ARDHI UNIVERSITY

ASSESSMENT OF CADASTRAL INFORMATION ASYMMETRY ON RURAL LIVELIHOOD IN HAI DISTRICT

A Case Study of Hai district

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BSc Geomatics

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

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the Ardhi University dissertation titled **"Assessment of Cadastral Information Asymmetry on Rural Livelihood in Hai District"** in partial fulfillment of the requirements for the award of degree of Bachelor of Science in Geomatics at Ardhi University.

…….

Mr. METHOD, GWALEBA

Supervisor

Date…….

DECLARATION AND COPYRIGHT

I, **KIMARO, WALBRUGA D** 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.

..……..

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(Candidate)

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DEDICATION

I dedicate this dissertation to my beloved father Dionis J Kimaro and my mother lucy Didas Shirima who have raised me to be the woman I am today. I am so grateful for everything you have done for me from the moment I was born until today, for your support and prayer and endless love towards me. To my sisters and my brothers, I appreciate your effort, care and support during the year of my study. Thank you all so much for helping me throughout my academic journey.

ABSTRACT

The assessment of cadastral information asymmetry on rural livelihoods is a critical aspect of understanding the impact of land administration systems on rural communities. Cadastral information plays a crucial role in determining land ownership, boundaries, and rights, which directly affect rural livelihoods.

Due to the existing ongoing processes, laws, procedures and the modern technology used in land ownership, land use rights are still not completely secured. Cadastral information asymmetry impacts on land use rights, land ownership and land management in Masama-mashariki village was the main aim of this study.

The research employs a mixed-methods approach, combining quantitative analysis of cadastral data and qualitative investigation through interviews and structured questions with key stakeholders such as landowners and local authorities. Yamane formula was used to obtain a sample size of 150 respondents of households. The study focuses on a specific rural area, examining the accuracy, accessibility, and comprehensiveness of cadastral information.

Moreover, the study explores the relationship between cadastral information asymmetry and economic outcomes, such as agricultural productivity and land tenure security. It examines the ways in which information gaps affect land use planning, access to credit, investment decisions, and overall agricultural development in rural areas.

The research concludes by highlighting the importance of addressing cadastral information asymmetry to promote sustainable rural livelihoods. It emphasizes the need for improved data collection and management systems, increased transparency, and effective dissemination of accurate cadastral information to empower rural communities. The study contributes to the broader understanding of the role of cadastral systems in rural development and offers insights for policymakers, land administrators, and stakeholders to mitigate information asymmetry and promote equitable rural livelihoods.

The results had shown that due to asymmetry of cadastral information in rural livelihood area lead at high percentage of misunderstanding among people, undeveloped area, people fail to know their right about land and they don’t know even how to get information about land.

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LIST OF ABBREVIATIONS

IPC	Iron Pins in Concrete
SMD	Survey and Mapping Division
TP	Town Plan
SRS	Survey Registration System
CLA	Cadastral Legal Arrangements
NLP	The National Land Policy

CHAPTER ONE

INTRODUCTION

1.1 Background

In both developed and developing countries economic developments are correlated with increases demand of land. Economic development increases the development pressure on land.
Tanzania faces serious problem in cadastral information which lead to the problem of land management resources and land administration, the need for land development and short coming in land use planning practices.

Rural livelihoods are intricately connected to land tenure and property rights, making accurate and accessible cadastral information crucial for sustainable development in rural areas. Cadastral information refers to the detailed records and maps that document land ownership, boundaries, and associated rights. It plays a fundamental role in determining land use, facilitating transactions, resolving disputes, and enabling effective land administration.

However, the presence of information asymmetry regarding cadastral data poses significant challenges to rural livelihoods. Information asymmetry occurs when one party has more or better information than another, leading to an imbalance of power and unequal access to resources. In the context of rural communities, this can result from inadequate data collection and management systems, limited transparency in land administration processes, or disparities in information dissemination.

Understanding the extent and implications of cadastral information asymmetry on rural livelihoods is essential for devising effective strategies to address these challenges. It requires a comprehensive assessment of the accuracy, accessibility, and comprehensiveness of cadastral information, as well as an exploration of its impact on economic outcomes and social equity within rural communities.

Land use implies the manner through which human being employ the land and its resources. It entails the economic and cultural activities practiced on the land, which may be for different purposes such as agriculture, recreation, commercial, residential etc., (Dale and McLaughlin 2000).

Government all over the world recognize land as public good for which specialized state agencies are responsible for its provision and related service. The responsibility includes production and maintenance of quality land information through land registration system, facilitating public access and knowledge of state of title, charges and encumbrance to real estate property by notice of information (Chatterton et al., 1980; Larsson, 1991).

All land in Tanzania is a public property and is vested to the president who holds it as a trustee for the public. The control and power to manage land are vested to the government, an individual has rights to use land and other resources subject to conditions imposed by the relevant laws. However, it has been noticed that land is one of the sources of conflicts in Sub Saharan Africa. Land conflicts are a widespread phenomenon, and can occur at any time or place. Both need and greed can equally give rise to them, and scarcity and increases in land value can make things worse. They especially occur when there is a chance to obtain land for free or at a very low price regardless of whether the land is state, common or someone's private property. Some examples are; inheritance conflicts, boundary disputes, influential individuals accumulating land through illicit practices involving abuse of position, fraud, corruption and bribery, in particular in (post)conflict situations or during the early phases of economic transition, when regulatory institutions, controls and mechanisms of sanctions are not (yet) in place, (Bonn 2017).

Land use rights refers to the rights to occupy, use and make profit from the land by the land users. It approves land use application in terms of relevant legislation, but also the rights to land can be obtained by inheritance rights to use land that's attached to a certain property.

The land use rights determine what is allowed on the property in terms of the type of development and the conditions through which the development or land use are subjected. One has rights to land use if he /she has an approval to utilize or improve land in accordance with a site development plan and conditions in terms of that policy.

This study aims to fill this research gap by conducting a thorough assessment of cadastral information asymmetry on rural livelihoods. By examining a specific rural area, the study seeks to shed light on the various challenges faced by rural communities due to information gaps in cadastral data. It also explores the consequences of such asymmetry on economic activities, such as agricultural productivity, land tenure security, and overall rural development.

By combining quantitative analysis of cadastral data with qualitative investigations involving key stakeholders, this study aims to provide a comprehensive understanding of the complex dynamics between cadastral information and rural livelihoods. The findings will contribute to the existing literature on land administration systems and inform policymakers, land administrators, and other stakeholders about the need for targeted interventions to mitigate information asymmetry and promote equitable rural livelihoods.

Overall, this research is significant as it addresses an understudied aspect of land administration systems and highlights the importance of cadastral information in shaping rural livelihoods. By identifying the challenges posed by information asymmetry, this study aims to contribute to the development of strategies that empower rural communities and promote sustainable rural development.

1.2 Statement of Problem

Cadastral information is an important tool for land management and administration in rural areas. It provides valuable information on land ownership, land use, and boundaries, which is critical for the planning and implementation of various rural development projects. However, information asymmetry on cadastral information can lead to an unequal distribution of resources and create barriers to access and utilization of land, especially for vulnerable groups. Hai District is a rural area in Tanzania that faces challenges related to land management, and there is a need to assess the impact of cadastral information asymmetry on rural livelihoods.

1.3 Main objective of the study

The main objective of this study is to assess the impact of cadastral information asymmetry on rural livelihoods in Hai District

1.3.1 Specific objectives of the study

i. Identify the factors that contribute to cadastral information asymmetry in the district.

ii. Assess the effects of cadastral information asymmetry on rural livelihoods, including land access, land use, and land ownership.

iii. Identify the challenges faced by rural communities in accessing and utilizing cadastral information.

iv. Develop recommendations for improving the dissemination and utilization of cadastral information in Hai District.

1.4 Research questions

i. What is the source of cadastral information in rural livelihood in hai district?

ii. How do rural household access land information?

iii. What is the effect of the land information asymmetry on improved livelihood?

iv. How can we implementing the policy that have be made?

1.5 Significance of the study

i. Encourage people who live in that area to understand proper means of accessing and using the land and appropriate information channel to use when seeking information based on land use.

ii. Policy maker, land officer, community leader and planners will gain knowledge relevant for solving disputes associated with land use information asymmetry.

iii. Attractive natural resources, fertile land, water resources, extensive grazing, land reliable rains.

1.6 Study Area

Hai is one of the seven districts of the Kilimanjaro region of Tanzania. The district covers approximately 1,217 square kilometers. Masama-mashariki one of the wards of Hai districts with square 25312 and population approximate 14,898. Figure 1.1 illustrates the area of Hai district at Masama-mashariki.

