

**Assessing Development of Potential Vacant Land in Urban Area; Case of
Gelan Sub City, Sheger City, Ethiopia.**



TESHOME TUFA ARADA

A Thesis Submitted to the Department of Architecture,
College of Civil Engineering and Architecture

Office of Graduate Studies

Adama Science and Technology University

June, 2025
Adama, Ethiopia

**Assessing the Development of Potential Vacant Land in Urban Area;
Case of Gelan Sub City, Sheger City Ethiopia.**

TESHOME TUFA ARADA

Advisor: Yared Girma (PhD)

A Thesis Submitted to the Department of Architecture,
College of Civil Engineering and Architecture

Office of Graduate Studies

Adama Science and Technology University

June, 2025
Adama, Ethiopia

DECLARATION

I hereby declare that this Master Thesis entitled “Assessing the Development of Potential Vacant Land in Urban Area; Case of Gelan Sub City, Sheger City, Ethiopia” is my original work. That is, it has not been submitted for the award of any academic degree, diploma or certificate in any other university. All sources of materials that are used for this thesis have been duly acknowledged through citation.

Name of the student

Signature

Date

RECOMMENDATION

I/we, the advisor(s) of this thesis, hereby certify that I/we have read the revised version of the thesis entitled “Assessing the Development of Potential Vacant Land in Urban Area; Case of Gelan Sub City, Ethiopia” prepared under my/our guidance by Teshome Tufa Arada submitted in fulfilment of the requirements for the degree of Master’s of Science in urban Planning and Design. Therefore, I/we recommend the submission of revised version of the thesis to the department following the applicable procedures.

Major Advisor

Signature

Date

APPROVAL SHEET

I/we, the advisors of the thesis entitled “Assessing the Development of Potential Vacant Land in Urban Area; Case of Gelan Sub City, Sheger City, Ethiopia” and developed by Teshome Tufa Arada, here by certify that the recommendation and suggestions made by the board of examiners are appropriately incorporated into the final version of the thesis.

Yared Girma (PhD)

Major Advisor

Signature

Date

We, the undersigned, members of the Board of Examiners of the thesis by Teshome Tufa Arada have read and evaluated the thesis entitled “Assessing the Development of Potential Vacant Land in Urban Area; Case of Gelan Sub City, Sheger City, Ethiopia” and examined the candidate during open defense. This is, therefore, to certify that the thesis is accepted for fulfillment of the requirement of the degree of Master of Science in Urban Planning and Design.

Chairperson

Signature

Date

Internal Examiner

Signature

Date

External Examiner

Signature

Date

Finally, approval and acceptance of the thesis proposal is contingent upon submission of its final copy to the Office of Postgraduate Studies (OPGS) through the Department Graduate Council (DGC) and College Graduate Committee (CGC).

Department Head

Signature

Date

College Dean

Signature

Date

Office of postgraduate studies, Dean

Signature

Date

ACKNOWLEDGEMENTS

First and foremost, I extend my deepest gratitude to the Almighty God for His invaluable blessings, guidance, and protection throughout my life and the course of this work. I am sincerely thankful to Yared Girma (PhD) for his unwavering support, encouragement, and guidance from the very beginning to the completion of this thesis. His insights were instrumental in helping me grasp the subject matter and in shaping the research process.

I would also like to express my heartfelt appreciation to the Sheger City Administration and the staff of Gelan Sub City for their cooperation in providing essential information and facilitating data collection for this study.

In addition, I am genuinely thank ful to my lecturers and friends for their support along the way. Lastly, I would like to express my sincere thanks to Adama Science and Technology University for its continued support and resources.

TABLE OF CONTENTS

Contents	pages
DECLARATION	i
RECOMMENDATION	ii
APPROVAL SHEET	iii
ACKNOWLEDGEMENTS	iv
LIST OF TABLES	iv
LIST OF FIGURES	v
LIST OF ABBREVIATIONS	vi
ABSTRACT	vii
CHAPTER ONE: INTRODUCTION	8
1.1. Background of the Study	8
1.2. Problem of the Statement	10
1.3. Objectives of the study	12
1.3.1. General	12
1.3.2. Specific Objective	12
1.4. Research Questions	12
1.5. Significance of the study	12
1.6. Scope and limitation of the study	13
1.7. Operational definitions	14
1.8. Thesis organization.....	14
CHAPTER TWO: LITERATURE REVIEW	15
2.1. Theoretical literature review	15
2.1.1. Definition of vacant land (Undeveloped plots).	15
2.1.2. Causes of Urban Undeveloped (Vacant) Land.....	17
2.1.3. Socio-economic effects of urban vacant land in the study area.	19
2.2. Empirical review of related literature	19
2.2.1. Globally Strategic Managing of Vacant Land.	23
2.3. A practical controlling of Unutilized vacant land in Ethiopia's.....	23
2.3.1 Remnant (Abandoned) Parcels.....	25
2.3.2. Parcels with Physical Limitations	25
2.3.3. Parcels Held for Corporate Reserves and organization Vacant Land	26
2.3.4. Vacant Land for Speculation	26
2.4. Conceptual framework.....	27

2.5. Research and knowledge Gaps in Related literature	27
CHAPTER 3: MATERIALS AND METHODS.....	30
3.1. Description of the study area.....	30
3.1.1. Topography and Temperature	31
3.1.2. Population.....	32
3.2. Research Design	32
3.3. Population, Sampling Methods and Sample Size Determination.....	33
3.3.1. Sampling Techniques	33
3.3.2. Sampling frame, sample unit and sample size.	33
3.4. Data Type and Sources.....	35
3.5. Materials Used for this study	36
3.6. Methods of Data collection.....	36
3.7. Data Analysis Methods.....	37
3.7.1. Identification of the vacant land in study area.....	38
3.7.2. Analysis of spatial distribution of urban vacant land	39
3.8. Validity and Reliability.....	41
3.8.1. Validity.....	41
3.8.2. Reliability	41
3.9. Ethical Considerations.....	42
CHAPTER 4: RESULTS AND DISCUSSIONS.....	44
4.1. Results	44
4.1.1. General characteristics of respondent's participant in survey	44
4.1.2. Response Rate of participants.....	44
4.1.3. Respondents' Demographic and Socio-Economic Profiles.....	45
4.2. Overall Features of Unused Vacant Land in the Study Area	47
4.2.1. Vacant land Identification in Gelan sub City.	47
4.2.2. The condition of land use types and its contribution to vacant land.....	48
4.3. Spatial distribution of undeveloped vacant land in study area	55
4.3.1. Spatial Distribution of Land Use/Land cover of Study area	55
4.3.2. Spatial Distribution of Existing land use of Gelan sub city	58
4.3.3. Current Status of Undeveloped vacant land in Gelan sub city.....	63
4.3.4. Undeveloped Investment Land in Three Woredas of Gelan Sub-City.....	64
4.1. Identify the primary factors contributing to the existence of undeveloped land within the study area.....	67
4.4.1. Causes of undeveloped vacant land in study area	67

4.4.2. Socio-economic effects of vacant land in the sub city	70
4.4.3. Potential Benefits of Vacant Land in Urban Areas	74
4.5. Discussions	75
5: CONCLUSIONS AND RECOMMENDATIONS.....	77
5.2. Recommendations	79
REFERENCES	81
APPENDIX	84

LIST OF TABLES

Table number and titles	pages
Table: 3.1. Data Types and Sources	35
Table: 3.2. Software Used	36
Table: 4.1. profile of the respondents.	46
Table: 4.2. Status of vacant land tenure system in study area	48
Table: 4.3. land use types of vacant land in study area	49
Table: 4.4. Land Acquisition system of vacant land	51
Table: 4.5. Total amount of vacant land acquired in sqm	52
Table: 4.6. Total amount of vacant land identified used owners.....	52
Table: 4.7. The individual parcel Acquired Period of time in year	54
Table: 4.8. Confusion matrix of classified LULC 2025 in study area.....	56
Table: 4.9. Overall classification Accuracy and kappa Statistics.....	56
Table: 4.10. Landuse Landcover descriptions and area approximate area in percentages..	57
Table: 4.11. Identified undeveloped vacant land area and numbers	61
Table: 4.12. Undeveloped vacant land acquired for investment and residential use....	Error!
Bookmark not defined.	
Table: 4.13. Percentage of totally Undeveloped land for investment in 2025 (2017 E.C)..	65
Table: 4.14. Primary Socio-economic Factors of undeveloped vacant land	68
Table: 4.15. Primary institutional factors of undeveloped vacant land in study area.....	69
Table: 4.16. The economic effect of unutilized vacant land in study area	70
Table: 4.17. The Primary Social effects of undeveloped vacant land	72
Table: 4.18. Environmental effects of undeveloped vacant land	73

LIST OF FIGURES

Figure Number and Lists	Pages
Figure: 2.1 conceptual frame work of the study adopted from literatures.	27
Figure: 3.1. Location map of Gelan Sub city show in Sheger city Oromia.	30
Figure: 3.2. Altitude of Gelan Sub-City	31
Figure: 3.3. Methodological work flow of the whole study.	40
Figure: 4.1. Undeveloped vacant land for industrial and other social use in study area	50
Figure: 4.2. Unutilized idle land used for residential land use in the study area.....	50
Figure: 4.3. Undeveloped vacant land not developed at all within the study area	53
Figure: 4.4. Land Use Land Cover Map of Gelan sub city in 2025	58
Figure: 4.5. General land use map of Gelan sub city	60
Figure: 4.6. Identified undeveloped vacant land and GPS field survey.	62
Figure: 4.7. Map of undeveloped investment land in three woredas of Gelan sub city	65

LIST OF ABBREVIATIONS

ANOVA	Analysis of variance
CSA	Central statistical authority
DEM	Digital Elevation Model
FDRE	Federal Democratic Republic of Ethiopia
FPC	Finite population correction
FGD	Focused Group Discussion
GIS	Geographical information system
GNP	Gross National Product
IBM	International Business Machines Corporation
LULC	Land use land cover
NGO	Non-governmental organization
SPSS	Statistical Package for Social Sciences
USGS	United States Geological Survey

ABSTRACT

This study aims to assess the development potential of vacant land in urban areas by examining the extent, characteristics, and root causes of undeveloped plots in Galan Sub-City, with the goal of identifying idle land and proposing actionable development strategies. Unmanaged vacant land can affect property values, quality of life, and even mental health on society. Vacant land in poor condition is often an indicator of poverty in the most distressed places, whereas intentional green space is an indicator of prosperity. Utilizing secondary data, the research identified approximately 353 undeveloped residential plots covering around 94.29 hectares across three key woredas: Gelan, Sida Awash, and Andoodee. but from field survey identified by analysis area of 924.217 hectares in totals are undeveloped and vacant plots. Despite nearly 90.3% of these plots being legally titled and over 92% exceeding 200 square meters in size, a significant portion remains unused. The land use distribution shows that 61.7% of plots are allocated for residential purposes, while the rest are intended for commercial, mixed-use, or unspecified developments. Ownership history indicates that 52% of landholders acquired plots through formal leasehold agreements, 12.8% via informal purchases from local farmers, and 10.7% through inheritance. Alarming, 43.9% of the plots have remained undeveloped for more than a decade, indicating chronic underutilization. Spatial analysis, based on GPS mapping and land use data, further highlights the distribution of underutilized land across different sectors. Five plots designated for social services, covering 16.47ha, remain entirely undeveloped, despite their intended role in supporting schools, health centers, and community infrastructure. Similarly, 26 mixed residential plots (19.98ha), 11 manufacturing and storage plots (269.82ha), and 17 commercial plots 14.13ha remain idle, some for over ten years. These patterns reflect systemic inefficiencies in land management and enforcement. The potential development of vacant plots vacant land near commercial or residential zones may have higher development potential. Although Areas categorized under green fields, open spaces, or bare lands in LULC maps often correspond with undeveloped parcels. The study recommends stricter enforcement of development timelines, financial support for low-income landowners, public awareness campaigns, and the formalization of informal land transactions. Additionally, infrastructure development in high-vacancy zones and the strategic use of reclaimed land for affordable housing and community services are essential. Implementing these measures can enable Galan Sub-City to solve the development potential of idle plots, promoting efficient land use, improved urban living, and sustainable growth.

Key words: Urban Undeveloped land, spatial Analysis, Gelan Sub city, vacant land

CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

Urbanization is a defining trend of the twenty-first century, as rapidly expanding cities place increasing pressure on limited land resources (Meier, 2018). The demand for equitable and sustainable land use solutions grows as urban sprawl increases (Chali et al., 2024). With the potential for new housing, commercial development, green areas, and infrastructure expansion, urban undeveloped land offers a crucial chance to address these issues. Effectively utilizing the potential of undeveloped urban land, however, necessitates a thorough comprehension of its suitability for different forms of development, considering a complex interaction of social, economic, environmental, and infrastructure aspects (Undesa, 2019).

The term vacant land frequently carries a negative connotation, abandoned, empty, dangerous thus symbolizing disinvestment, blight, and decay. As an outcome, it is often automatically viewed as a problem in urban areas (Hamstead, 2013) cited in (Mohamad Selamat et al., 2023) However, vacant land may instead be viewed as valuable urban landscape that provides community benefits and/or opportunities for transformation via community redevelopment, as well as being a potential source of ecosystem services that support the health and well-being of local people (Mao et al., 2022).

(Leonard, 2022) In recent times the phenomenon of vacant urban lands where most lands under private ownership are left unoccupied or unused in urban areas has been on the ascendancy. In a work that involved an assessment of African cities, it was identified by the authors of the existence of lot of patches of unused and undeveloped lands mostly at or close to city centres as one of the common characteristics (Song et al., 2020). This has led to a situation of highly uneven and fragmented cities with urban sprawl, as the cities grow outwards. It is for this reason that most African cities tend to be unproductive when analysed from the perspective of an urban economic theory as the disjointed nature of the cities prevents the agglomeration needed to make cities productive (Haas & Kopanyi, 2017).

Vacant lands in urban areas constitute a unique subcategory of land in a city that exhibits the characteristic of increasing value where there is urban growth and public developments (Leonard, 2022). Also, another unique nature of vacant urban land is the fact that people may hold it as a form of speculation because of the expected future increase in value which

happens as a result of public development and investments by the city. According to (Leonard, 2022) This development actually deprives people who are in actual need of land from its accessibility. It must, however, be noted that this is not the only cause of the phenomenon of urban vacant lands (Pickett et al., 2011).

Ethiopia has undergone tremendous urbanization, which has significantly altered the landscape of the city. The transformation of undeveloped land into built-up space is not uniform in all directions. Even during the same period, it is dynamically active in some parts of the city, while it is less dynamic in other parts of the country city or towns (Ermias et al., 2020).

Raw land, often known as undeveloped land (vacant), is a huge area of unrealized potential. It contains a wealth of opportunities that are just waiting to be discovered and turned into something useful (Mohammed K, 2018). According to this author Land that has not been developed or constructed upon is referred to as undeveloped land. It lacks any structures, utilities, or infrastructure that would typically be found in developed areas. It is often untouched by human activity, preserving its natural state. This land can vary in size, ranging from small parcels to vast expanses of wilderness, spanning thousands of acres. The characteristics of undeveloped land can differ greatly depending on its location, climate, topography, and ecological makeup.

The issue of undeveloped lands within urban areas might arise out of a number of reasons notable which may be as a result of land speculation, where investors buy more than one block of land with the ultimate motive of making huge profits from the appreciated land values over time (Gemedat et al., 2021). There are also other reasons in terms of cost, taxation, planning restrictions among others as land speculation is not the only reason that can be attributed to the phenomenon of vacant urban lands (Song et al., 2020).

The persistence of undeveloped land presents several challenges, notably contributing to urban sprawl. According to (Leonard, 2022), individuals in genuine need of land often lack access to these idle plots, leaving their productive potential untapped. Consequently, the growing population is pushed toward the urban periphery, exacerbating urban sprawl and compelling governments to incur increased expenditures to provide essential services in these newly developed areas. Furthermore, the issue is intensified when land remains under

the control of private owners who delay its release for development, thereby hindering the orderly expansion and transformation of the urban landscape.

Numerous research studies have expounded on the multifaceted nature of vacant land a concept universally recognized for its detrimental impact on surrounding neighborhoods. Although empty or undeveloped land is a valuable resource, it is sadly not well utilized as a source of revenue. There are a number of undeveloped, unoccupied lots in the Gelan sub city that are both privately and publicly owned. These include land used for residential, commercial, and industrial purposes, as well as for greenery and other social functions in the Sub city.

While existing research has explored aspects of urban development and land use, a significant gap remains in our understanding of how to comprehensively assess the potential of undeveloped urban land. Current approaches often lack a holistic perspective, failing to integrate the diverse factors that influence development appropriateness and the potential impacts on surrounding communities. Furthermore, the integration of Geographic Information Systems (GIS) in this context remains limited, despite its potential for powerful spatial analysis, data visualization, and decision support.

1.2. Problem of the Statement

Numerous studies have confirmed the rapid pace of urbanization in Ethiopia, reflected both in population growth and the spatial expansion of settlements, affecting small towns as well as major cities (Koroso et al., 2021), as cited in (Pan et al., 2024). This accelerated urban growth has led to a substantial increase in the demand for land and housing, placing intense pressure on peri-urban areas and land located near municipal boundaries (Pan et al., 2024). Globally, as populations continue to concentrate in urban centers, the spatial demands to accommodate residents and associated urban functions have also grown significantly. However, the presence of unstable or unsuitable subsurface conditions can limit the usability of vacant urban land. Therefore, evaluating the intensity and efficiency of urban land use is essential to ensure the rational planning and management of public land resources (Habtamu et al., 2022).

