



UNIVERSITY OF NAIROBI

FACULTY OF BUILT ENVIRONMENT AND DESIGN

DEPARTMENT OF ARCHITECTURE

The Role of Community Land Trust in Optimizing Infrastructure Provision in Low-Income Settlement; A Case of Tanzania-Bondeni Community, Voi Town, Taita Taveta County, Kenya.

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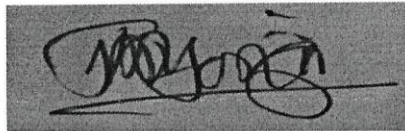
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W50/35821/2019

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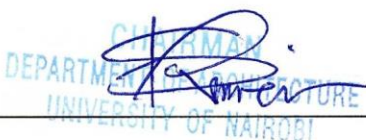
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DECLARATION

I, Linet Anyango Ogweno, hereby declare that this thesis proposal is my original work. To the best of my knowledge, the work presented here has not been presented for a proposal in any institution of higher learning.

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DEDICATION

I would like to dedicate this thesis to first and foremost my loving husband. Thank you for standing with me throughout this entire process. I wish to also extend this dedication to my dad, you truly are precious. Thank you for pushing me, the love you have for knowledge and for us to always strive for greatness have made me who I am today.

ACKNOWLEDGEMENT

Praise be to the most High God.

I would like to acknowledge the following persons, institutions and organizations that provided me with the requisite finances, information, and technical assistance to complete this thesis and without whom, the study would not have been successful:

First and foremost, I highly extend my gratitude to the study participants from the Tanzania-Bondeni settlement for their dedication and invaluable contribution in terms of information that answered the core objectives of the study and made the research a successful undertaking.

I would like to recognize my supervisors Professors Ayonga and Shihembetsa for their profound wisdom and feedback throughout the writing process. Thank you for keeping me on toes.

Dr. Planner Moses Midheme, whose brilliance I hold in the highest regard. Thank you for reading my drafts, making comments and making me feel part of an academic planning community.

Planner Moses Orege who encouraged me to go for it even when it seemed impossible. Thank you so much for your tutelage and mentorship during the time I learnt from you at Global Geosystems.

To my colleagues and classmates who always seemed to know what to say to keep me going, thank you.

To all the staff from the Department of Lands and Administration in Voi Town with whom I interacted with during the data collection period, I have learnt a lot from you.

I salute you all

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ACRONYMS AND ABBREVIATIONS

BPS	Budget Policy Statement
CLT	Community Land Trust Model
CSISU	Caribbean Strategy for Informal Settlement Upgrading
DNI	Dudley Neighbors, Inc. Land Trust
DSNI	Dudley Street Neighborhood Initiative
GTZ	German Development Agency
GOK	Government of Kenya
GRC	Grievance Redress Committee
KISIP	Kenya Informal Settlement Improvement Program
KENSUP	Kenya Slum Upgrading Program
KNBS	Kenya National Bureau of Statistics
PDP	Part Development Plan PDP
RC	Resident Committee
SPSS	Statistical Package for Social Science
UN	United Nations
UNHCS	United Nations Centre for Human Settlements
UNDP	United Nations Development Program
UES	Urban Environmental Sanitation
USA	United States of America

ABSTRACT

Land tenure's role towards the provision and optimization of basic infrastructure in low-income settlements however critical has not been well documented. Tenure in informal settlements is quite complex and elusive which has had an impact towards the provision and optimization of infrastructure in low income settlements. Low income settlements under freehold tenure are often characterized with narrow access roads that do not meet the planning standards. Where these settlements are found on private tenure, it is usually difficult to optimize infrastructure as the owners find it hard to release land for infrastructure development. Despite increasing government initiatives to upgrade and improve informal settlements, the form of tenure always causes a hindrance as the dwellers often associate these improvements with demolitions of their structures. Also, most of these upgrading activities have often focused on individual titling yet this method has proven cumbersome, expensive and time consuming. Where individual titling has improved tenure security, it has often failed to ensure the provision of land for key infrastructural amenities. Despite the increasing recognition of community land trusts (CLTs) as an innovative form of tenure able to guarantee secure tenure, foster community participation and improve housing there remains a dearth of research examining its role on achieving infrastructure optimization in low-income settlements in Kenya. This study set out to examine the role that community land trusts play with regards to optimization of infrastructure in low-income settlements. The study employed a descriptive survey research design, utilizing self-administered questionnaires, key informant interviews, and analysis of project-related documents as the primary methods for data collection. The findings of the study indicated that the Community Land Trust (CLT) tenure model has contributed to the overall enhancement of infrastructure services in the Tanzania-Bondeni settlement scheme. Through CLT, the community was able to set aside land for communal water points, sanitation, educational and social facilities. The land allocated to serve as a market is still intact and fiercely guarded by the community from encroachment and land grabbing. The access roads measure between 9-12 metres unlike in other tenure whose roads measure between 3-6 metres. The findings suggest that despite the remaining challenges that face the CLT model such as weak management structure, lack of funding, poor waste management, the establishment of a CLT can help ensure that infrastructure projects are grounded in the needs and aspirations of the community, and that they contribute to the well-being of all residents. Community land trusts unlike other forms of tenure found within low income settlements has the ability to offer a socio-economic framework that enables gradual enhancements to infrastructure and building improvements.

CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

Today, the United Nations records show that 55% of the world's population lives in urban areas, a proportion that is expected to increase to 68% by 2050 (UN, 2018). Rapid urbanization is proving to be one of the most challenging issues for developing countries. The rapid urbanization rate and the failure of urban economies to keep up have significantly fueled the spread of slums and informal settlements. The expansion of informal settlements, slums, and impoverished residential areas is a worldwide trend that accompanies the increase in urban populations. Approximately 25% of the global urban population currently resides in informal settlements, and since 1990, around 213 million individuals have joined these communities (UN-Habitat, 2013b: 126–8).

As the population in African urban settlements and cities continues to rise, the challenges they face are becoming increasingly chaotic. The growing number of inhabitants places immense pressure on the capacity of urban entities to deliver essential services to their residents, as noted by UN-Habitat in 2008. The cost associated with urban infrastructure and services such as housing, water, transportation, healthcare, and sanitation has become unaffordable for a majority of urban dwellers, primarily due to widespread poverty and low-income levels. Consequently, the results have been the growth of slums and informal settlements, which are unplanned and lacking basic infrastructure and services such as water, electricity, roads, lighting and sanitation among others (Akatch et al, 2012). Infrastructure provision within informal settlements has been highly elusive. Several initiatives geared towards improvement of infrastructure within these areas have mostly been unsuccessful due to the lack of secure tenure.

Kenya's urban landscape is highly characterized by slums and informal settlements. Kenya's Budget Policy Statement (BPS, 2020) noted that 10 million Kenyans which is 21.2% of the 47 million population live in slums. During this time, it was evident that informal settlements were not an ephemeral phenomenon (Davis et al, 2020). The government engaged in slum clearance (demolition), yet the paradox was that these informal settlements will just be rebuilt elsewhere. World Bank relocation strategies implemented through site and service schemes failed to answer the question of secure tenure and provision of basic socio-economic amenities thus leading to the birth of the upgrading strategy. The biggest criticism however levelled upon this strategy was that at this time, Kenya had embraced both capitalism and private property and enacted policies to change customary tenures to leasehold or freehold, particularly in peri-urban areas (Davis et al, 2020). A second criticism of upgrading programs was the turnover in beneficiaries, who resold lands and homes to which they had been granted title, either due to market pressures (voluntary or distress sales) or to reap a speculative windfall (Kamunyor, 2016). Finally, the efficiency of upgrading programs

was significantly hindered to a great extent by the lack of community involvement in their design and implementation.

Following these criticisms, a fourth policy response, the idea of a community land trust (CLT) was introduced in Kenya in the early 1990s to the problem of informal settlements. This model, whose origins emanated from the USA, had two advantages; first, it was tool designed against anti-speculation for reducing gentrification since there was separation between the land and its improvements and second the CLT model was considered a powerful vehicle for community empowerment, through community control of the land and community-based management of the neighborhood (Davis et al, 2020).

The Tanzania-Bondeni Community Land Trust in Voi was set in 1994 as policy response to try and secure tenure security, improve housing and basic amenities, and encourage community participation. The CLT still exists even though its uptake in Kenya has not been positive. This study seeks to examine the role that community land trust model plays as a panacea towards the optimization of infrastructure provision in low-income settlements.

1.2. Problem Statement.

According to the U.N. Habitat, statistics show that one in eight people live in informal settlements (UN-Habitat, 2018). Informal settlements serve as the initial destination for immigrants due to their affordability, providing them with a means to gather resources before integrating into urban society (UN- Habitat, 2003 a). These residents of informal settlements often face significant challenges in accessing and enjoying basic infrastructure and services like water supply, roads, sewage systems, electricity, public transportation, and waste management. The lack or poor quality of infrastructural facilities in low-income settlements can be attributed to several factors including but not limited to; limited financial resources, informal nature of settlements, land tenure issues, limited government capacity, political and social factors, rapid urbanization and population growth. This lack of essential amenities poses health and safety risks (UN-Habitat, 2007) while additionally exacerbating the poverty levels in these settlements due to negligence by city authorities in providing the necessary infrastructure and services.

Land tenure, and not just secure tenure but the form of tenure is central to any discussion on provision of infrastructure for informal settlements (Bah et al, 2018). The exponential and often uncontrolled expansion of urban areas in developing economies has underscored the importance of enhancing legal mechanisms for accessing land and services, both for current and future urban populations. The urgency to address this issue has gained significant attention. Different tenure types pose significant challenges with regards to the provision and optimization of infrastructure in low income settlements.

Governments and other organizations have made concerted efforts to address the basic necessities of these communities, employing diverse approaches to tackle the issues at hand (Basile & Ehlenz, 2021). Despite these efforts, the provision of infrastructure within informal settlements remains elusive, largely due to the form of tenure present within low income settlements. The form of land tenure system in place remains a crucial determinant in either improving the conditions within informal settlements or perpetuating the existing lack of essential facilities. The form of land tenure significantly influences the ability of residents to access basic services and amenities.

Another policy response that emerged was the upgrading of informal settlements rather than their elimination. Upgrading programs were implemented in various forms, addressing multiple issues such as basic service provision, regularization of land tenure, and infrastructure improvement. However, since they were not attuned to local realities, they faced a number of criticisms; Kenya's land market is highly capitalist, the targeted beneficiaries ended up selling their land either due to speculative windfall or market pressure and finally the lack of/poor involvement of the targeted communities during the upgrading process.

Most upgrading and infrastructure improvement strategies approach when it came to improving security of tenure in informal settlements was to provide individual freehold titles to land and property. The assumption in this was that this kind of titling model would raise property values. This form of tenure greatly hampered efforts towards the optimization and provision of infrastructure in low income settlements. Providing individual freehold titles to land and property in low-income settlements can have unintended consequences for infrastructure optimization. While it may offer residents security of tenure, it can also incentivize property sales and speculative land development, undermining efforts to optimize infrastructure. Individual ownership may hinder collective decision-making for infrastructure planning and maintenance. Upgrading programs and infrastructure development initiatives often overlook the needs and rights of tenants, resulting in inadequate provision of services and exclusion from decision-making processes.

Recent government interventions in improving infrastructural services to informal settlements have been; using various agencies such as NMS in Nairobi City County, NYS and *Kazi Kwa Vijana* initiatives to do incremental upgrading of infrastructure in low income settlements; yet in all these programs if the primary issue of secure tenure and not just tenure but which form of tenure is not addressed, then the very foundation upon which these improvements are made lies in limbo.

The form of tenure can greatly influence whether improvements are done, and if these improvements made will benefit the targeted community. In most tenure improvements approaches in slums, policy makers gave too much emphasis on individual titles which although enhancing tenure security and improving living conditions, often make it difficult for land owners to avail land for infrastructure and they also encourage land sales which further deprives the slum dwellers. Community land trust on the other hand as compared to

other forms of tenure found in low income settlements not only provides tenure security but offers opportunities for control and at the same time, an easy way to release land for infrastructure.

Community Land Trust was a concept developed and applied in the United States of America (USA) to solve a housing crisis. Over the years, we have seen its many variations and applications. Community Land Trusts have been used to provide secure tenure amongst Brazil's informal settlements. In the early 1990s, Kenya introduced the concept of a Community Land Trust as a solution to the challenges posed by informal settlements (Davis *et al*, 2020). This tenure model had two major defining components; the land on one side belonging to the Trust, while on the other side were the improvements made on the land belonging to the inhabitants (Davis, 2010).

Low income settlement schemes found on either public or private land makes it difficult to plan and implement infrastructure projects, as the ownership and control of the land are uncertain. Insecure tenure can lead to resistance, disputes, and even eviction threats, hindering infrastructure development. Various intermediate forms of tenure such as the Community Land Trusts have proven to be better at optimizing community infrastructure. The case of the Tanzania-Bondeni community land trust in Voi town provides an opportunity to examine how land tenure arrangements can optimize infrastructure provision in low-income settlements and contribute to sustainable urban development. This program aimed at improving the livelihoods of people living and working there by providing security of tenure, housing improvement and physical and social infrastructure. The physical and social infrastructure components was aimed at enhancing availability, accessibility and affordability of the physical and social infrastructure within the informal settlement. Under the physical and social infrastructure of the CLT, which is the focus of the study, the settlement depicted quite well planned neighborhood with clearly identified streets, water connections, electricity, sanitation facilities and provisions made for public utilities such as markets, health center and nursery school (Pekka, 2004).

Despite the increasing recognition of the potential of Community Land Trusts tenure model in offering permanency, affordability and community control with regards to optimization of infrastructure in low-income settlements, there is a lack of empirical evidence on its comparative advantages and challenges. Moreover, the existing studies tend to focus on the CLT models in developed countries, and there is a limited understanding of their applicability and effectiveness in developing countries, such as Kenya. A key feature of the CLT model is that land and the improvements on land are treated separately. On this aspect of leased land, the targeted beneficiaries of these improvements is the community and this aids in avoiding gentrification, a common occurrence with other forms of tenure. Another advantage of this tenure model unlike other forms of tenure is that of community control and ownership. The resident committee in charge of daily operations comprise of members who reside within the CLT. This ensures that communities do not

disintegrate and also allows for effective participation from community members a fact not seen with other forms of tenure. Usually once the upgrading process is done, the committee that was in charge of the project is usually dissolved meaning that even the safeguarding of community facilities is not guaranteed.

This research aimed to fill this gap by examining the role that CLT model plays in the optimization of infrastructure in Tanzania-Bondeni in Voi Town. As we seek to show that CLT's can be a panacea to the challenge of infrastructure optimization in low income settlements, we should keep a few questions in mind. First, what challenges do other forms of tenure found in low income settlements present with regards to optimization of infrastructure in low income settlements? Secondly, how can a model designed to promote security of tenure optimize infrastructure? Third, are there any shortcomings that still plague CLT tenure model and if so then what proposals can be made towards its improvement?

1.3. Research Objectives

1.3.1. General Objective

The General Objective of the study was to examine the role of community land trust model as a panacea in the optimization of infrastructure.

1.3.2. Specific Objectives

The specific objectives of this study are: -

1. To identify the challenges presented by other land tenure systems during the optimization of infrastructure in low-income settlements.
2. To analyze the extent to which CLT has been an improvement to the optimization of infrastructure in Tanzania-Bondeni.
3. To find out the remaining challenges in the CLT model in the optimization of infrastructure in Tanzania-Bondeni.
4. To make proposals towards the improvement of the CLT Model.

1.4. Research Questions

The research aimed to answer the following key questions: -

1. What challenges do the different forms of land tenure present during the optimization of infrastructure in low income settlements?
2. To what extent has the CLT MODEL been an improvement to the optimization of community infrastructure in low income settlements?
3. What shortcomings still face CLT model when optimizing infrastructure?

4. What proposals can be made towards the improvement of the CLT Model?

1.5. Justification of the Study

The issue of provision of secure tenure and infrastructure improvement in low income settlements has posed a challenge to both state actors and the settlement dwellers for a very long time. This study will make contribution to the existing literature on how community land trust model can be panacea to the optimization of infrastructure in low income settlements. It will benefit the settlement dwellers as will make recommendations for better strategies towards the improvement of the basic infrastructure for improved livelihoods. Overall, the findings and conclusions of this study will add to the collective knowledge base and foster a deeper understanding on Community Land Trusts.

1.6. Scope and Limitation of the Study

The CLT model implemented within Tanzania-Bondeni had four major objectives; security of tenure, housing improvement, physical and social infrastructure and community mobilization. This study narrowed down its scope to the physical and social infrastructure component within Tanzania-Bondeni informal settlement. On the physical and social infrastructure component, we wanted to understand how this tenure model enhanced availability, accessibility and affordability. The geographical scope of the study area was defined by the boundary of Tanzania-Bondeni informal settlement.

The study was limited to the infrastructural component of the CLT model due to time and financial constraints. The researcher devised a time schedule and budget that facilitated the successful completion of the study within the allocated resources and specified timeframe.