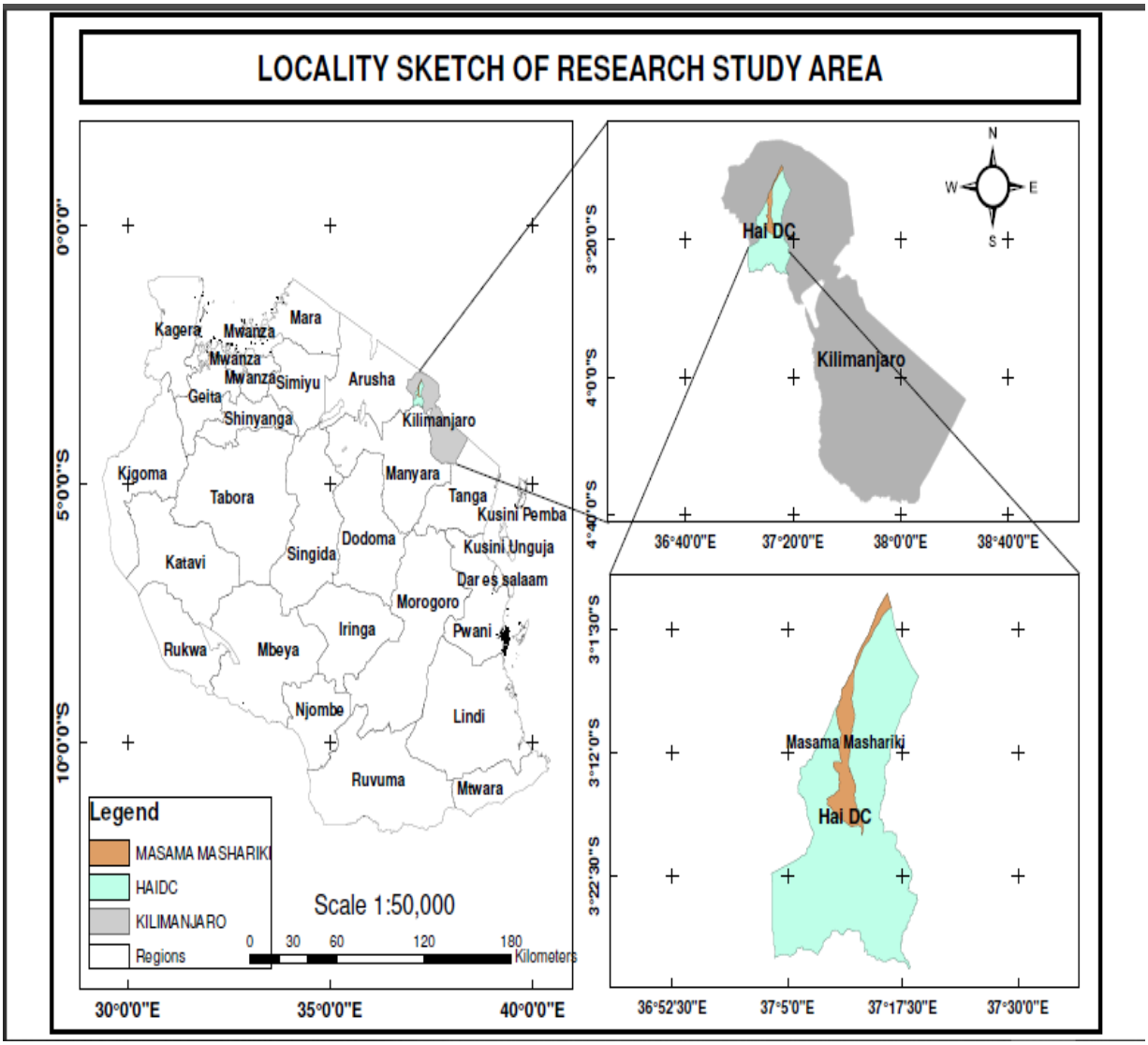


Figure 1.1 Research case study Area

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of land

Land is the platform of all human activities. Therefore, whatever is done in any sector of the economy has an impact on land. Land provides a foundation for economic activity and the function broad ways that is; traditionally or non-traditionally (the latter is sometimes called the narrow definition of land). As defined by (Rwegasira, 2012) 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. It also includes any estate, interest or any other right over the land for example, the right to collect herbs or to hunt. With this definition, a person without physically owning a piece of land may have a right to claim interest(s) over it. The nontraditionally definition of land is 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 to the statutory definition of land. With this definition, a person who owns land does not own any minerals or petroleum existing there. For this case, if it happens, minerals or petroleum are discovered on one's land, the holder shall be required compulsorily to transfer the land to the government as to give room for the mining industry.

In Tanzania, issues regarding land use practices have been evolving over time. In recent years, village land use planning has been accepted as a means to resolve land use conflicts and enhance sustainable utilization of land and management of natural resources (Mango & Kalenzi, 2011). Indeed, Land tenure systems are designed to meet specific needs and constraints of each society in a specific country so as to maintain harmonious land use practices for livelihoods development (Fimbo, 1992; FAO, 2006). In Tanzania, land belongs to the state and has been categorised thusly: general land, village land and reserved land (URT, 1999a; Mndeme, 2002; Moyo, 2006).

Village land is the land category formed as a strategy to guide the management of the land among rural communities under the Village Land Act of 1999 (URT, 1999a). Under this Act, all village land is controlled by the village government (URT, 1999a). Reserved Land refers to the land set aside for specific purposes such as forest reserves, game parks, game reserves and land for public utilities. According to the Tanzania Village Land Act of 1999, General Land refers to all public land that is not Reserved Land or Village Land including unoccupied or unused village land (URT, 1999a; Moyo, 2006; Fimbo, 1992). Security of tenure therefore is there to protect families and households from evictions which may intimidate and jeopardise human survival including issues about homelessness, inadequate livelihood earnings and food insecurity (Surya, 2013*).* However, together with the aforementioned arrangements, land uses malpractice jeopardise sustainable livelihoods.

2.2 Overview of 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. 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. Such information is prerequisite to successful land registration in Tanzania. A land parcel is the basic unit in the cadastral system. Each parcel is given a unique parcel number and address, which together with parcel dimensions are shown on a cadastral survey plan. A set of beacons or Iron Pins in Concrete (IPC) defines a boundary line that separates adjoining parcels. Coordinated (fixed) boundary lines are invariably used. General boundaries comprising physical features such as hedges, walls, streams etc. on the ground may be used subject to written permission of the Director of Surveys and Mapping.

2.2.1 Objectives of Cadastral Survey

The principal purpose of cadastral surveys in Tanzania is to give unambiguous spatial locations, sizes and shapes of land parcels (Silayo, 1997:16-20) 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. Efficient acquisition of such information is a critical issue for the achievement of timely urban land development. Furthermore, systematic records of land and rights in land have great importance for public

administration, land planning and land development and private transactions in land. This situation is particularly true in those developing countries where the rapid growth of population has caused increasing pressure on rural land, while simultaneously a massive migration of people to cities and towns has led to uncontrolled growth of urban centers. Nevertheless, the need for accurate land records is often ignored by policy-makers; and the cadastral system of many countries is, in consequence, highly defective (Abdulla, 2007). The identification of an unambiguous identification of parcels and a related descriptive record, offers some or all of the following advantages, depending upon the precise purpose for which it has been established;

i. Consequent stimulation of the land market and investment in land, particularly through longer term credit secured on land.

ii. Machinery for assessing and levying land tax

iii. Basic data and machinery for implementation of land reform measures.

iv. Control of land transactions by means of which compliance is ensured with planning requirements, or by means of which rural indebtedness, uneconomic subdivision, excessive alienation of land to non-nationals, etc. can be prevented;

v. Public planning of all kinds; the need for urban planning, in particular, is tremendous

2.3 Cadastral system in Tanzania

A basic unit of cadastral survey is a land parcel. Surveying and mapping of land parcel provides the basic foundation of the cadastral survey system. 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” (Mango, 2019). The survey description can be in textual, numerical and graphical forms if not in combination of these. The basic information provided by cadastral survey is the geometric descriptions for the measured land which are the spatial location, size and shape. Such information is prerequisite to successful land registration in Tanzania (URT, 1999). Boundary lines for the adjacent parcels are defined by a set of beacons or Iron Pins in Concrete (IPC). Also, general boundaries comprising physical features such as hedges,

walls and streams on the ground may be used subject to written permission from the Director of Surveys and Mapping. Cadastral surveys in Tanzania are based on two existing situations;

i. For the urban areas where approved Town Plan (TP) Drawing are prepared, surveyor obtains and set out parcels in according to those TP Drawing information.

ii. For all the areas found in rural or informal urban settlements, surveyor sets out parcels from the sketch plans that show approximate locations and sizes of the land earmarked for survey (Silayo, 2005).

There are several mandatory steps to be followed when conducting cadastral survey in Tanzania. The steps can be examined in three major groups of;

i. When requesting to conduct the survey,

ii. Executing the survey and

iii. The submission of the cadastral survey work for the recognition of approval at Survey and Mapping Division.

Details of these steps together with the Survey Registration System (SRS) and the Cadastral Legal Arrangements (CLA) are explained as follows;

2.3.1 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.

2.3.2 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. 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.

2.3.3 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.

2.4 Overview on land use and land use rights

The land use definition is the function or functions for which humans use an area of land. Different types of land will be used for different purposes example land use for agricultural, residential, commercial, recreation and industrial. Since land is a finite space needed and used by everyone, some laws and regulations protect and ensure it is used safely and fairly. These laws can be termed as land of tenure, generated to protect the legal and beneficial right to use the Land for the purposes (Land use rights). Under the present land laws, there are no restrictions on access to land in this country. Any person, citizen or foreigner, can apply and be allocated land for any type of use. This has facilitated acquisition of land for speculative purposes, especially in prime agricultural, industrial, commercial and residential areas (Ministry of Lands and Human Settlement Development June, 1995). Land use rights includes licenses and leases, referring to the rights to occupy, use, make profit from or dispose of the land by the land users. The land users obtain the land use rights from the land owner (either the state for state-owned land or the farmers' collectives for collectively-owned land).

2.5 Cadastral Survey Registration System

Complete cadastral survey work is submitted at SMD where a re-check is done and thereafter the process of survey approval and registration begins. Survey Registration System (SRS) is used for approving and registering all surveys in Tanzania. As a system programs, SRS include; 1). Cadpro software for Survey Computations. 2) Survey-info for Survey data storage, (3) SR- Manager for processing approval of new surveys and Data entry and (4) Smart Deeds for drawing deed plans and retrieval of scanned survey plans images. Among other specific activities during the examination and approval of new surveys are: Plot and block numbering, locating a new survey on TP drawing or Topographic Map, retrieving a drawing in GIS software and Importing survey

data from other programs (Katambi, 2009). The approved records of cadastral surveys contained into survey-info of the SRS are; scanned survey plans, scanned town planning layout plans, coordinates, geodetic control points and street names.