Though one of the city assets is its available resources for economic development, unfortunately, many cities in developing countries have land that are vacant, abundant, undeveloped, or unused, with different factors and weak policies and regulations in place to convert them in to revenue generating and valuable lands. Like in many countries,

inefficient utilization of urban land in Ethiopia take land by way of lease contract and keep it idle with no development on it (Habtamu et al., 2022).

Vacant land presents a unique challenge in urban environments, primarily because the problem lacks a clear owner. Although such land may be owned by private individuals, public agencies, or quasi-public entities, the broader consequences such as property deterioration and neighborhood disinvestment are borne by the surrounding community. As Kim (2016) noted, “a problem that no one owns is actually everyone’s problem”.

Unmanaged vacant land can affect property values, quality of life, and even mental health both at an individual and community level (Meier, 2018). Intentional open and green space has the exact opposite effect. Vacant land in poor condition is often an indicator of poverty in the most distressed places, whereas intentional green space is an indicator of prosperity. While several neighborhood characteristics influence health, there has been increasing attention on the impact of deteriorated neighborhood conditions, such as vacant and abandoned property (Meier, 2018).

In Gelan Sub-City, vacant lots and abandoned buildings are visible signs of neighborhood disorder and are associated with violence and fear. These areas often feature overgrown vegetation and illegal dumping, which can create opportunities for criminal activities, such as hiding illegal firearms and misusing public spaces (Roude et al., 2024).

Urban planning in Gelan sub-city is challenged by the lack of comprehensive, evidence-based assessments of undeveloped land, particularly those utilizing geographic information systems (GIS). Although urban development and land use planning have been widely studied in broader contexts, there is limited understanding of the spatial potential of vacant or idle land parcels within Gelan sub city. This absence of spatially detailed analysis undermines effective decision-making, leading to inefficient land use, misallocation of resources, and increased risk of unplanned and environmentally damaging development. Without GIS-based evaluations, planners and policymakers lack the necessary tools to identify suitable land for development, hindering efforts toward sustainable urban growth and optimal land resource management.

Therefore, the study investigated the potential of vacant land in Gelan Sub city. Also, by utilize geographic information systems analysis to provide appropriate information about geographic data to identify the potential for undeveloped land use.

Finally, the study aimed to close this gap by offering a thorough GIS-based methodology to evaluate the potential of urban undeveloped land for various types of development. This

research sought to bridge this critical knowledge gap by investigating the assessment of urban undeveloped land potential in Gelan Sub-City. By employing advanced geospatial tools such as GIS and remote sensing, the study mapped the spatial extent and distribution of undeveloped urban land, identified hotspots, and traced its evolution over time.

1.3. Objectives of the study

1.3.1. General

The general objective of this study was to assess the development of potential vacant land in urban area its socio-economic effects on its neighboring in Gelan sub city Ethiopia.

1.3.2. Specific Objective

This study seeks to achieve the following specific objectives:

1. To Identify vacant land in Gelan Sub-City.
2. To determine the underlying causes for the presence of vacant land within the Sub-City.
3. To assess the socio-economic effects of urban vacant land in the study area.
4. To analyze the development potential of urban vacant land for various uses.

1.4. Research Questions

Based on the outlined specific objectives, the study formulates the following research questions.

1. What is the spatial extent and distribution of vacant land parcels within the Gelan Sub-City?
2. What factors contribute to the continued existence of vacant land in the Sub-City?
3. What are the socio-economic consequences of urban undeveloped land in the study area?
4. To what extent is the vacant land in Gelan Sub-City suitable for different development types?

1.5. Significance of the study

This study is significant as it aims to support the development of urban areas that are economically productive, environmentally sustainable, and socially inclusive. By integrating GIS-based spatial analysis with land use preferences, the study provides valuable insights for urban planners and GIS professionals to make informed decisions regarding land use and development. The findings are expected to benefit local

government authorities, environmental agencies, researchers, and especially urban inhabitants by promoting efficient resource allocation, minimizing environmental impacts, and improving overall quality of life. Ultimately, this research contributes to more sustainable, equitable, and data-driven urban planning practices.

The potential return on investment can be significant, especially if the land is strategically located or possesses unique attributes that attract buyers or tenants. For instance, consider a piece of undeveloped land situated near a growing urban area. Its proximity to existing infrastructure, amenities, and employment opportunities can make it an attractive site for residential development.

Moreover, the information provided by this study was used as a springboard for further studies related to potential of undeveloped vacant land and it will be useful for policy-based guidelines to solve the problem competition between different unused vacant land for further development. Generally, it provides clear information for all stakeholders to understand about land use conflict areas likely to be occurring.

The findings can also help Gelan Sub city administration in coordinating different stakeholders towards the development process by bridging the gap between structure plan proposal and implementation.

1.6. Scope and limitation of the study

The scope of this research will be delimited to a specific area within Gelan Sub city. Gelan Sub-City might have a significantly larger proportion or area of undeveloped land compared to other sub-cities. Based on a comparative analysis considering the extent of undeveloped land, Gelan Sub-City selected as the primary study site. Its significantly higher proportion of undeveloped land, in comparison to the other 12 sub-cities, ensures a robust and statistically sound study that can contribute significantly to understanding the potential of vacant land in similar urban contexts within Shager City. The administrative boundary of Sub city as of current year will serve as the spatial restriction for the study, ensuring a focused Assessment of potential of undeveloped urban vacant land dynamics within this defined area.

The thematic scope of this research encompasses a comprehensive analysis of the potential of vacant of urban area in Gelan Sub city, Ethiopia. The thematic focus includes spatial extent and spatial distribution of urban undeveloped land area by utilizing Geospatial tools like GIS and remote sensing.

However, the research is subject to several limitations. The analysis will rely on available GIS software, which may have technical constraints in terms of resolution, processing capabilities, and access to high-quality spatial data. Furthermore, limited availability and responsiveness of key informants and stakeholders within the sub-city may reduce the response rate, potentially affecting the completeness and representativeness of primary data collected. These limitations could influence the depth and generalizability of the findings, though the study remains a valuable contribution to understanding land use potential in rapidly urbanizing contexts.

1.7. Operational definitions

Land: Land is an area of ground, especially one that is used for a particular purpose such as farming or building.

Vacant Land: Vacant Land means any parcel or combination of parcels of real property without industrial, commercial, and residential buildings (Lee et al., 2020).

Undeveloped Land: Undeveloped Land means raw land that has not been filled to grade or been permitted for development. This means a few different things; the land may be left in its natural state, used for agricultural purposes, or used for grazing. Also referred to as raw land or unimproved land, undeveloped land is often vacant or uninhabited and lacks buildings, infrastructure, or utilities (Lee et al., 2020).

Remnant Land: These are land parcels that are left undeveloped from other major developments close to them as they are considered not suitable for large-scale development due to their relatively small size and irregular shape (Haas & Kopanyi, 2017).

1.8. Thesis organization

This thesis is organized into five chapters. Chapter One introduces the background of study and identifies the core issues that underpin the research. It also presents the research objectives, questions, hypothesis, and the overall structure of the thesis. Chapter Two explores the theoretical background by reviewing relevant literature to provide insights that support the research context. Chapter Three offers a concise overview of study area, describing the methodology employed, including data collection during fieldwork and the subsequent analysis. This chapter serves as the foundation for the subsequent chapters. Chapter Four details the research findings and analytical results, along with a discussion of their significance in relation to the study area. Finally, Chapter Five summarizes the conclusions drawn and offers recommendations based on the study's results.

CHAPTER TWO: LITERATURE REVIEW

2.1. Theoretical literature review

2.1.1. Definition of vacant land (Undeveloped plots).

Land comprises a variety of natural elements, including soil, rocks, water resources, and native vegetation, all of which contribute to its ecological and economic value (Leonard, 2022). Beyond its physical components, land holds deep social and cultural significance it often defines the geographic boundaries of communities, embodies historical and sociocultural heritage, and serves as a foundation for economic development and identity. As a communal or shared resource, land plays a crucial role in shaping settlement patterns, livelihoods, and governance structures. Furthermore, land encompasses not only the surface itself but also all the minerals beneath it and the permanent structures erected upon it, such as buildings and infrastructure (Leonard, 2022).

As a resource, land is a wise investment and a priceless asset whose value increases over time, despite the possibility of depreciation. Given that practically all economic activity occurs on land, there is no question that land is humanity's most important economic resource. Therefore, it will be extremely challenging to carry out any economic activity successfully without using land.

(Leonard, 2022) In recent times, the phenomenon of vacant urban lands where most lands under private ownership are left unoccupied or unused in urban areas has been on the ascendancy. In a work that involved an assessment of African cities, it was identified by the authors of the existence of lot of patches of unused and undeveloped lands mostly at or close to city centers as one of the common characteristics (Kim et al., 2018). This has led to a situation of highly uneven and fragmented cities with urban sprawl, as the cities grow outwards. It is for this reason that most African cities tend to be unproductive when analyzed from the perspective of an urban economic theory as the disjointed nature of the cities prevents the agglomeration needed to make cities. Vacant lands in urban areas constitute a unique subcategory of land in a city that exhibits the characteristic of increasing value where there is urban growth and public developments.

The fact that people may keep vacant urban land as a kind of speculation due to the anticipated future gain in value brought about by city investments and public development is another distinctive feature of this type of land. In reality, this development denies access

to land to those who truly need it. However, it should be highlighted that there are other factors contributing to the urban unoccupied land situation (Kim et al., 2018).

According to Kim & Kim (2012) cited in (Leonard, 2022) , urban vacant lands, which considers a waste product, arise out of urban growth, economic and industrial activities. Land vacancies are the end product of urban developments which include decentralization arising from demographic change, de industrialisation, urban sprawl, and the taste for modern varieties of residential choices, as well as housing foreclosures, subsequent abandonment and demolition (Mohamad Selamat et al., 2023).

Vacant lands are found in locations with roughly the same comparative occurrence in areas of all different land price classifications which tend to be contrary to the simple explanation given that they are always found either at the outskirts or in the centers of the cities (Kim, 2016). Furthermore, through a conducted poll, it was revealed that the phenomenon of vacant lands in urban areas is as a result of deliberate speculative choices on the part of land owners and not really a consequence of financial constraints facing the landowners. In criticizing the situation, some politicians and economists have contended that economic productivity is violated when people withhold land on the basis of speculation (Kim, 2016).

Urban areas in many cities contain a considerable amount of unused and deteriorating land, which presents ongoing challenges for urban management (Kivell, 2002, as cited in Leonard, 2022). These neglected spaces, often left with abandoned buildings, are commonly turned into illegal dumping sites and are linked to negative public perceptions of the neighborhood. Moreover, such areas can pose fire hazards and are sometimes associated with unlawful activities, including drug-related offenses.

Urban vacant lands predominantly in the Ethiopia and other parts of the world tend to be observed from an economic standpoint in terms of its highest and best use (Gemedet et al., 2021) . It is often ignored if it is unable to meet these conditions and expectations. However, there are also numerous options and opportunities to improve vacant lands with respect to its environmental and social value. It is for this reason that many urban design professionals and scholars are focusing on the subject of urban vacant lands and the potential it comes with, especially with regard to planning and design (Kim et al., 2018). These unused lands can be released or used to the benefit of the larger society who is in desperate need of land instead of allowing it to remain idle. In Ethiopian cities and towns

an increasing level of housing deficit every year, the issue of urban vacant land is a challenge that needs to be addressed as land constitutes a very important resource input needed to tackle the issue of housing this also same in Gelan Sub city.

2.1.2. Causes of Urban Undeveloped (Vacant) Land

Urban sprawl is frequently influenced by broader macroeconomic trends such as economic expansion and globalization, which drive demand for land and infrastructure Han, (2021). However, individual-level factors also play a crucial role. Rising household incomes and greater personal wealth enable more people to pursue suburban lifestyles characterized by larger homes, private yards, modern appliances, and increased living space features that are often unavailable or unaffordable in dense urban centers. Additionally, lower land and housing costs in peripheral areas make suburban living even more attractive to many families. Beyond economic motivations, structural issues like weak land-use regulations and the prevalence of single-use zoning where residential, commercial, and industrial functions are strictly separated further encourage the spread of low-density developments. These policies often limit the ability to create compact, mixed-use neighborhoods, thereby accelerating urban expansion into surrounding rural or undeveloped areas.

Han (2021) explains that suburban development including the building of homes, installation of utilities, and expansion of road networks plays a significant role in contributing to the gross national product (GNP) of developed nations. As urban growth often extends toward the outskirts of metropolitan areas, a substantial portion of resources and public services is allocated to these expanding edges. A notable trend in this peripheral development is the growing uniformity in suburban construction. Housing developments in these areas frequently feature repetitive architectural designs, with many homes built to the same or very similar layouts and lot dimensions, reflecting a high degree of standardization in suburban planning.

One critical factor that determines the level of intensity in the phenomenon of urban vacant land is the value of these lands (Model, 2013). It suggests that the forces and determinants of land values are in no way different from the ones responsible for urban vacant land values. (Adams et al., 2002) also indicated that one can ascertain the reason why land is vacant by determining the time period the land has been vacant and unused. Specifically, where land has been vacant for long time periods without any transaction recorded on land, it can be attributed to development challenges rather than land speculation. On the other hand, in a situation where a vacant land is frequently transacted but still remains vacant or

undeveloped, it could suggest that this land is more suitable for development as the regular transactions on it give a clue of its marketability (Leonard, 2022).

This, therefore, suggests that the phenomenon of urban vacant lands is not in any way necessarily bad or an indication of a market failure as Evans (2004) clearly expressed. With regard to frictional unemployed land or land held for future use as a result of its nature, building on it must not be rushed or done in a hasty manner as it could, in the long run, lead to uses that are socially undesirable. A number of other studies have revealed several instances where the presence of vacant lands mean that resources are being used effectively and efficiently (Leonard, 2022). But in a situation where the unused land is structural in nature then there will be the need for some intervention. Authorities in making decisions concerning the use and development of vacant lands must know and understand the type of vacant land it is dealing with, otherwise efforts directed towards limiting its quantity may be socially unfavourable.

(Haas & Kopanyi, 2017) Insecure property rights and land tenure may be another factor responsible for land vacancy. This is actually a common feature for most developing countries that are still in the course of undertaking land regularization. The lower the level of security for land titles, the lower the level of investment by landowners in their land as they remain uncertain as to whether it will be expropriated in the future. Hence, the phenomenon of vacant land can be an indication of general challenges in a system where property rights formalization is being undertaken.

It is very essential for urban planners to understand and appreciate the type of vacant land in question and the category within which it falls so as to inform the kind of policy to be instituted to ensure its efficient and optimum use through densification. One way by which land vacancy is managed and controlled is through land taxation. Such intervention will not actually yield any results in the event the vacant land is unbuildable. This is because a land tax will only have minimum effect on encouraging more efficient land use where the vacant land is really buildable. Most urban vacant lands not moving into the market before set to be developed actually makes it difficult to determine their build ability Moreover, there are varied definitions of ‘build ability’; for instance, a huge company in manufacturing may have the motivation to use vacant land that, due to natural or physical factors, was considered unbuildable (Adams et al., 2002) cited in (Leonard, 2022).

Most lands remain vacant and undeveloped by reason of their size such that it is considered too small to be invested in. Such land parcels may be of great need to others, especially low-income households, who use such small lands to put up their personal dwellings. Furthermore, urban planners seem not to recognise the option where a land tax may encourage non-speculative owners to give out parcels that may be unsuitable for large development but rather offer free spaces for communal activities such as parks, etc. Vacant land build ability will, therefore, depend on the owner and it is subject to change with time.

The factors responsible for occurrence of urban vacant lands are varied as the quantity of vacant parcels within an area with every parcel having its unique reason for being vacant. These factors also differ between different cities, neighbourhoods, and between different kinds of vacant lands in the same neighbourhood. A number of theories have been developed to ascertain the existence of vacant land in urban areas. also, from the point of view of an urban planner, outlined five reasons for vacant land in urban spaces.

2.1.3. Socio-economic effects of urban vacant land in the study area.

The fundamental economic advantage urban areas offer is the potential for greater efficiency brought about by population density, talented human capital, and access to resources. These economies of scale increase labor productivity and enable private sector growth. In relation to that, lower revenue collection and low tax income, reduced infrastructure development, reduced employment opportunity, discouraged investment, disputes, social crime, human health problem, plan distortion, loss of aesthetic value, and urban sprawl are observed as a major effect that were caused by the existence of the undeveloped land in the town. Based up on the findings, the researcher put possible recommendations to come up to this obscurity (Habtamu et al., 2022).

While several neighbourhood characteristics influence health, there has been increasing attention on the impact of deteriorated neighbourhood conditions, such as vacant and abandoned property (Hohl et al., 2023). Vacant lots and buildings are visible signs of neighbourhood disorder and are correlated with violence, fear, and often have overgrown vegetation and dumping that may provide opportunities for illegal activity, harbouring illegal firearms, and misuse of spaces (Newman et al., 2018).

2.2. Empirical review of related literature

Cities and urban areas in Africa have different features, notable among which include low exposure, high disintegration and fragmentation. To begin with is the new building cover

and volume close to urban middles. There still exists areas where lands are either vacant or land developed with low volume of building structures even though a number of African cities have high rise buildings. This is responsible for the low level of capital concentration near urban middles, or infill on vacant parcels. City boundaries are forced and pushed outward by the expanded type of development.