1.7. Assumptions of the Study

The study had the following working assumptions;

1. The study assumed that the CLT model has the capability to optimize infrastructure provision in low-income settlements.
2. The study assumed that the respondents had adequate knowledge on different tenure systems and how they influence infrastructure optimization in low income settlements.

1.8. Operational Definition of Terms

Community: collective users of land, which may include but not limited to a clan or ethnic community. These users possess a well-defined set of rights and responsibilities concerning the use and management of land and land-based resources. They include residents living in a given community/region.

Community Land Trust: is a model that advocates for collective/communal ownership of land. In this concept, land ownership and the ownership of buildings on that land are treated as separate entities. Essentially, the developments on the land e.g., house belongs to your, while the land is communally owned..

Infrastructure: Including but not limited to water reticulation, sanitation, access roads, storm drainage and flood prevention, markets, social halls and schools.

Optimization: the action of maximizing and making the best or most effective use of a given resource. It involves the process of making infrastructure provision more efficient, effective, and sustainable, considering the needs and priorities of the community.

Panacea: a solution or remedy

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction to Literature Review

The main objective of this research project was to examine the role of CLT model as a panacea in the optimization of community infrastructure in low income settlements. A comprehensive review of literature relevant to the study objectives was undertaken. This review looked at the CLT model and its place within Kenya's Urban context, tenure arrangements and the challenges they pose with regards to optimization of infrastructure, how CLT can be a panacea for inadequate basic services and amenities in low income settlements and finally the implementation of CLT's from the global perspective to provide strategies and lessons to improve the local context of the study area to ensure sustainable development. This chapter will also discuss the theoretical underpinnings of the study and draw up a conceptual framework explaining all the variables.

2.2. Community and its Application to Informal Settlements.

The Community Land Act 2016, defines community as a distinct and organized group of people who share any of the following attributes and utilize community land, forming a community based on: common ancestry, similar culture or a unique mode of livelihood, socio-economic or other similar common interests, geographical space, ecological space, or ethnicity.

According to Bryon Munon (1968), a community can be defined as a population residing within a confined geographic area, characterized by a sense of unity and interdependency, and possessing relative self-sufficiency. Sylvia Dale (1990), describes community as a group of individuals residing in the same local area, sharing a sense of identity and belonging. Additionally, it encompasses the social relationships and interactions that occur within a specific bounded region.

In the context of informal settlements, a community can refer to a collective group of individuals who reside in those settlements. It includes the residents, their families, and other individuals who share the same living conditions and geographical space within the informal settlement. Communities in informal settlements often form organically due to the shared experiences, challenges, and circumstances that they face. These settlements are characterized by a lack of formal planning, inadequate infrastructure, and limited access to basic services. In such conditions, the community becomes an essential source of support, social cohesion, and empowerment for the residents.

Communities in informal settlements can have their own social structures, norms, and informal governance systems that facilitate decision-making, conflict resolution, and resource allocation within the settlement.

They may establish community leaders, committees, or informal organizations to represent their interests, advocate for their rights, and address common challenges.

Communities within communal land trusts refer to groups of individuals who collectively own and manage land through a trust structure. A communal land trust is an arrangement where land is held in trust for the benefit of the community, rather than being owned individually. These communities come together to share the benefits, responsibilities, and decision-making related to the land. This model promotes sustainable land use, affordable housing, and community empowerment, providing an alternative approach to land management and homeownership.

Communities in informal settlements whose land is under communal land trusts experience a unique combination of informal settlement dynamics and the collective ownership and management structure of a communal land trust. These communities have the opportunity to leverage the collective ownership and management structure to address their unique challenges. Through collaboration, advocacy, and community empowerment, they can strive to improve their living conditions, and enhance the overall well-being of their community members.

2.3 A Framework for CLT and Low Income Settlements in Kenya's Urban Landscape.

Low income settlements are neighborhoods or regions with a median household income significantly below the national or regional average. They are characterized by high poverty levels, poor infrastructure, and inadequate public services. These settlements constitute about 30-70% of the population in major urban centers in Kenya (Kariuki & Mbuvi, 2000). They comprise a mixture of informal and formal settlements (including peri-urban).

Communal Lands in Kenya can be defined as those lands where a particular group of users share the following attributes; a common ancestry; similar culture or unique mode of livelihood; socio-economic or other similar common interest; geographical space; ecological space; or ethnicity (GOK, 2016). These lands may serve for the purposes of grazing such as ranching areas, agricultural regions for farming, residential areas for settlement, and protected areas for conservation purposes. We find that communal rural lands differ from urban communal lands for have the privilege of having a common ancestry or ethnicity. In urban areas, these groups of users are defined as having resided in a specific geographic location for an extended duration of time and they share in the collective responsibility of managing common assets.

There have been different policy approaches by the government towards the improvement of the living conditions for slum dwellers ranging from upgrading, provision of secure tenure and improving basic infrastructure. The CLT model was a concept of land tenure that had primarily been applied to U.S. and European countries; however, recent literature shows the opportunities for its application within the

developing world in informal settlements as an approach that could facilitate long-term sustainability and community control (Basile & Ehlenz, 2021). This model brings the advantages of leasehold into freehold system (Vuong, 2016). It has the potential for revitalization, community building while at the same time effectively eliminates the risk of land speculation and eviction (World Economic Forum, 2021).

In Kenya, the Community Land Trust (CLT) tenure model has gained significant recognition as a successful approach to ensuring secure land tenure and facilitating the provision of infrastructure and essential services within informal settlements. Peris Mang'ira, the National Coordinator for the Kenya Informal Settlements Improvement Project (KISIP), highlights the relevance of the community land tenure regime, both in Kenya and globally, particularly in situations where high population densities make individual ownership unfeasible. She emphasizes that through the implementation of community land titling, residents in informal settlements can obtain guaranteed land tenure and secure ownership rights (World Economic Forum, 2022).

Community-based land ownership has wide-ranging positive impacts on improving livelihoods, including increased incomes, improved housing conditions, enhanced investments, better health outcomes, expanded employment opportunities, and thriving businesses. These improvements are a result of the stability and security of tenure that community-based land ownership provides. By fostering collaboration among the public and private sectors and ensuring strong community participation, Community Land Trusts (CLTs) can serve as a powerful tool. They not only guarantee the right to adequate shelter but also make land available for infrastructure development. Moreover, CLTs empower residents to actively shape the future of their communities and play a crucial role in preserving natural resources. (World Economic Forum, 2016).

2.3. Provision of Basic Infrastructure as a Component of Slum Upgrading.

In low-income settlements, the availability and quality of urban services are severely lacking. The existing infrastructure, such as roads, pathways, and drainage channels, are either lacking or primarily made of earth, which makes them vulnerable to flooding and other weather-related issues. Moreover, in certain informal settlements, the absence of proper roads hinders both vehicular and non-vehicular access to households. It is crucial to prioritize the development of infrastructure and the provision of essential services (Davis et al, 2020) as key programs for fostering growth and improvement in these areas.

The provision and maintenance infrastructure have emerged as significant challenges, especially in slums and informal settlements found in Kenya's urban settlements. The majority of Urban Authorities in the country struggle to address the immense demand for infrastructure development and the provision of vital services (Wasike, 2002). The inclusion of essential infrastructure, for example water and sanitation systems, plays a crucial role in slum upgrading initiatives. It is widely recognized that the development of a comprehensive infrastructure system, both in newly established settlements and during the process of slum

upgrading, is of utmost importance (UN Habitat & KENSUP, 2007). Constitutional rights to water, sanitation, and housing will not be realized in the absence of secure tenure.

Infrastructure plays a vital role in facilitating development as it forms the backbone for any economy to provide essential services that contribute to human health and well-being. Diverse and complex forms of infrastructure make up the fundamental physical and organizational structures that are necessary to support development (UN Habitat, 2008). Lack of secure tenure poses significant challenges when upgrading living conditions of the urban poor. This directly impacts on accessibility of basic urban services and contributes to the absence of investments at the settlement level, including crucial infrastructure development. As a result, social exclusion is heightened, and poverty becomes further entrenched. For instance, residents who live in constant fear of evictions may lack the motivation to enhance their neighborhood infrastructure. Evidently, in most government programs or actions to improve conditions in informal settlements, a settlement's eligibility is influenced by its potential for regularization, further compounding the issue (Almansi, 2009).

According to Gulyani and Connors (2002), infrastructure should be prioritized as a central component of upgrading projects and given utmost importance on the poverty reduction agenda. It is widely acknowledged as a critical element in improving informal settlements and diminishing their prevalence (Kovacic, 2018; UN-Habitat, 2011). Scholars such as Gulyani and Basset (2010) and Collin (2012) advocate for a dual entry approach that encompasses both tenure and infrastructure considerations in upgrading programs (Mangira & Mbathi, 2020). Infrastructure upgrading is a crucial component of slum upgrading initiatives as it effectively contributes to *de facto* tenure security. By implementing infrastructure improvements, such as the extension of basic services like water and sanitation, residents are more likely to perceive these public investments as indicators of permanency in their settlements (Kamunyori, 2010). Infrastructure development within low income settlements sends a signal to the community lowering their perception of the possibility for eviction. Handzic (2010) supports this notion through his study of a World Bank-funded slum upgrading project in favelas, where residents interpreted substantial government investments as a commitment to retaining them on the land. This perception, regardless of their *de jure* tenure security, motivates residents to invest in enhancing their housing and settlement conditions.

2.4. Land Tenure Models and the challenges they pose with regards to the Optimization of infrastructure in Low-Income Settlements in Kenya

Land tenure refers to the way in which individuals or entities own or hold land, encompassing the particular arrangements and conditions associated with land ownership. Land tenure systems encompass the legal, contractual, or customary arrangements that grant individuals or organizations access to the various opportunities associated with land (Lamba, 2005). Secure land tenure provides occupants of land with the assurance that they can continue to occupy the land and derive its benefits without the fear or risk of forced

evictions. It establishes a clear understanding that any eviction can only occur through a recognized and agreed-upon legal process that is objective, applicable, contestable, and independent (Lamba, 2005). Land tenure goes beyond ownership and is connected to "...the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to... who can use what resources for how long and under what conditions (Almansi, 2009)." Security of tenure is therefore a fundamental component to delivering community infrastructure.

The form of tenure within low-income settlements can be quite complex. Kenya's constitution provides for the following categories of land tenure system; Public, private and community (GOK, 2010). Land tenure upon which low-income settlements in Kenya are founded varies within a broad continuum from insecure tenure to secure and titled tenure. The typology of such settlements in Kenya is important in understanding their nature and the resultant strategies. In Kenya, low-income settlements exhibit more than one typical characteristic as per the internationally accepted definition. While these schemes seem straightforward and intuitive enough for comprehension, some easily become inadequate in describing the full gamut of their conditions or the messy reality that one meets on the ground (GOK, 2022).

Existing literature has demonstrated that inadequate tenure relations can significantly impede investments in essential infrastructure such as roads, housing, and other services. Moreover, they can create barriers for marginalized communities in accessing these services in an equitable manner (Cromwell, 2002). Different government strategies geared towards the enhancement of living conditions in low-income settlements have always leaned towards the provision of individual titling. Internationally, literature acknowledges that individual titling should not be emphasized as the only form of tenure (Syagga, 2012).

Low-income settlements can be viewed from a generic or a practical approach (GOK, 2022). The generic approach views low-income settlements in Kenya on a definitional context i.e. the physical, social or legal characteristics of the settlement in question, or some combinations of these. In this we have; dilapidated municipal quarters, irregular subdivisions and squatter settlements. For example, dilapidated municipal quarters may have once been planned and serviced, but have since deteriorated over time, non-compliance with health and sanitation norms (e.g., poor drainage, broken sewer systems or occupation densities beyond authorized thresholds); and public safety issues (mainly dilapidated structures) (GOK, 2022). The practical approach looks at the distinctive features based on their morphology, land tenure and location that overall make the provision of any infrastructural component difficult to achieve. These typologies include densely populated urban settlements, urban settler villages, settlements with initial government intervention, settlements on private land, settlements on infrastructure reserves, and settlements on environmentally sensitive zones.

With this sort of outlook, for example in densely populated urban settlements, individual titling has often proved cumbersome as some beneficiaries lay claim to small portions of land which are not within the allowable minimum plot sizes for subdivision and titling. This is because such plots are not able to be provided with an access road and other services such as drainage, water, and sewerage. These settlements also have land rights contestation amongst residents socially divided into two groups: those that are structure owners who form the minority and tenants who are the majority (comprise of over 70% of the residents) (Rigon, 2016).

In cases where there was some form of prior government intervention, but which was not completed, e.g there are settlements where a Part Development Plan (PDP) had been prepared as a basis for allocating land. However, these PDPs were never fully implemented through the process of surveying to clearly demarcate the road reserves and individual plot boundaries. This led to the beneficiaries constructing their structures haphazardly and beyond the PDP boundary due to lack of survey beacons. In such scenarios, the optimization of infrastructure has often not been at 100% as most residents claim that the process has not been completed and therefore any government intervention is often resisted.

Where these settlements happen to fall on infrastructure reserves such as wayleaves especially roads, railway, and electricity, infrastructure upgrading in such settlements proves a challenge as wayleaves are protected under the Land Act 2012 sections 143, 144 and 148. Wayleaves are public rights of way which cannot be claimed by an individual. As such the law prohibits regularizing tenure or upgrading in-situ for those occupying the registered wayleave land. Generally, the underlying assumption for achieving tenure security has been centered on providing legal protection against forced eviction, harassment, and various threats (Syagga, 2012). However, an alternative approach to fostering tenure security involves the regularization of informal settlements, which enhances residents' perception of security without placing excessive emphasis on ownership rights. This broader perspective recognizes that tenure security can be achieved through measures that go beyond strict ownership considerations (Mbula, 2012).

Individual titling model is a formal land tenure model that involves the granting of individual land titles to residents. Under this model, individuals are granted legal ownership and control of the land, which they can use for their own purposes, including building homes, farming, or commercial activities. This model is typically administered by government agencies, which may provide subsidies or other forms of support to help individuals acquire land titles. Individual Titling Model often involved expensive and cumbersome land registration procedures that many at times has struggled to keep up with the rising demand, more so in urban areas. Granting land title to a single individual within a family unit can worsen gender inequality as it may result in the exclusion of women from land rights. Additionally, it can contribute to the fragmentation

of shared resources such as forests and pastures, which are crucial for the livelihoods of marginalized communities (Cromwell, 2002).

There is a growing concern regarding projects centered on individual titling due to their potential to exacerbate gentrification and further marginalize impoverished residents, despite the benefits experienced by those who receive titles. This particular form of tenure is seen as having a higher likelihood of contributing to the exclusion of poor residents rather than addressing their needs (Rigon, 2016). Furthermore, the argument posits that regularization programs based on individual titling fail to adequately consider the complexities present in Kenya's informal settlements. These settlements often witness conflicts between structure-owners, who possess ownership of the shacks or buildings on publicly owned land, and tenants, who represent a significant majority (92%) of the residents (Gulyani and Talukdar, 2008). In cases where regularization involves individual titling, it can result in rent hikes and potential displacement for tenants, further exacerbating social tensions and inequalities within these settlements (Rigon, 2016).

Due to the multiple interests of stakeholders in low-income settlements, where it is inconceivable for every settlement to be surveyed and each individual issued with a title, the best titling option to dispel multiple interest is to include all residents in low income settlements under a community land trust. In this scenario, the Community Land Trust (CLT) model offers a solution by separating the ownership of land from the buildings constructed on it. Essentially, individuals have ownership of their houses, while the land is held collectively by a not-for-profit CLT. The title to the land is entrusted to the CLT, which is managed democratically by residents and local stakeholders. As a result, the land is not individually titled but instead held collectively, providing a sense of shared ownership (Veronesi, 2021).

The CLT model effectively addresses the primary concern of residents in informal settlements, which is the assurance of remaining in their current homes that they have invested significant time and resources in over the years. Moreover, it promotes self-organization among residents, empowering them to enhance community activities and improve infrastructure within their settlements (Veronesi, 2021). In situations where individual titling may result in land-grabbing by privileged elites and distress sales among economically disadvantaged families, intermediate tenure approaches, such as the establishment of Community Land Trusts in urban areas of Kenya, present a more advantageous alternative. Under this system, all land within a settlement is consolidated under a single head title, safeguarding open spaces and social amenities from encroachment. At the same time, community members are encouraged and empowered to make investments in land development, and market transactions for property improvements like buildings where possible (Cromwell, 2002). This approach strikes a balance by protecting communal assets while facilitating individual investments and transactions.