2.6 Cadastral Survey Legal Arrangements

Cadastral survey in Tanzania is carried out under the legal arrangements that are specified in various documents. “The first land survey and surveyor’s ordinance were enacted into law in 1923 to control the state of affairs at that time. In 1957 it was reviewed and the current Land Survey Ordinance (Cap 390) was signed into law to regulate all survey work in the country. This Ordinance is in consonance with the Land Registration Ordinance, Cap 334 of 1953, of which Section 88(1) states: ‘No estate shall be registered except in accordance with an approved cadastral survey plan’” (Lugoe 2008). Apart from it, the Land Act No. 4 of 1999 section 22(1c) which states that a granted right of occupancy shall be issued on land that has been surveyed (URT, 1999). In addition to the above, the Land Survey Act of 1977 establishes the National Council of Professional Surveyors (NCPS) whose main tasks include, the certification of the competence of practicing surveyors and enforcement of professional code of conduct and ethics, regulating standards of conduct and the activities of professional surveyors, regulating the practice of the professions of land surveying & land economy surveying and promoting the profession of surveying. The law provides that both government and private licensed surveyors to can carry out cadastral surveys in Tanzania (URT, 1977).

2.7 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 common benefit, direct or indirect, of the natives of Tanzania (Kauzeni, Kikula, Mohamed, Lyimo, & Dalal-Clayton, 1993). 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.

i. Granted right of occupancy is held outside village lands and it may be granted for up to 99 years. Land has to be surveyed before a certificate of occupancy issued.

ii. Customary right of occupancy is held in rural areas indefinitely. The relevant certificates are issued to village councils after the land has been surveyed.

2.8 Land tenure security

Land tenure security exists when an individual perceives that he or she has rights to a piece of land on a continuous basis, free from imposition or interference from outside sources, as well as ability to reap the benefits of labour and capital invested in that land, either in use or upon transfer to another holder (Roth et al 1994). Chief or village readers do protect community land rights but in urban fringes this is not enough anymore and there is a need for government to play role. In real life, tenure security can never be absolute, to a large extent it is what people perceive it to be, and land tenure improvement through registration can only enhance but never achieve total security. Most African governments are trying to find means on how to increase tenure security to customary ownership, as 80% of people in sub-Saharan countries holds land under customary system, and this makes land to be of crucial importance to economies and societies, constituting the main livelihood basis for a large population (Sanga, 2009).

However, the World Bank report on land tenure argues that tenure security can easily be achieved by Legal recognition of existing rights and institutions, subject to minimum conditions, in more effective than premature attempts at establishing formalized structure (Deininger 2003). Tanzania has opted to adapt the latter approach by providing customary land rights a legal recognition and designate existing community elected government as land administration authorities (Wily 2003). The first approach has been adapted by country like Botswana where customary law was integrated into state law (Nelson 2004; Kaakunga and Ndalikokule 2006). Security in land has direct psychological, social and economic benefits. According to Dale and McLaughlin (1988) benefits of tenure security is clear in the following situations; when people are private owners and secure in their rights, free from fear of dispossession, and secure in their expectation of being able to sell their property, then they are willing to invest in their properties and can convince lenders to provide capital to make investment. On the other side, lending institutions can be sure in security of the collateral. No investment in land or property is safe unless the right of ownership of that land is stable and secure in both law and practice.

Tenure security is characterized by enforceability of property rights, and refers to the degree to which individual or group rights to land and natural resources are recognized and protected. Numerous factors play a role in determining the level of tenure security. These include the legitimacy of the property rights, (Unruh et al. 2005). A lack of security implies insufficient capacity to defend a property right against competing claims, encroachment, or eviction. Insecurity of property rights discourages investment and invites land use conflicts. Land use conflicts occurs when there are conflicting views on land use policies, (Chong Yi Lam 2020). The conflicts on land use rights includes encroachment on the neighbouring property or the public land.

2.9 Overview on land demarcation.

Demarcation is the operation that legally establishes boundaries between properties. This can be done out of court or it can be imposed by the courts in case of owner disputes. Property is demarcated by local, natural features of land either trees, streams or rocks and relatively permanent human structures such as walls, bridges and monument. Land demarcation of boundaries can be done in two systems. General boundaries and fixed boundaries, both fixed and general boundary systems are used in marking land for title registration. The first is mostly applicable in rural areas whereas the latter applies most in urban areas.

- **General boundary system**

General boundary is not determined in relation to the physical features that demarcate it. These features show the general line of the boundary but do not show the exact location within which such physical features pass. In order to operate satisfactorily, the boundaries exist on the ground and must be maintained by landowners. The government, therefore, guarantees general boundary as to title only. The authority concerned is the Land Registry.

- **Fixed boundary system**

Fixed boundary is where a boundary of a parcel of land has been accurately determined by survey. Survey marks are placed at the corners of the land and the actual boundary between two survey marks is the straight line joining them. Due to its accuracy, the government guarantees title and extent through the land surveyor.

The strength and weakness of each system of a land title registration and its operation depends on the ability to re-establish registered boundaries from the records. Registered boundaries are ground boundaries, which have been reflected by a registration system. Whenever there is uncertainty between two plots over the positions of the beacons marking their fixed boundaries, concerned parties contact a licensed surveyor. The surveyor obtains relevant data from the Director of Surveys, which he or she uses to re-establish the disputed boundary (K' obado 2008).

However, if there is uncertainty regarding a general boundary, the parties report to the Land Registrar, who then obtains evidence on the original position of the boundary from the local people who often have good memories as to where the boundary once passed. The land registrar can also gather any other evidence including consulting general boundary maps. Generally, ground evidence has more ‘weight’ than the maps. Village elders do not base their evidences on mathematical data but on good memories during the re-establishment.

CHAPTER THREE

METHODOLOGY

This chapter presents research methodology through describing research design, sample size, sampling techniques, type and source of data, data collection methods, data processing and data analysis.

3.1 Data collection

The study uses a mixed-methods approach, which means that it uses both qualitative and quantitative ways to collect data. The qualitative data was be collected through key informant interviews with relevant stakeholders, including government officials, community leaders, and landowners. A structured questionnaire was used to do a survey of rural households in the district to get the quantitative data. The sample size for the survey will be determined using the appropriate statistical methods.

In this research study both qualitative and quantitative data was collected as primary data since they were collected direct from the field. Questionnaires and interview were the tools scheduled to collect data direct from the respondents.

a) Household survey.

In this method data was collected through structured questionnaire to obtain information regarding the cadastral information availability, access as well as how cadastral information asymmetry affects the livelihood of masama-mashariki householders.

b) Interview.

The data collected here involved some intellectuals and officers to acquire knowledge on present condition of cadastral information's availability at Hai district. Also, how do the cadastral information's asymmetry affect the rural livelihood and what should be done to solve the problem regarding cadastral information's.

3.1.1 Sample Size determination

Before doing data collection of any population, we first have to determine the sample size which was represent the population of that area. The sample size is defined as the number of observations used for determining the estimations of a given population, the measure of the number of individual samples used in an experiment. The sample size was determined and represent the entire population of this research study area.

In this research study the Taro Yamane formula was used to determine the sample size of the study area. Below is the mathematical illustration for the Taro Yamane method:

$$n= N/ (1+N (e)^2) \quad \text{(3.1)}$$

Where: n signifies the sample size,

N=population size,

e=margin of error (MoE), e = 0.08 based on the research condition.

According to census of 2022 the population of Masama-mashariki is 12904 and number of households is 3606. Where by sample size of this study was determine by number of households. As for households, using Taro Yamane formula the sample size was found to be 150 households. This also included 5 land officials from Hai district who are the key informants.

3.1.2 Sampling design

The survey measures perceptions and knowledge for the purpose of understanding how cadastral information asymmetry affects the rural livelihood as well as how cadastral information's are accessible in that area. The sample therefore gathered data that is representative of all adults' residents living on the study area, not just focusing on the household head or most knowledgeable person. This is critical given that cadastral information asymmetry effects may vary within the household and that the goal is to hear the views of all most residents' households. Throughout the survey individuals aged 18 years or above here referred to as "Adults" were involved.

- **Simple random sampling.**

This method is considered the most effective methods of sampling than any other method. Simple random sampling method was used in selection of households' to be surveyed in this research

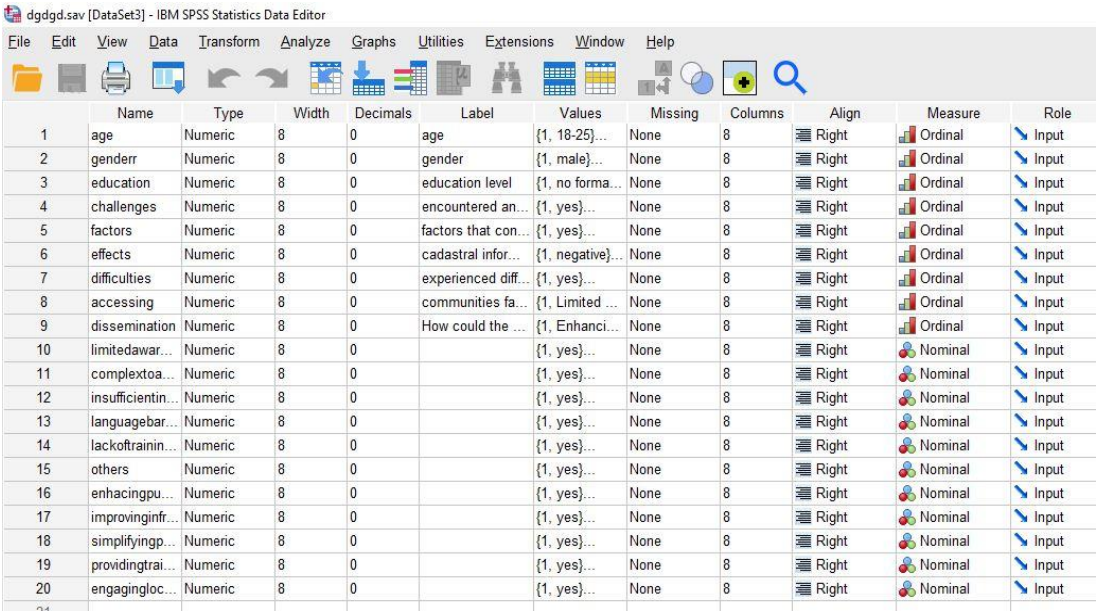
study. On which a randomly selection of household was done as any household within the selected area was qualified to be questioned.