African cities and urban centres are also unique for the large number of leapfrog patches. These are small newly built parcels of land that do not border on or connect existing buildings or developments. Due to its separation from existing developments, the quest of urban managers to provide a networked kind of service that increases economic and urban productivity is undermined. The occurrence of urban expansion, especially due to leapfrog, creates just a single pattern of development, making commuting in African cities very challenging. The physically disjointed nature of African cities makes urban settlers disconnected from one another. The phenomenon of city or urban expansion has largely occurred as leapfrog patches which do not connect with already built-up urban areas, resulting in increasing commuting costs including lower accessibility to other people and markets in the city.

Koroso (2022) notes that African cities do not exhibit significantly higher spatial fragmentation such as variations in population density or the proportion of open and vacant land near urban built-up areas when compared to cities in other parts of the world. However, the availability of reliable and up-to-date data on urban fragmentation remains limited. As Leonard (2022) points out, the most recent comprehensive dataset, which dates back to 2000, suggests that many African cities display spatial patterns that are broadly comparable to global urban trends.

When it comes to population density gradients or the proportion of open and vacant space surrounding urban built-up areas, cities in Africa do not show more spatial fragmentation as compared to cities and urban centres in other regions. Available data are unreliable as comprehensive and current dataset on built-up urban fragmentation is yet to be completed. The most recent data, for 2000, gives an indication that plenty of cities in Africa, on the average, have similarities with other cities across the world (Leonard, 2022).

According to Haase et al. (2018), data indicates that the average proportion of vacant or open space surrounding developed areas within a walkable radius in African cities is approximately 39%, a figure comparable to that of more developed regions such as Europe

and Southeast Asia. Additionally, the ratio of a city's overall footprint to its built-up area referred to as the "average city footprint ratio" is about 1.8 in African cities. This metric closely aligns with similar urban patterns observed in cities across Latin America, North Africa, Europe, and Japan.

Cities in Sub-Saharan Africa do not seem to be more fragmented as others may assume due to the prevalence of urbanized vacant or open space as compared to other cities. African cities possibly will be more fragmented than the global average near the urban and inner city. In terms of economic drive and important spots for the exchange of goods and services including ideas, the inner city is most ideal. They are also areas where one can locate most of the valuable lands in the city. The underutilization of land in the city deprives the city of the opportunity to make use of some of its productive land (Leonard, 2022).

However, lands in urban centres are also left vacant for green spaces as not all land parcels at the centres require to be developed. Conversely, African cities like Antananarivo, Brazzaville and Harare, which are not neighbouring built-up areas, are dispersed throughout the center, with over 30% of land within 5km of the city center left vacant and unbuilt (Antos *et al.*, 2016) cited in (Koroso, 2022). Between 2000 and 2010, the phenomenon of leapfrog development was on the rise in many African countries, consequently resulting in fragmentation.

Adigeh and Dagnew (2020), conducted a study across 21 African countries and found that new urban fragmentation between the 1990s and 2000s was predominantly evident in Windhoek, Namibia. Only four cities Windhoek, Addis Ababa, Lusaka, and Ouagadougou showed a measurable number of leapfrog developments per square kilometer of urban footprint. Cities such as Maputo, Nyala, and Nairobi were identified as experiencing a growing trend of spatial fragmentation. In the case of Maputo, for example, nearly 51% of the newly formed vacant land patches between 2000 and 2010 were attributed to leapfrog development, with approximately 95 new patches recorded per square kilometer of land in 2010 (Baruah, 2015).

(vom Hofe et al., 2019) A vacant land refers to a parcel of land purposely earmarked for development but has been put to the designated use within official time specification. Abandoned buildings comprise partially developed structures with the owner's cessation of maintenance responsibilities and the performance general custodial duties and as such

normally suffer physically impaired integrities (Fletcher, 2014). The quantity of vacant and abandoned building structures in cities are accompanied by negative impacts on the surrounding environments (Mikel bank, 2008).

According to studied by (Porter et al., 2019) Findings from study indicate that cities with many abandoned structures such as abandoned houses have a high potential of experiencing crimes within their vicinity because such properties serve as hideouts for thieves and make their operations much easier. According to (John & Gary, 2008) cited in (Porter et al., 2019), one of the clear signs of cities' deterioration is vacant and abandoned building properties which undermine the appearance and economic values of cities and their surroundings. Many elements of community life are impacted by vacant and abandoned structures, including housing.

(Bieretz & Schilling, 2019) state that cities must handle the growing number of unoccupied and uncompleted structures, not only for the detrimental impact they have on the community, but also because of the countless costs they entail. The cost grows with each year that land remains vacant, underdeveloped and abandoned (Han, 2014).

(vom Hofe et al., 2019) stresses the inability of property owners to either maintain or develop their land properties amounts to the abandonment of such properties. identified and grouped the causes of vacant and abandoned properties into various forms including the occurrence of natural disasters, the cost of renovating and repair of properties, environmental and sustainability issues, economic bust, and violent neighbourhoods.

According to (Branas et al., 2012) a strong partnership between city managers and community members is very essential in formulating strategies for proper management and addressing of the issues of vacant land properties in cities. This implies that both the community and city authority must be prepared and willing to collaboratively fight against the incidence of vacant land and abandoned building structures to reduce cities' deterioration resulting from such displeasing situation. As studied by (Han, 2014) mentions that the impacts of vacant and structures increase as they stay abandoned for long, and as such suggest immediate reoccupation to mitigate the support up of the negative impact (Han, 2014).

2.2.1. Globally Strategic Managing of Vacant Land.

According to (Habtamu et al., 2022) A comprehensive study conducted in Philadelphia, as detailed in the 2000 Final Report of the Vacant Land Management Study, analyzed the city's persistent challenges in managing vacant urban land. Philadelphia's urban governance framework, established by the City Charter in the 1950s during a period of population growth, was designed to accommodate urban expansion. However, as the population declined, the city's approach to vacant land management became increasingly fragmented, lacking a centralized and coordinated system (Habtamu et al., 2022).

According to author (Habtamu et al., 2022) the address these inefficiencies, the report advocates for the adoption of an Asset Management Approach an integrated, strategic, and ongoing method. A central recommendation is the establishment of an Office of Vacant Land Management (OVLM) within the city's Redevelopment Authority. This sector would be responsible for addressing urban blight, streamlining bureaucratic processes, and supporting community revitalization efforts.

Based on the author's conclusions, the case of Philadelphia offers valuable lessons on how a strategic and institutionalized approach can transform vacant urban land from a source of urban decline into an opportunity for revitalization and sustainable development. For Gelan Sub-City, where a significant portion of land remains undeveloped and underutilized, adopting a similarly comprehensive land management framework is crucial. The current fragmented and reactive responses to vacant land in Gelan mirror the early challenges faced by cities like Philadelphia, highlighting the urgent need for a coordinated and proactive strategy.

2.3. A practical controlling of Unutilized vacant land in Ethiopia's

Ethiopia has practiced rapid urbanization especially over the past two decades. Although the state owns all land and allows leasing for various purposes, weaknesses in land institutions and policies have created loopholes that make urban land management less effective (Koroso et al., 2021). Urban land comprises only a small part of the earth surface, but it is an important part because it is where almost half of the world's human population lives and where more than half of the world's economic activity occurs (Tera et al., 2022) cited in (Habtamu et al., 2022). According to the researcher predicted by the year 2030, almost 60% of developing and 83.7% in developed world population will live in cities.

This dynamic growth of urban population calls for effective and efficient urban land management especially in less developed countries like in Ethiopia (Tera et al., 2022).

Land management can be defined as a system of land administration concerned with the judicious allocation and use of land to achieve orderly growth and efficient functioning of cities (Branas et al., 2012). It is the process by which the resources of land are put into good effect. It is also the system of land administration concerned with the appropriate use of land for different activities, controlling the general performance of urban growth through different measures and the efficient utilization of urban land. Therefore, a clear understanding and application of the concept of urban land management is important to manage urban land properly. This involves establishing procedures with make land for development rapidly available to the public (Habtamu et al., 2022).

Generally, when compare undeveloped vacant land utilization system in Ethiopia with other countries that the literature reviewed, there is a great dissimilarity regarding efficient utilization of urban land especially undeveloped vacant land (Zimmermann, 2008). Therefore, the above lessons drawn from the literature review are more essential for this study in order to make vacant land utilization efficient. The government of Ethiopia did the effort to satisfy the demand for land and to keep the price lower through mass allocation of land for residential housing to low income groups, land allocation for cooperative, lease holding by auction often by negotiation and issuance of different rules and regulations for effective use of land and stabilizing the price.

Socio economic activity of Urban vacant land (Tera et al., 2022) despite that the determination by the government did not attempt to satisfy the socio-economic activities of the urban residents in the county. As the author stated that One of the major problems of the towns through the country is inefficient utilization of resources. This indicates that the system of land delivery, development and management as well as the rules and regulation to enhance effective land utilization are not able to prevent the prevalence of undeveloped vacant land in the urban centers in general. Like in many countries' inefficient utilization of urban lands in Ethiopia take land by way of lease contract and keep it idle with noor little building on it and wait for future price rise to sub lease it. They acquire a plot of land either build a small house at their plot, or they keep the land idle for more than the period of time of building completion. There were also many who could not begin building their

project even often they have been granted land through auction (Adigeh and Dagneu, 2020).

According to the authors (Adigeh and Dagneu, 2020) reported the national level, Ethiopia's urban land management practices often lack strong enforcement mechanisms, integrated planning, and dedicated institutions to manage vacant and idle lands effectively. Leaseholders frequently retain undeveloped parcels for extended periods without consequence, contributing to land scarcity, informal expansion, and inefficient urban growth. To overcome these challenges, Ethiopia beginning with local administrations like Gelan must establish dedicated entities or offices tasked with managing vacant land, similar to the proposed Office of Vacant Land Management in Philadelphia.

Such an office should be empowered to acquire, maintain, and repurpose undeveloped land in line with urban development goals. Using geospatial tools like GIS for spatial analysis and adopting an asset management approach and updated land registration Gelan Sub-City can improve land utilization, support planned growth, and enhance community development. Ultimately, institutional reform, policy enforcement, and the integration of technology will be critical in transforming Ethiopia's undeveloped vacant lands into productive assets for sustainable urban futures.

2.3.1 Remnant (Abandoned) Parcels

Remnant Land Parcel means a disturbed portion of the City Lands on which structures, facilities or other infrastructure is not required to be constructed as part of the Project. These are land parcels that are left undeveloped from other major developments close to them as they are considered not suitable for large-scale development due to their relatively small size and irregular shape (Kim, 2016). This kind of land area also available in study area example residential land near manufacturing and storage to build its difficulty in case of small area and incompatible land use.

2.3.2. Parcels with Physical Limitations

(Gemedat et al., 2021) stated Key among the many factors responsible for the vacant state of lands especially in cities is that of topography. With these land parcels, they actually remain vacant due to natural factors. This is because they are normally sited in areas susceptible to flooding or where the land becomes unsuitable for construction as a result of the topographical shape of the city. Such parcels are either unsuitable for development of

any kind, or besides the impracticalities and difficulty involved in developing them hinder their development so long as there are suitable lands available elsewhere which can be put to the same use. Parcels with physical limitations include natural and environmental like steep slope and flood hazard (Habtamu et al., 2022).

2.3.3. Parcels Held for Corporate Reserves and organization Vacant Land

According to the previous study conducted by (Gemeda et al., 2021) Large businesses, especially those in the industrial sector, may also hold vacant lands which are normally in close proximity to their existing plots and buildings with the expectation of expanding the level of production in the future. Reserve resources offer a glimpse into the future of resource utilization and sustainability. Shale gas, methane hydrates, deep-sea minerals, geothermal energy, and Arctic oil and gas reserves are just a few examples of the untapped potential that awaits further exploration and development (Gemeda et al., 2021).

Public authorities normally hold and have interests in these types of lands and leave them vacant for future infrastructure developments and shaping urban growth. It should also be clearly stated that where rigidity is applied in applying controls and restrictions without, form of flexibility will end up with the negative effect of discouraging any development. An example of this is an area, which has been over-zoned for a use, is of no current or future demand.

2.3.4. Vacant Land for Speculation

vacant land speculation as it mentioned by different scholars it's a land held by those who intend to obtain maximum benefit in terms of capital gains from the increase in land values due to the development of the city and related investments. The time period a land remains vacant will depend on the will of its owner (Kim, 2016). Often land owners hold land for reasons of speculation and the owner will choose to rather keep the land vacant and pay taxes until the favourable moment arrives and gives him the chance to realise his desired returns or profit. Sometimes, the lack of resources for investment could stall an ongoing development or the failure of a construction project. The challenge of capital shortage was a major reason for which several lands parcels in Guangzhou were supplied but not used. According to the scholars studies show that the situation is not different in other cities in Europe and United State (Newman et al., 2018; Nemeth & Langhorst, 2014; Crowe & Foley, 2017).

2.4. Conceptual framework Template

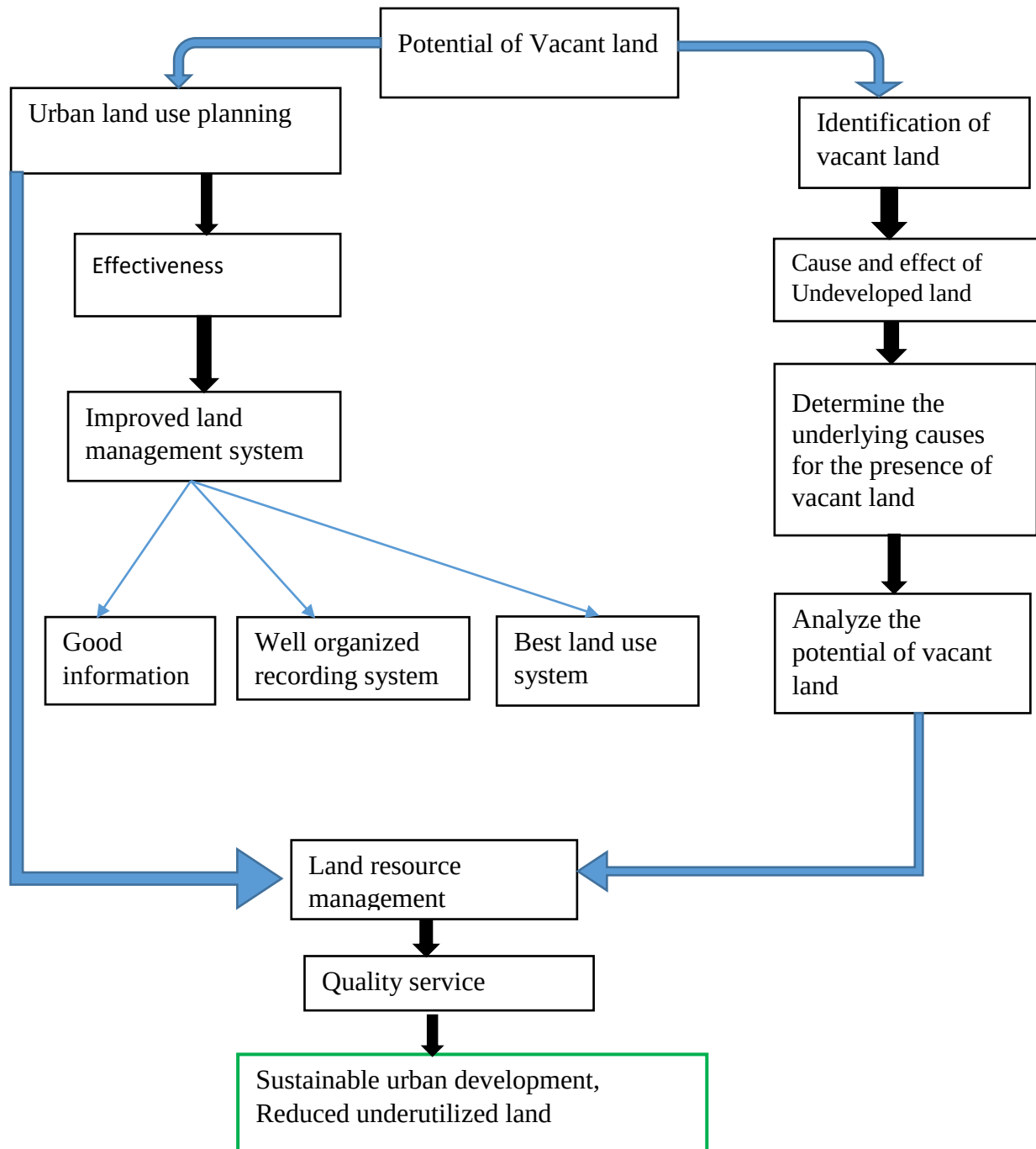


Figure: 2.1 conceptual frame work of the study adopted from literatures.

2.5. Research and knowledge Gaps in Related literature

Despite the visible presence of numerous vacant and underutilized properties owned by individuals, businesses, or even government bodies across the main urban centers in the Gelan study area, there is a noticeable lack of focused research on this issue within the

Ethiopian context. Existing literature offers limited insight into the underlying causes and contributing factors behind urban land vacancy in Ethiopian cities and towns (Habtmu et al., 2022). Based on the previous study, this topic has been largely overlooked by scholars and urban researchers. This study aims to address this research gap by examining the potential uses of undeveloped urban land and exploring its socio-economic impacts on surrounding communities. By investigating the drivers behind land vacancy, the research seeks to contribute valuable knowledge that can inform more effective urban planning, design, and land management strategies.

