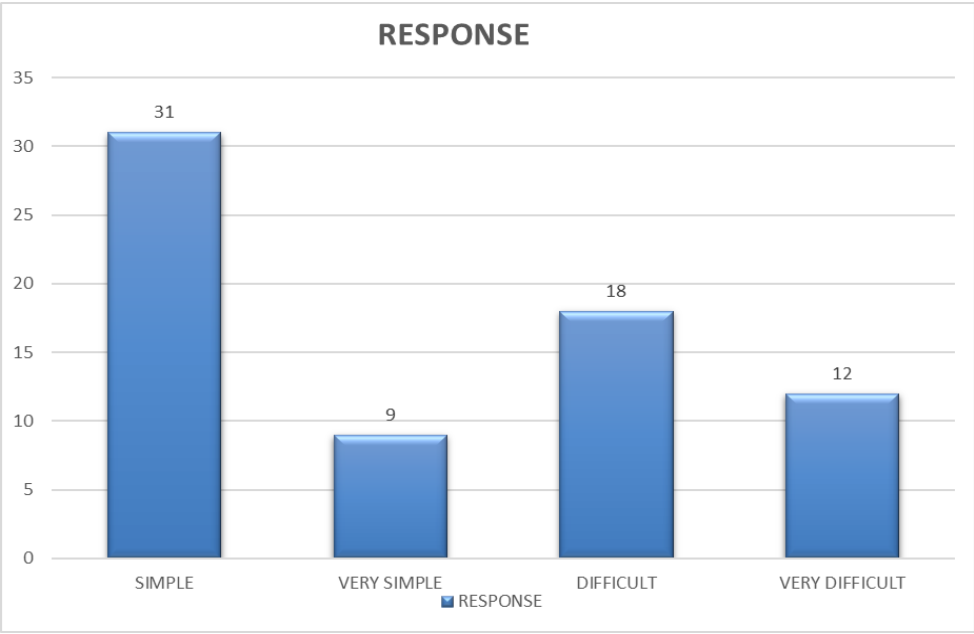

Figure 5: histogram to show levels of difficultness on the execution of the PPM.

4.5 COMPARISON OF THE PPM AND ORAL ADJUDICATION.

The comparison of PPM method and oral adjudication method was among the specific objective of the study. The reason for comparing these two method was to see if the PPM is superior of oral adjudication process that is mostly done in our country, then maybe Participatory mapping could have been suggested to be the main method in the adjudication process. The results from villagers when they were asked if PPM is better than Oral adjudication are presented on the figure 6 below. Those who agreed are represented as YES and those who denied as NO.

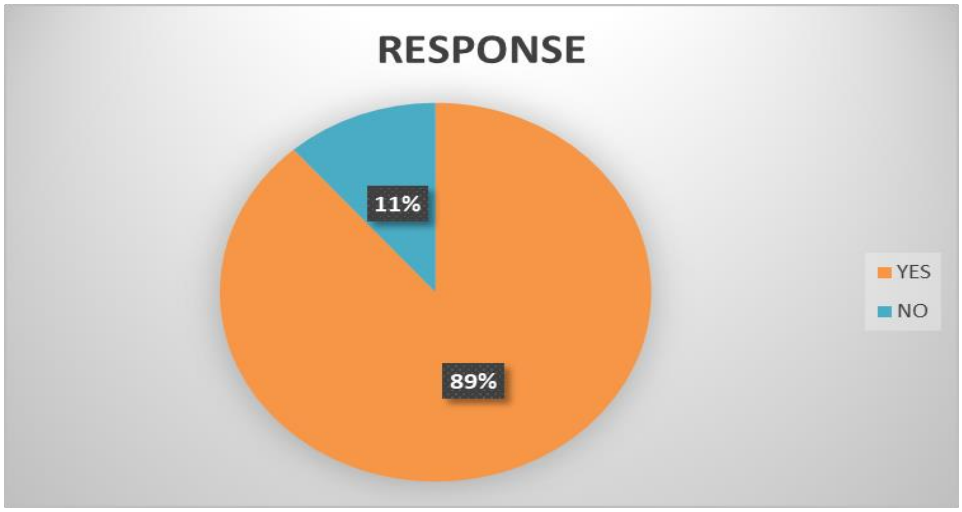

Figure 6: Number of respondents on superiority of PPM over Oral adjudication

From the results above it indicates that large amount of people found the method of participatory mapping is better to be used in the adjudication process rather than oral (usual) adjudication process. Also, from the conversations that researcher had with local citizens during an interview, they had few things to say on matter of comparison oral adjudication and participatory mapping method;

i.) Using participatory mapping method involves more decision-making participation and transparency throughout the project.

ii.) Having Focusing group discussions helped to understand others' opinions and led to gain more information concerning village's land. Thus, it gave the light for everybody to present their opinions and their understandings.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATION

5.1 OVERVIEW

This chapter covers two matters which are, the conclusion of the study from the findings obtained from the local citizens and analyzed by the researcher himself considering the main objective as well as specific objectives stated on the introduction chapter and also, on this chapter there are some recommendations made by the researcher regarding the study and its conclusion.