3.2 Data processing

Data processing refers to the collection, and translation of a data set into valuable and usable information. It includes data collection, data input and then processed. The data collected in this research were both qualitative and quantitative data. Qualitative data was collected through key informant interviews with relevant stakeholders, including government officials, community leaders, and landowners. A structured questionnaire was used to do a survey of rural households in the district to get the quantitative data. The sample size for the survey was determined using the appropriate statistical methods.

3.3 Data analysis

Data analysis involves in descriptive statistics, thematic analysis, and regression analysis. Field data was being organised, described, labelled, analysed, summarised and presented quantitatively and qualitatively. Quantitative data will be derived from the questionnaires and presented using frequency tables and graph. Data will be coded and analysed using the Statistical Package for Social Sciences (SPSS) version 27.0. to derive frequencies, percentages. Figure 3.1 and Figure 3.2 below show how you enter your variable data of the questioner and the data view which means the data from the finding



	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	age	Numeric	8	0	age	{1, 18-25}...	None	8	Right	Ordinal	Input
2	genderr	Numeric	8	0	gender	{1, male}...	None	8	Right	Ordinal	Input
3	education	Numeric	8	0	education level	{1, no forma...	None	8	Right	Ordinal	Input
4	challenges	Numeric	8	0	encountered an...	{1, yes}...	None	8	Right	Ordinal	Input
5	factors	Numeric	8	0	factors that con...	{1, yes}...	None	8	Right	Ordinal	Input
6	effects	Numeric	8	0	cadastral infor...	{1, negative}...	None	8	Right	Ordinal	Input
7	difficulties	Numeric	8	0	experienced diff...	{1, yes}...	None	8	Right	Ordinal	Input
8	accessing	Numeric	8	0	communities fa...	{1, Limited ...	None	8	Right	Ordinal	Input
9	dissemination	Numeric	8	0	How could the ...	{1, Enhanci...	None	8	Right	Ordinal	Input
10	limitedawar...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
11	complextoa...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
12	insufficientin...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
13	languagebar...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
14	lackoftrainin...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
15	others	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
16	enhacingpu...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
17	improvinginfr...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
18	simplifyingp...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
19	providingtrai...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input
20	engagingloc...	Numeric	8	0		{1, yes}...	None	8	Right	Nominal	Input

Figure 3.1 SPSS user interface for data entrance as it was used in this study.

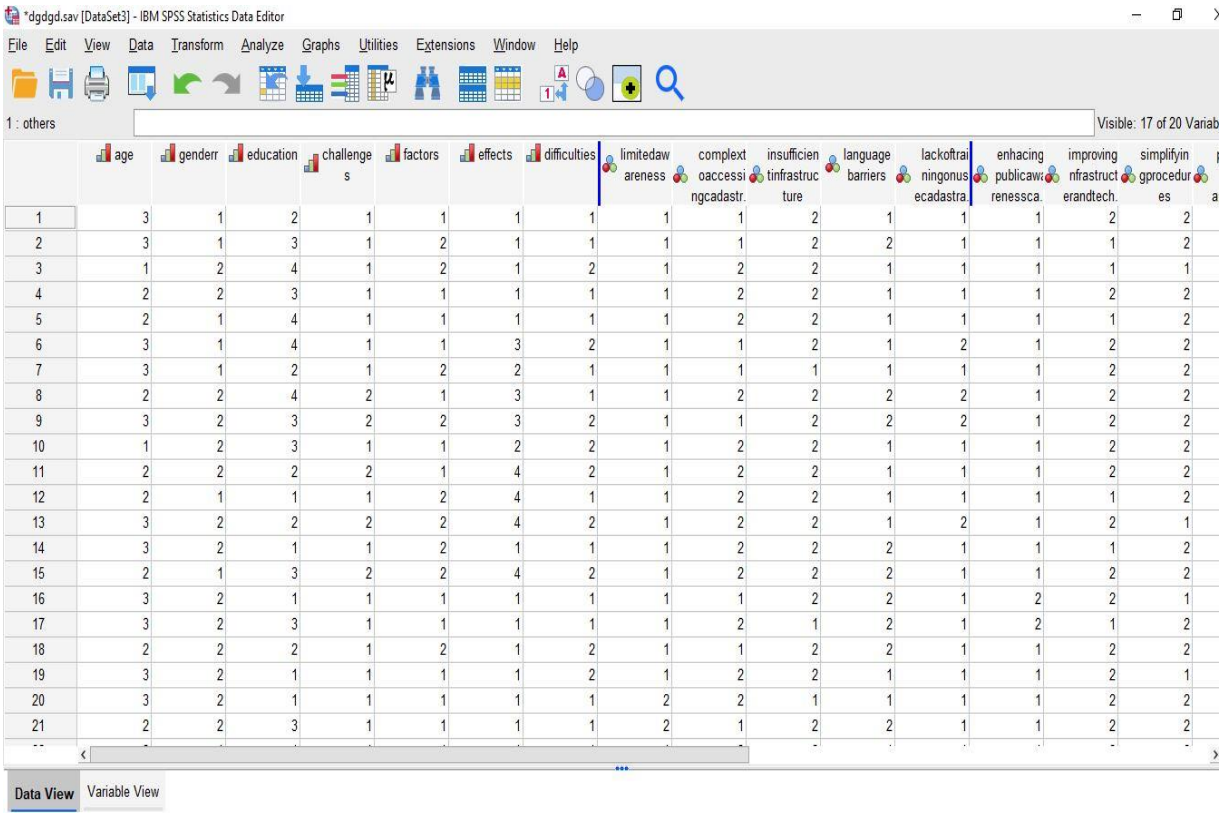


Figure 3.2 SPSS data view section as it was used in this study during data processing

CHAPTER FOUR

RESULT AND DISCUSSION

4.1 Introduction

The primary and secondary data collected during the fieldwork (Chapter 3) are discussed in this chapter. Both qualitative and quantitative methods have been used using statistical and spatial analysis methods.

4.2 Age composition

The finding shows that 56.0% are age between 26-40 and 40.7% are age between 40-60 and 2.7% and 0.7% are aged between 60-100.Most of the resident are at the age of 26-40 and 40-60 and are the one who participate in different activities in the society so as to improve their livelihoods. Figure 4-1 illustrate the graph of age.

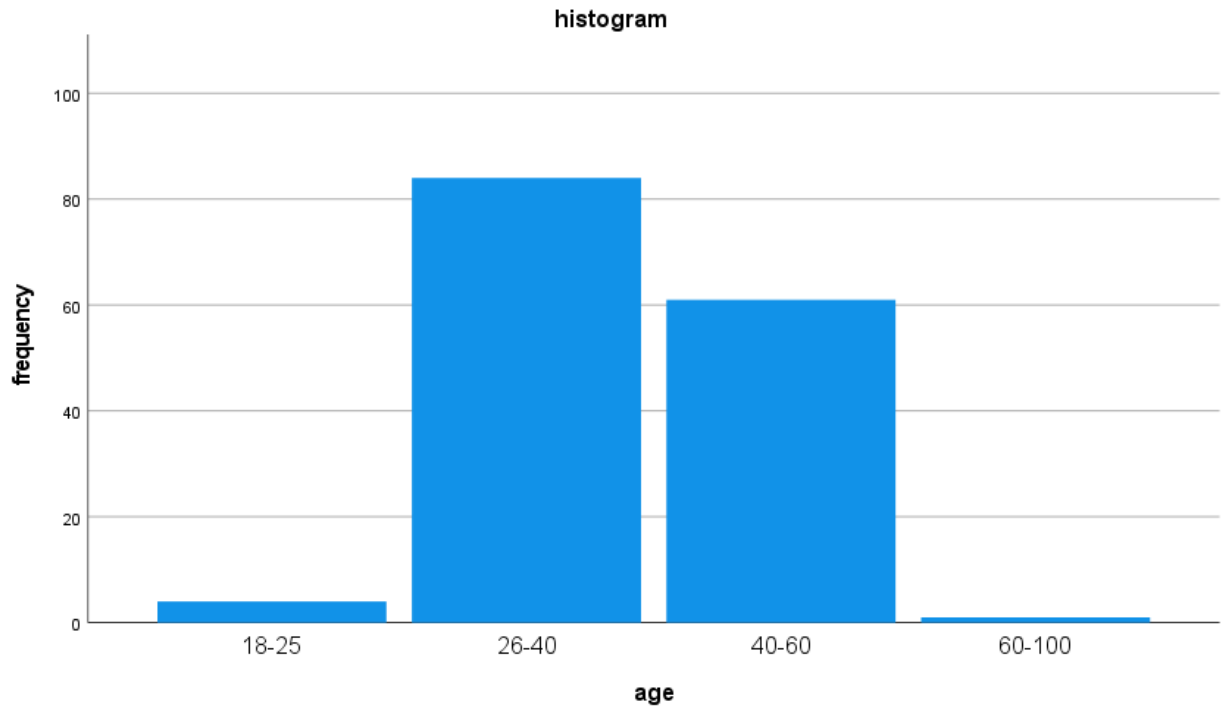


Figure 4.1 Graph of age of households

4.3 Gender

These research show that in masama-Mashariki village 53.3% are male and 46.7% are female thus male population is higher in Masama-Mashariki since most male is the one who owns the land and female population is small because them didn't want to contribute in issues about land because most of them are saying that their just marred so they don't know much about the land and women who participate in answering the question most of them they own the land left by their parents. Figure 4-2 illustrate the resident gender.