According to Newman et al. (2018), while global research has increasingly provided detailed classifications of vacant land in urban areas across various cities and countries, there remains a significant gap in understanding the underlying causes of these patterns. Much of the existing literature focuses on the extent of vacant land but falls short in analyzing the factors driving its emergence and change over time. This lack of causal analysis represents a major shortcoming in urban vacancy studies. Newman et al. emphasize the importance of using historical rather than solely current data to better understand the dynamics behind the formation of vacant urban areas. Such an approach could support the development of more effective and sustainable urban policies aimed at reducing land vacancy and promoting efficient land use. While much Vacant Urban areas research has focused on factors such as regional location and development (Newman et al., 2018) and population decline (Bieretz and Schilling, 2019) these studies have not necessarily worked off of the data provided from one another or been comprehensive in nature.

Gelan sub city is one of the rapidly growing and newly emerging sub city in Sheger city of Oromia regional state. Due to the area's strategic location at a road cross that connect many areas and the development of urbanization, there is a significant demand for land for residential, commercial, and industrial and manufacturing, and other uses. Beyond the property's productive worth, undeveloped unoccupied land reduces the town's socioeconomic growth. It impacts the city's entire development if it is not avoided. Issues pertaining to undeveloped urban vacant land in our nation are not the focus of most studies, particularly in the study area.

Management solutions for undeveloped vacant land are also poorly positioned, and there hasn't been much prior research on this subject in the study area. Vacant land and idle plots

can transform to utilized space at any given point, thereby making vacant urban areas difficult to study longitudinally. It is, however, a common urban land use, and a worthwhile condition to study across cities.

In Gelan Sub-City, management strategies for vacant land remain inadequately developed, with limited prior research exploring the issue in a systematic and spatially informed manner. The dynamic nature of vacant and abandoned lots often shifting between unused and utilized states adds complexity to their study, making consistent and longitudinal analysis challenging. Despite this, vacant urban land remains a persistent and significant aspect of urban landscapes, particularly in rapidly urbanizing areas like Gelan.

This research aims to address the existing knowledge gap by providing a focused analysis of vacant land in Gelan Sub-City, using GIS-based tools to support evidence-driven urban planning. By doing so, it contributes critical insights into the efficient utilization of scarce urban land resources. The findings are expected to inform local land management practices and serve as a reference for similar urban settings in Ethiopia, ultimately supporting sustainable urban development and policy formulation at both local and national levels.

CHAPTER 3: MATERIALS AND METHODS

3.1. Description of the study area

Geographically Gelan Sub city located northeast part of Capital city Addis Ababa's in, 25 kilometers from center places it within the Shegar City administration, adjacent to the Special Zone of the Oromia Regional State. Geographically, it is located between 467000m to 487000m Northing and 969900m to 984000m Easting. According to the current master plan, the total area coverage of the town is 143.3798 km² (14,337.98) hectares.

Gelan sub city sits on a flat landscape covered in volcanic soil and porous rocks. A watershed running north to south divides streams flowing towards the Akaki groundwater catchment zone from those flowing towards Dukem, except for streams originating on surrounding hilltops.

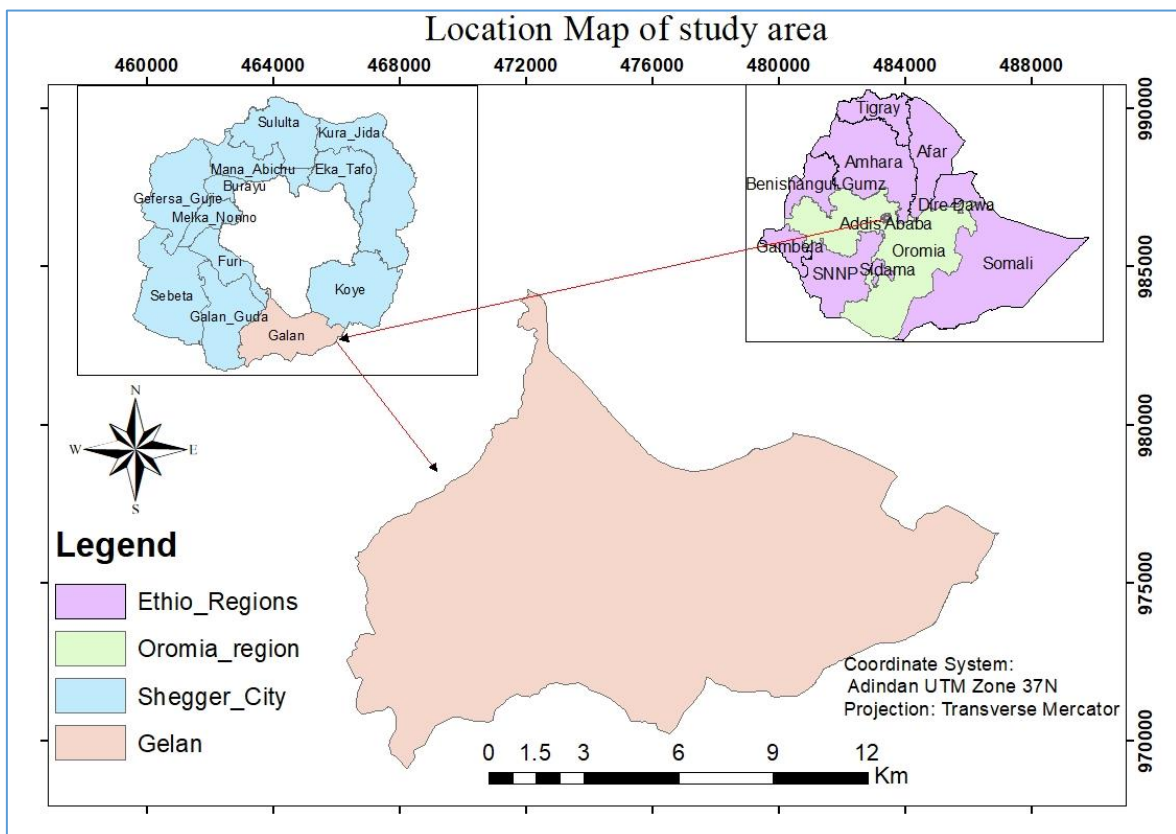


Figure: 3.1. Location map of Gelan Sub city show in Sheger city Oromia.

Gelan, is one of the 12 sub-cities within Shegar City, has a relatively recent history. As described by (worku, 2016) its establishment coincided with the millennium anniversary of Ethiopia. Driven by the expansion of Addis Ababa (then known as "Finfine"), the Oromia Regional State sought to control its surrounding areas and incorporated Gelan into its administration. The town's name derives from the local Tulama Oromo group called Gelan.

3.1.1. Topography and Temperature

Topographically in Gelan sub city Soil types are influenced by the elevation difference between Merino, the lowest region, and Gara Bushu, the highest mountain. Higher places have nit soil and certain materials that locals frequently utilize for construction, whereas lower-lying areas have vertigos (clay) soil.

Figure 3.2 illustrates the altitude variation within Gelan Sub-City, ranging from the highest point at 2384 meters above sea level to the lowest point at 1982 meters above sea level. The altitude data was extracted from the USGS ASTER (Advanced Space borne Thermal Emission and Reflection Radiometer) Digital Elevation Model (DEM). The DEM data provides a detailed topographic map of the area, showcasing the terrain's elevation differences across the sub-city.

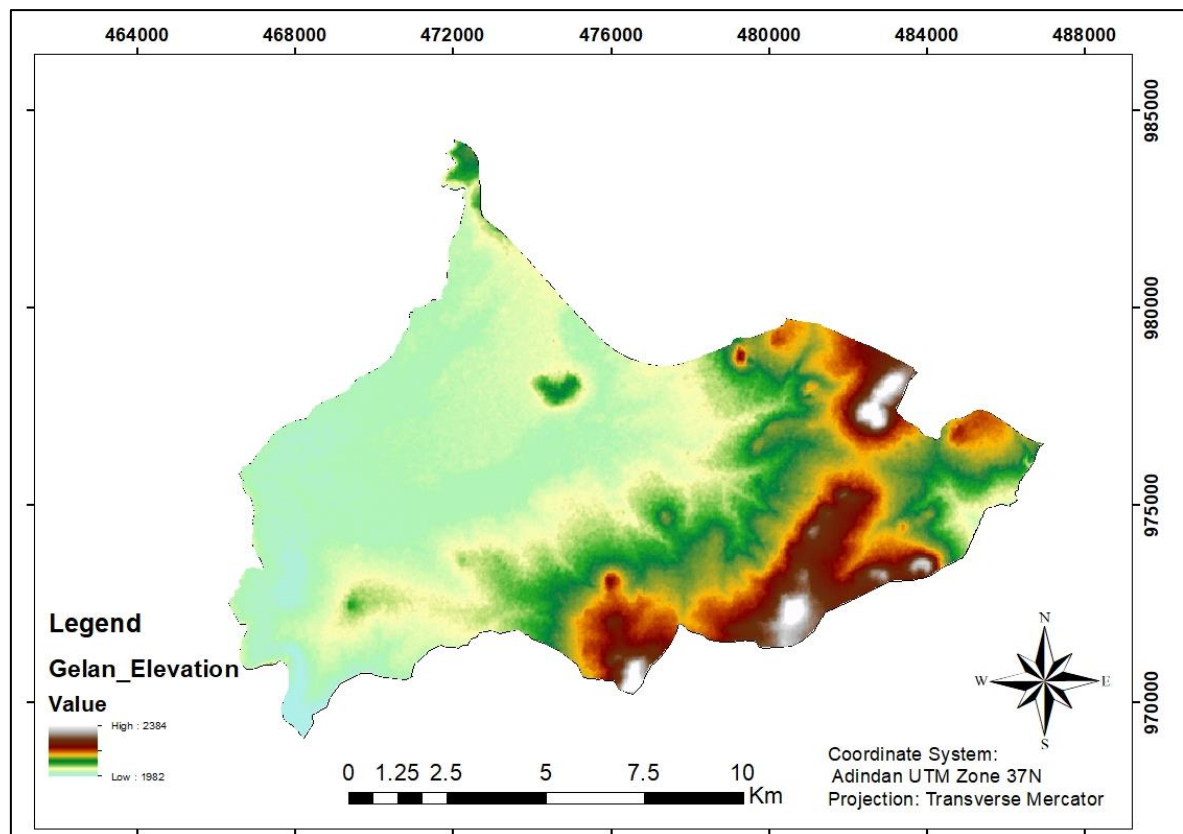


Figure: 3.2. Altitude of Gelan Sub-City

The variation in altitude could influence land development patterns, infrastructure planning, and urban expansion. Higher elevation areas may face challenges in construction due to steeper terrain, while lower areas may be more suitable for residential and industrial

development. The data can be crucial for urban planners and developers, as it helps in determining flood risk zones, access to transportation networks, and the overall feasibility of land development in different parts of the sub-city.

With an average maximum temperature of 17°C and an average annual temperature of 20°C, this altitude range produces a sub-tropical (Woinadega) climate that is comparable to tropical and subtropical areas. Gelan is appropriate for human habitation because of this temperature range.

3.1.2. Population

Population dynamics in Gelan are affected by fertility, mortality, and migration. These complex processes involve social, cultural, economic, political, and psychological factors. In urban environments, migration plays a leading role in shaping population characteristics and reflects the town's urbanization rate. According to the 1999 census, Gelan had a total population of 13,898 (7,033 male and 6,865 female). Based on a 2.5% annual growth rate, the average household size was estimated to be 3.6 and 3.61 in 2011 and 2012, respectively. According to municipality report 2020 total population of Sub city were estimated to 123,050. However, rapid migration and other factors likely suggest a current population exceeding these projections.

3.2. Research Design

This study utilized a descriptive research design employing a survey strategy. The research explored and described the state of urban land management practices, specifically addressing the challenges related to undeveloped vacant land within the defined study area. To gather comprehensive, reliable, and sufficient data, the study integrated both qualitative and quantitative research methods. Qualitative data constituted the primary dataset, while quantitative data served a supplementary role. The research further employed both qualitative and quantitative approaches to achieve its objectives, using qualitative methods to identify and understand the socio-economic and environmental impacts of undeveloped urban land within and around the study area.

3.3. Population, Sampling Methods and Sample Size Determination

3.3.1. Sampling Techniques

To ensure a representative sample of the study population, a mixed sampling approach was adopted, incorporating both probability and non-probability methods. The probability sampling technique was utilized to select units that accurately reflect the characteristics of the larger population. Specifically, simple random sampling was employed to identify the sample weredas, ensuring each had an equal chance of selection. Within these selected weredas, the researcher focused on individuals holding undeveloped vacant land. Additionally, purposive sampling, a non-probability technique, was used to select key informants who are closely involved with the issue in order to gather in-depth insights regarding undeveloped vacant land.

3.3.2. Sampling frame, sample unit and sample size.

The population of the study consists of 383 vacant landowners targeted for sample in Sub city. These include people that have fully acquired land for use within the study area. The real reason behind the selection of this set of respondents is because they qualify as people with most likelihood of having had the experience of making a choice as to whether to develop a land or keep it vacant which makes them most qualified to provide the needed information for this study (Leonard, 2022).

In this research, two non-probability sampling methods convenience sampling and purposive sampling were employed to collect data. Purposive sampling involved selecting units from a predefined group, with the study area chosen intentionally, and respondents then sampled from within this area to participate in the study. The convenience sampling method was subsequently used to identify the respondents, selecting individuals based on their accessibility and willingness to take part in the interview.

The sampling frame for this study was based on the total population of residents living in the three weredas of Gelan Sub-City, which is estimated at 123,050 households. While this figure represents the overall population of the sub-city, the study specifically targeted owners of vacant lots, who are more directly relevant to the research objectives. From this target population group, a sample of 383 vacant landholders was selected for the study. Therefore, the total population of 123,050 households was used as the basis for calculating the appropriate sample size, which was determined using a standard sample size determination formula (Eq.1).

The best approach depends on our specific circumstances and assumptions. However, the formula that incorporates the finite population correction (FPC) is generally considered the most accurate for populations of this size 123,050. This addresses the fact that sampling from a finite population reduces the variability compared to sampling from an infinitely large population (Wretman, J. et al., 1992).

The standard sample size formula for proportions was applied to get the sample size for interviews from a total population of 123,050 with a 95% confidence level and a 5% margin of error:

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{e^2} \dots\dots\dots \text{eq1}$$

Where:

- n = required sample size (before finite population correction)
- Z = Z-score for 95% confidence level = 1.96
- p = estimated proportion of population = 0.5 (most conservative)
- e = margin of error = 0.05

$$n = \frac{(1.96)^2 \cdot 0.5 \cdot (1 - 0.5)}{(0.05)^2} = \frac{3.8416 \cdot 0.25}{0.0025} = \frac{0.9604}{0.0025} = 384.16$$

So, $n \approx 384$ (for an infinite population) then Apply Finite Population Correction (FPC)

Since our population is finite (123,050), we adjust:

$$n_{adj} = \frac{n}{1 + \frac{n-1}{N}} = \frac{384}{1 + \frac{383}{123050}} \approx \frac{384}{1 + 0.0031} \approx \frac{384}{1.0031} \approx 382.8$$

Therefore, using the formula with the finite population correction, the recommended sample size is approximately 383 respondents.

Finally, from total sample target of 123,050 households, 383 sample informants were selected for survey. In order to increase the accuracy of the research results, the research operated at a 95% level of confidence with a margin of error of 5% to minimize error. Stratified random sampling will be used for dividing the population into subgroups or strata based on certain characteristics, such as socio-economic status, land use or building characteristics. A sample were selected from each stratum to ensure that the sample is

representative of the population. It is important to ensure that the sample is representative of the population to ensure that the study findings are valid and reliable.

3.4. Data Type and Sources

To reach our main objective, the study was utilized both primary and secondary sources. primary data is gathered directly from field and urban communities within the study area, as well as from experts at the sub-city and woreda levels. Our methods for collecting this primary data were included field surveys, structured questionnaires, in-depth interviews with key informants. For the secondary data, we'll draw from a variety of resources such as journals, official reports, legal documents, aerial photographs, the structural plan of the sub-city, Landsat imagery, and previous research studies.

Specifically, to assess undeveloped vacant lots in the extent and spatial distribution of urban undeveloped vacant in the study area, Landsat imagery of 2024 will be acquired from the United States Geological Survey (USGS) and high-resolution image will from urban land management of City Administration.

Satellite Imagery sentinel images in 2025 Satellite imagery from Landsat, acquired from the United States Geological Survey (USGS), has been used to identify land cover types and detect undeveloped vacant lots within the study area. Landsat imagery provides multispectral data that is crucial for land use classification. For this data the images were downloaded from USGS Copernicus Open Access Hub satellite image with resolution of 10m acquired in April 2025 target between 168 path and 54 rows. Additionally, High-Resolution Ortho Photos: High-resolution ortho photos were obtained from the urban land sector of the City Administration with 0.1m spatial resolution.

Table: 3.1. Data Types and Sources

List of Data	Source	Format	Purpose/ Description
Study Area Boundary	Gelan city administration urban land sectors	shapefile	For bounding study area
City Master Plan Updated	Gelan city Municipality	Shape File	Parcel Delineation
Landsat imagery/ Sentinel 2A Image (10m)	USGS/ Copernicus Open Access Hub	Tiff	For classification
Digital Elevation Model 30m	USGS (ASTERDEM)	grid	Drive slope and elevation
Processed Ortho photo (0.1m)	Gelan city administration urban land sectors		Extraction of land use

These images are providing detailed, accurate, and up-to-date visual representation of the urban landscape and will complement the satellite imagery for precise identification.

3.5. Materials Used for this study

ArcGIS, SPSS and geospatial Software for image processing will be used for data extraction and preparation of data analysis. SPSS and micro soft excel will be used for socioeconomic data analysis and interpretative.