5.1 CONCLUSION

The main objective of this research is the role of participatory mapping in the adjudication process for customary land rights case study in Malindi village, Lushoto district. After the findings and analysis, it has been discovered that the method of participatory mapping in the adjudication process has the role of maintain the security and protection of customary land rights as well as spreading the awareness to people concerning matter of land. So, by using this method people are able to participate on land issues and has been of important to them since they are fully participating on decision making which has led to reduction of land conflicts. Also, the implementation of the method has been good so far regarding the findings from the opinions of the respondents and people mostly prefer it rather than oral adjudication that is mostly practiced.

Regarding the findings and analysis of this study, it is advised to more practice this method of participatory mapping since it is practically affecting the adjudication process in positive ways and mostly it gives chances to local people on participating in the decision making of their land that they hold customarily. Through findings and analysis, it may also be advised that the government has to consider the replacement of the usual (oral) adjudication process with the participatory mapping method since it seems to be more efficient and modernized way to be used.

5.2 RECOMMENDATIONS

Based on the findings, analysis and conclusion of the study, the following are important recommendations to be considered;

i. Stimulation of the development through participatory mapping is clearly happening in the modern world nowadays, thus more projects have to be done in our country so as to highly promote the use of this method and bettering of the adjudication process generally.

ii. More researches concerning the assessment of the method can be done too, this will increase the assurance before starting fully implement the method as the official method of adjudication in Tanzania.

iii. The requirement for the council that deals with land in our country to develop the adjudication method into more opening methods such as Participatory mapping is of highly important since these methods give an opportunity to stakeholders to fully participate in all stages.

References

Brown, G, and Fagerholm, N. (2015). Empirical PPGIS/PGIS maping of ecosystems services: A Review and Evaluation.

Brown, G. (2020). Mapping place values: 10 lessons from two decades of public participation GIS empirical research.

Bruce, J. (1998). Review of Tenure Terminology. *Land Tenure Center, University of Wisconsin-Madison.*

Bryan, B. (2011). Comparing spatial explicit ecological and social values for natural areas to identify effective conservation strategies.

Caillard, V. (2003). History of mapping in Tanzania.

Dale, P.F. and J.McLaughlin. (2000). Land Administration. *Oxford, Oxford University Press*.

Deininger, K. (2003). Land Policies For Growth and Povert Reduction. *A world Bank Publication*.

Dekker, H. (2003). The Invisible Line: Land Reform, Land Tenure Security and Land Registration.

Dinh, H.T & Monga, C. (2013). Light Manufacturing in Tanzania. *World Bank Publication.*

FAO. (2002). "Land Tenure and Rural Development." FAO land tenure studies book 3.

Feder, G. and D. Feeny. (1991). Land Tenure and Property Rights: Theory and Implications for Development Policy.

Feder, G. and R. Noronha. (1987). Land Rights System and Agriculture Development in Sub-Saharan Africa.

Goodchild, M. (2007). Citizens as sensors: the world of volunteered geography. *Geojournal*.

Hayuma, E. (2005). Tanzania Land Policy and genesis of Land reform sub-components of private sector competitives project.

Katambi, S. (2009). Development of the New Cadastral System in Tanzania.

Kironde, J. (2000). Understanding Land Markets in African urban areas: the Case of Dar es Salaam, Tanzania.

Kombe, W. (1995). Formal and Informal Land Management in Tanzania: case study of Dar es Salaam City.

Lamba, A. (2005). Land Tenure management systems in informal settlements: a case study in Nairobi.

Lugoe, F. (2008). Challenges and Issues in the Surveying and Mapping of Tanzania Land.

Mango, J. (2015). An overview of the cadastral ystem in Tanzania. *The world Cadastre Summit, Congress & Exhibition*.

Mtetewaunga, S. (1990). Social Implications of Land Reform in Tanzania.

Mukherjee, F. (2015). Public Participatory GIS. *Geography Compass.*

Payne, G. (2001). Urban Land Tenure Policy Options: tittles or rights?. *Habitat International*.

Rowe, H. (1933). Triangulation in Tanganyika Territory.

Sami, M. (2014). The Evolution of the Cadastral Surveyor.

Sanga, R. T. (2009). Assesing the Impact of Customary Land Rights Registration on Credit Access by Farmers in Tanzania. acase study in Mbozi District.

Sheuya, S. (2010). Informal settlements and finance in Dar Es Salaam, Tanzania. UNHABITAT.

Silayo, E. (2003). Country Report of Tanzania.

Silayo, E. (2005). Searching for an affordable and acceptable cadastral survey.

Silayo, E. (2008). Comparative study to land policy in 9 countries Africa and Asia.

Smith, J. (2006). The Backborne of Colonial Mapping in Eastern Africa.

Tenga, R. (1992). Pastoral Land Rights in Tanzania.

Tuladhar, A. (2006). Reengineering Cadastre and Land registration sytsems and business opportunities. *International Federation of Surveyors*.

UN-ECE. (1996). Land Administration Guidelines.

UN-ECE. (2005). "Social and Economics Benefits Good Land Administration, 2nd Edition." Working Party on Land Administration.

URT. (1997). National Land Policy.

URT. (1999). The Village land Act No. 5.

URT. (2001). National Microfinance Policy, Ministry of finance.

Van Der Molen, P. (2003). Future Cadastre: Cadastres after 2014.

Verplanke, J. (2016). A shared perspective of PGIS and VGI. *The Cartographic Journal*.

APPENDICIES