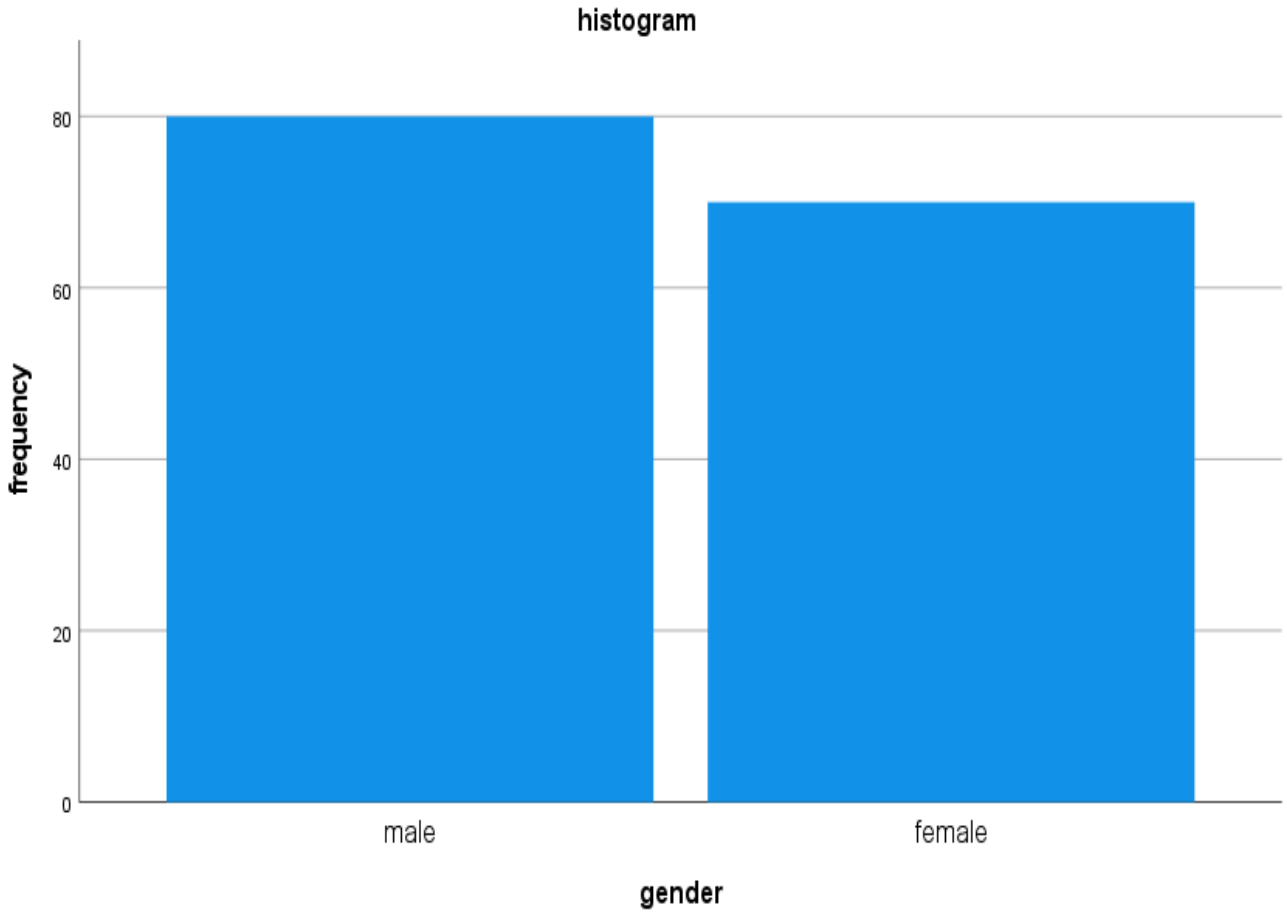


Figure 4.2 Graph of gender of households

4.4 Education level

The finding also show that 36.0% residents have secondary education and 30.7% have primary education and 27.3% have no formal education and 6.0% have post-secondary education these implies that most of the residents have formal awareness, and thus it helped in simplifying the

work of obtaining the data for this research. Figure 4.3 below illustrates education level of the resident of masama-mashariki.

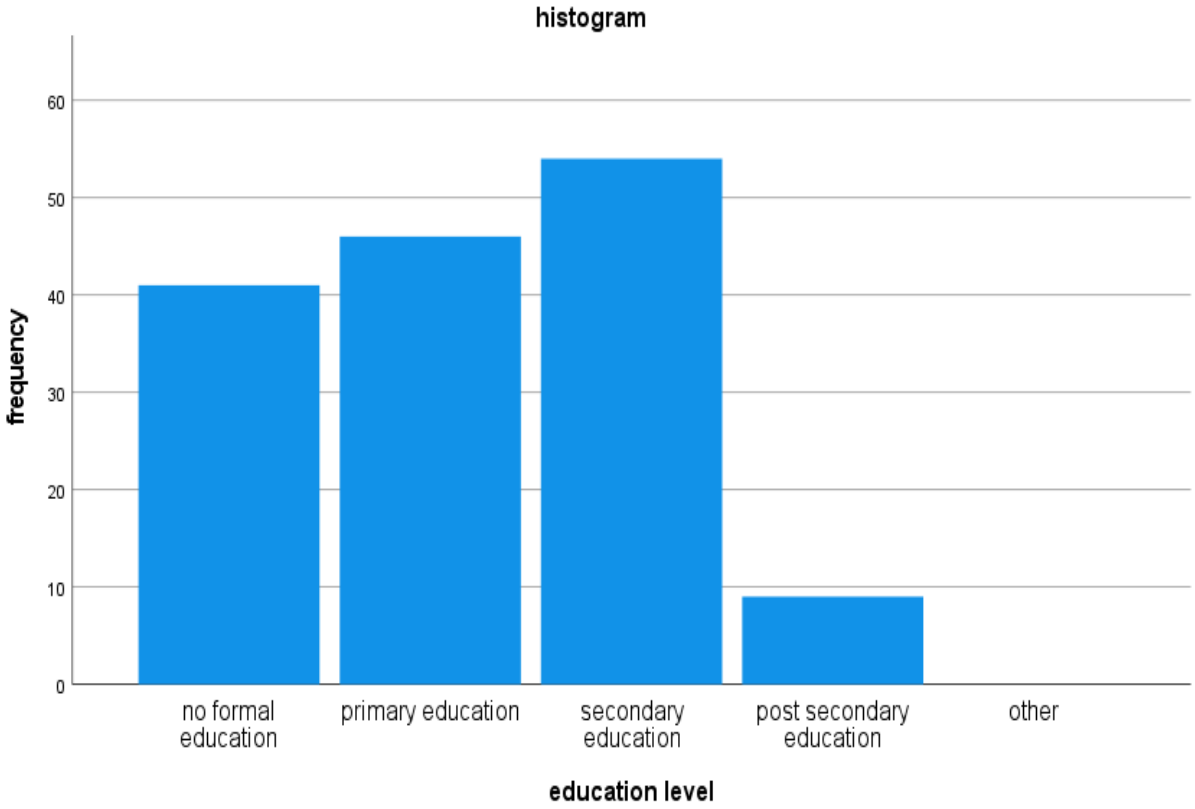


Figure 4.3 Graph of education level of households

4.5 Challenge in accessing cadastral information

The research also wanted to know if resident of Masama-mashariki ward have encountered any challenges in accessing cadastral information in the Hai District?

The following graph show that 70.0% have encounter challenges in accessing cadastral information in the area and 30% have not encounter any challenges in accessing the cadastral information. Most of the resident they have said yes that they have encounter challenges in accessing cadastral information since the don't know the procedure of how they can obtain the cadastral information and how to use the information. Figure 4-4 illustrate the challenge in accessing cadastral information.