Table:3.2. Software Used

Material	Version	Purpose
ArcGIS	v10.8	Spatial Analysis and Map layout
SPSS	26	For Analysis of demographic data,
Google Earth	pro	For checking the timely data
MS-Office and Excel	V2019	For writing report and charting

3.6. Methods of Data collection

This study primarily employed a mixed analytical justification methodology, relying on both primary and secondary data to meet its objectives. The primary data consisted of field information gathered from respondents who participated in the research. In contrast, the secondary data included existing literature on urban vacant lands, focusing on landowners and the factors contributing to land vacancies. This approach helped to contextualize the findings and identify gaps in the existing literature related to urban land studies.

a) Questionnaires: The data collection involved the use of structured questionnaires, which consisted of both closed-ended and open-ended questions, along with some prompts designed to gather detailed information from household respondents. The questionnaires were administered in written form and filled out by the selected respondents who were owners of vacant lots in Gelan Sub-City. After data collection, the responses were coded and analysed using SPSS software to identify patterns, trends, and relevant findings. A copy of the questionnaire used for this study is included in the appendix section at the end of this paper.

b) Key informant Interview: An interview is fundamentally a conversation that involves a face-to-face verbal exchange between two or more people, in which the interviewer seeks to gather information, opinions, and beliefs from the interviewee(s). This method is

particularly valuable for obtaining detailed insights and allowing for greater flexibility in response, as it provides an opportunity for the interviewee to elaborate on their thoughts. In this study, the researcher conducted face-to-face structured personal interviews with a purposively selected group of participants, ensuring that individuals with relevant knowledge and experience related to vacant land management in Gelan Sub-City were included. The interviews were structured with pre-determined questions, but also allowed for follow-up questions to explore responses more deeply. The data gathered through these interviews provided rich, qualitative insights that complemented other data collection methods, such as observation and questionnaires.

c) Site Observations: Observation was employed as one of the primary data collection methods, involving the systematic selection, on-site observation, and recording of visible characteristics within the study area. A structured observation checklist was used as a tool to guide and support the process, ensuring that key aspects such as the social, physical, and institutional structures were carefully examined and documented. During the site visits, the researcher identified and verified vacant land parcels firsthand, confirming their existence and conditions in the field. This observational data was then cross-checked with the local development plan and spatial data extracted from the approved structure plan to ensure consistency and accuracy. This approach helped validate the data obtained from other sources and provided critical insights into the actual land use status within Gelan Sub-City.

3.7. Data Analysis Methods

Concerning the data gathered from the household survey, the pre-coded questionnaires were processed, managed, and analysed using Statistical Package for Social Sciences (SPSS) software and Microsoft Excel program. The analysis involved the use of descriptive statistics to summarize and describe the key features of the data, including measures of central tendency such as mean, median, and mode, to provide an overview of typical household characteristics, land use patterns, and vacant land ownership within Gelan Sub-City. Frequency distributions were also calculated to identify the occurrence of specific land use behaviours and the proportion of vacant land parcels relative to total land holdings.

In addition, cross-tabulations were employed to examine relationships between various variables, such as household income, land ownership, and the prevalence of vacant land,

offering deeper insights into the socio-economic factors influencing land use in the study area. The researcher also calculated percentages and standard deviations to assess the variability in land utilization and the concentration of vacant properties across different areas within Gelan Sub-City.

To complement the descriptive statistical methods, GIS spatial analysis and regression analysis were used to assess and identify the status of vacant urban land. GIS spatial analysis provided visual representations and maps of vacant land parcels, allowing for the identification of spatial patterns, while regression analysis helped investigate the potential drivers influencing vacant land usage, including socio-economic and environmental factors.

The first steps were identifying the utilization status including unutilized, underutilized, and utilized and the spatial distribution land using visual interpretation. Identification of Utilization Status and Spatial Distribution Using Visual Interpretation. The first step involves identifying and categorizing the utilization status of existing land in the study area in current year. This was based on visual interpretation of remote sensing data like high-resolution satellite imagery or orthophoto). Analyse the imagery to visually categorize land into the following utilization statuses:

- ❖ Unutilized Land: Land that has not been developed or used for any purpose (e.g., vacant lots, unused land).
- ❖ Underutilized Land: Land that has some form of development but is not fully utilized (e.g., partial development, low-density construction).
- ❖ Utilized Land: Land that is fully developed or used for residential, commercial, industrial, or agricultural purposes. These were evaluated utilization percentage of each plot by 0%, 25%, 50%, 75% and 100%.

3.7.1. Identification of the vacant land in study area

In this topic using the subordinate data collected from concerned body, the undeveloped vacant land owners in the study area also identified in this step and confirmed during site visiting. The purpose of this steps was identifying the location of vacant land as well as their proximity to neighborhood. Proposed data and methodology for processing both the Landsat and ortho photo data to extract relevant information on undeveloped vacant lots are:

Landsat Data Preprocessing: The Landsat images will be preprocessed to correct for atmospheric interference and to ensure geometric accuracy. This involves radiometric and atmospheric corrections, as well as georeferencing to align with the ortho photo data.

Classification of Land cover: A supervised classification approach will be applied to the Landsat imagery to distinguish between different land use types, particularly focusing on identifying areas with vacant or undeveloped land. The classification will be refined using ground-truth data and comparison with the high-resolution ortho images.

Accuracy assessment: to ensure the accuracy of the land classification, a validation process will be undertaken using ground truth data or high-resolution imagery from independent sources. An accuracy assessment will be conducted by comparing classified maps with reference data (e.g., known land-use maps, field surveys). The overall classification accuracy, producer accuracy and user's accuracy will be calculated.

Ortho photos will be used to verify and improve the classification results from the Landsat data. Manual or semi-automated techniques may be applied to pinpoint and refine the boundaries of undeveloped vacant lots, especially in areas where the satellite data resolution may be insufficient.

Examining the location of vacant land using a geographic information system (GIS) technology will help precise exactly where the buildings are located in space, clarify the major features of the neighborhoods (i.e. social service, streets, parks, etc.) and identify geographic features that might otherwise be missed from the ground level (Mutuli, 2016).

3.7.2. Analysis of spatial distribution of urban vacant land

In this study, the spatial distribution of vacant areas within Gelan Sub-City was analyzed to better understand the patterns and trends of vacant land. The identified vacant lots were systematically mapped using Geographic Information System (GIS) tools to assess their locations and extent within the city. This analysis provided a visual representation of undeveloped areas, allowing for a clear understanding of where vacant lands are concentrated and where there might be opportunities for future urban development. Once the spatial distribution was analysed, the results were mapped to provide a visual representation of vacant land within Gelan Sub-City. GIS tools were used to create detailed maps highlighting the extent, location, and spatial patterns of undeveloped urban areas. These maps allowed for the identification of vacant land collections, which were important for assessing land use efficiency and understanding urban growth dynamics.

The general work flow of methodology and procedure of the study were illustrated in below figure: 3.3.

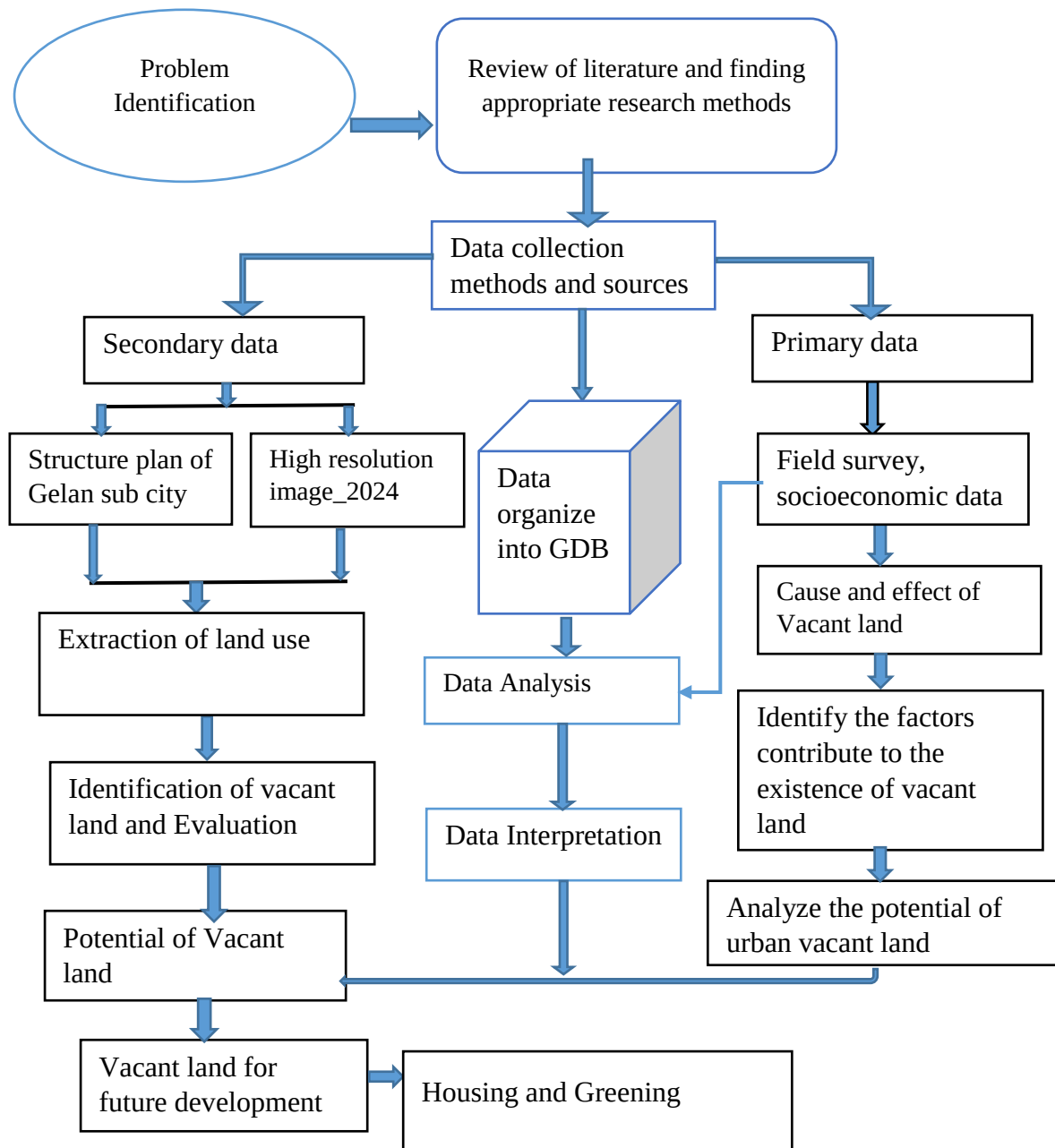


Figure: 3.3. Methodological work flow of the whole study.

The analysis of spatial distribution provided valuable insights into the underlying spatial dynamics of vacant land in Gelan Sub-City. By combining the GIS mapping with spatial statistical techniques, the study highlighted the extent of vacant land, its potential drivers, and the possible implications for urban planning and development (Banerjee & Loukaitou-sideris, 2012). This spatial analysis not only contributed to understanding the current land

use status but also informed future recommendations for better management and utilization of urban vacant land.

In summary, the methodology for assessing the extent and spatial distribution of undeveloped vacant lots involves the acquisition of Landsat imagery (2024) and high resolution ortho photos, followed by data preprocessing, classification of land use types, and spatial distribution analysis. The accuracy of the results was validated using ground truth data and independent sources. This approach provides an effective and accurate means of assessing urban undeveloped idle lands for urban planning and management purposes.

3.8. Validity and Reliability

3.8.1. Validity

In this study was achieved through the careful design and application of data collection tools that were directly aligned with the research objectives. The questionnaires, interview guides, and observation checklists were developed based on existing urban planning literature and adapted to the local context of Gelan. To ensure content validity, the instruments were reviewed by urban planners, local government officials, and academic experts familiar with land management and urban development in Ethiopia. The questions and criteria used for identifying vacant land were specifically linked to relevant indicators, such as land use status, development conditions, and infrastructure availability, ensuring construct validity.

Furthermore, the use of GIS spatial analysis added a strong layer of criterion-related validity by visually confirming and measuring the physical sites and conditions of vacant land parcels. Field visits and on-site observations were conducted to validate the GIS data, ensuring that what was classified as vacant in the spatial datasets corresponded with the actual land conditions observed on the ground. This triangulation of data from surveys, interviews, spatial analysis, and direct observation enhanced the internal validity of the findings and reduced the risk of measurement error.

3.8.2. Reliability

Reliability was ensured by implementing a standardized and consistent data collection process. Structured questionnaires were used for all respondents, and the same criteria were applied during field observations across different sites within Gelan Sub-City. The

researcher also conducted a pilot survey to pre-test the questionnaire, which helped to refine unclear questions before the full data collection began. The use of SPSS and Microsoft Excel for data entry and statistical analysis ensured that the information was accurately processed, and consistent results could be generated under similar conditions.

In addition, the spatial analysis was conducted using clearly defined procedures within GIS software, allowing the methods to be replicated by other researchers or institutions in similar urban contexts. The GIS-based classification of vacant land followed objective criteria such as land cover type, proximity to infrastructure, and current usage status, further enhancing the reliability and repeatability of the findings. Overall, the integrated methodological approach, combined with multiple sources of data and cross-verification techniques, ensured that the research findings on identifying vacant land for future development in Gelan Sub-City are both valid and reliable, providing a strong basis for planning decisions and urban land policy improvements.

3.9. Ethical Considerations

This research was conducted in accordance with the academic and ethical standards of Adama Science and Technology University (ASTU). The study was carried out solely for academic purposes, with the objective of contributing to knowledge on urban land management and supporting sustainable development efforts in Gelan Sub-City. All necessary steps were taken to ensure that the research process was ethically sound and respectful of the rights and privacy of participants. Before data collection began, participants were informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time without consequence. Informed consent was obtained from all respondents, and no personal or sensitive information was disclosed in any form.

Furthermore, data collected from public offices and local authorities in Gelan Sub-City were used with full acknowledgment and permission. The researcher ensured that all sources of spatial data, official documents, and administrative information were properly cited and referenced. Local stakeholders who participated in interviews or provided access to records were also recognized and thanked for their contributions. Confidentiality and anonymity were strictly maintained throughout the research process. Data collected through questionnaires, interviews, and observations were used solely for research

purposes and stored securely to prevent unauthorized access. Overall, this research adhered to all ethical guidelines set forth by ASTU and respected the institutional and community protocols in Gelan Sub-City. The findings were presented with integrity and transparency, ensuring that the voices and information provided by participants were accurately and respectfully represented.

CHAPTER 4: RESULTS AND DISCUSSIONS

4.1. Results

4.1.1. General characteristics of respondent's participant in survey

Data collection was carried out across three woredas within Gelan Sub city, in addition to interviews with key informants. According to records from the municipal office, the focus areas included Andode Woreda, Sida Awash Woreda, and Gelan Woreda. These woredas have respective populations of approximately 27,962, 59,714, and 35,374. The study targeted landowners residing within these areas, aiming to capture a diverse representation of views and experiences related to undeveloped vacant land. The selection of these woredas was based on their varying population densities, land use patterns, and the prevalence of vacant land, which allowed for a more nuanced understanding of the spatial and socio-economic factors influencing land underdevelopment. The inclusion of key informants further enriched the dataset by providing expert perspectives on policy gaps, urban planning challenges, and land management issues across the sub city.

4.1.2. Response Rate of participants

To gather comprehensive data on vacant land and its socio-economic impacts, the researcher categorized respondents into two main groups: owners of vacant land in sub city and key informants with relevant expertise or firsthand knowledge of the subject matter. A field survey involving direct observation and structured interviews was conducted with 259 owners of undeveloped vacant land to gain insights into ownership patterns, usage constraints, and development intentions. In addition, in-depth interviews were held with 10 key informants including urban planners, land administration officials, and local leaders to explore the underlying factors contributing to the persistence of vacant land, its broader socio-economic implications for Gelan Sub city, and the urban land management challenges associated with it. This mixed-method approach helped ensure a more holistic understanding of the issue from both a grassroots and institutional perspective.

Out of the 383 households selected for the study in Gelan Sub-City, a total of 259 households provided responses, yielding an actual response rate of approximately 67.6%. Among these, the exact 196 households fully completed the questionnaire, offering comprehensive and clearly usable data. The remaining 63 respondents answered only selected questions correctly or participated through oral interviews, contributing partial but valuable information. The data gathered from these 259 households is deemed adequate

and reliable for identifying areas of undeveloped vacant land and for assessing its broader socioeconomic effects, including issues related to land use efficiency, investment delays, and housing shortages within Gelan Sub-City.

The respondents represented a mix of household sizes, occupations, and tenure statuses, providing valuable insights into land use patterns and local perceptions of land development. Most of the respondents were long-term residents with a good understanding of the town's layout and land conditions, which enhances the reliability of their input. Despite the limited participation, the responses offer a meaningful basis for assessing undeveloped vacant land and informing planning decisions in Gelan Town. Consequently, the response rate of the study is considered good to gather relevant information, address the research problem, and answer the research questions effectively to get the best fit results.

4.1.3. Respondents' Demographic and Socio-Economic Profiles

Variables like the gender and age of the units of analysis, was collected during survey respondents. Additionally, socio-economic data were gathered, covering key indicators such as income level, educational attainment, and employment status.

The table below presents a detailed breakdown of land ownership in relation to various demographic and socio-economic factors. Specifically, it illustrates how land ownership is distributed across different gender categories, age groups, education levels, income brackets, and employment statuses of the respondents.