2.5. Inadequate Infrastructural Services and Social Amenities in Low-income Settlements

Low-income settlements suffer from inadequate provision of essential services, including transportation, water and sanitation (including sewerage, storm drainage, and solid waste management), electricity and amenities, health and education facilities, as well as public spaces and recreational facilities (UN Habitat, 2016). The provision of fundamental infrastructure plays a vital role in promoting public health, environmental protection, and the efficient functioning of human settlements. Moreover, these essential services enable residents in low-income neighborhoods to generate income and serve as incentives for households to enhance their shelter and overall living conditions. However, the current state of affairs indicates that many County Governments in Kenya face significant challenges in meeting the substantial demand for infrastructure development and service provision (Wasike, 2002). Several factors have contributed to this situation, including tenure insecurity, unequal distribution of infrastructure development that disproportionately affects low-income settlements, ineffective urban planning, the absence of comprehensive and inclusive policies and programs, and insufficient incentives to attract private sector service providers. Even in cases where basic services are available, they are often inadequate and can be accessed at higher costs compared to standardized tariff rates (UN Habitat, 2016).

Past initiatives, including site and service programs, redevelopment, and in situ upgrading and regularization, have been implemented to address the infrastructure gap in low-income settlements (UN Habitat, 2016). However, their effectiveness in achieving desired outcomes or meeting the demand has been limited, primarily due to the failure to address tenure security. This lack of security also hampers collaboration among diverse stakeholders involved in urban development, including the government, private sector, civil society (communities residing in informal settlements and non-governmental organizations), and international development partners. To ensure optimal provision of services and amenities, including open public spaces and green areas, it is crucial to provide not just secure tenure but tenure that fosters community ownership in low-income settlements (UN Habitat, 2016).

2.5.1 Improved Access to Water

United Nations defines access to an improved drinking water source if the household members use a facility that is protected from outside contamination, in particular from faecal matters' contamination (UN Habitat, 2020). Community Land tenure has the capability to provide for access to improved drinking water source by ensuring protection of the water source to avoid contamination and degrading, having wide enough roads where water pipes can pass through and also providing for common areas where stand pipes can be placed. Unlike where private tenure exist, then the responsibility solely lies on the individual. In such cases, water supply may even be privatized and many residents may rely on private vendors who take advantage of the situation to hike the prices, of piped water thus increasing the cost of living. There are also incidences where

youth groups also collude with the vendors by tampering with water pipes and causing disconnection, so that the vendors can earn more from their business (GOK, 2022).

2.5.2 Sanitation and Drainage Facilities

In many urban low-income settlements, there is a lack of suitable and sufficient waste disposal systems as well as safe water supply systems. Access to improved sanitation is determined by whether household members have access to a facility that incorporates an excreta disposal system, effectively separating human waste from direct human contact in a hygienic manner (UN Habitat, 2020). Community Land tenure has the ability to provide for land for liquid waste disposal and also where communal baths and toilets can be located. This is unlike in freehold or private tenure where individuals may be reluctant to allocate space for these facilities. Where septic tanks and soak pits are in freehold or private tenure, the sites at times end up being inaccessible due to the narrow roads which lead to the latrines.

2.5.3 Access Roads

The distribution of access to services has been uneven across different settlements, leading to the presence of spatially disadvantaged communities (UN Habitat, 2020). Access routes to housing structures primarily consist of footpaths. However, the condition of these access routes is generally inadequate, particularly in settlements that have not undergone any upgrading initiatives. These settlements often suffer from limited space allocation and insufficient accompanying services such as storm water drainage and street lighting (Mgele, 2014).

2.5.4 Social Facilities (Pre and Primary Schools, Markets and Open Spaces)

Cities Alliance (2021), Community buildings, public space, sports facilities, schools, health services and other social amenities play a vital role in the lives of many low-income residents. Most low-income neighborhoods exhibit severe deficiencies in social infrastructure and facilities necessary to support both social and economic wellbeing of the inhabitants. Communal Land tenure offers the opportunity to provide for and avail these critical infrastructure that support community well-being and aid in building sustainable neighborhoods.

2.6. Case Studies on Community Land Trust as Enabler of Infrastructure Provision

2.6.1 CLT Establishment in the Global North.

➤ Dudley Neighbors Incorporated, USA

The very earliest forms of CLT can be traced in the USA (Vuong, 2016). The Dudley Neighbors, Inc. Land Trust (DNI) stands as an early exemplar of a city-land trust partnership aimed at tackling various community

issues. Established in the 1980s within the Dudley Triangle Neighborhood of Boston, Massachusetts, DNI was a crucial component of the broader Dudley Street Neighborhood Initiative (Grannis, n.d). Similar to numerous other urban neighborhoods throughout the nation, the Dudley and Roxbury neighborhood in the city of Boston encountered significant disinvestment during the 1970s and early 1980s (Thaden & Pickett, 2019). Following a prolonged period of disinvestment, the neighborhood faced numerous challenges including blight, dumping, and arson. In response, the Dudley Neighbors, Inc. Land Trust (DNI) was established with the goal of promoting economic development in the Dudley Triangle neighborhood while ensuring community control and preventing the displacement of existing residents. The land trust played a vital role in fostering community resilience by alleviating the pressure of displacement in the face of rapid gentrification. Additionally, DNI incorporated environmentally sustainable practices such as renewable energy in select developments, while also managing urban farms and parks that contribute to food security, mitigate urban heat islands, and effectively manage storm water runoff (GeorgeTown Law, n.d.).

Community Land Trusts in the USA context could be traced back to the civil rights movement when, in 1969, a group of African-American activists in Georgia, known as the founders of New Communities Inc., recognized the importance of securing land for their community to achieve greater independence. They believed that communal land ownership, coupled with individual homeownership, could provide low-income individuals with financial security, cooperative management, and long-term housing affordability. This pioneering approach of community-owned land with individually owned homes forms the core principle of a CLT, embodying the vision and ideals of the civil rights movement. The concept has since evolved and gained recognition as an effective model for sustainable and inclusive community development (World Economic Forum, 2021).

DSNI/DNI is an example of a community land trust that has kept resident control of land at the forefront without sacrificing scale in its land holdings (Thaden & Pickett, 2019). DNI has played a pivotal role in supporting the development of various community facilities aimed at fostering community resilience in the neighborhood. These amenities encompass a range of essential spaces, including the Dudley Town Common, parks, a 10,000 square-foot greenhouse, an urban farm, community centers, and commercial spaces, all of which are designed to ensure long-term affordability. The urban farms and greenhouse contribute to enhancing food security by providing residents with the opportunity to cultivate healthy and affordable food. Furthermore, the land trust takes on the responsibility of managing parks and green spaces, which not only mitigate urban heat islands but also improve storm-water management by reducing impervious surfaces. Beyond their practical functions, these community facilities also promote social cohesion among neighbors, thereby playing a crucial role in nurturing community resilience (Adaptation Clearinghouse, n.d.).

Figure 2.1: How CLTs Work



Source; Graphic by NYCCLI accessed on May 20th, 2023, <https://nyccli.org/resources/clts-and-mhas-frequently-asked-questions/>.

➤ **Caño Martín Peña CLT**

The Martín Peña Channel, originally a waterway coursing through the heart of San Juan, Puerto Rico, faced significant challenges as impoverished squatters established settlements along its mangrove swamps, erecting over 5,000 informal dwellings. Over time, the channel became burdened with debris and sediment, compounded by the absence of a proper sewer system, resulting in severe pollution. The lack of proper drainage exacerbated the situation, leading to frequent and hazardous flooding whenever rainfall occurred, posing significant risks to the residents of the area (Boano & Astolfo, 2017).

In 2002, a comprehensive restoration plan was announced for the Martín Peña Channel. The plan encompassed not only the cleaning and dredging of the channel, but also the implementation of stormwater and sewerage infrastructure to prevent further contamination. Additionally, essential upgrades were planned for the potable water and power infrastructure in the area. Alongside these infrastructure improvements, interventions were necessary to enhance the quality of public spaces, ensure access to adequate housing, and devise sensible relocation strategies where needed. Furthermore, socio-economic development initiatives were proposed to address the holistic needs of the community (Davis *et al*, 2020).

The proposed eco-restoration of the channel and infrastructure rehabilitation in the District had the potential to expose these residents to involuntary displacement and gentrification. Recognizing this risk, the communities along the Caño undertook a comprehensive and extensive deliberation process to evaluate the available land ownership strategies that would safeguard the long-term existence of their communities (Davis *et al*, 2020).

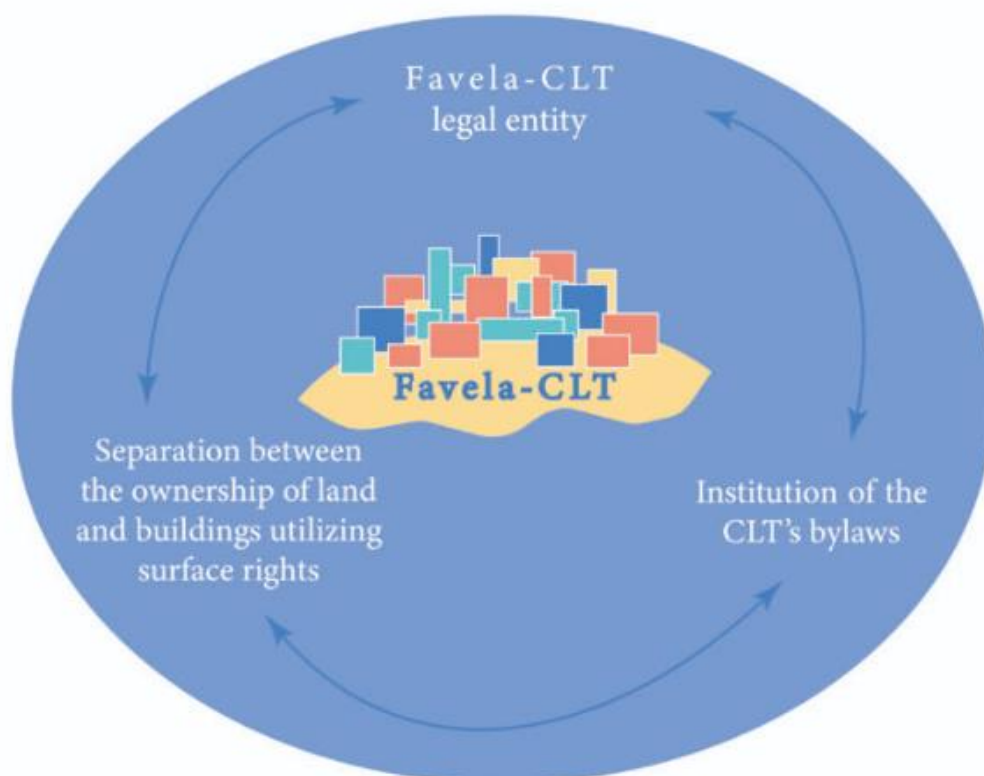
By engaging in a participatory planning, action, and reflection process, the residents successfully embraced the development plan. They carefully assessed various alternatives to address tenure insecurity while aligning with their priorities, which encompassed objectives like preventing displacement and gentrification, securing future access to credit, and preserving the right to occupy and utilize the land for generations to come. During their deliberations, they thoroughly examined different land ownership models, including individual land titles, land cooperatives, and the community land trust. After meticulous consideration, they concluded that the community land trust (CLT) not only met their requirements but also offered the flexibility needed to fulfill their diverse needs and aspirations (Davis *et al*, 2020).

2.6.2 CLT Movement in Brazil – Favela Community Land Trust

Favelas, which are informal settlements constructed by residents who face exclusion from the formal housing market, are characterized as neighborhoods that have historically lacked regulation from government authorities. These areas are primarily self-managed by the residents themselves, who have established community-led forms of governance to address their collective needs and challenges (World Habitat, 2017). The lack of secure land tenure in favelas has resulted in arbitrary evictions by government authorities. This insecure tenure situation has further enabled governments to justify their neglect in developing local infrastructure and providing essential public services in these areas (Davis *et al*, 2020).

Land regularization programs have frequently prioritized individual titling, inadvertently heightening the risk of involuntary displacements caused by market forces that intensify following the legalization of land. Even in cases where forced evictions were not taking place and governments were investing in on-site rehabilitation and upgrading initiatives, centrally located favelas still faced the threat of gentrification (Davis *et al*, 2020). The introduction of the Favela CLT aimed to empower residents and provide them with secure tenure through collective ownership of land. By implementing CLT in informal settlements, the community gained a valuable tool to safeguard against both evictions and real estate speculation, ensuring their long-term stability and control over their own land (World Habitat, 2021).

Figure 2.2: Favela CLT



Source; From RioOnWatch.org, By Jaqueline Suarez and Julio Santos Filho 2022.

Benefits

- i. The Community Land Trust option, as opposed to individual titles, provides a means for the entire community to collectively hold and manage land and properties, ensuring long-term affordability for all residents.
- ii. With the expanding influence of capital, the emergence of CLT projects provides an opportunity for favela residents to critically examine the role and limitations of individual property titles in protecting the right to housing as a fundamental human right. It also presents an alternative approach for legal protection.
- iii. LTs go beyond addressing land tenure issues and offer a pathway to achieving and sustaining genuine community development, drawing upon the inherent qualities of community life that are deeply rooted in *Favelas*.

2.7. Lessons Learnt from CLTs

Based on the review of the case studies highlighted above, I identified the necessary conditions for CLTs implementation in realizing optimization of infrastructure in low income settlements.

- a. Community willingness, commitment, and agreement.

The dedication to collective land ownership and stewardship ensures the protection and safeguarding of land allocated for different facilities. This requires consensus among community members, facilitated through participatory processes, as exemplified in the *Caño Martín Peña* CLT. Educating residents about the CLT model is also crucial for fostering shared commitment and community willingness. Without such commitment and willingness, the successful optimization of infrastructure within the CLT framework may be hindered (Basile, 2021).

b. Strong and effective leadership.

The presence of passionate community champions is essential in promoting the CLT model and educating community members. These champions collaborate with local government and supporting organizations to advocate for the model's benefits. Once established, a CLT requires a representative organization to spearhead the initiative and ensure inclusive community (Basile, 2021). These community stewards then become the watchdog for the trust to ensure land is not grabbed or illegally allocated.

c. Public Sector Support.

Government legislation, policies or programs can be the vital ingredient necessary for the acceptance of CLT in informal settlements (Basile, 2021). The government through programs such as KISIP that seek to facilitate secure tenure and upgrading of infrastructural facilities, could promote the adoption of CLT model especially where land is publicly owned instead of evictions or demolitions. The CLT tenure model offers an alternative approach that mitigates against the risks of gentrification and displacement that may arise from improvement or regularization efforts, thus ensuring the long-term stability of the community (Basile, 2021).

d. Collaboration with allied organizations, institutions, and/or technical professionals.

The establishment of a CLT in an informal settlement necessitates the development of a comprehensive improvement plan that encompasses infrastructure upgrading. These steps can be intricate and may demand technical expertise and support, including financial resources. While the absence of partnerships does not necessarily hinder the process, such collaborative support becomes crucial for a successful optimization endeavor. Partnering with organizations, professionals, and funders can provide the necessary technical know-how, resources, and guidance to effectively implement the infrastructure upgrading initiatives within the CLT framework (Basile, 2021).

Figure 2.3: Conditions for a successful CLT



Source; Author, 2023.

2.8. Theoretical Framework

In this section, the study shall review various theories and try and anchor them within our study.

2.8.1. Theory of Infrastructure and Common Management

The idea of the commons is an intriguing concept and one that goes far beyond the basic provision of common land. The theory of the commons, popularized by the work of political economist Elinor Ostrom, explores the sustainable management of shared resources. It challenges the traditional notion that common resources are inevitably subject to overexploitation or degradation. Instead, it highlights the potential for communities to develop effective governance systems that promote responsible use and long-term sustainability.

The theory of infrastructure and commons management, as espoused by Brett M. Frischmann in his book "Infrastructure: The Social Value of Shared Resources," offers insights into the governance and optimization of infrastructure and the role of community land trusts (CLTs) within this framework. Frischmann's theory emphasizes the importance of infrastructure as a shared social resource and challenges the prevailing view that infrastructure is solely a physical system. He argues that infrastructure encompasses both tangible components (e.g., roads, bridges) and intangible components (e.g., legal frameworks, social norms) that facilitate and support human activities. Viewing infrastructure as a commons highlights its role in fostering collective action, promoting social interactions, and contributing to overall societal well-being.

In low-income settlements, where formal infrastructure systems might be inadequate or absent, residents often rely on common resources to meet their basic needs. These resources can include water sources, sanitation facilities, energy supplies, or transportation networks. Applying the theory of the commons to infrastructure provision in such settlements involves recognizing the shared nature of these resources and finding ways to collectively manage and maintain them. This theory provides a foundation for understanding how communities can collaboratively address infrastructure challenges. Infrastructure optimization focuses on improving the efficiency and effectiveness of infrastructure systems. It involves ensuring that infrastructure assets are grounded to reflect community vision, minimize costs, and reduce negative environmental and social impacts

A community land trust is a distinct organizational model that embodies the principles of the common pool resources in the context of land (Veronesi, 2021). The relationship between the theory of the commons and community land trusts lies in their shared focus on collective ownership and decision-making. Community land trusts (CLTs) embody the principles of the commons by establishing a framework in which land, a valuable and limited resource, is collectively governed and leveraged for the betterment of the community. This arrangement enables the community to maintain control over the land, prevent gentrification, and ensure permanent affordability.