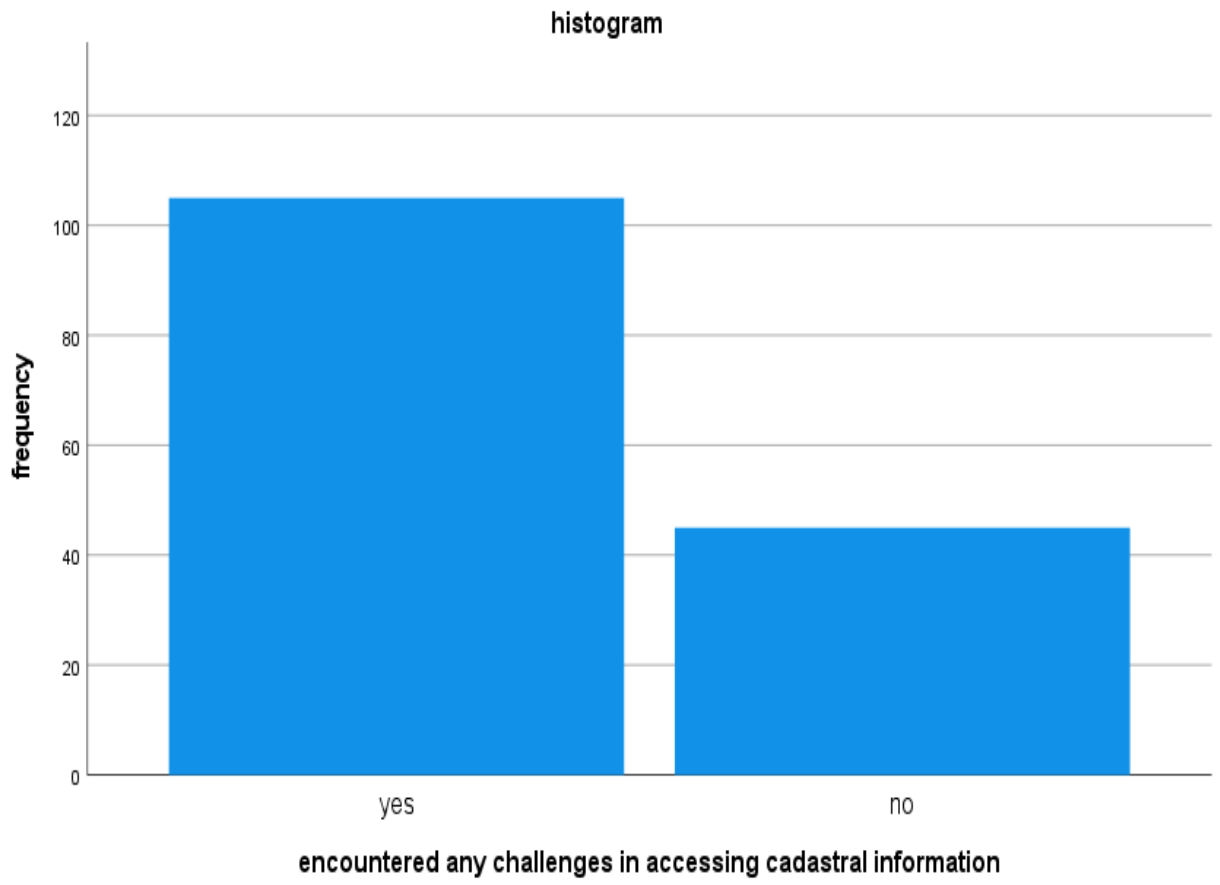


Figure 4.4 challenges

4.6 Awareness

The research also wanted to know if the resident in hai district are aware of the factors that contribute to cadastral information asymmetry in the district? The below graph show that 58.7% of the resident in Masama-mashariki ward have the awareness of the factor that contribute cadastral information and 41.3% they do not have awareness of the factors that contribute cadastral information. The findings aware of the factor that contribute to cadastral information asymmetry in their area. Since most of the resident everyone has different ideas about why the cadastral information is not available in their area the ideas are as follows limited awareness about cadastral poor government and corruption. Figure 4-5 illustrate the awareness of factors that contribute cadastral information asymmetry

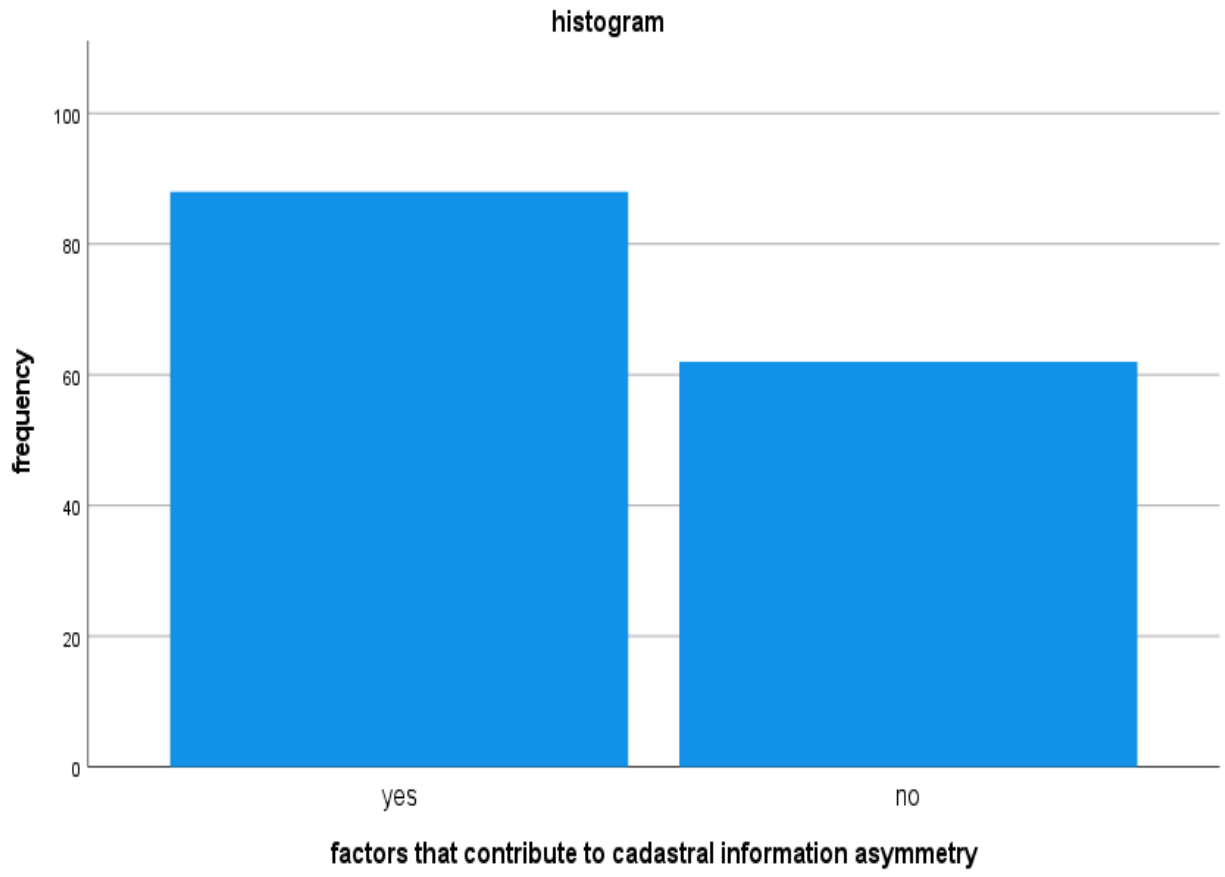


Figure 4.5 awareness of factors that contribute cadastral information asymmetry

4.7 Cadastral information asymmetry effects

The research also wanted to know how does cadastral information asymmetry affect rural livelihoods in terms of land access, land use, and land ownership?

The below graph show that 50% of the resident answered negative effect and 24.7% replies not sure and 14% of the resident answered positive and 11.3% of the resident answered no impact. According to data analysis most resident they said due to asymmetry of cadastral information asymmetry in rural livelihood the effect that are like to happen are negative such as misunderstanding between people and they will not be able to sell the are land if they are in need of money or want a loan in the bank so negative impact are in a higher risk to occur and the percent that said that the don't know if the effect will occur since their not sure about what cadastral information will help them. The figure below illustrates the effects of cadastral information asymmetry

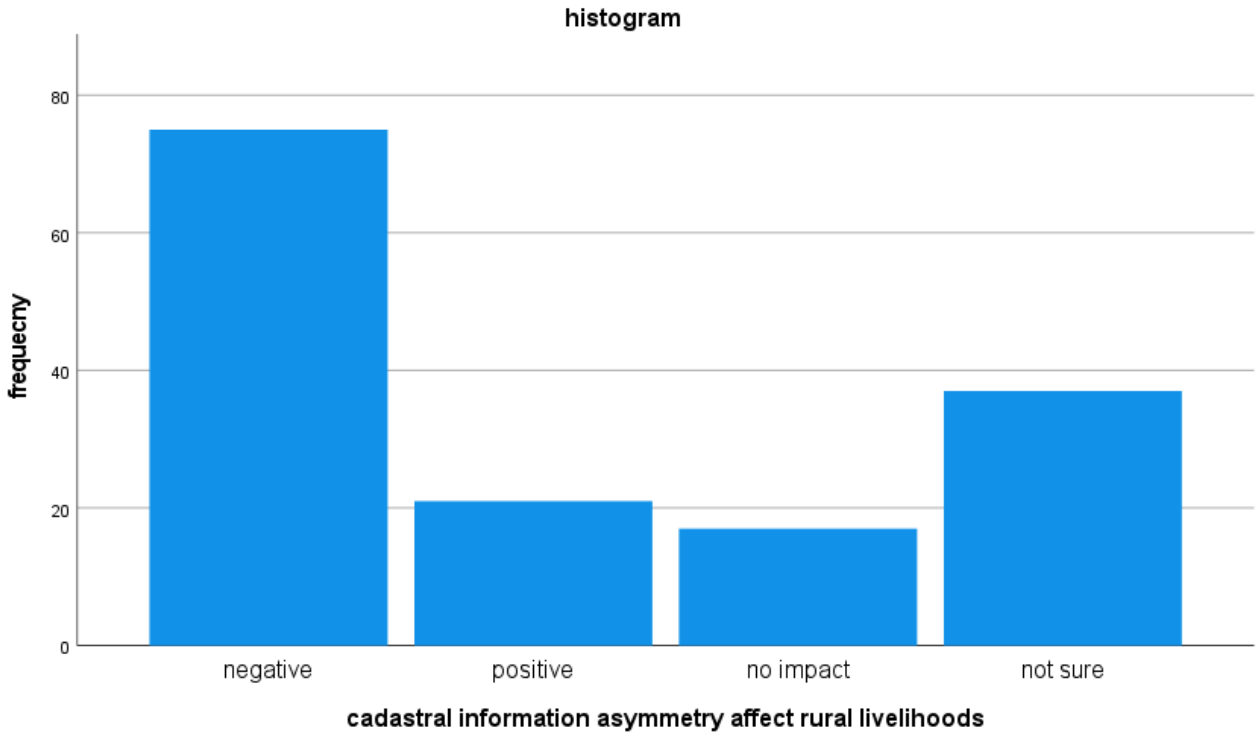


Figure 4.6 Effects of cadastral information asymmetry

4.8 Experienced difficulties in utilizing cadastral information

The research also wanted to know if the resident in Masama-Mashariki ward have experienced difficulties in utilizing cadastral information for land-related activities in the Hai District?