From the total vacant land owners (respondents), 72.4.4% was males and the remaining 27.6% was females. This gender composition had a significant indirect role of the study problem. The opinions of individuals were different in both sexes regarding undeveloped vacant land and its effects. As observed from the information provided by the respondents, the participated individual in survey most of them are a low income to develop the land so that this leads to the land undeveloped.

A group of age level of participants is also important in examining individual's opinion of the factors that contribute to the existence of vacant land and its socio-economic effects (Habtamu, 2022) . Table: 4.1 show that 11.7 % of respondents aged between 19-30 years old. The remaining 56.6% and 16.3% of respondents aged between 31-40, and over 41 years old respectively. This implies that more of the respondents have ability and responsibility to develop the land delivered because they are either head of the household

or the land owner. Under the variable of employment status, the respondent's employment condition was identified and measured to support the study.

Table: 4.1. profile of the respondents.

Selected Variables		Frequency (N)	Percentage (%)
Gender	Male	142	72.4
	Female	54	27.6
	Sum	196	100
Age	19-30	23	11.7
	31-40	111	56.6
	41-60	32	16.3
	Above 60	30	15.3
	Sum	196	100
Education Level	illiterate	11	5.6
	can read and write	29	14.8
	primary or secondary	34	17.4
	Collage (TVET)	50	25.5
	1st Degree and Above	72	36.7
	Sum	196	100
Employment Status	Self-employee	99	50.5
	Unemployed	19	9.7
	Government employee	64	32.7
	NGO employee	14	7.1
	Sum	196	100
Level of Income	1001-2000	22	11.2
	2001-4000	73	37.2
	4001 - 5000	46	23.5
	5001 and Above	55	28.1
	Sum	196	100

The employment condition of the respondent's is an important socio-economic parameter. In this study, it is considered as an indicator of household's capacity to develop the delivered land efficiently and effectively. Based on the data gathered, out of the total respondents, 9.7% have no work, 50.5% are self-employee (daily laborers and traders), 32.7% are government employee, and 7.1% are NGO employee, as well as there are no respondents under the question of others. According to the data collected, out of the total, more than half of the respondents are the self-employee (daily laborers), and the government employee with the low income. This shows that employment status of the

respondents was contributed to the existence of undeveloped vacant land within the study area.

The level of income in population is a critical variable in this study, as it directly reflects an individual's financial capacity to develop land (Habtamu, 2022). According to scholars there are many range of salary example (Habtamu, 2022) uses range from 500 to 2001 but for this study we use average of salary between 200 to 5000 and above. According to the survey data, 11.2% of respondents fall into the lowest income category, earning 2,000 or less per month. About 37.2% reported monthly incomes between 2,001 and 4,000, while 23.5% earn between 4,001 and 5,000. The remaining 28.1% have incomes exceeding 5,001. Field survey findings further indicate that this latter group those earning 5,001 or more are predominantly the ones utilizing land for industrial, commercial, or other socio-economic purposes. This suggests a strong correlation between income level and the ability to develop land. Many respondents, particularly those in lower income levels, expressed during interviews that their financial limitations prevent them from making productive use of their land, contributing to the presence of vacant land in the Gelan sub city.

4.2. Overall Features of Unused Vacant Land in the Study Area

4.2.1. Vacant land Identification in Gelan sub City.

The municipality's secondary data indicates the owners of undeveloped vacant land within the study area. According to this data, there are roughly 140 residential plots that remain completely undeveloped in the Gelan sub City. As per the information and data we received from the city administration, 25 hectares of undeveloped land in the Galan wereda Bira Bone area of the sub city has been returned to the land bank and is now given to industrial and residential services but still its undeveloped. Also 20 hectares undeveloped land in the Sida Awash wereda (Kebele) and 35 hectares in Andoodee wereda were returned to the land bank for other uses, according to the data. In total, 94.29 hec undeveloped urban land of Galan sub city is being returned to land banking and other services. The following tables illustrate the land tenure conditions of the undeveloped land within the study region.

Table: 4.2. Status of vacant land tenure system in study area

Land Tenure System	Frequency	Percent
Plots have a title deed	177	90.3
Plots do not have a title deed	16	8.2
others	3	1.5
Total	196	100.0

Furthermore, another key aspect that the researcher considered to confirm the status of privately owned and publicly held undeveloped vacant land in the study area is the land tenure situation. The table above indicate from the total vacant land owners 177 parcels account for 90.3% undeveloped land holders have the title deed and 16 plots account for 8.2% were undeveloped land owners do not have title deed for their property. While the remaining other 3 plots account for 2.2 % of them are unknown reason, because of the following reason; such as the problem of building permit, municipality problem with regard to building permit, financial problems of the land owners and other problems. Therefore, this realizes the idea that the undeveloped vacant lands existing in the town are privately owned and public owned, which is provided by the municipality to be developed 90.3%, this means that the land owners have a right and responsibility to develop the land with regard to rules and regulations. The remaining plots those have no title deed and also the undeveloped vacant land in terms of the perception of land speculation.

4.2.2. The condition of land use types and its contribution to vacant land

The condition of the land use type is one of the most significant things to identify the factors that contribute to the existence of undeveloped land and its socio-economic effects. Understanding the condition of land use is essential when analyzing factors that contribute to the existence of undeveloped vacant land (Habtamu, 2022). The type and state of land use directly impact urban development, environmental management, and socio-economic factors. The condition of land use plays a critical role in determining the existence of vacant land and its socio-economic impacts. Residential, commercial, industrial, agricultural, and mixed-use land each presents unique challenges and opportunities when it comes to urban development. Identifying the causes of vacancy and understanding the socio-economic effects of undeveloped land can help inform more sustainable urban planning, promote economic growth, and address environmental concerns. Residential areas often have varying conditions, ranging from highly developed and well-maintained

neighbourhoods to underdeveloped or vacant parcels of land. The state of residential land use depends on factors such as urbanization, population growth, infrastructure development, and local zoning laws. Poorly maintained residential areas, or those with abandoned properties, are more likely to have vacant land parcels.

Several key factors contribute to the presence of vacant residential land within urban areas. One of the primary causes is urban sprawl, where rapid and unplanned outward expansion of cities leads to scattered development and leaves parcels of land unused or underutilized. Economic factors also play a significant role, as financial constraints or lack of investment can prevent property owners from developing their land. Additionally, declining property values or uncertain market conditions may discourage construction or redevelopment. Another important factor is outdated infrastructure; when roads, utilities, and other essential services are lacking or in poor condition, land becomes less attractive or feasible for residential development. Together, these factors contribute to the persistence of vacant land, hindering efficient urban growth and land use planning.

Commercial land use encompasses areas developed for retail, office spaces, and other business activities. The condition of commercial land use can vary greatly based on economic conditions, consumer demand, and urban development patterns. Commercial areas that are underdeveloped or suffer from a lack of investment often have vacant properties or unused land. Industrial land includes factories, warehouses, and other facilities for manufacturing and production. The condition of industrial land varies based on shifts in industry, technological advancements, and economic factors. In many cities, industrial land can become vacant due to deindustrialization, relocation of factories, or changes in production methods. the table below presents the different land use types of the undeveloped land within the study area of Gelan Sub city.

Table: 4.3. land use types of vacant land in study area

Types of land use	Frequency	Percentage%
Residential	121	61.7
Commercial	30	15.3
Industrial	33	16.8
other Use	8	5.8
Total	196	100.0

(Source: own Analysis and field survey, 2025)

As a result, indicate in table above, the total area of these undeveloped plots under the study area is approximately about 372.781 hectares out of the total undeveloped vacant 121 parcels account for 61.7% are the plots under residential land use. The next large area coverage land use was Industrial and manufacturing 33 parcels account for 16.8% while 30 parcels 15.3% are plots under commercial use. The small area covered by other land use 8 parcels 5.8% identified are plots that are under other social uses (the land under office use, the land under school use, and the land under other social use and youth center). This indicates that various land use types exist among the undeveloped vacant land within the Sub City. Consequently, the study concludes that a significant portion of the undeveloped vacant land in the area has been designated for residential purposes. The following figures shows that the undeveloped vacant land within the study area with respect to their land use type.



Figure: 4.1. Undeveloped vacant land for industrial and other social use in study area

(Sources: photo captured by author and own survey,2025)



Figure: 4.2. Unutilized idle land used for residential land use in the study area

(Sources: photo captured by author and own survey,2025)

Another critical aspect examined in this study was the system through which land was acquired by the respondents. Understanding these acquisition mechanisms provides valuable insight into land ownership dynamics and the broader socio-economic patterns influencing property development in the study area. According to the data collected through both secondary sources and primary field surveys, respondents obtained land through various channels, with the most prevalent being leasehold agreements, which accounted for approximately 52% of all cases.

This suggests a significant reliance on formal governmental processes and structured legal arrangements for land access. In addition to leaseholds, a notable portion of respondents, about 14.5%, reported purchasing land directly from local farmers an informal but common practice in peri-urban and transitioning rural areas. Another 10.7% of respondents acquired land through inheritance, reflecting the role of generational property transfer within families and the cultural significance of land as a familial asset.

Furthermore, 2.6% of the landholders gained access to land by occupying previously vacant plots or through other miscellaneous methods not formally categorized. These varied methods of land acquisition highlight a complex mix of formal and informal systems coexisting within the same geographic region. The following table summarizes the total land acquired by each group of owners within the study area, providing a clearer picture of the distribution and origin of land tenure types among the surveyed population.

Table: 4.4. Land Acquisition system of vacant land

Land acquisition system	Frequency	Percentage (%)
Lease hold	102	52
inheritance	21	10.7
bought from farmers	25	12.8
occupied vacant land	5	2.6
others	43	21.9
Total	196	100.0

(Sources: own survey, 2025)

Another key focus of this study was to assess the total land area (measured in square meters) acquired by the respondents, along with how much of that land has been utilized for different purposes. These purposes include land that has been developed (such as for building construction or fencing), left empty, or remains entirely undeveloped. Additionally, the study considered the duration of land ownership, which ranged from 1 to

10 years. Using data gathered from both secondary sources and on-site field surveys, the table below presents a detailed summary of the land acquisition patterns among property owners in the study area.

Table: 4.5. Total amount of vacant land acquired in sqm

Area of land acquired (plots)	Frequency	Percentage
$\leq 200 \text{ m}^2$	14	7.1
200-400 m^2	67	34.2
400-500 m^2	29	14.8
5000 - 1000 m^2	37	18.9
> 1000 m^2 and above	49	25
Total	196	100.0

(Sources: own survey and spss analysis, 2025)

The table above illustrates that, based on responses, 7.1% of the land area comprises 14 parcels measuring $\leq 200 \text{ m}^2$. Additionally, 67 parcels account for 34.2% fall within the 200-400 m^2 range, 29 parcels account for 14.8% are between 400-500 m^2 . The second largest percentage 25% occupied 49 parcels are larger than 1000meter square and medium range from 500-1000 m^2 total 37 plots account for 18.9%. This data indicates that the majority of undeveloped plots are held by owners of smaller plot sizes.

The findings revealed that various quantities of land are regarded as undeveloped vacant land within the sub-city, which impacts the town's socio-economic development through land utilization. Specifically, the total land area acquired by respondents is approximately 372.781 hectares. The study also identified the proportion of this land that is held by owners of undeveloped vacant plots. Within the study area, different categories of land acquisition were observed based on the total land allocated. These land amounts were determined through field surveys conducted in collaboration with surveyors, aligned with the municipality's land use plan.

Table: 4.6. Total amount of vacant land identified used owners.

Level of land usages	Frequency	Percentage
not contracted at all 0% used	50	25.5
only fence 5% used	65	33.2
25% used	21	10.7
50% used	36	18.4

75% Used	24	12.2
100% Used	0	0
Sum	196	100.0

(Sources: own survey and spss analysis, 2025)

According to the data above, among the identified undeveloped vacant plots in the study area, 50 plots remain completely unbuilt or empty land, 65 parcels are enclosed only by simple fencing, 21 are utilized at just 25% regular fence and unfinished of their total area, 36 parcels use at 50%, and 24 parcels only use at 75%. No landowners have fully utilized their plots (100%) in line with the land use plan. This analysis shows that most landowners have left their plots idle and undeveloped. As indicated earlier in Table 4.2, 90.3% of landowners hold title deeds and have secure tenure, giving them the legal right to develop their land. However, none of the plots are being used efficiently or effectively. Moreover, under the FDRE Urban Land Lease Proclamation No. 721/2012, which sets timelines for starting and completing construction, any plot not developed within the stipulated period is considered undeveloped and subject to government repossession. These findings confirm the presence of significant undeveloped land within the study area. The following figures further illustrate the undeveloped vacant land that is not developed at all within the study area.



Figure: 4.3. Undeveloped vacant land not developed at all within the study area

(Source: photo captured by author, field survey, 2025)

Furthermore, the duration since the land was acquired is a key factor in identifying undeveloped vacant land within the area (Habtamu, 2022). This time period is categorized into four ranges: less than 1 year, 1 to 5 years, 5 to 10 years, and more than 10 years. These

categories help in analyzing patterns of land retention and potential development delays. Recognizing how long land has remained unused provides valuable insights into land-use dynamics, investment trends, and possible barriers to development. The following table presents a detailed summary of the time elapsed since each parcel was acquired, highlighting how long the land has remained vacant.

Table: 4.7. The individual parcel Acquired Period of time in year

Period In years	Frequency	Percentage
Less than 1 year	-	-
1-5 years	27	13.8
5-10 years	83	42.3
≥ 10 years	86	43.9
Sum	196	100

(Sources: own survey and spss analysis, 2025)

Based on secondary data and field survey findings, it was identified that 43.9% of the total undeveloped plots have been held for more than ten years. The remaining plots include 83 parcels account for 42.3% held for 5 to 10 years, and 13.8% percentage for 27 total parcels held for 1 to 5 years. as results show above there are no parcels of land held less than one year. This implies that the number of plots undeveloped for greater than 5 years are 59 parcels and the others 18 parcels are the plots undeveloped for less than or equal to 5 years.

As studied by (Habtamu et al., 2022) According to the FDRE Urban Land Lease Proclamation no.721/2012 about the completion of construction after the commencement described in Article (23) sub-article (4) as, generally that the total completion period may not exceed: two years and six months for small construction projects, four years for medium construction projects, and five years for large construction projects; where a lessee fails to complete construction within the time limit specified in the Article, the lease contract shall be terminated and the appropriate body shall take back the land (Habtamu, 2022).

In addition to this, the building permit ordinances put the other advantages, i.e. even if, when the problems occur during the construction of projects regarding the completion of construction, the lessee should renew the building permit to finish the construction. Even though, as the findings shows that the data collected from the municipality, there was no questions raised by the undeveloped land holders regarding renew of building permit. In general, the maximum number of undeveloped land owners which is 86 plots in the study

area were those the undeveloped land owners hold the plots of land for greater than 5 (five) years without development with contrary to above proclamation and building ordinances.

4.3. Spatial distribution of undeveloped vacant land in study area

4.3.1. Spatial Distribution of Land Use/Land cover of Study area

Understanding Land Use/Land Cover is crucial for analyzing the spatial distribution of undeveloped vacant land in any given study area. LULC provides a comprehensive classification of how land is utilized land use and the physical characteristics on the surface (land cover), and directly influences the location, availability, and suitability of vacant land for future development or conservation. The LULC classification of the study area reveals a diverse pattern of land utilization and surface features.

Based on recent satellite imagery and GIS-based classification, the study area comprises the following major land use and land cover types. The LULC of the study area includes a variety of categories that reflect both natural and human-modified landscapes. Waterbodies consist of rivers, lakes, ponds, and wetlands that play a vital role in hydrological balance and support biodiversity. Mixed forests are areas with a combination of deciduous and evergreen tree species, contributing to ecological stability and serving as carbon sinks. Bare land (include vacant area) denotes by exposed soil, rock outcrops, or degraded areas with little or no vegetation cover, often resulting from natural processes or human activities such as deforestation or construction. Agriculture includes cultivated lands, croplands, and plantations used for food production and economic activities, often characterized by seasonal changes in land cover.

Settlements (Built-up Area) encompass residential, commercial, and industrial zones along with associated infrastructure. Vegetation or grasslands refer to areas covered predominantly by natural grasses, shrubs, and low-lying plants, typically found in open spaces that are not cultivated for agriculture or developed for urban use. In the context of the study area, vegetation or grasslands may be transitional zones between forests and agricultural lands or found in unused open spaces within or around settlements.

In the case of land use development Spatial distribution patterns of vacant land are closely related to surrounding land uses. For example, vacant land near commercial or residential zones may have higher development potential. Although Areas categorized under green

fields, open spaces, or bare lands in LULC maps often correspond with undeveloped parcels.

Table: 4.8. Confusion matrix of classified LULC 2025 in study area

		Ground reference						Row Total
Class		water bodies	Mixed Forests	Bare land	Veget- ation	Agri- culture	Settle- ment	
Classified Map	waterbodies	10	0	0	0	0	0	10
	Mixed Forests	0	12	0	1	0	0	13
	Bare land	0	0	15	1	1	0	17
	vegetation	0	1	0	9	0	0	10
	Agriculture	0	0	0	0	8	2	10
	Settlement	0	0	0	0	1	9	10
	Column Total	10	13	15	11	10	11	70

Confusion matrix Accuracy Assessments and area coverage of each land use land cover class classified images are illustrated in table 4.8, 4.9 and 4.10 respectively. The overall accuracy of land use land cover of classified images shows 90% which is acceptable results. While a kappa coefficient (overall kappa Statistics) was 0.879 which is recommended as best classification.