Frischmann's theory suggests that CLTs offer several benefits in optimizing infrastructure. Firstly, CLTs can promote equity by ensuring that essential resources like water points, social halls and recreational spaces remain accessible and affordable for community members, even as surrounding property values rise. By removing land speculation pressures, CLTs help preserve the social value of infrastructure for the benefit of the community rather than private profit.

Secondly, CLTs facilitate community participation and self-governance, aligning with the principles of commons management. They provide a framework for shared decision-making and collective ownership, enabling communities to actively shape the use and management of infrastructure resources. This participatory approach fosters a sense of ownership, engagement, and accountability among community members.

Lastly, CLTs contribute to the long-term sustainability of infrastructure by offering stable and resilient models of ownership and stewardship. As community-controlled entities, CLTs can prioritize sustainability practices, such as energy efficiency, ecological considerations, and community resilience planning. By holding land in trust, CLTs can also ensure the perpetual affordability and availability of essential resources, mitigating the risks of displacement or exclusion due to market forces.

Newton and Rocco (2021) used the theory to illustrate how a slum in *São Paulo* (Brazil) was able to mobilize the commons to reclaim the city and achieve community resilience. Cities around the world have also embraced the idea of urban commons for example, setting up community gardens, to foster community engagement, social cohesion, and sustainable urban development. Community land trusts can be seen as a way of creating and protecting commons-based assets, such as recreational parks, and community centers that are accessible to everyone within the community irrespective of their income levels or social standing.

In summary, the theory of the commons and community land trusts share a common focus on collective ownership, responsible resource management, and community governance. CLTs provide a practical application of the theory by applying its principles to land, offering an alternative to land ownership models and addressing the challenges of infrastructure provision.

2.8.2. Theory of Change

The theory of change is a framework that elucidates the causal relationships between activities, outcomes, and impacts resulting from an intervention, be it a project, program, or policy. The theory of change outlines how specific actions and initiatives contribute to a series of interconnected outcomes, ultimately leading to the intended or observed impacts (William & Gachiri, 2022). Noteworthy contributors to the development of the theory of change include Auguste Comte (1798–1857), Herbert Spencer (1820–1903), Emile Durkheim (1858–1917), Karl Marx (1818–1883), and Talcott Parsons (1902–1979). These thinkers played influential roles in shaping and advancing our understanding of social systems and the factors that drive change within them.

Based on the definition and arguments presented above, the study adopted the theory of change as one of the theories within its theoretical framework since the CLT model project's goal and objectives sought to overall improve the settlements through targeting the following aspects;

- i. Land Tenure
- ii. Basic infrastructure and housing
- iii. Community participation and mobilization.

By targeting and focusing on these individual components we see that the model would eventually achieve its desired goal of improving and upgrading this low income settlement. The theory of change has greatly informed the Caribbean Strategy for Informal Settlement Upgrading (CSISU) as noted by the UN-Habitat (2020) to ensure inclusive and resilient urbanization.

2.8.3 Social Innovation Theory

Social innovation refers to the development and implementation of novel ideas, strategies, and solutions that address social and environmental challenges (Logue, 2019). It involves finding innovative approaches to tackle issues such as poverty, inequality, sustainability, healthcare, education, and more. Proponents of this theory include; Henry Mintzberg, Geoff Mulgan, Jürgen Howaldt and Heike Jacobsen amongst many others.

The theory of social innovation revolves around creatively addressing social challenges through collaboration, empowerment, systems thinking, and sustainable practices. It aims to create transformative change by challenging the status quo, promoting social justice, and improving the well-being of individuals and communities. Social innovation processes have been argued to play a pivotal role in facilitating the integration of participatory mechanisms within urban decision-making processes. This integration not only fosters greater social inclusion of marginalized groups but also strengthens the resilience of urban areas and communities (Ardili & Oliveira, 2020).

Low income settlements have continued to lack or have inadequate basic infrastructural services and amenities despite the level of investment from the government and other non-state agencies. This can be largely attributed to the form of tenure present within these low income settlements. As identified from the literature review, different tenure types pose different challenges when it comes to upgrading infrastructure within these settlement schemes. CLTs are a social innovation that addresses the challenge of provision and optimization of infrastructure in low income settlements. By acquiring and holding land in trust, CLTs can ensure long-term affordability and protect communities from gentrification and displacement. They provide opportunities for low-income families and individuals to access water, schools and other community facilities such as gardens and social halls.

By utilizing CLTs as a social innovation tool, communities can optimize infrastructure in a way that is participatory, inclusive, and sustainable. CLTs provide a framework for collaborative decision-making, community empowerment, and the creation of infrastructure that serves the long-term needs of the community while addressing social challenges such as secure tenure, affordable housing and community development.

This theory has been applied within the urban development to revitalize neighborhoods, improve living conditions, and promote community engagement. Initiatives include but not limited to infrastructure development and enhancing community participation. By encompassing collaboration, empowerment, sustainability, and innovative solutions to tenure security and infrastructure upgrading, community land trusts are seen as a component of social innovation theory. They demonstrate how novel approaches to land and housing ownership can address social issues and contribute to positive social change.

2.9. Research Gap

Mang'ira (2019), Despite the increasing recognition of community land trusts (CLTs) as a means to empower communities, promote capacity-building, facilitate collaboration, and foster solidarity among residents, there remains a dearth of research examining the role of the CLT model as an innovative form of tenure for achieving infrastructure optimization in low-income settlements in Kenya.

Existing studies have primarily focused on the positive outcomes of CLTs, such as the provision of permanently affordable housing and the creation of wealth-building opportunities for low-income families through lower purchase prices and access to affordable loans (Basile, 2022). However, limited attention has been given to investigating how the CLT tenure model specifically contributes to infrastructure improvements in low-income settlements.

Thus, this study delved into the potential benefits and challenges associated with implementing CLTs in order to realize infrastructure optimization within Kenya's low-income settlements. By conducting such research, we can gain valuable insights that inform future initiatives and policies aimed at improving infrastructure and tenure security in these marginalized communities.

2.10. Study Conceptual Framework

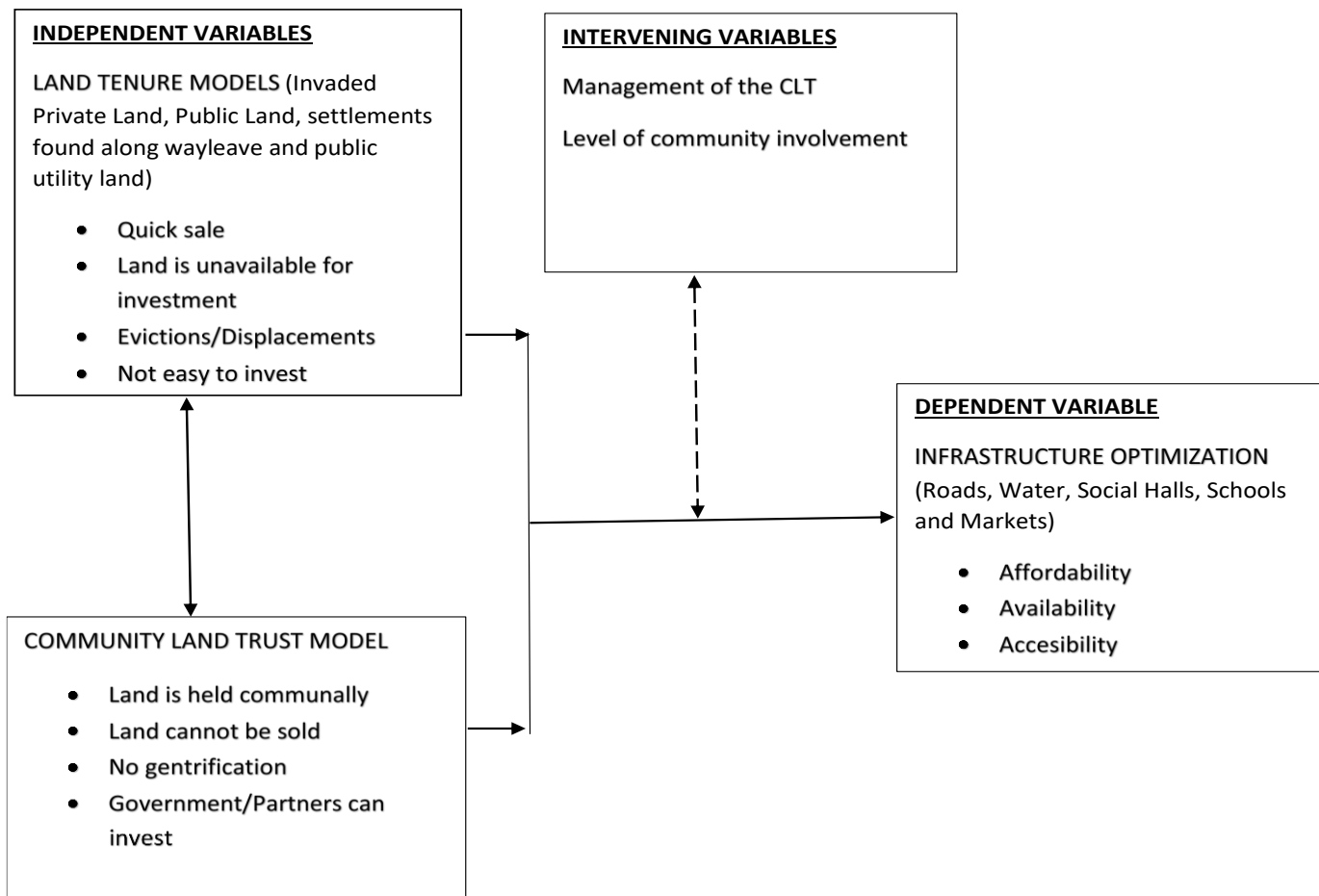
Low-income settlements face numerous challenges in terms of infrastructure provision, including inadequate housing, poor transportation, insecure land tenure, lack of basic services, limited access to education and healthcare, and limited government support. Other tenure models have their limitations when it comes to optimization of infrastructure in low income settlements. Community land tenure has the potential to provide for secure tenure yet at the same time optimize infrastructure provision in low income settlements.

The provision and management of infrastructure in low-income settlements is a complex issue that requires a coordinated effort from both state and non-state actors. The government plays a critical role in providing infrastructure in low-income settlements, including policy development, funding, service delivery, planning and coordination, capacity building, and monitoring and evaluation. By collaborating with multiple actors, government can help enhance sustainable and equitable infrastructure development in low-income settlements, which can improve the quality of life for the dwellers and support broader development objectives.

Community land trusts can face a myriad of challenges in realizing their objectives, including but not limited to lack of resources, lack of support from government and other stakeholders, limited capacity and expertise, political interference, Weak management and financial limitations. To overcome these challenges, community land trusts may need to develop strategic partnerships, engage in advocacy and outreach efforts,

and build the technical capacity and expertise needed to effectively manage land and develop infrastructure and services.

Figure 2.5: Conceptual Framework



Source; Author’s Construct, 2023.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

This section provides a comprehensive overview of the methodologies employed to address the research questions and accomplish the study objectives. It encompasses a detailed account of the target population, the research design and unit of analysis, the tools utilized for data collection, the sampling techniques and procedures, the methods employed for data analysis, as well as the ethical considerations associated with the study. By presenting this information, the section offers a clear understanding of the procedural framework implemented to ensure the validity and reliability of the research outcomes.

3.2. Research Methods

3.2.1. Research Design

This study utilized a descriptive survey research design to examine the characteristics of the observed phenomena and explore potential correlations between multiple variables. Descriptive research aims to describe the attributes of a group, situation, or phenomenon under investigation without manipulating variables or testing hypotheses. To gather data, a combination of research methods was employed, including observations, case studies, questionnaires, in-depth interviews, and archival methods. Both quantitative and qualitative approaches were utilized to collect and analyze the data, allowing for a comprehensive compilation of information.

3.3. Data Sources

3.3.1. Primary Data

To obtain primary data for the study, the researcher employed three strategies: field research, data access, and primary data collection techniques. These techniques allowed the researcher to directly observe and engage with the residents of the CLT model as they utilized the various infrastructure components. The participant observation technique, as described by Smith (1981), was utilized, which involved observing and interviewing participants while maintaining limited relationships with them. The researcher and a research assistant visited the Tanzania-Bondeni settlement scheme to gain firsthand experience with the availability, accessibility, and costs of the CLT model's infrastructure components. This enabled them to document and verify the existence of infrastructure facilities and amenities, supplemented by capturing photographs for further evidence. Additionally, semi-structured and structured interviews were conducted, providing qualitative and quantitative data for analysis purposes.

3.3.2. Secondary Data

The research reviewed different published and unpublished studies and literature on the concept of tenure and infrastructure optimization in informal settlement from global, regional and the local perspectives. This data was useful in the identification of the general challenges of how different tenure models impedes infrastructure provision and how CLT model can be used to solve such challenges.

3.4. Sampling Design

In this section, the sampling frame, the sample size and the sampling techniques used in the research were described.

3.4.1. Research Setting

Tanzania-Bondeni settlement scheme in Voi was selected for this research as a case study as it is one of the pioneers where CLT model has been implemented in Kenya. This settlement scheme was once informal but it was upgraded to provide secure tenure among low-income households. The form of tenure model in low-income settlements has had an influence over optimization of infrastructure. This study shall focus on the role of community land tenure as panacea in optimization of infrastructure in low-income settlements.

3.4.2. Target Population

Oso & Onen (2009), define Population as the total number of subjects. Target population refers to an entire group of individuals, events or objects having a common observable characteristic. The target population for this research included Officials from the Ministry of Lands and Physical Planning, County Directorate in charge of Physical Planning, County Directorate in charge of Public Works, Voi Town Administration, KISIP Project Coordination Teams involved in tenure regularization and infrastructure upgrading and the Resident Committee in charge of managing the settlement.

The residents of Tanzania-Bondeni CLT also formed part of the target population as the benefitting community. They were represented by the household head of each interviewed household.

3.4.3. Population Frame and Sampling Size

The latest population Census of 2019 puts the population of Voi Town at 55,200 and that of Kaloleni sub location where the settlement is situated at 33,328 residents (KNBS, 2019). Government records stating the exact population for the settlement of Tanzania Bondeni were not available, however since the study specifically focused on Tanzania-Bondeni CLT that had a total of 764 plots representing 764 households.

3.4.4. Sample Size Distribution

According to Mugenda & Mugenda (2003), a sample is a set of respondents (adult respondents) selected for the purpose of this study. In a descriptive survey research, an optimum sample size is usually around 10-20% of the population, as long as this does not exceed 1000. From the defined sample frame of 764 household heads of the Tanzania-Bondeni settlement scheme, the study sample size was distributed as shown in the table;

Table 3.1: Sample Size for the Study

Target Group	Total Population	Sample Size
Tanzania-Bondeni CLT Residents	764	76
Tanzania-Bondeni RC	13	1
County Directorate of Physical Planning	20	2
County Directorate of Works	30	3
Voi Town Administration	30	3
National Government- MoLPP	10	1
KISIP	1	1
Total	868	86

Source; Author, 2021

3.5. Sampling Techniques

3.5.1 Random Sampling

This study employed a random sampling technique, where respondents were selected by chance, ensuring that every member of the population had an equal opportunity to be chosen. Random sampling was employed in selecting respondent from the local area residents.

3.5.2. Purposive Sampling

The study utilized a purposive or judgmental sampling method, specifically when selecting respondents to administer questionnaires and conduct interviews. Purposive sampling was employed to identify individuals considered to be knowledgeable and resourceful in providing information relevant to the study objectives. This approach was applied in selecting key informants, including officials from the resident committee overseeing the CLT, as well as County Government Officials such as the Town Administrator, Physical Planning Officer, Works Officer responsible for Informal Settlements, Land Registrar from the Ministry of Lands and Adjudication, and KISIP officials.

3.6. Data Collection Tools and Techniques

1. Questionnaires: The primary data collection involved distributing questionnaires to the identified household heads, as listed in table 3.1

2. Interviews: Structured interviews were conducted with officials from the Resident committee, KISIP, County government and National Government staff from the Ministry of Lands and Physical Planning.

3. Observations and Photography: The researcher observed and documented what was happening on site. Recording was done through taking notes and capturing photographs of the settlement scheme.