The below graph show that 61.3% of the resident have experience difficulties in utilizing cadastral information and 38.7% of the resident have not experience difficulties in utilizing cadastral information. Most of the resident they said yes, they do experience difficulties in utilizing cadastral information cause most they don't know how to use the cadastral information. The figure 4-7 illustrates the experienced difficulties in utilizing cadastral information

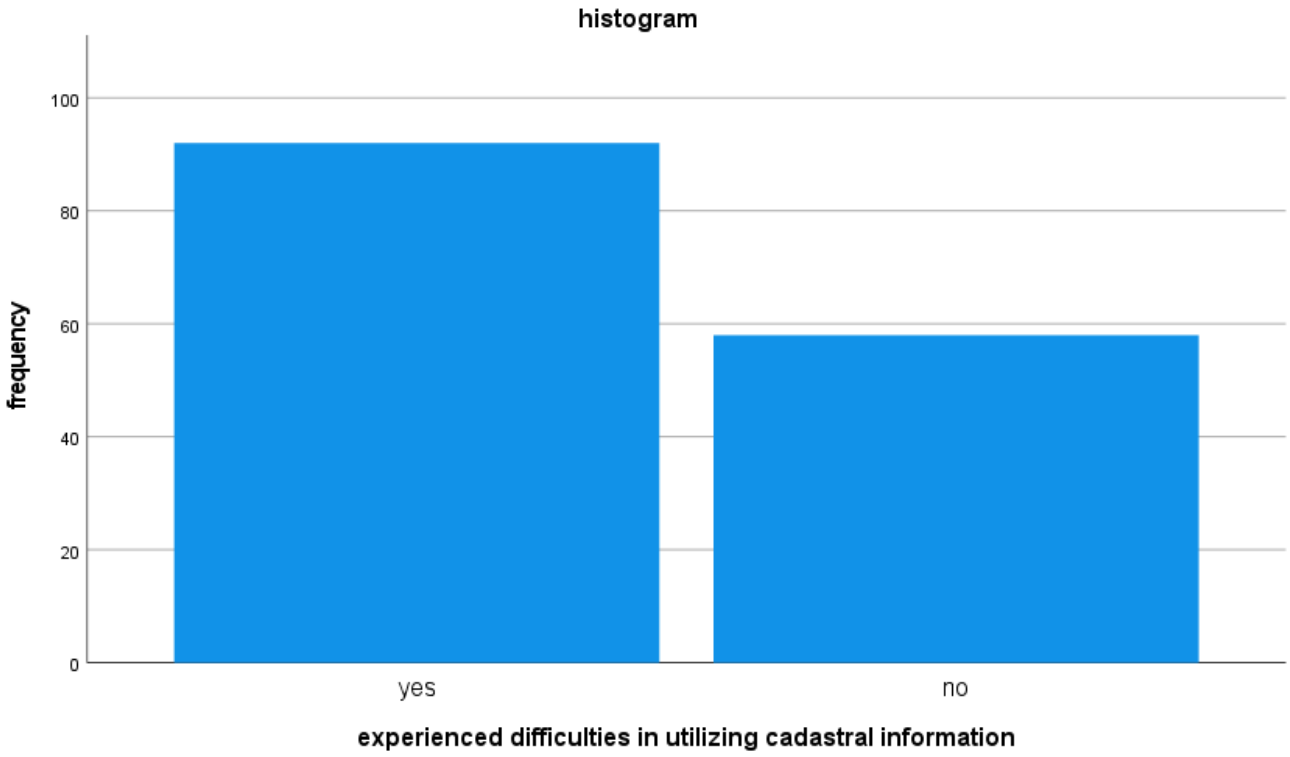


Figure 4.7 experienced difficulties in utilizing cadastral information

4.9 Challenges do rural communities face in utilizing cadastral information.

The research also wanted to know what challenges do rural communities face in accessing and utilizing cadastral information? And the respondent had multiple answer to choose in this question which are

i. Limited awareness of available cadastral information
ii. Complex or unclear procedures to access cadastral information
iii. Insufficient infrastructure or technology for accessing information
iv. Language or literacy barriers
v. Lack of training or knowledge on how to interpret and use cadastral information

The below graph shows the respond of each answer 5% said that Insufficient infrastructure or technology for accessing information and 33.1% Limited awareness of available cadastral information and 13.2% Complex or unclear procedures to access cadastral information and 16.8%

Language or literacy barriers and 31.9% Lack of training or knowledge on how to interpret and use cadastral information. these are the challenges do rural communities facing in accessing cadastral information.

Most of the challenge according to data analysis is limited awareness of available cadastral information so due to this it means that most of the resident in Hai district they have little knowledge about cadastral and available of how to get information about cadastral is still the problem.

Also lack of training or knowledge on how to interpret and use the cadastral information so as to bring for them development in their community so according to the finding some resident their getting information about cadastral but since the can't interpret or use the information it is the challenge.

The finding shows that another challenge in their area is complex and unclear procedures to access cadastral information. Most resident are face challenges in get the information about cadastral information because they don't know the procedures to follow for them to get information and the is unclear procedures so resident, they don't know where to start and who to follow.

Also, the finding show that the is a challenge in language and literacy barriers yes most of the resident in Hai district they have formal education but they don't have education about land how to utilization and manage their land so due that literacy barriers is among of the challenge in the area

The finding also says one of the challenges is insufficient infrastructure or technology for accessing information the is no technology which it will help them to get the information cause main source of information is local government and the local government they don't know much about cadastral they just follow order from the above and the don't have a full information to explain to their people because they don't know much. Figure 4-8 illustrate the information Challenges rural committees face in accessing cadastral

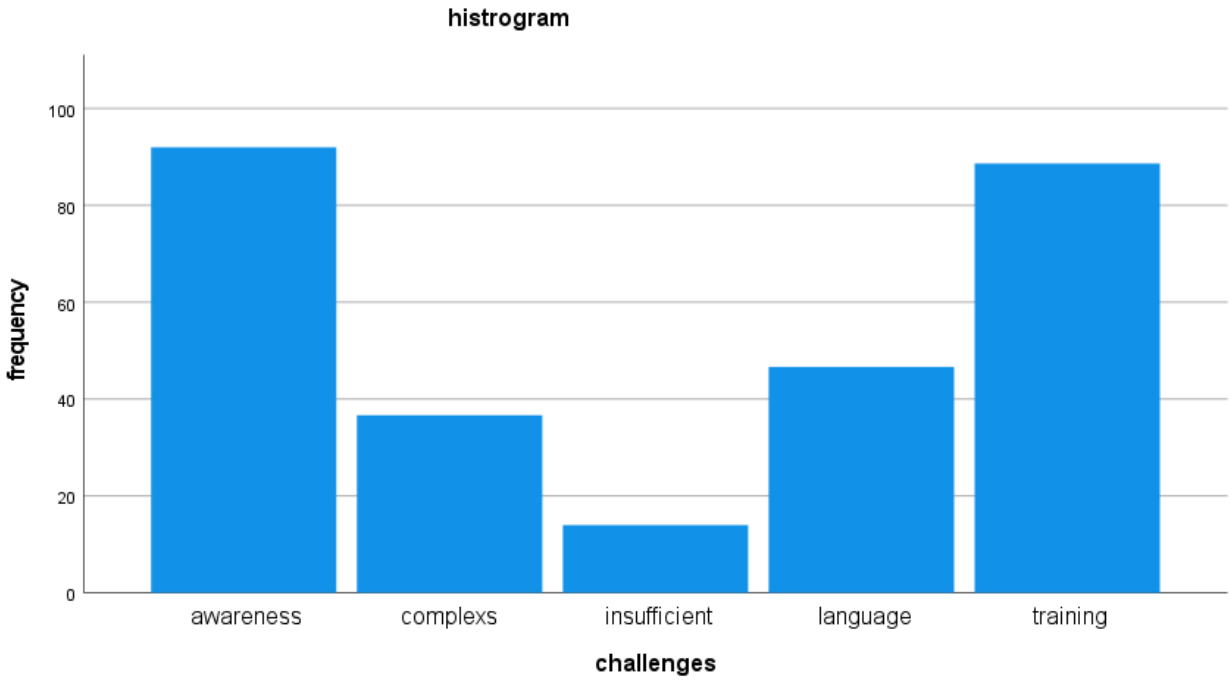


Figure 4.8 information Challenges rural committees face in accessing cadastral

4.10 Dissemination and utilization of cadastral information

The research also wanted to know about how could the dissemination and utilization of cadastral information in the Hai District be improve? And the respondent had multiple answer to choose in this question which are

i. Enhancing public awareness campaigns on the availability and importance of cadastral information
ii. Simplifying procedures for accessing and retrieving cadastral information
iii. Improving infrastructure and technology for easier access to information
iv. Providing training and capacity building programs on the use of cadastral information
v. Engaging local communities in participatory mapping and data collection processes

The graph show that 32.9% the said enhancing public awareness campaigns on the availability and importance of cadastral information and 12.6% the said by improving infrastructure and technology for easier access to information and 5.0% the said by simplifying procedures for accessing and retrieving cadastral information and 32.9% the said by Providing training and capacity building programs on the use of cadastral information and 16.5% they said by Providing training and capacity building programs on the use of cadastral information.

Most people are suggesting that in order to dissemination and utilization of cadastral information then they should be campaigns and public awareness on the availability and importance of cadastral information so as most resident should know about cadastral and it important.

Also providing training and capacity building programs on the use of the cadastral information. So as those programs they can help the resident should have knowledge and to be educated about cadastral and how it works

The finding shows that by improving infrastructure and technology for easier access of cadastral information in there are will help them to utilize the cadastral information that they have and bring it to develop the livelihood in rural area. Table 4.1 below illustrate the dissemination and utilization of cadastral information

Table 4.1Dissemination and utilization of cadastral information

Dissemination and utilization of cadastral information

		Responses		
		N	Percent	Percent of Cases
Dissemination and utilization of cadastral information	Enhancing public awareness campaigns	138	32.9%	94.5%
	Improving infrastructure and technology	53	12.6%	36.3%
	Simplifying procedures	21	5.0%	14.4%
	Providing training and capacity building program	138	32.9%	47.3%
	Engaging local communities in participatory mapping	69	16.5%	94.5%
Total		419	100.0%	287.0%

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In conclusion, the assessment of cadastral information asymmetry on rural livelihood in Hai District has revealed significant implications for the local communities. Cadastral information asymmetry refers to the unequal access and distribution of land-related information, which can result in various socio-economic challenges for rural residents.

The findings of the assessment indicate that the lack of comprehensive and accessible cadastral information negatively impacts rural livelihoods in Hai District. Firstly, limited access to accurate land information hinders land tenure security for farmers and local communities. Without clear knowledge of land boundaries, ownership, and rights, rural residents face difficulties in securing their land tenure, which can lead to land disputes and conflicts.