Table: 4.9. Overall classification Accuracy and kappa Statistics

class	produces Accuracy (omission Error)	User_ Accuracy (comission Error)	Overall Accuracy	Overall kappa Statistics
Agriculture	80%	80%	90%	0.879
Bare land	100%	88%		
Mixed Forests	92%	92%		
Settlements	82%	90%		
vegetation	82%	90%		
Water bodies	100%	100%		

As shown in Table 4.9 commission and omission error was calculated. As results show in above table Agriculture land producer Accuracy and user accuracy same 80%, bare land user accuracy 100% and 88%, mixed forests 92% same as producer accuracy, Settlements

and vegetation's same both producer accuracy 82% and 90%user accuracy. While water bodies 100% both producer and user accuracy.

Table 4.10: Landuse Landcover descriptions and area approximate area in percentages.

LULC_Class	descriptions	Area (ha)	Area in %
Agriculture	Cultivated land, plantation, and fallow fields	4296.481	30%
Bare land/vacant	Undeveloped land, open plots, and wetlands	2698.29	19%
Mixed Forests	Natural forests, and shrubs	1371.87	10%
Settlements/Built-up area	Residentials, commercial, industrials and infrastructure	2114.257	14%
vegetation	Grass land and urban greenery	3752.241	26%
waterbodies	Rivers, lakes, and ponds	103.59	1%
Total		14336.729	100

Table 4.10 presents the land use/land cover classification results for the study area. Agricultural land constitutes the largest portion, covering 30% of the total area, indicating its significant role in the region's economy and land use patterns. Bare land or vacant areas follow closely, occupying 19% of the landscape. These spaces may include undeveloped plots, fallow lands, or areas awaiting development, reflecting potential for future land use changes. Mixed forests account for 10% of the area, highlighting the presence of diverse forest ecosystems that contribute to biodiversity and ecological balance.

Settlements and built-up areas comprise 14%, indicating urbanization and infrastructure development within the region. Vegetation, encompassing grasslands, shrubs, and other non-forested plant life, covers 26%, suggesting a substantial presence of natural and semi-natural habitats. Water bodies, including rivers, lakes, and ponds, make up a mere 1% of the area, pointing to limited aquatic resources or the need for detailed hydrological studies to assess water availability and management. These classifications provide a comprehensive overview of the current land use distribution, offering insights into potential areas for conservation, development, and resource management. The classified map was illustrated below figure 4.5 with different colour.

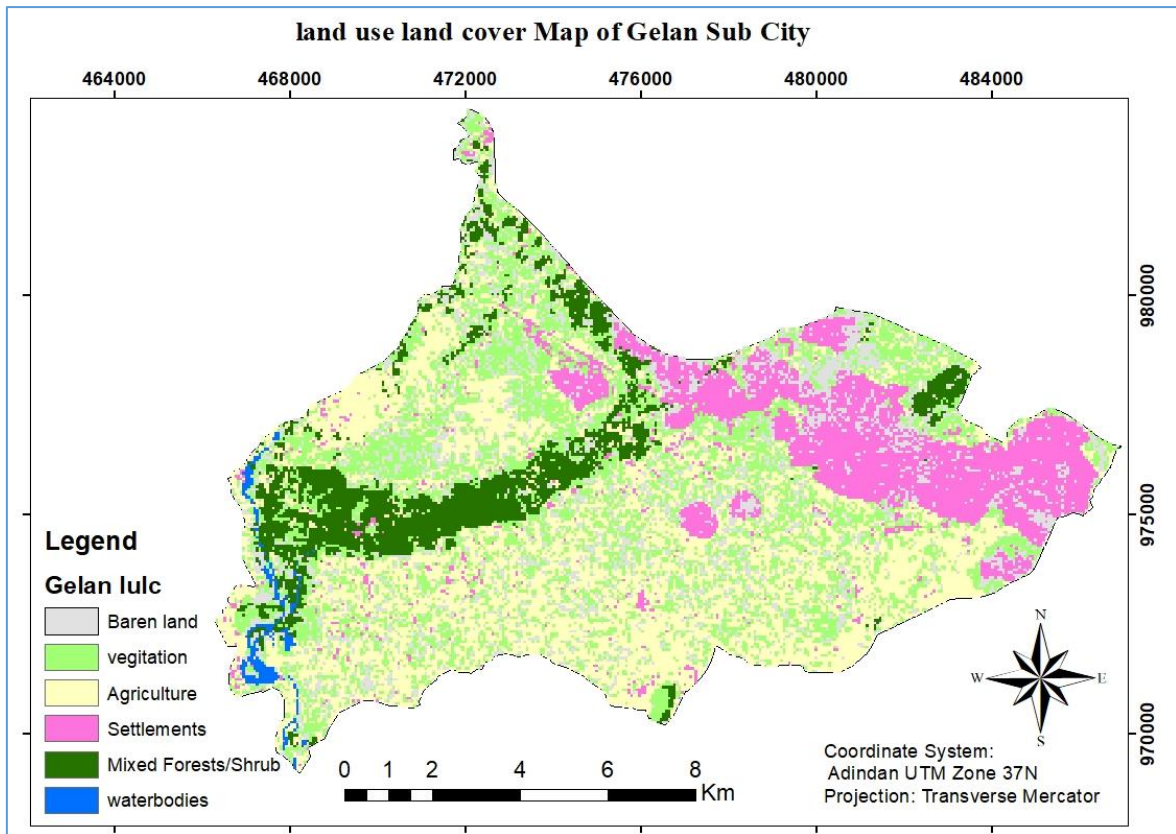


Figure: 4.4. Land Use Land Cover Map of Gelan sub city in 2025

Figure 4.4 presents a classified land use/land cover (LULC) map of Gelan sub city that visually distinguishes various land categories using specific color codes. Agricultural areas are depicted in grey, indicating regions primarily utilized for farming and crop production. Bare land or vacant areas, also shown in grey, represent undeveloped or unused land, which may include fallow fields or plots awaiting development. Mixed forests are illustrated in fill green, highlighting areas with diverse tree. Settlements and built-up areas are marked in a pink color, signifying urbanized regions characterized by infrastructure and human habitation. Vegetation, encompassing grasslands, shrubs, and other non-forested plant life, is represented in another green light color, covering natural and semi-natural habitats. Water bodies, including rivers, lakes, and ponds, are indicated in a blue color, identifying aquatic resources within the landscape.

4.3.2. Spatial Distribution of Existing land use of Gelan sub city

Identifying developed and undeveloped land involves analysing physical, legal, and functional characteristics of a parcel to determine its current state of use (Ehrhardt et al., 2025). As stated by (Ehrhardt et al., 2025) developed land refers to areas that have been constructed on or modified for specific uses, such as residential, commercial, industrial, or

public infrastructure. This includes buildings, roads, utilities, and landscaping. In contrast, undeveloped land often called vacant or raw land lacks significant built structures or active use and may be used for agriculture, left as natural open space, or simply idle.

In this case, researcher used high-resolution imagery to extract areas of vacant land. However, the imagery alone does not reveal whether the extracted land is developed or undeveloped. To determine the actual status of each parcel, researcher conduct on-site verification. Identifying whether land is developed or undeveloped involves analyzing several factors, including its physical characteristics (such as the presence of buildings or infrastructure), legal status (such as zoning or land ownership records), and functional use (how the land is currently being utilized in practice).

Figure 4.5 presents a proportional analysis of the proposed land use plan and the existing land use in Galan Sub-City. This figure visually highlights the discrepancies between planned urban development and the current utilization of land, emphasizing areas where land remains vacant or underutilized despite being allocated for specific purposes in the land use framework. The analysis reveals that a significant portion of the land remains undeveloped across multiple designated land use categories. One of the most affected categories is Administration, where several plots intended for government offices and public administration facilities remain vacant, indicating delays in institutional development or limited investment in civic infrastructure.

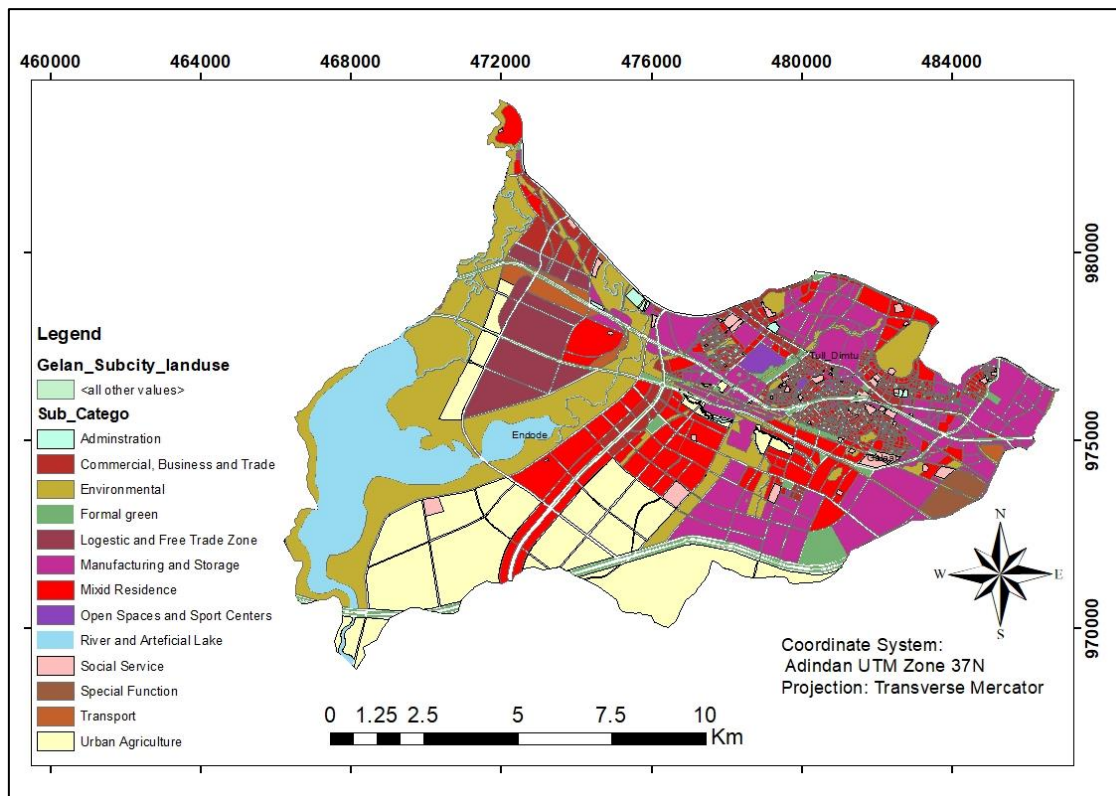


Figure: 4.5. General land use map of Gelan sub city

(Sources Gelan sub city municipality and own map, 2025)

Similarly, land allocated for Social Services including schools, health centres, and community facilities shows notable vacancy. These parcels, though designated for essential public services, have not seen meaningful development, representing a missed opportunity to enhance the quality of life for residents. In the Mixed Residence category, which typically combines residential, commercial, and community functions, a substantial number of plots remain unused. This underdevelopment hinders the creation of vibrant, integrated neighbourhoods that can support both living and working environments.

In the Manufacturing and Storage zones, large areas allocated for industrial activities such as factories and warehouses remain undeveloped. This lack of industrial growth impedes economic development, job creation, and the intended diversification of the local economy. Environmental Protection Zones, which are critical for preserving ecological balance and managing flood risks, also show signs of neglect. While these areas may not require heavy construction, the absence of protective measures, rehabilitation, or green infrastructure development suggests that environmental planning remains incomplete. Lastly, the Commercial and Business land use category displays several vacant plots that were

designated for retail, office, and service-related developments. The lack of activity in these zones reflects weak market uptake, potential regulatory bottlenecks, or limited investor confidence.

Overall, Figure 4.5 underscores a stark contrast between the city's development vision and its current reality. The prevalence of vacant land across multiple planned land use types signals the need for urgent policy enforcement, investment incentives, and improved urban governance to bridge the gap between planning and implementation.

According to Table 4.11 and figure 4.6, the data collected through GPS mapping and land use analysis reveal a significant amount of undeveloped land across various designated uses within the study area. Specifically, five plots allocated for social services remain entirely undeveloped, covering a total area of 16.47 hectares. These lands were originally intended to support community infrastructure such as schools, clinics, or recreational facilities, but to date, no construction or development activities have taken place. In the category of mixed residential land use, there are 26 plots with a combined area of 19.98 hectares that also remain idle. These plots were likely designated for residential housing developments combined with commercial or community services. However, despite the growing demand for housing and mixed-use developments, these lands have not seen any progress in terms of construction or utilization.

Table 4.11: Identified undeveloped vacant land area and numbers

s/no	Subcategory	Number	Area_Ha
1	Transport	2	19.03
2	Social Service	5	16.47
3	Mixed Residence	22	19.98
4	Formal green	7	23.38
5	Manufacturing and Storage	11	269.82
6	Environmental	2	8.70
7	Commercial and Business	17	14.13
8	River and Artificial Lake		1.28
	total		372.78

The situation is even more critical in the manufacturing and storage sector. A total of 11 plots, representing a substantial 269.82 hectares, have not been developed. This represents a missed opportunity for industrial growth, job creation, and economic activity. These plots

have been left vacant despite their potential to support factories, warehouses, or other industrial operations.

Lastly, land allocated for commercial and business purposes also shows a high level of underutilization. There are 17 undeveloped plots in this category, covering an area of 14.13 hectares. Notably, these plots were acquired over ten years ago, yet no meaningful development has occurred. This prolonged vacancy suggests inefficiencies in land administration and a lack of enforcement of development requirements.

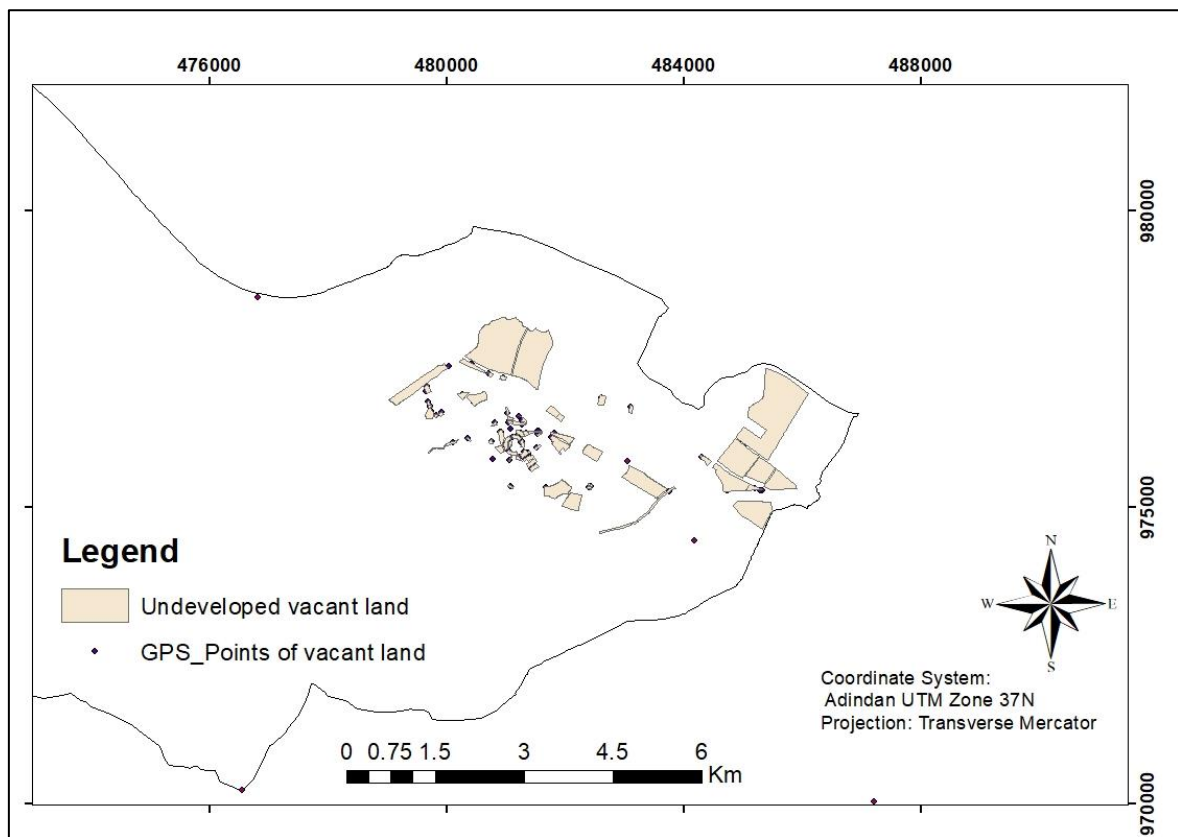


Figure 4.6: Identified undeveloped vacant land and GPS field survey.

As illustrated in Figure 4.5, the GPS data collected during field surveys when overlaid with the most recent land use data from the Galan Sub-City Municipality clearly highlights numerous plots that remain idle across various zoning categories. The results show area coverages of vacant and undeveloped plots from above were 924.217 hectares in totals. Overall, the integration of aerial imagery, municipal land use records, and GIS overlay has proven to be a powerful and efficient method for systematically identifying, plotting, and evaluating vacant land in the study area. This data-driven approach enables urban planners and policymakers to accurately assess the spatial distribution, size, and intended use of

undeveloped plots, allowing for informed decision-making in the planning and management of urban growth.