3.7. Data Analysis and Presentation Techniques

3.7.1. Data Analysis Methods

Table 3.2: Matrix showing Data Needs

Research Objectives	Data Required	Use of data	Source of data	Means of Data Collection	Method of Data analysis
To identify the challenges presented by other land tenure systems during the optimization of infrastructure in low-income settlements.	Types of tenure models, Infrastructure optimization challenges, Historical data Socio-economic data	The data required to find out the challenges that other forms of tenure present when it comes to optimization of infrastructure	Literature Review	Document analysis	Table
To analyze the extent to which CLT has been an improvement to the optimization of infrastructure in the study area.	Water, Sanitary Facilities, Roads network, Social Halls, Open spaces and ECDE's	To assess feasibility of CLT Model as a solution to infrastructure needs in low income settlements	Directorate of planning Tanzania-Bondeni Residents	Observation guide Interviews Questionnaires Checklist	SPSS
To find out the remaining challenges in the CLT model in the optimization of infrastructure in Tanzania-Bondeni.	Legal implications Community involvement Management of the CLT Funding Partnership with LA/Non state actors	To find out other shortcomings likely to hinder the CLT model from realizing optimization of infrastructure	Tanzania-Bondeni residents MoLPP Directorate of Planning KISIP	Interviews Questionnaires Observation	SPSS

To make proposals towards the improvement of the CLT Model.	Integrated urban management approaches	To propose strategies that improves the CLT Model with regards to the optimization of infrastructure in low income settlements.	Case studies Professionals	Document Analysis	Content Analysis
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Source; Author, 2021

This section involves cleaning, transforming and synthesizing the data collected to be of more significance.

The data was analyzed as indicated below: -

- The quantitative data was analyzed using SPSS and Excel software
- The qualitative data was analyzed using logical reasoning based on past studies and case studies as indicated in the literature review.

3.7.2. Data Presentation Techniques

The data was presented once the data analysis was complete. The data was presented as categorical or continuous data. Continuous data was represented using descriptions while categorical data was presented as bar charts, pie charts and other techniques.

3.8. Validity and Reliability of Research Instruments

According to (Haradhan, 2017), reliability refers to the stability of the findings while validity shows the truthfulness of the findings. These are key in research for they ensure that the research is transparent and reduces instances of bias by the researcher. The study used content validity to show the extent to which the questions on the questionnaires were able to achieve the objectives of the study. The study utilized content validity by formulating questions that are clear and easy to understand. This ensured that the views collected were as honest and true as possible.

CHAPTER FOUR: STUDY AREA

4.1. Historical Background

4.1.1. Pre-Upgrading

The Tanzania-Bondeni CLT was implemented as part of a settlement upgrading project from 1991 to 2004. The settlement was home to approximately 4,370 squatters residing in 530 structures, facing significant challenges such as poverty and overcrowded living conditions (Yahya, 2002; Midheme, 2010). The proximity to the Voi River resulted in recurring floods, leading to frequent displacements, property damage, and loss of life for the residents. Additionally, the absence of essential municipal services, including piped water and garbage removal, further deteriorated the health conditions within the settlement. Despite these harsh circumstances, the settlement displayed internal stability, with up to 47% of the residents having lived on-site for over 30 years at the beginning of the project (Midheme, 2010).

4.1.2. Origins of the CLT Initiative

The Tanzania-Bondeni (Voi) upgrading project was a collaborative effort between the Voi Municipal Council, the Ministry of Local Government (MLG), and the GTZ Small Towns Development Project (STDP). The land where the settlement was located was owned by the government, as well as two corporate entities: Kenya Railways Corporation and Voi Sisal Estates Ltd. The project had four main objectives: (1) to provide tenure security and legalize the informal settlement, (2) to improve the delivery of municipal services to the settlement, (3) to enhance the local environmental quality, and (4) to boost municipal revenues through improved collection of land rates (MoLG, 2004).

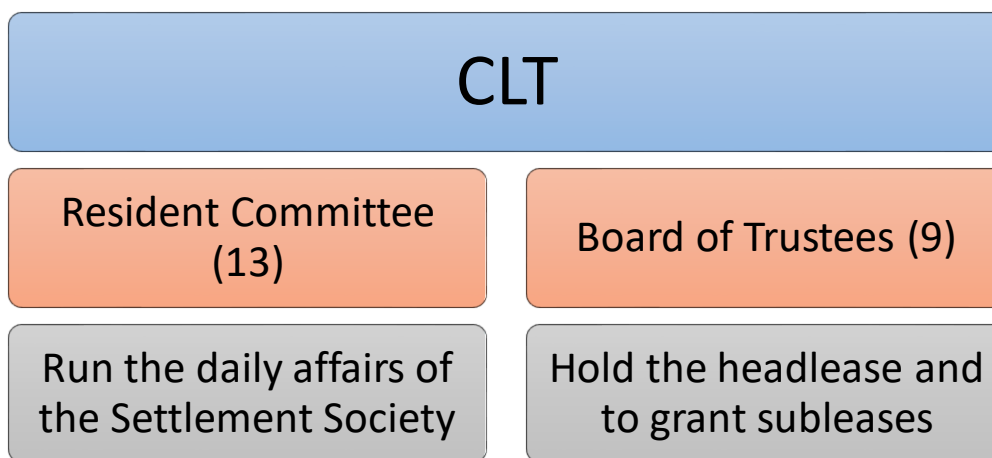
Unlike traditional settlement upgrading projects that often follow a top-down approach, the design and implementation of the Voi initiative adopted a multi-disciplinary and multi-sectoral approach, incorporating various project components (Midheme, 2012). A physical layout plan was developed, including designated areas for residential and commercial plots. Additionally, provisions were made for a market, schools, a health center, a community center, and open spaces. The project focused on infrastructure improvements, such as the construction of better roads, storm water drainage systems, and stand pipes for municipal water supply. To mitigate the risk of flooding, a riparian strip along the Voi River was preserved, serving as both a space for subsistence gardening and a buffer against flood risks.

The final plan realized a total of 818 plots, exceeding the number originally claimed by the owners of the structures. Once the original claimants received their plots, the additional plots were democratically allocated to other residents, with priority given to the elderly, the sick, and the very poor. Long-term tenants were also given favorable consideration (Midheme, 2010).

4.1.3. Management of the CLT

The Community Land Trust (CLT) in Tanzania-Bondeni is governed by a nine-member board of trustees, who oversee its long-term operations. Assisting the board is a residents' committee, responsible for managing the day-to-day affairs of the CLT. The committee consists of thirteen members, with a special provision of reserving three seats for women (Yahya, 2002; MoLG, 2004). To sustain its activities, the CLT collects annual fees from its members, which contribute to its recurrent budget. The CLT's financial accounts are audited and approved by the members during the annual general meeting, ensuring transparency and accountability (Bassett, 2005; Midheme, 2010).

Figure 4.1 Management Structure



Source; Author, 2023.

4.2 Site Analysis

4.2.1. Location and Size

Tanzania-Bondeni, situated in Taita Taveta County, is a settlement located approximately 1.5 kilometers away from the bustling center of Voi Town. Covering an area of around 22 hectares, the settlement is physically divided by a railway track belonging to Kenya Railways. The larger section, known as Tanzania, lies to the south of the track and is bordered by the Voi River to the south and the Voi Sisal Estate to the west. The smaller section, Bondeni, meaning "in the valley" in Swahili, is situated to the north of the railway line. Bondeni is nestled between the embankment supporting the active rail line and the embankment of a disused rail line to the north, giving it the appearance of being situated in a valley (Bassett, 2007). Map 1 shows the study area in a national context, Map 2 depicts the study area in relation to Taita Taveta County and where Tanzania-Bondeni falls within the different wards in Voi Sub County. The final map shows the study area which is Tanzania-Bondeni.

Figure 4.2 Location

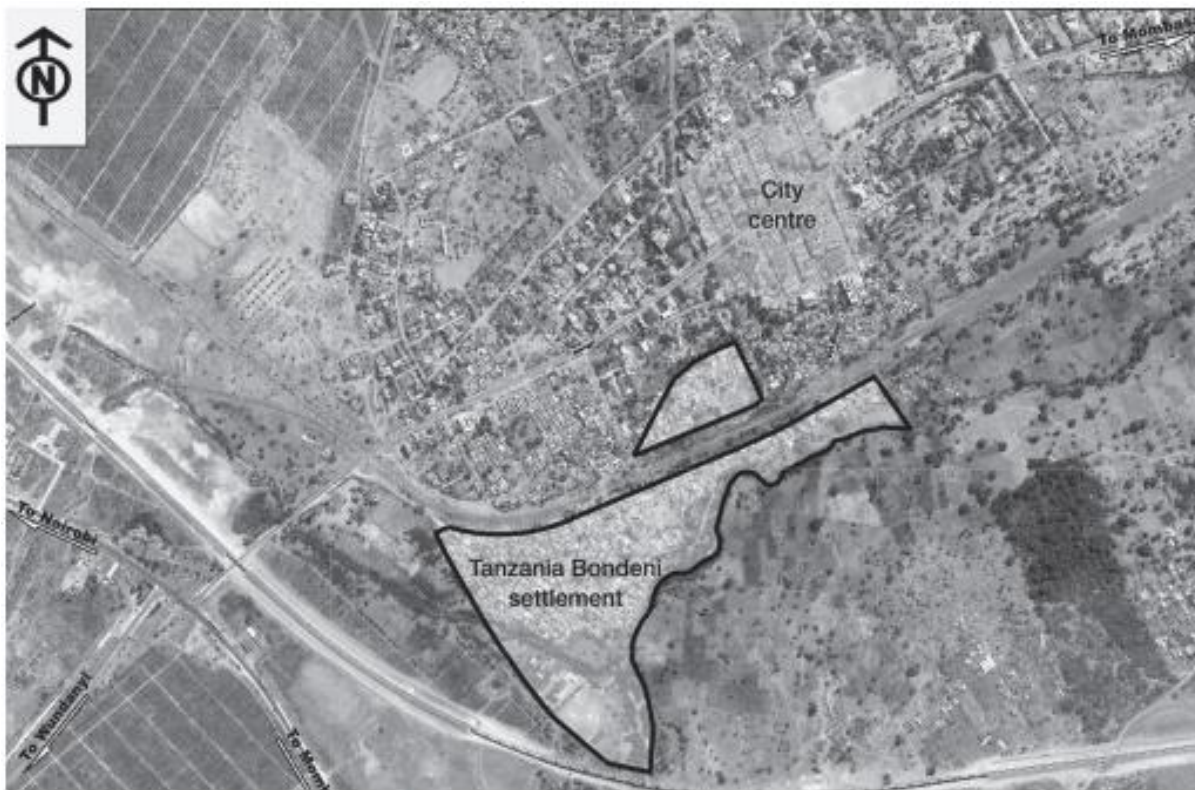
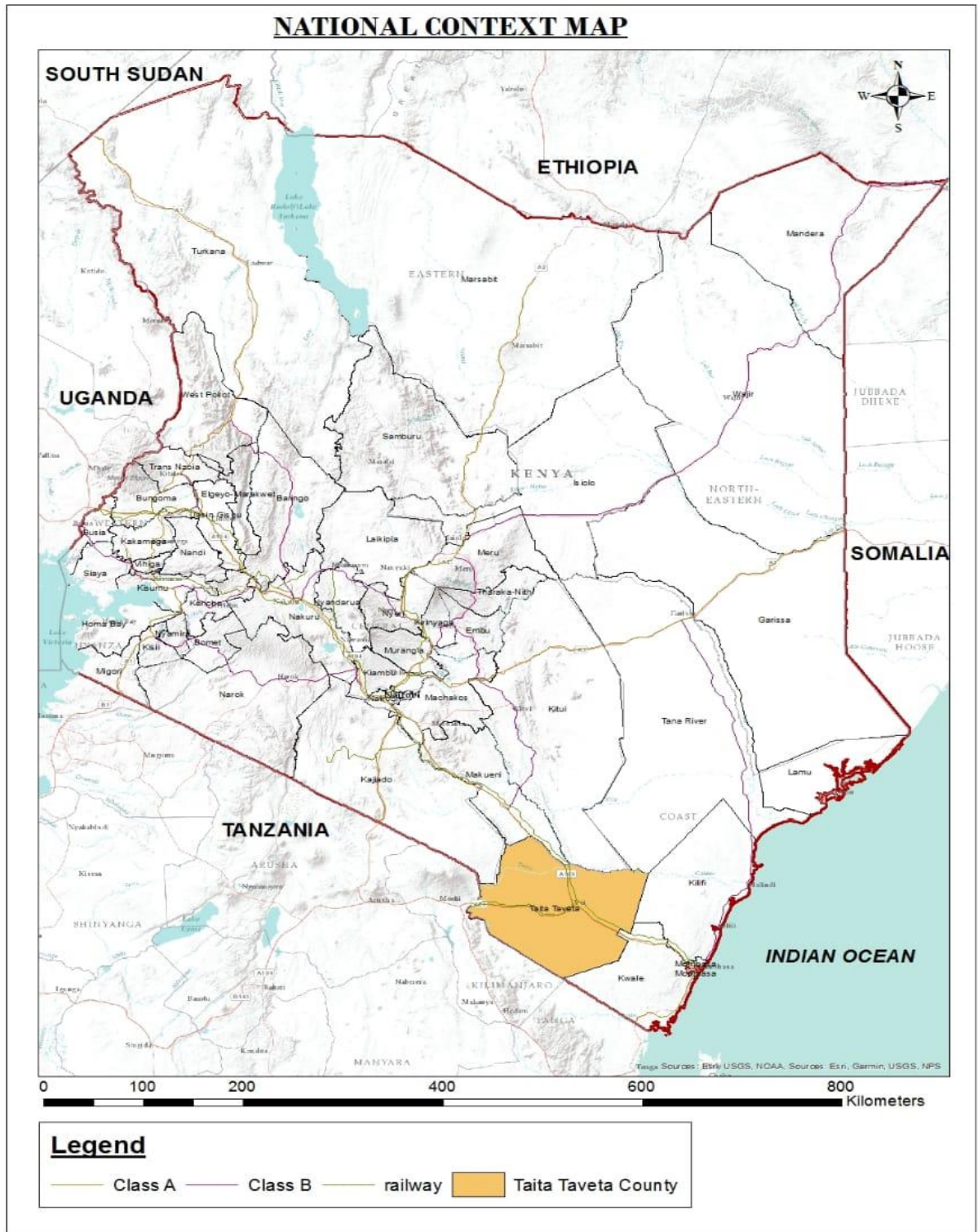


Fig. 14.1. Location of the informal settlement of Tanzania-Bondeni. Map scale: 1:10,000.

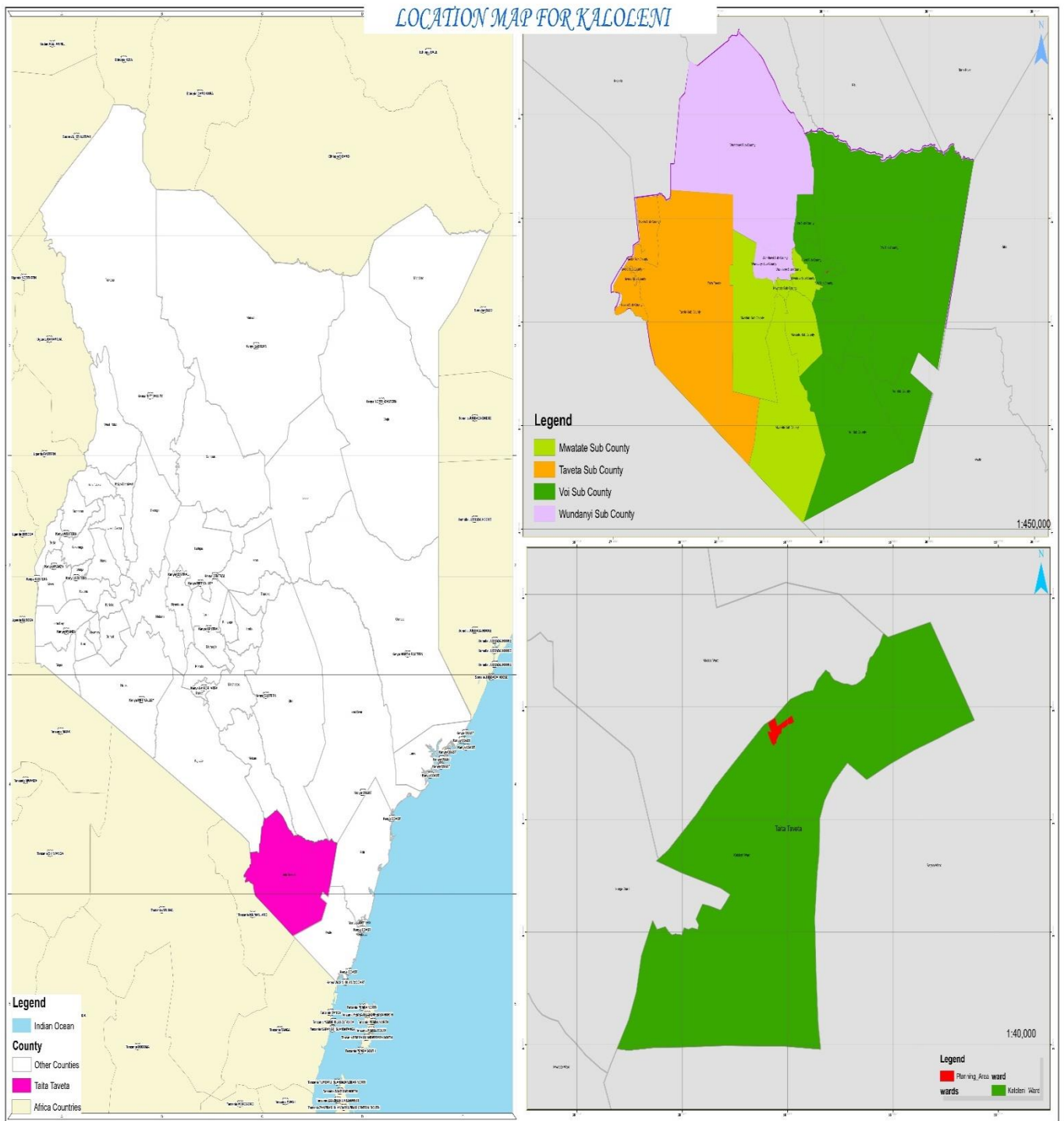
Source; Image by Claire Simonneau, 2020.