Secondly, the information gap restricts opportunities for rural development and economic growth. Inadequate access to cadastral information hampers land-use planning and efficient allocation of resources. This, in turn, limits the ability of farmers to make informed decisions regarding agricultural investments, land use diversification, and market participation. Consequently, rural livelihoods remain constrained, hindering poverty reduction efforts and overall socio-economic progress in the district.

Furthermore, the asymmetry in cadastral information exacerbates social inequalities and marginalization. Vulnerable groups, such as women, small-scale farmers, and indigenous communities, are particularly disadvantaged by the lack of access to land information. This perpetuates existing power imbalances and widens the gap between resource-rich and resource-poor individuals, impeding inclusive and sustainable rural development.

To address these challenges, it is crucial to prioritize efforts in bridging the cadastral information gap in Hai District. This can be achieved through a multi-pronged approach that involves the collaboration of various stakeholders, including local government bodies, land administration agencies, community organizations, and development partners. Key actions should include;

Enhancing cadastral data collection and management systems to ensure accurate, up-to-date, and accessible information for all stakeholders.

Strengthening institutional capacities and promoting transparency in land governance to ensure equitable access to land-related information.

Implementing awareness campaigns and capacity-building programs to empower local communities, especially vulnerable groups, with knowledge and skills related to land tenure and cadastral information.

Fostering participatory approaches and inclusive decision-making processes that involve all stakeholders in land-related matters.

Promoting the use of technology and digital platforms to facilitate information sharing, land documentation, and dispute resolution.

By addressing cadastral information asymmetry and promoting equitable access to land-related information, Hai District can unlock the potential for sustainable rural development, poverty reduction, and improved livelihoods. It is through these concerted efforts that the district can strive towards a more inclusive, resilient, and prosperous future for all its residents.

5.2 Recommendations

Based on the assessment of cadastral information asymmetry on rural livelihood in Hai District, the following recommendations are proposed to address the identified challenges and improve the overall situation:

Strengthen information systems which invest in the development and enhancement of cadastral information systems that are accurate, comprehensive, and easily accessible. This should involve the digitization of land records, mapping systems, and the establishment of a centralized database. Implement measures to ensure regular updates and maintenance of these systems.

Improve data sharing and collaboration by foster collaboration among relevant stakeholders, including government agencies, community organizations, and development partners. Encourage the sharing of cadastral information and knowledge to ensure a more inclusive and comprehensive understanding of land tenure issues. Establish platforms and mechanisms for information exchange and coordination.

Enhance capacity building conduct training programs and workshops to enhance the capacity of local government officials, land administrators, and community members in understanding and utilizing cadastral information. Provide technical skills and knowledge on land tenure, mapping techniques, dispute resolution, and the use of digital tools.

Promote community engagement which involve local communities in decision-making processes related to land management and planning. Establish mechanisms for community participation and consultation to ensure their voices are heard and their needs are taken into account. Encourage the formation of community-based organizations that can advocate for land rights and represent the interests of rural residents.

Address gender inequality by recognize and address the gender disparities in access to land and information. Implement measures to ensure women's equal participation and representation in land-related decision-making processes. Promote women's land rights and provide them with access to information and resources that can enhance their livelihoods.

Enhance legal frameworks by review and update land-related laws and regulations to align with international best practices and ensure the protection of land rights for all individuals, particularly vulnerable groups. Strengthen mechanisms for resolving land disputes and enforcing land tenure security.

Promote innovative technologies which explore the use of innovative technologies, such as remote sensing, geospatial mapping, and block chain, to improve the accuracy, efficiency, and transparency of cadastral information management. Foster partnerships with technology providers and leverage digital tools to streamline land administration processes.

Monitor and evaluate progress by establish a monitoring and evaluation framework to assess the effectiveness of interventions aimed at reducing cadastral information asymmetry. Regularly review the impact of initiatives, gather feedback from stakeholders, and make necessary adjustments to ensure continuous improvement.

By implementing these recommendations, Hai District can work towards reducing cadastral information asymmetry, improving land tenure security, and fostering sustainable rural livelihoods. These efforts can contribute to the overall development and well-being of the district's rural communities.

REFFERENCES

Bruce, J. W. (1998). Review of tenure terminology: Land Tenure Center, University of Wisconsin-Madison. United States of America.

Chileshe, R., & Shamaoma, H. (2014). Examining the Challenges of Cadastral Surveying Practice in Zambia. South African Journal of Geomatics, 3(1), 53-63.

Dattalo, P. (2008). Determining Sample Size, Balancing Power, Precision, and Practicality. New york: Oxford University Press.

Deininger, K. (2003). Land policies for growth and poverty reduction. New York: World Bank and Oxford university press.

Deininger, K. (2003). Land Policies for Growth and Poverty Reduction. New York: A publication of the World Bank and Oxford University Press.

Deininger, K. (2004). Land Policies for Growth and Poverty Reduction: Key Issues and Challenges Ahead. International Federation of Surveyors, 9-11.

Dinh, H. T., & Monga, C. (2013). Light Manufacturing in Tanzania: A Reform Agenda for Job Creation and Prosperity: World Bank Publications.

Founder, H., & Mostak, C. T. (2023, january 30). A Heavy of Digital Twins. Retrieved from A HeavyRF Digital Twins web site: www.heavy.al

Katambi, S. S., (2009). Development of the New Cadastral Survey System in Tanzania. Paper presented at FIG Week 2009, Surveyors Key Role in Accelerated Development Eilat, Israel, 3-8 May 2009.

Kauzeni, A., Kikula, I., Mohamed, S., Lyimo, J., & Dalal-Clayton, D. (1993). Land use planning and resource assessment in Tanzania: A case study: Institute of Resource Assessment, University of Dar es Salaam. Tanzania.

Kweka, O. J., Nkya, T. E., & Mbilinyi, P. B. (2017). The Impact of Cadastral Data for Poverty Reduction in Tanzania. Journal of Land Adiministration in Eastern Africa, 4(1), 179-191.

Ministry of finance and economic affairss. (2010). National strategy for growth and reduction of poverty II. Tanzania: United Republic of Tanzania .

Mushi, R., Kweka, O. J., & Nkya, T. E. (2018). The Role of Cadastral Data in Improving Land Adiministration Efficiency. International Journal of Engineering and Technology, 10(5), 325-332.

Mwangeni, Kweka, & Nkya. (2019). Challanges of Cadastral data use For Poverty Reduction in Tanzania. journal of Land Adiministration in Eastern Africa, 6(1), 29-41.

National Bureau of Statistics. (2020). Tanzania in Figures 2019. Retrieved from Tanzania in Figures 2019 web site: http://www.nbs.go.tz/nbs/Takwimu/census2012/Tanzania in Figures 2019.

Silayo, E. H., (1997). Cadastral Surveying Practice in Tanzania, Dar es Salaam University Press. Dar es Salaam. Pp 165.

Silayo, E. H. (2005). Searching for an affordable and acceptable cadastral survey method. Proceedings FIG Working Week and GSDI-8-From Pharaohs to Geoinformatics, 16-21.

Soltanieh, S. M. (2008). Cadastral Data Modelling - A Tool for e-Land Administration. Australia: The University of Melbourne. Australia.

Tenga, R. W. (1992). Pastoral Land Rights in Tanzania: A Review: International Institute for Environment and Development. Tanzania.

Ting, L., & williamson, I. (1999a). Cadastral Trends. A synthesis, 4(1): 46-54.

URT, (1977). “The Land Survey Act CAP.324”. The Government Printer”, Dar es salaam. Tanzania.

URT, (2001). “The Land (Allocation Committees) Regulations” The Government Printer”, Dar es salaam. Tanzania.

URT, (1999). “The Land Act”. The Government Printer”, Dar es salaam"Metes and Bounds: Definition and uses", study.com. (2020). Tanzania.

Yomralioglu, T., & McLaughlin, J. (2017). Cadastre: Geo-Information Innovations in Land Adiministration. Switzerland: Springer.

APPENDICES

Respondents' Characteristic Appendix 1: Interview Questions to Residents of Hai District.

This interview is for academic purposes only and is meant to collect information on Assessment of cadastral information asymmetry on rural livelihood.

A. Respondents' Characteristics

1. What is your age (circle one)

a) 18-25
b) 26-40
c) 40-60
d) 60-100

2. Gender (please circle one)

(a) Male
(b) Female

3. What is your education level (circle one)

a) No formal education
b) Primary education
c) Secondary education
d) Post-secondary education
e) If other (please

1. Have you encountered any challenges in accessing cadastral information in the Hai District?

a) Yes
b) No

1. Are you aware of the factors that contribute to cadastral information asymmetry in the district?

a) Yes
b) No

2. How does cadastral information asymmetry affect rural livelihoods in terms of land access, land use, and land ownership?

a) Negatively

b) Positively

c) No impact

d) Not sure

3. Have you experienced difficulties in utilizing cadastral information for land-related activities in the Hai District

a) Yes

b) No

4. What challenges do rural communities face in accessing and utilizing cadastral information? (Select all that apply)

a) Limited awareness of available cadastral information

b) Complex or unclear procedures to access cadastral information

c) Insufficient infrastructure or technology for accessing information

d) Language or literacy barriers

e) Lack of training or knowledge on how to interpret and use cadastral information

f) Other (please specify)

5. How could the dissemination and utilization of cadastral information in the Hai District be improved? (Select all that apply)

a) Enhancing public awareness campaigns on the availability and importance of cadastral information

b) Simplifying procedures for accessing and retrieving cadastral information

c) Improving infrastructure and technology for easier access to information

d) Providing training and capacity building programs on the use of cadastral information

e) Engaging local communities in participatory mapping and data collection processes

f) Other (please specify)

6. Do you have any additional recommendations or suggestions for improving the dissemination and utilization of cadastral information in the Hai District? (Open-ended question)

……

……

……

Thank you