Figure 4.3: Map of Study Area in National Context



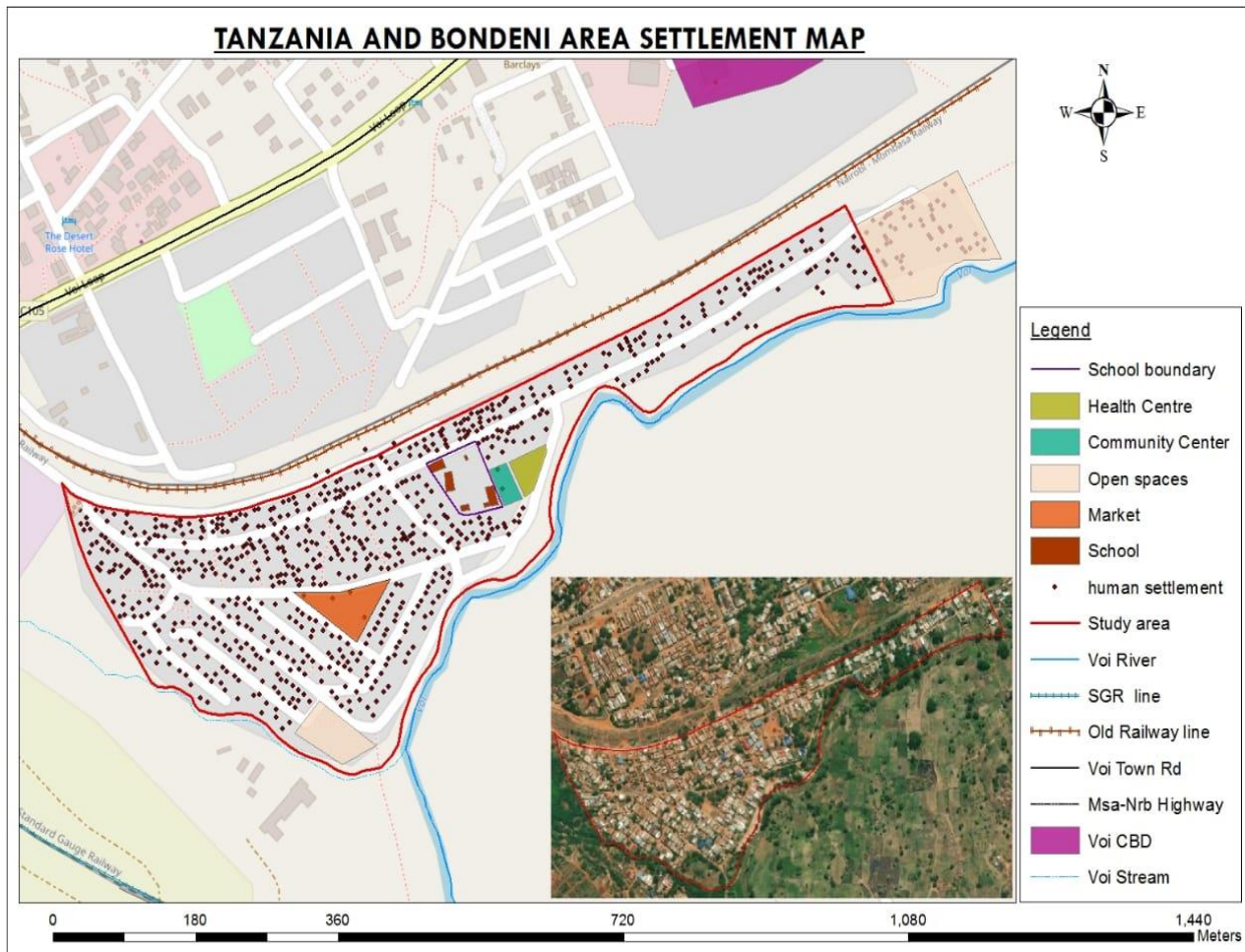
Source; Taita Taveta County CIDP II, 2018-2022.

Figure 4.4: Location of Tanzania-Bondeni Settlement Scheme in Kaloleni Ward



Source; Taita Taveta County CIDP II 2018-2022.

Figure 4.5: Tanzania-Bondeni Settlement Scheme



Source; Adapted from Voi Part Development Plan, 2018-2022.

4.2.2. Land Tenure and Ownership

The land where Tanzania-Bondeni settlement is registered under communal land tenure. The community was issued with head lease by the Commissioner of lands. The CLT then in turn issued subleases to individual trust members as proof of property-holding within the settlement.

4.2.3. Population

Government records showing the population of Tanzania Bondeni are not available, however the ward within which the settlement can be found has a total population of 33,328 (KNBS,2019). According to the site layout plan, the settlements is made up of approximately 764 plots.

4.2.4. Economic Activities

Tanzania- Bondeni Settlement Scheme is located within Voi town. Voi is a characterized as a transition town with a marketplace for agricultural and meat products from the fertile Taita Hills as well as the surrounding

areas. The town center consists mostly of general stores, shops, markets, kiosks and hotels. Most lodges that service tourists for the national parks are located in the suburbs at the edge of town. The Voi Sisal Estates are located to the west of the town.

4.2.5. Weather and Climate

The settlement experiences the Taita Taveta Climate, which is mainly dry, except for Taita Hills which are considerably wet. The south-easterly winds influence climate in the area, whereby hilly areas have ideal conditions for moisture condensation which then results in relief rainfall.

4.2.6. Topography

Taita Taveta County has three major topographical zones. Tanzania-Bondeni settlement scheme falls within the lower zone where which includes plains where the national parks, mines and ranches are found. Altitudes range from 500 metres above sea level to almost 2300 m at the highest point in the county Vuria Peak.

4.2.7. Water Resources

Voi River is the main river of the settlement scheme, and it flows through the town. It provides about 210 kilometers of riverway with the essential life-giving sustenance that, in this part of the world, is sorely needed. The river originates from the Taita Taveta hills, flows past the town at Voi and then travels through Tsavo East National Park. Voi is the river that feeds into the Aruba dam.

4.2.8. Rainfall

Long rains are usually experienced between March and May – where on average, highlands record 265 mm as opposed to the 157 mm in lowlands. Short rains are anticipated between October and December, with annual rainfall being recorded at 1,200mm (highlands) and 341mm (lowlands). Rainfall distribution is usually uneven, with higher rainfall amounts being recorded in highland areas as compared to the lowlands. Annually, mean rainfall is 650mm.

4.2.9. Temperatures

Average temperature in Taita Taveta County is 23⁰C, with lows of 18⁰C in hilly areas (Sagalla, Taita ad Mwambirwa) and rising to about 25⁰C in lower zones.

4.2.10. Land Use

The physical layout plan for the settlement scheme had the following major land-use classes: residential use; market centers; social infrastructure; recreational areas; water bodies and riverine areas; urban agriculture; open lands and others; and protected areas.

4.3. Conclusion

Having looked at the area of study in details, let us now have a look at the research findings and analysis of the data collected.

CHAPTER FIVE: RESULTS AND DISCUSSIONS

5.1. Introduction

This section presented the analyzed and interpreted data as per the four objectives of the study. The data was processed and the results discussed in response to the outlined research questions.

5.2. Questionnaire Return Rate

The study targeted 86 households within Tanzania-Bondeni settlement scheme who part of the determined sample size. 81 households (94.2%) positively responded to the survey request and returned the questionnaires. The response and return rate of 94.2% was statistically acceptable for analysis as Babbie (2007) suggested that response rate above 50.0% can be reported, that over 60.0% is good, and that over 70.0% is deemed as excellent as was the case of the study survey's return rate. The return rate was summarized as indicated in Table 5.1 below.

Table 5.1: Questionnaire Return Rate

Category	Sent	Returned	Return Rate (%)
Households	86	81	94.2%

Source; Researcher, 2023

5.3. Challenges Presented by other Land Tenure Systems during the Optimization of Infrastructure in Low Income Settlements

Table 5.2: Different ownership types and Challenges

Tenure Type	Challenge
Individual Titling Model (Freehold/Leasehold)	Hard to release land for infrastructure development Gentrification Titling process often expensive and cumbersome Gender inequalities/Exclusion
Uncommitted Government Land/Deffered Public Land	Difficult for Government/non-state agencies to invest Evictions
Invaded Private Land	Evictions, Demolitions, Had to invest
Settlements that have had little government intervention. DP prepared, not approved	No survey hence lack of clearly demarcated roads, etc
Settlements on public utility land e.g. Road reserves, wayleaves,	Evictions, Demolitions, Difficult to invest

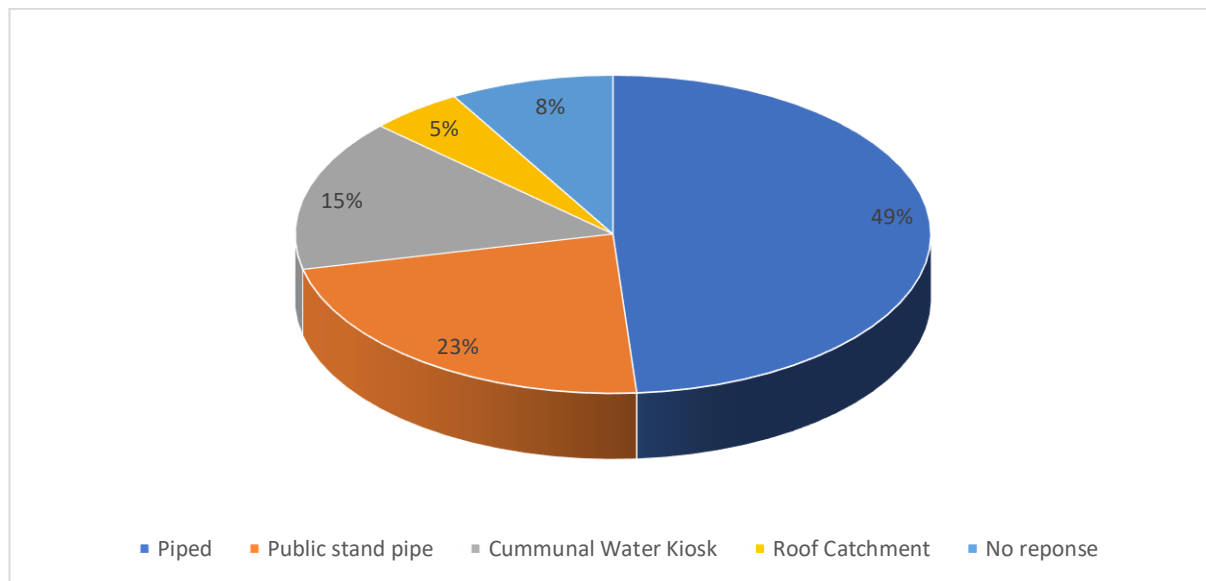
Source: Adapted form Literature Review, Modified by the Researcher, 2023

5.4. Extent to which CLT Model Improved Optimization of Community Infrastructure

5.4.1. Water Availability, Quality, Access, and Cost

The extent to which CLT model been an improvement to the optimization of community infrastructure in low-income settlements was determined by the availability of the community infrastructural facilities, their perceived quality, and the cost of access.

Figure 5.1: Water Sources within the Settlement



Source; Researcher, 2023

The main sources of water available within the settlement is piped which as accessed by the majority of the residents noted by 49.0% of the respondents. Public stand pipes that supply water households are also available to serve those who have no access to piped water within their houses as noted by 23.0% of the respondents. Communal water Kiosk are also available with settlement as noted by 15.0% of the respondents. The water Kiosks are very vital as they store water that can be accessed by the community members especially when the piped water supply system is broken down and finally the option of roof water catchment that provide rain water especially during the rainy seasons. The promotion of roof water harvesting helps reduce the strain on the main water source.

The perceived quality of water sources within the settlement are captured in Table 5.3 below with a majority of the respondents at 55.6% acknowledging that the water sources are of good quality, of moderate quality by 25.9% and very good quality noted by 18.2% of the respondents involved in the survey. Piped water is available on daily basis for the residents within the Tanzania-Bondeni settlement as noted by 100.0% of

those selected for the survey as other sources supplement the piped water especially when there is a break down in the supply system.

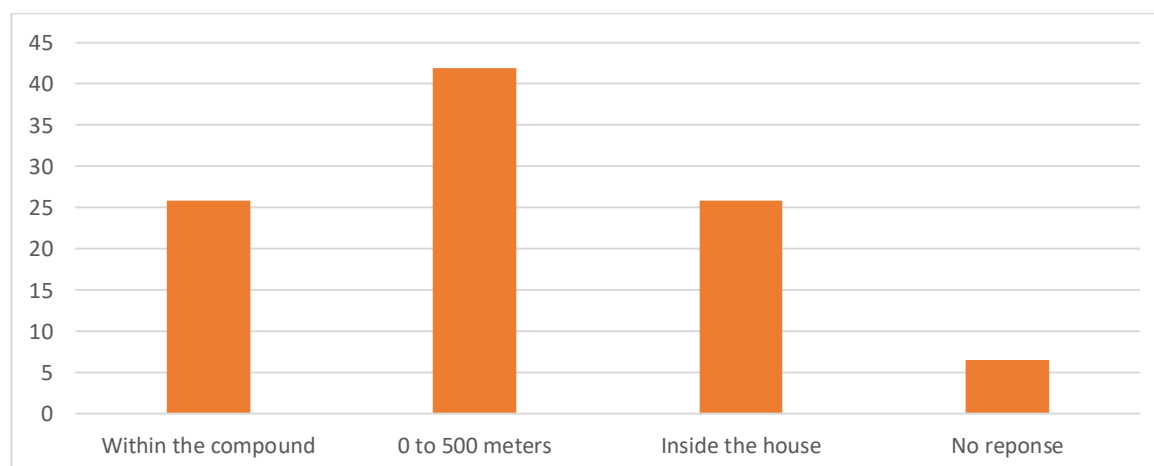
Table 5.3: Perceived Quality of Water in Settlement

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Moderate	21	25.9	25.9	25.9
Good	45	55.6	55.6	81.5
Very Good	15	18.2	18.2	100.0
Total	81	100.0	100.0	

Source; Researcher, 2023

Accessibility to the water sources is shown in Figure 5.2 below where 25.8% of the respondents noted that they do not have travel to access water as water services, 48.4% travel to access the water services to a maximum distance of 500 meters, as 25.8% of the respondents have water supplied right inside their houses.

Figure 5.2: Accessibility to Water Sources within the Settlement Scheme



Source; Researcher, 2023

The World Health Organization Joint Monitoring Program on water and sanitation states that “Access to water means that the source is less than 1 kilometer away from its place of use and that it is possible to reliably obtain at least 20 liters per member of a household per day. From the survey, 27.0 % of the respondents pay an average of Kshs.500 per month for water services while 6.5% of the respondents pay an average of Kshs.200 per month for water services.

Community land trusts (CLTs) offer unique characteristics that distinguish them from other forms of land tenure when it comes to guaranteeing water availability. While other land tenure models may contribute to water management to some extent, CLTs are specifically designed to prioritize community needs and

sustainable practices, which can have a more direct impact on water resources. In our case, the Tanzania-Bondeni CLT were able to protect the main water source which is Voi River that passes through the settlement and is responsible for the provision of piped water to the homesteads. This has ensured a steady and clean supply as shown on Table 5.3. Another key aspect is the communal water kiosks. Unlike other forms of tenure that do not set aside land for communal water points and even if provided for are run by private individuals, the case of Tanzania-Bondeni showed that the community prioritized the availability of these communal water points to serve those who may not have access to piped water. The study also revealed these communal water points are owned by the community and the monies collected go into the maintenance of the facility.

5.4.2. Sanitary Facilities Availability, Access, Quality and Cost

38.7% of the respondents had access to own water borne toilets, while 19.4% relied on public water toilet, 29.0% had own pit latrines and 6.5% of the respondents relied on public pit latrines.

Table 5.4: Availability of Toilets

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Own waterborne toilet	33	38.7	41.4	41.4
Public Water toilet	15	19.4	20.7	62.1
Own pit latrine	23	29.0	31.0	93.1
Public Pit Latrine	5	6.5	6.9	
Missing	5	6.1		
Total	81	100.0		100.0

Source; Researcher, 2023

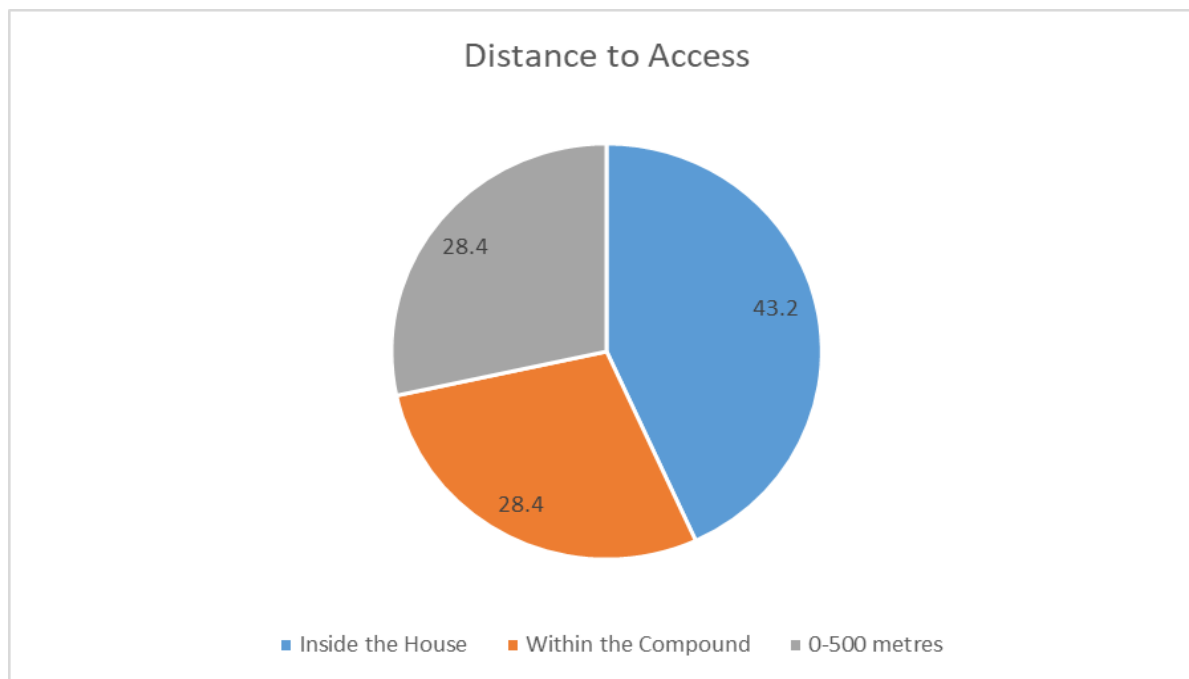
The quality of the toilet facilities was perceived to be good by 55.2% of the respondents included in the survey and as moderate by 35.5% and no cost is incurred in the use of the toilet facilities. Distance to access to the toilet facilities are as captured in Figure 5.4 where 32.2% of the respondents have the facility inside their houses, 12.9% within their compounds while who travel to access the facilities walk a distance of 0 to 500 meters.

Figure 5.3 Public Toilet & Bath Facilities



Source; Fieldwork, 2023.

Figure 5.4: Access to the Toilet Facilities



Source; Researcher, 2023

Disposal means of grey water is mainly through septic tanks as noted by 74.1% of the respondents and Bio-digesters as noted by 25.9% of the respondents as illustrated by Table 5.5 below.

Table 5.5: Means of Disposal of Liquid

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Septic tank	60	74.1	74.1	74.1
Bio-Digester	21	25.9	25.9	100.0
Total	81	100.0	100.0	

Source; Researcher, 2023

When it comes to guaranteeing the availability of sanitation facilities, community land trusts (CLTs) can play a significant role, especially in underserved communities. While CLTs may not directly provide sanitation facilities themselves, they can influence land use planning and community development in ways that promote access to adequate sanitation. A noteworthy contribution in our case was that through CLT, the community was able to allocate land for the construction of public sanitation facilities and for the establishment of a liquid waste treatment plant.

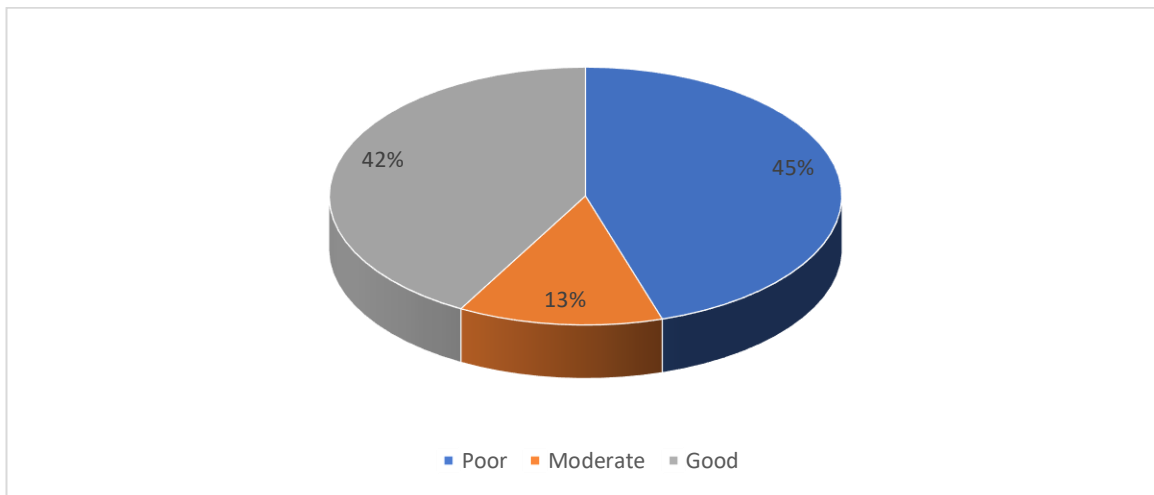
5.4.3. Socio-Economic Infrastructure Availability, Quality, Cost and Accessibility

The road networks within the Tanzania-Bondeni settlement are generally still clear as initially provided for with redevelopment plan as noted by 100.0% of the respondents included in the survey. Through the establishment of the community land trust, the community was able to set aside various road sizes according to the planning standards. The roads measure between 9M-12M. This is sufficient to allow for the laying of pipes, cables, power lines and drainage.

When it comes to setting aside land for road infrastructure, it is often difficult to achieve the required standards. For instance, under land adjudication programs where the form of tenure provided for is freehold, one can find road sizes measuring about 3M. Also, in slum upgrading initiatives, most of the residents are usually reluctant to demolish their structures and pave way for road infrastructure and thus you find that the upgrading plan therefore has to create road sizes that may not be sufficient to allow for other road infrastructure.

The perceived quality of the road networks is as illustrated in Figure 5.5 where a majority of 45.0 contended that the quality of the roads is poor since they are still earth roads, 12.9% indicated the roads are of moderate quality and 41.9% noted that the roads are generally of good quality.

Figure 5.5 Perceived Quality of Roads in Tanzania-Bondeni Settlement Scheme



Source; Researcher, 2023

Figure 5.6 Access Roads.



Source; Fieldwork, 2023

Early Childhood Development Education Center and Primary School initially provided for within the settlement is still available and was basically deemed to be of good quality by 67.7% of the respondents, of moderate quality by 25.8% and of poor quality by 6.5% of the respondents and moderately affordable as illustrated in Figure 5.8 below. The distance to access to ECDE and Primary School within the Tanzania-Bondeni settlement is as captured in Table. As per the physical planning Hand Book (2007), the acceptable

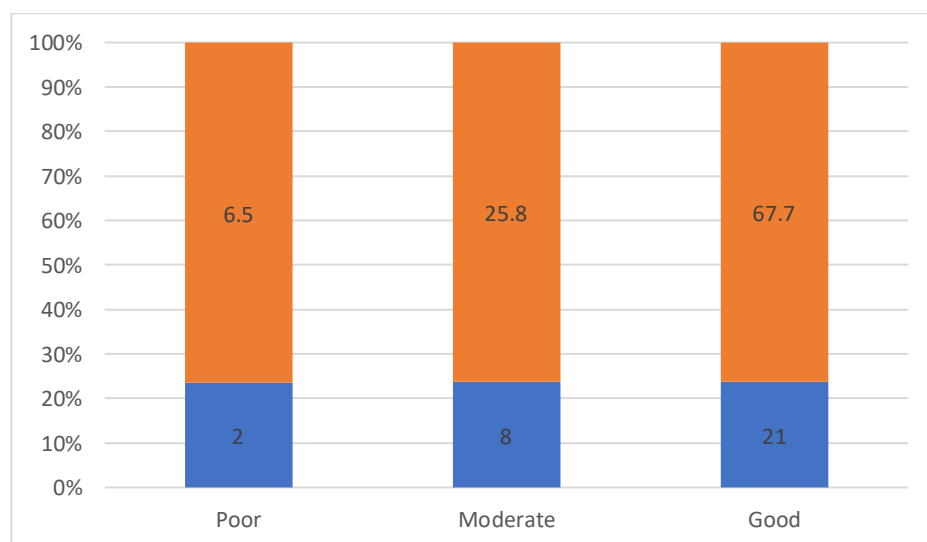
distance to access ECDE and primary schools are between 250 to 300 meters which is still majorly as of the case of Tanzania-Bonden settlement. The setting aside land for both the pre and primary school ensured that children don't have to travel long distances to access education facilities.

Figure 5.7 ECDE & Primary School.



Source; Field work, 2023.

Figure 5.8: Availability and Quality of ECDE/Primary School



Source; Researcher, 2023

Table 5.7: Distance to Access ECDE and Primary School

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0 to 100 meters	32	38.7	38.7	38.7
250 to 300 meters	34	41.9	41.9	80.6
300 to 500	11	12.9	12.9	93.5
No response	4	6.5	6.5	
Total	81	100.0	100.0	100.0

Source; Researcher, 2023

There exist social hall and open spaces within the settlement, and they were perceived to be of good quality by 35.5% of the respondents, 25.8% and 6.5% as of moderate and poor quality respectively illustrated in Table 5.8 below. The charges especially for social halls were deemed to be moderate by 25.8% and low by 16.1% of the respondents. The access to open spaces such playing grounds are at no charge especially for children within the settlement. Distance to access to social hall/open spaces within the settlement are capture by Table 5.9 below with a majority of 35.5% noting they cover a distance between 0-500 meters and 19.4% for both 600-1000 meter and more than 1000 meters. For the social hall and open spaces to be used most effectively the need to closely related to facilities such as existing health facilities and learning facilities which is as the case for Tanzania-Bondeni settlement.

By supporting social halls and community centers, CLTs contribute to building strong and resilient communities. These spaces provide opportunities for social interaction, learning, and collective action, fostering a sense of belonging and camaraderie among residents. The Tanzania-Bondeni CLT was able to work with the authority to ensure the recognition and protection of these spaces. It is through community advocacy that they were able to lobby the County Government to construct the social hall and the office for the Member of County Assembly, MCA.

Figure 5.9: Social Hall



Source; Field Work, 2023

Figure 5.10: Settlement Offices



Source: Field Work, 2023.

Table 5.8: Quality of Social Halls/Open Spaces

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	6	7.4	7.4	7.4
	Moderate	11	13.5	13.5	13.5
	Good	59	72.8	72.8	72.8
	No response	5	6.2	6.2	100.0
Total		81	100.0		

Source; Researcher, 2023

Table 5.9: Distance to Access the Social Hall/Open Spaces

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 to 500 meters	29	35.5	47.8	47.8
	600 meters to 1000 meters	16	19.4	26.1	26.1
	More than 1000 meters	16	19.4	26.1	26.1
	Total	61	74.2	100.0	
Missing	System	20	25.8		
Total		81	100.0		100.0

Source; Researcher, 2023

The field data collection revealed that there is no market facility within the settlement scheme. However, the land set aside for the market facility is there and is safely guarded from encroachment by the residents. This underscores the importance of a CLT in terms of protecting their land. The socio-economic facilities and infrastructure studied show that they continue to efficiently serve the community.

Figure 5.11: MCA's Office



Source; Field work, 2023

Figure 5.12: Market Space



Source; Field Work, 2023.

5.5. Remaining Challenges still facing the CLT Model in the Optimization of Community Infrastructure

The respondents also stated the challenges captured in Table 5.10 below as problems they experience with this type of tenure.

Table 5.10 Challenges of the CLT Model

		Responses		Percent of
		N	Percent	Cases
(a)	The septic tanks are very smelly and have leakages	25	32.4%	32.4%
	Land for treatment has been grabbed by the current leadership	11	13.5%	45.9%
	The drains are sometimes blocked, especially with solid waste	11	13.5%	59.4%
	High costs for exhauster services by the county vehicles	13	16.2%	75.6%
	Decision making process over the management of land are very lengthy and difficult	11	13.5%	89.1%
	There are no sewer connections, everyone manages their own connections	10	10.8%	
	Total	81	100.0%	100.0%

Source; Researcher, 2023

Despite the positive contributions that community land trust have shown with regards to the optimization of infrastructure provision in low income settlements, there still remains teething challenges as shown in Table 5.10. This can be attributed to the theory of the tragedy of the commons. According to this theory, where individuals continue to act in their self-interest ignoring the needs of others, they often end up exploiting and depleting the natural resource leading to its decline and collapse.

CHAPTER SIX: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1. Introduction

This chapter highlights the summary of main study findings as per outlined study objectives,

6.2. Summary of the Study Findings

In general, the community land trust model as an innovative form of tenure seems to have optimized infrastructure in Tanzania-Bondeni Settlement Scheme. The summary of the findings are discussed under the relevant study objectives in the following sections.

6.2.1 Challenges that the different forms of land tenure systems present with regards to infrastructure optimization in low-income settlements.

According to the literature reviewed and what was observed in the survey, the major challenges presented with different types of tenure systems found within low-income settlements with regards to optimization of infrastructure included evictions/displacement, gentrification, lack of community participation, interference by the political class among others. An advantage that the CLT model has over other tenure types is that land is communally owned so it is easier to obtain land for infrastructural improvements. It also offers protection to all residents within the settlement especially the vulnerable segment from possible evictions and grabbing of the land. As a community under the CLT model, they have a stronger voice to resist activities that threaten their tenure security within the settlement. Benefits from CLT Model is shared equally among the residents.

6.2.2 Extent to which CLT Model Improved Optimization of Community Infrastructure

CLT model has improved optimization of community infrastructure in terms of their availability, quality, access, and cost. These key infrastructural services include water services, sanitary facilities, and socio-economic infrastructure such as roads, ECDE and primary schools, social hall, open spaces and market facilities. On water availability, Piped water is available on daily basis for the residents within the Tanzania-Bondeni settlement as well as other sources supplement the piped water especially when there is a break down in the supply system. The quality of the toilet facilities was perceived to be good and no cost is incurred in the use of public toilet facilities. The road networks within the settlement scheme are generally still clear as provided for with redevelopment plan with minimal encroachment on the road reserves especially by those who have constructed convenience shops. Socio-economic infrastructure such as schools, markets, social halls and open spaces are available and within recommended distance.

6.2.3 Remaining Challenges facing CLT model in the optimization of infrastructure in Tanzania-Bondeni.

1. Management of the CLT.

A major challenge noted by the study was the inefficacies of the CLT Management committee within the Tanzania-Bondeni settlement. The loss of land previously allocated for liquid waste treatment plant within the settlement is blamed on their weak leadership. The Resident Committee in charge of managing the settlement scheme have failed to call for annual meetings and hold elections to allow for new leadership.

2. Finances

Another major limitation of CLT Model of land tenure of the respondents is that no one can use the title deed for collateral purposes. This however can also be partly attributed to the weak leadership as failure to register the trust as cooperative society to enable them source for funding from state and non-state agencies.

3. Wastewater Management

The lack of a sewer line has left the residents to mainly rely on the use of exhauster to drain their septic tanks which is expensive.

4. Community Mobilization

Inadequate community participation led to conflicts which has consequently hampered the realization of the full benefits of CLT.

6.2.4 Proposals towards the Improvement of the CLT Model

According to the residents of Tanzania-Bondeni settlement Scheme, Land Officials that were interviewed and from the case studies that were reviewed during the literature review, the following proposals could aid CLT in optimizing infrastructure.

1. Effective Management Committee

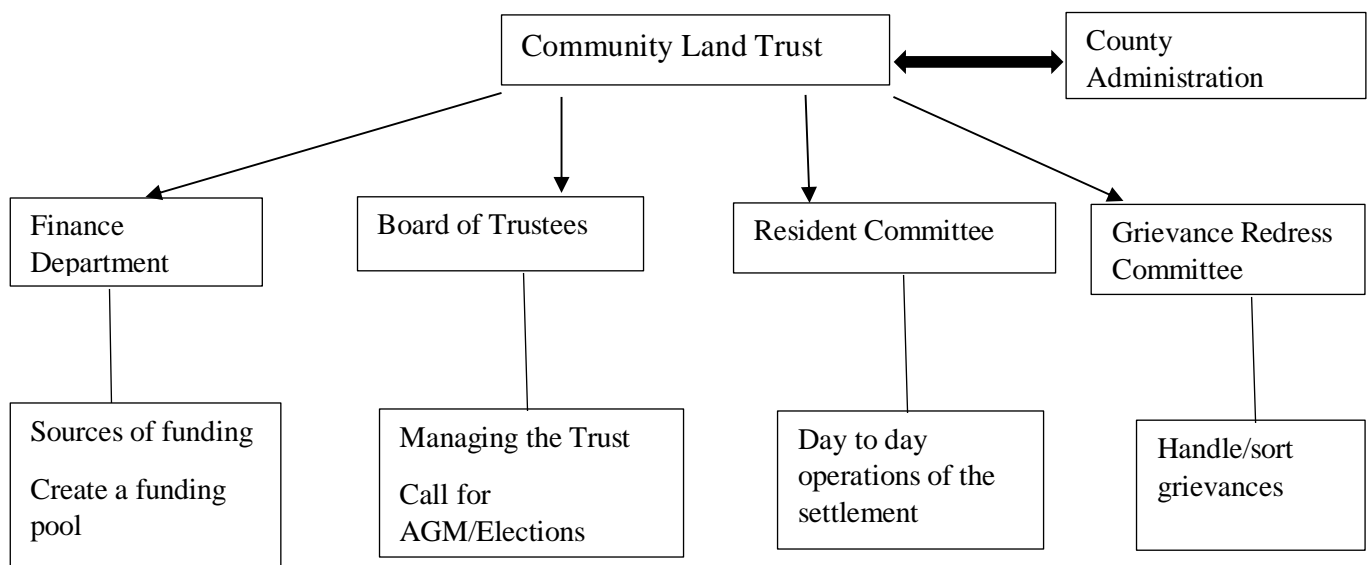
The biggest threat that faces CLT lies in its management structure. There needs to be a Board of trustees that will be in charge of the overall trust head lease and issuance of sub-leases to the residents. This Board of trustees shall also be responsible for calling for annual general meetings where the residents shall continue to be sensitized and kept abreast with developments happening within the trust. It is in such meetings where elections for the officials shall be conducted and also discuss various issues relating to overall improvements of housing quality and infrastructural services.

Within the CLT, there also needs to be a Resident Committee in charge of day to day operations of the trust. They shall ensure that the settlement runs effectively, community assets are protected, infrastructural improvements are to the betterment of the residents.

One of the major limitations within the old management structure was that there was no committee to address and handle residents’ grievances. In this new structure, it is proposed that there be a grievance redress committee, with a social worker to act as a link between the county and the trust. The community may have issues that they need to be addressed and they may feel that the RC is not responsive. By lodging their complaints with GRC, they are assured that their matter shall be handled with utmost important.

This new framework also proposes a finance department within the trust. Infrastructural amenities are expensive to invest in and maintain. General improvements may lack due to inadequate funding. Instead of waiting for the ward fund, CLT can organize itself by having a common pool where they invest towards infrastructure. This unit can also be responsible for sourcing for partners and donors to invest within the community.

Figure 6.1 Improved management structure.



Source; Author, 2023.

Lastly, it is important to note that CLTs do not exist in isolation. They need to be anchored within the overall planning framework of the county government. The county therefore provides general oversight.

2. Wastewater Management.

The water treatment facility should be located on the land initially provided for. Each home should also be connected to a sewer line. To avoid spillage during rainy seasons, the drains should be unclogged regularly especially before the onset of rains.

3. Active Community Involvement

Respondents interviewed felt the CLT Resident Committee have failed in the area due to passive involvement of the community in these projects. As a result, this led to conflicts in the area between the residents and the management committee. The community have held demonstrations on several occasions against CLT RC in the area. It is therefore, important to involve the community at all stages of the project to avoid conflicts and implement projects that are owned and have benefits to the community. To ensure optimization, CLT should be designed in a way that promotes community participation and ownership. Community members should be actively involved in the planning, implementation, and management of the infrastructural components.

4. Land Governance

The management committee should involve the necessary stakeholders to aid in the repossession of any grabbed or illegally allocated land within the settlement scheme

6.3. Conclusions

CLT model still remains a suitable land tenure system as it stands a better chance to protect the vulnerable residents within Tanzania-Bondeni settlement who are still prone to threats of eviction and displacement due to market forces. The settlement falls within a prime location within Voi Town and there has been the desire by the County Government to take control of spaces that were set aside for a market. In regard to optimization of infrastructural services within the Tanzania-Bondeni Settlement, CLT model has continued to ensure their availability, access, quality and affordability.

Access to infrastructural services such as water are still within the desired planning standards and global recommendations. For Instance, the distance covered to access water services is mainly between 0-500 meters which is within the globally recommended of not more than 1000 meters to define accessibility. In general, the infrastructural services and facilities that were provided for in the Tanzania-Bondeni settlement scheme are still available as originally planned and provided for except for the proposed site for the liquid waste treatment that has since been grabbed.

The emerging challenges associated with CLT Model is more inclined to the management committee due to their inability to control development within the settlement, mobilize the community to save and invest and identification of partners and programs that will enable the community members improve their livelihoods.

In cases where CLT Model has thrived such as the Dudley Neighbourhood case, success has been achieved through having an inclusive board of directors, investing in the youth by developing future leaders, strong partnerships with developers who invested to create 300 new homes, a Town Common, gardens, urban agriculture, parks and playgrounds. By DSNI Having strong international networks enabled them to share knowledge, innovate and leverage funding from international donors for community-led development schemes.

It is important to take note that CLTs born in the USA were addressing a housing need. Literature has shown that there can be variations of the CLT to fit whichever context, in our case it is informal settlements where tenure security and basic amenities is often lacking. Before proposing this type of tenure, it is important to study the characteristics of the informal settlements dwellers as one size cannot fit all. The community has to have strong sense of leadership, organized, a strong sense of belonging, ability to form strong partnerships and the willingness for collective ownership.

6.4. Further Areas of Studies

The study identified the following areas for further studies. The first area is on management opportunities and challenges faced by the CLT Resident Committee in carrying out their roles to ensure effective implementation of CLT Model since the key challenge is the capacity of the committee to oversee the implementation of the CLT Model. Another potential research gap could be the lack of attention to the role of power dynamics and stakeholder engagement in the success of the CLT model. For example, the study could investigate the ways in which community members and external actors negotiate and collaborate in the design, implementation, and maintenance of infrastructure projects, and the extent to which power imbalances or conflicts affect the outcomes of these projects. Overall, these research gaps suggest opportunities for further investigation and inquiry in the field of land tenure, infrastructure provision, and community development in low-income settlements.

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APPENDICIES

Appendix 1: Data Collection Tools



Master of Urban Management
Department of Architecture and Building
University of Nairobi

Household Questionnaire

Name of Estate ----- Date of interview -----

Dear Respondent

Reference is made to the attached questionnaire that seeks obtain historical data about your community. I am a student in the School of Built Environment University of Nairobi and currently undertaking research on **THE ROLE OF COMMUNITY LAND TRUST MODEL IN OPTIMIZING COMMUNITY INFRASTRUCTURE (Roads, water, and drainage) IN LOW INCOME SETTLEMENTS; A case of TANZANIA BONDENI IN VOI TOWN, TAITA TAVETA COUNTY.**

The study through its specific objectives seeks to determine how different is the community land trust is from other models of Land tenure systems found in slums, to what extent has the CLT MODEL been an improvement to the optimization of community infrastructure in low-income settlements, what are the challenges of CLT model in the optimization/improvement of community infrastructure in Tanzania-Bondeni and the possible lessons can Kenya learn from countries in mitigating the challenges that face CLT Model?

The questionnaire aims to collect data related to CLT performance your community. The information given is meant for academic purposes only and will therefore be treated with high level of confidentiality. Kindly answer the questions as per the guidelines provided.

Yours faithfully

Lynette Misasa
Reg. No.
Email: lynnmisasa93@gmail.com
Phone No. 0717 312 599

SECTION 1: INFORMATION ON RESPONDENT

1. What are your household characteristics? (Please fill in the table below)

S/No	Household	Member	Gender	Age	Educational Level	Occupation

2. Do you own the house you live in? 1)Yes 2) No

3. What is the mode of housing occupancy? 1) Municipal/Railway/Government house 2) Company house 3) Rental house d) Owner occupier 4) others (specify)

4. If renting, how much rent do you pay per month (exclusive of water and electricity)?

KSH-----

5. What type of house do you live in?

1) Bungalow 2) Maisonette 3) Single room 4) one roomed with kitchen and bathroom 5) Two roomed with kitchen and bathroom 6) others (specify)

SECTION II: DIFFERENCE OF COMMUNITY LAND TRUST FROM OTHER MODELS OF LAND TENURE SYSTEMS FOUND IN SLUMS

6. What type of land tenure is this housing occupying?

1) Individual Title 2) Community Land Trust 3) Any other

7. What are the benefits associated with this type of land tenure identified above?

8. What are the problems associated with land tenure identified above?

9. In your opinion, how can these problems be solved?

SECTION III: EXTENT TO WHICH CLT MODEL BEEN AN IMPROVEMENT TO THE OPTIMIZATION OF COMMUNITY INFRASTRUCTURE IN LOW INCOME SETTLEMENTS

10. What are your sources, quality and frequency of supply? (Please fill in the table below)

Water Sources	Types available	Quality (1. very poor, 2. poor, 3. moderate, 4. good and 5. very good)	Frequency of supply
Piped			
Public stand pipe			
Communal Water Kiosk			
Water Vendors			
Roof Catchments			
Any other, specify			

11. What are your sources, distance to access and cost of water? (Please fill in the table below)

Water Sources	Distance to access (Km)	Cost of water per liter or 1 meter cubic
Piped		
Public stand pipe		
Communal Water Kiosk		
Water Vendors		
Roof Catchments		
Any other, specify		

12. What facility do you use for a toilet, quality, access and cost?

Toilet Facility	Types available	Quality (1. very poor, 2. poor, 3. moderate, 4. good and 5. very good)	Cost per use	Distance to access
Own waterborne toilet				
Public water borne toilet				
Own pit latrine				
Public pit latrine				
Bo-latrine				
Any other, specify				

13. What facility do you use for bathing, quality, cost per use and distance to access?

Bathing Facility	Types available	Quality (1. very poor, 2. poor, 3. moderate, 4. good and 5. very good)	Cost per use	Distance to access
Own bathing cubicle				
Public bathing cubicle				
Any other, specify				

14. How do you dispose of Liquid waste? 1) Sewer connection 2) Septic tank 3) conservancy tank 4) others (specify)

15. How would you rate the following socio-economic infrastructure, availability, quality, cost (where applicable) and distance of access (where applicable)?

Facility	Availability	Quality (1. very poor, 2. poor, 3. moderate, 4. good and 5. very good)	Cost (1. Very low 2. Low 3. Moderate 4. high and 5. Very high)	Distance to access
Road Networks				
ECDE & Primary Schools				
Social Hall/Open Spaces				
Market Facilities				

16. What are the dominant means of transport used by members of your household to work/services?

1) Public vehicle b) Personal vehicle 2) Motorcycle d) Bicycle 3) Walking 4) Others (specify)

SECTION IV: CHALLENGES OF CLT MODEL IN THE OPTIMIZATION/IMPROVEMENT OF COMMUNITY INFRASTRUCTURE IN TANZANIA-BONDENI

17. What problems do you encounter in liquid waste management?

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

18. How can liquid waste management problems be solved?

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

19. What are the main problems associated with the means of transport that you use?

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

THANK YOU



Master of Urban Management

Department of Architecture and Building

University of Nairobi

Key Informant Interview Guide

County Government (Planner/Works officer/Administrator/officer in charge of informal settlements)

Name of Institution ----- Date of interview -----

Dear Respondent

Reference is made to the attached questionnaire that seeks obtain historical data about Tanzania Bondeni community. I am a student in the School of Built Environment University of Nairobi and currently undertaking research on **THE ROLE OF COMMUNITY LAND TRUST MODEL IN OPTIMIZING COMMUNITY INFRASTRUCTURE (Roads, water and drainage) IN LOW INCOME SETTLEMENTS; A case of TANZANIA BONDENI IN VOI TOWN, TAITA TAVETA COUNTY.**

The study through its specific objectives seeks to determine how different is the community land trust is from other models of Land tenure systems found in slums, to what extent has the CLT MODEL been an improvement to the optimization of community infrastructure in low-income settlements, what are the challenges of CLT model in the optimization/improvement of community infrastructure in Tanzania-Bondeni and the possible lessons can Kenya learn from countries in mitigating the challenges that face CLT Model?

The questionnaire aims to collect data related to CLT performance your community. The information given is meant for academic purposes only and will therefore be treated with high level of confidentiality. Kindly answer the questions as per the guidelines provided.

Yours faithfully

Lynette Misasa

Reg. No.

Email: lynnmisasa93@gmail.com

Phone No. 0717 312 599

1. What role and mandate does the County Government play in the provision of community infrastructure in low-income settlements?

2. What are the specific roles of your department in the delivery and maintenance of key community infrastructure in low-income settlements?

3. How would you rate/describe the community land trust tenure in its provision and optimization of community infrastructure in low-income settlements as compared to other forms of tenure present in other low-income settlements?

4. In your opinion, what are the issues influencing the quality of maintenance of the neighborhood infrastructure and services in low-income settlements and how can land tenure system play an enhanced role in this respect?

5. What lessons can Kenya learn with regards to mitigating the challenges that face the community land trust model in optimizing community infrastructure?

THANK YOU



Master of Urban Management

Department of Architecture and Building

University of Nairobi

Key Informant Interview Guide

COMMUNITY LAND TRUST OFFICIALS- Chairman/Secretary

Your Designation ----- Date of interview -----

Dear Respondent

Reference is made to the attached questionnaire that seeks obtain historical data about Tanzania Bondeni community. I am a student in the School of Built Environment University of Nairobi and currently undertaking research on **THE ROLE OF COMMUNITY LAND TRUST MODEL IN OPTIMIZING COMMUNITY INFRASTRUCTURE (Roads, water and drainage) IN LOW INCOME SETTLEMENTS; A case of TANZANIA BONDENI IN VOI TOWN, TAITA TAVETA COUNTY.**

The study through its specific objectives seeks to determine how different is the community land trust is from other models of Land tenure systems found in slums, to what extent has the CLT MODEL been an improvement to the optimization of community infrastructure in low-income settlements, what are the challenges of CLT model in the optimization/improvement of community infrastructure in Tanzania-Bondeni and the possible lessons can Kenya learn from countries in mitigating the challenges that face CLT Model?

The questionnaire aims to collect data related to CLT performance your community. The information given is meant for academic purposes only and will therefore be treated with high level of confidentiality. Kindly answer the questions as per the guidelines provided.

Yours faithfully

Lynette Misasa

Reg. No.

Email: lynnmisasa93@gmail.com

Phone No. 0717 312 599

1. What role does the Resident Committee play in the maintenance and optimization of community infrastructure in Tanzania-Bondeni?

2. How would you rate/describe the community land trust tenure in its provision and optimization of community infrastructure in low-income settlements as compared to other forms of tenure present in other low-income settlements?

3. In your opinion, what are the issues influencing the quality of maintenance of the neighborhood infrastructure and services in low-income settlements and how can land tenure system play an enhanced role in this respect?

4. What lessons can Kenya learn with regards to mitigating the challenges that face the community land trust model in optimizing community infrastructure?

THANK YOU

Appendix 2: Research Permit



UNIVERSITY OF NAIROBI

Faculty of Built Environment and Design
DEPARTMENT OF ARCHITECTURE
E- mail: architecture@uonbi.ac.ke

P.O. BOX 30197,
Nairobi, Kenya
Telephone: 020-4913519

Our Ref: UON/CAE/ABS/30402/2015

Date: 16th December, 2022

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: OGWENO LINET ANYANGO - REG. NO. W50/35821/2019

This is to confirm that the above named is a bona-fide student pursuing a Master of Urban Management degree in the Department of Architecture, University of Nairobi.

Ms. Ogweno wishes to collect data for her project titled "**The Role Of Community Land Trust Model In Optimizing Community Infrastructure In Low Income Settlements**".

We are thus requesting you to give her some of your valuable time and respond positively to her enquiries, provision of drawings, maps, etc as may be required. This is for academic purposes only.

Any assistance accorded to her will be highly appreciated.

Yours sincerely,

CHAIRMAN
DEPARTMENT OF ARCHITECTURE
UNIVERSITY OF NAIROBI

Arch. Musau Kimeu
CHAIRMAN,
DEPT. OF ARCHITECTURE