The visual evidence confirms that a significant number of parcels, some acquired over a decade ago, have not been developed in alignment with their designated land use plans. This combination of geospatial analysis and official records provides not only a clearer understanding of the extent of underutilized land but also helps prioritize areas for intervention, infrastructure provision, and potential reallocation. Ultimately, these findings support a more strategic and accountable approach to urban land development, helping address challenges related to urban sprawl, housing shortages, and inefficient land use. The data strongly indicate widespread underdevelopment across multiple sectors, highlighting the need for policy enforcement and strategic intervention to ensure that allocated land is put to productive use.

4.3.3. Current Status of Undeveloped vacant land in Gelan sub city

According to the 2025 report from the Gelan Municipality, a significant amount of land in Gelan Sub-City remains undeveloped and vacant. The report on unused investment land from Gelan Sub-City (2025) indicates that several plots initially allocated for various investment purposes have not been developed. These plots were designated for projects in sectors such as coffee processing, electric light equipment manufacturing, corrugated paper box production, wood products, and aluminum and fiber industries and other for educational purpose like collages. Specific details about each plot, including their names and respective areas, are presented in Table 4.14 of the report.

In 2025, Gelan Sub-City reported a total of 229,200 square meters of land remaining undeveloped, including 213 residential plots covering 3.15 hectares (31,500 square meters). These parcels, acquired over a decade ago, from (1999 EC to 2014 EC) have seen no development, leading to several critical challenges. Economically, the prolonged vacancy results in significant lost revenue from unrealized investments, job creation, and municipal taxes. The lack of development in residential plots contributes to the ongoing housing shortage, exacerbating overcrowding and encouraging the growth of informal settlements. Moreover, public infrastructure extended to these areas such as roads, electricity, and water remains underutilized, representing a misallocation of public resources. The situation reflects issues in land governance, particularly speculative land hoarding, where investors retain plots without development in anticipation of rising land

values. This behavior distorts the land market and restricts access for genuine developers. Additionally, long-term vacancy affects urban aesthetics and can lead to environmental degradation, including illegal dumping and unplanned land use. Overall, the persistence of undeveloped land for over ten years signals weak enforcement of land use policies and undermines investor and public confidence in the city's urban planning framework.

This highlights the issue of undeveloped vacant land in Gelan Sub-City, where large parcels, including long-held residential and investment plots, remain idle for over 10 years. The situation reflects poor land utilization, missed economic opportunities, and weak enforcement of urban planning regulations. It underscores the need for urgent municipal action to ensure proper land development and effective land management.

In conclusion, this suggests that Gelan Sub-City Municipality take immediate action to address the problem of undeveloped land. This should involve auditing long-idle plots, establishing clear development timelines, and enforcing penalties for non-compliance. Important measures include reclaiming land from inactive holders, strengthening monitoring and follow-up mechanisms, implementing policies to prevent land hoarding, and enhancing coordination among municipal departments. These actions are essential to promote land development, alleviate housing shortages, and rebuild public trust in the municipality's land management system

4.3.4. Undeveloped Investment Land in Three Woredas of Gelan Sub-City

According to the 2017 E.C. report from the Gelan Sub-City Administration, significant portions of land allocated for investment remain entirely undeveloped across three woredas. This underutilization of investment land poses multiple challenges for the city. Economically, it leads to a considerable decline in government revenue, as the land generates no income through taxes, leases, or job creation. Environmentally and socially, the vacant plots contribute to urban problems such as dust pollution, unmanaged waste, and a general decline in the city's appearance and livability. The continued neglect of these lands limits the city's potential for sustainable development and efficient land use. To counter these issues, there is an urgent need for strategic intervention by both public and private stakeholders. This includes encouraging investment through incentives, enforcing development deadlines, and revising policies to promote timely land use. Developing these idle lands would not only enhance the city's economic growth but also improve urban infrastructure and the quality of life for residents.

According to Figure 4.7 and Table 4.13, which illustrate the area coverage of undeveloped investment land in the three woredas Galaan, Siidaa Awaash, and Andoodee the extent of land remaining unused varies notably across these locations. The data shows that Siidaa_Awaash accounts for the largest share of undeveloped investment land, with a total area of 47.11 hectares, representing 44.62% of the total undeveloped land across the three woredas. Galaan Woreda follows closely, covering 43.63 hectares or 41.3%, while Andoodee Woreda has the smallest portion, with only 14.84 hectares, making up 14.1% of the total.

Table: 4.13. Percentage of totally Undeveloped land for investment in 2025 (2017 E.C)

wereda_name	No of plots	Area_ha	percentages	Status
Galaan	51	43.63	41.32	Vacant
Siidaa_Awaash	43	47.11	44.62	vacant
Andoodee	19	14.84	14.1	vacant
Total	113	105.58	100	

Sources: (Gelan sub city urban land use planning, 2025)

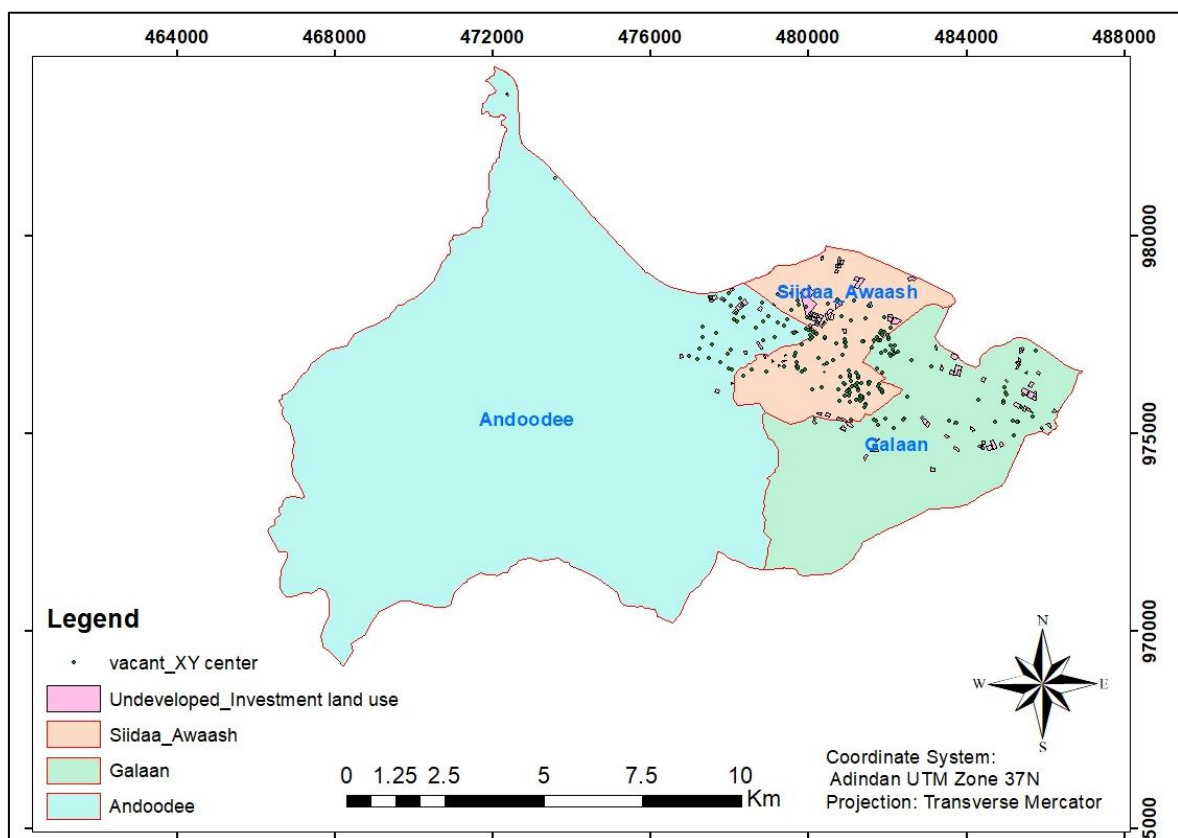


Figure: 4.7. Map of undeveloped investment land in three woredas of Gelan sub city

This distribution clearly indicates that Siidaa Awaash holds the highest proportion of undeveloped land among the three, highlighting a critical area of concern for urban planners and local authorities. The significantly larger share in Siidaa Awaash may be attributed to a range of factors such as lower investor interest, inadequate infrastructure, or possible administrative bottlenecks. Galaan Woreda, while slightly lower in percentage, still represents a substantial portion of idle investment land, suggesting similar developmental challenges. In contrast, the relatively smaller area in Andodee could indicate either more effective land utilization or fewer allocated investment plots.

The data underscores the need for differentiated strategies tailored to each woreda. For instance, in Siidaa Awaash, targeted interventions such as improved infrastructure access, streamlined investment processes, and promotion campaigns could be essential to attract and retain investors. In Galaan, enforcing development deadlines and offering technical support may encourage landholders to begin utilizing their plots. Meanwhile, the case of Andodee can be studied further to identify best practices that may be applicable in the other two areas.

Generally, the findings from Figure 4.7 and Table 4.13 reinforce the urgency of addressing the underutilization of investment land in Gelan Sub-City. By understanding the spatial distribution of these idle plots, stakeholders can design more effective policies that respond to the unique conditions of each woreda, ultimately supporting sustainable urban development and economic growth.

In conclusion, the presence of a large amount of undeveloped investment land in the three woredas of Gelan Sub-City particularly in Siidaa Awaash and Galaan poses significant economic and environmental challenges. However, it also presents a valuable opportunity for future development. These vacant lands should be prioritized for strategic use in projects such as residential housing, green spaces, infrastructure expansion, and other productive investments. Proper planning and timely development of these areas can greatly contribute to urban growth, improve living standards, increase government revenue, and enhance the overall attractiveness and functionality of the city. Therefore, immediate and coordinated action is essential to transform these idle lands into engines of sustainable development.

4.1. Identify the primary factors contributing to the existence of undeveloped land within the study area.

4.4.1. Causes of undeveloped vacant land in study area

As highlighted in the literature review part, various scholars have identified a range of factors contributing to the persistence of undeveloped vacant land within urban centres (Habtamu, 2022). These factors include economic issues such as land speculation and lack of investment, social dynamics like population decline or displacement, and regulatory or institutional barriers such as zoning restrictions or bureaucratic inefficiencies. Additionally, cultural perceptions about land use, shifts in neighbourhood characteristics, and evolving preferences among residents regarding location and housing types also play a significant role in shaping land development patterns in urban areas. According to (habtamu et al., 2022) the property values in the neighbourhood change determined by the neighbourhood decline.

The persistence of undeveloped vacant land can be attributed to a combination of social, economic, and institutional factors. Socially, a lack of community engagement in urban planning processes, population decline, or low population density can reduce the pressure to develop land, while negative perceptions of certain areas, including concerns about safety or poor neighbourhood reputation, may discourage potential investors or residents. Economically, high development outlays related to infrastructure, construction, and regulatory compliance often make development financially unfeasible. Moreover, land speculation where owners hold onto property in hopes of future value increases frequently leads to prolonged vacancy. Low market demand for housing or commercial space further discourages active growth. From an institutional perspective, inefficient land use policies, outdated zoning regulations, and complicated property rights issues can obstruct development. Moreover, bureaucratic delays in permitting and a lack of investment in basic infrastructure such as roads, water, and electricity often render land unsuitable or unattractive for immediate use. These combined factors create significant barriers to transforming vacant land into productive urban space. The following table: 4.14. shows that the primary factors that contribute to the existence of undeveloped land within the study sub city.

Table: 4.14. Primary Socio-economic Factors of undeveloped vacant land

Primary Socio-economic factors	Frequency	Percentage%
Poor financial capacity of the holders	72	36.7
Urban decline and neighbourhood change	23	11.7
Market instability Increment of construction material.	41	20.9
Land reserved for future construction (land speculation)	10	5.1
Property tax burden (tax load)	31	15.8
Poor provision of loan	19	9.7
Total	196	100.0

(Sources: sample Factors are Adopted from (Habtamu, 2022) and Own analysis 2025)

As the results based on the data collected and analysed from questionnaires' survey the table 4.14 describe, the followings are the major factors that cause the existence of undeveloped land on their parcel of land. From the total respondents, 36.7% undeveloped land owners said that the factors that contribute to the existence of undeveloped vacant land in the study area is socio-economic factor including, Poor financial capacity of the owners to develop the plots of land, 5.1% reserve the land for future construction, 20.9 % Market instability Increment of construction material, 15.8% property tax burden, and remaining 9.7% Poor provision of loan urban decline and poor provision of loans. The high score 36.7% responded that the socio-economic factor that contributes the existence of undeveloped vacant land within the study area.

In general, the socio-economic and institutional causes are the major factors that contribute to the existence of undeveloped land. Thus, the above findings pointed out the major factor which contributes to the undeveloped land within the town. Additionally, as the data obtained from the municipal officials and other key informants, more of the respondents said that the perceptions of future price of land value increase, wants to transfer without development, financial capacity of the developer especially the low-income group (people wants to held land without financial capacity), market instability with regard to construction materials are reveled as a socio-economic factor.

Table 4.15: Primary institutional factors of undeveloped vacant land in study area

Primary Institutional factors	Frequency	Percentage
Poor Coordination Among Government Agencies	17	8.7
Complex and protracted bureaucratic processes	9	4.6
Inadequate Regulatory Enforcement and Implementation	52	26.5
Inadequate provision of infrastructure & services	29	14.8
Zoning restrictions (land use plan change by government)	46	23.5
Inefficient land registration and management	43	21.9
Total	196	100.0

(Sources: questionnaires' survey analysis and own calculation, 2025)

As Table above indicate, the results reveal several institutional challenges that contribute to the existence of vacant land in the study area. Among the respondents, 26.5% identified inadequate regulatory enforcement and weak implementation mechanisms as the primary concern. This issue reflects a failure in enforcing land development policies and ensuring compliance with established regulations. Additionally, 23.5% pointed to zoning restrictions, particularly changes in land use plans initiated by the government, as a significant barrier to development. These changes often lead to uncertainty and delay for landowners and investors.

Another 14.8% cited the inadequate provisions of infrastructures & services such as roads networks, electricity lines, water, and sanitation as a major deterrent to land development. A further 21.9% noted inefficiencies in land registration and management systems, which complicate the legal transfer and utilization of land.

Poor coordination among government agencies was also reported by 8.7% of respondents, highlighting a lack of integrated planning and communication across institutions responsible for urban development. The least cited, yet still important, issue (4.6%) involved complex and prolonged bureaucratic processes. These include the absence of clear building regulations, weak legal implementation, insufficient monitoring and follow-up mechanisms by building permit authorities, as well as a shortage of skilled personnel and high employee turnover within these departments.

These institutional barriers are consistently observed by both government officials and private landowners, indicating a shared recognition of the systemic issues hindering land development. The results of this study bring into line strongly with the existing literature, reinforcing the idea that such institutional weaknesses are key factors contributing to the prevalence of undeveloped land in the area. Thus, the study confirms and supports the conclusions drawn in previous research regarding the root causes of land underutilization.

4.4.2. Socio-economic effects of vacant land in the sub city

Undeveloped vacant land can have several negative economic effects on a city or urban area. One of the primary consequences is a decrease in revenue collection and tax income for local governments, as vacant land typically generates lower property taxes compared to developed properties. This reduction in revenue limits the financial capacity of municipalities to invest in essential public services and infrastructure development, such as roads, water supply, and sanitation systems. The presence of large areas of undeveloped land also discourages private investment, as investors are often reluctant to commit resources to areas lacking in infrastructure or economic activity. This hesitance, in turn, restricts job creation and results in limited employment opportunities for residents. Furthermore, the abundance of vacant land can lead to a general decline in property values within the nearby areas, which further reduces the wealth of property owners and the attractiveness of the area for future development. Overall, the economic impact of undeveloped land extends beyond lost tax income, creating a cycle of underinvestment and stagnation in urban growth.

Table: 4.16. The economic effect of unutilized vacant land in study area

Primary Economic effects of undeveloped vacant land	Frequency	Percentage
decreases revenue collection and tax income	15	7.7
Decrease infrastructure growths	36	18.4
Undermines the city's investment efforts activity	50	25.5
limited employment Opportunity	23	11.7
depressed property values or decrease price	72	36.7
Total	196	100.0

(Sources: questionnaires' survey analysis and own calculation, 2025)

According to respondents, the economic effects of undeveloped vacant land in Gelan Sub-City are significant and multifaceted. The presence of large areas of unused land results in a 15 respondents 7.7% decrease in revenue collection and tax income, undermining the local government's ability to fund essential services and public projects.

Moreover, vacant properties negatively impact municipal tax revenue in several ways. First, these properties are frequently behind on tax payments. Second, due to their typically low market value, they contribute minimal property taxes. Third, they can lower the overall property values within a neighborhood. As property values decline, homeowners may become less inclined or financially able to invest in upkeep. This deterioration leads to further neighborhood decline, resulting in reduced rental prices as the area becomes less attractive to potential tenants.

Furthermore, 18.4% of respondents indicated that this land impedes infrastructure development, as scattered vacant plots make it difficult to implement integrated planning for roads, utilities, and public facilities. Investment in the city is also negatively affected, with 25.5% of respondents stating that undeveloped land discourages both domestic and foreign investors due to poor land use planning and lack of economic activity. In terms of employment, 11.7% noted that these vacant areas reduce job creation opportunities that could have arisen from businesses, housing developments, or industrial expansion. The most prominent impact, reported by 36.7% of respondents, is the decline in property values, as idle land lowers the overall attractiveness and economic vitality of the area. Collectively, these responses reflect the substantial economic challenges posed by underutilized land, which hinders urban growth and reduces the quality of life in Gelan Sub-City.

Social effects of undeveloped vacant land: The social effects of undeveloped vacant land are also notable and detrimental to the community. One significant impact is the decline in mental well-being, as the presence of neglected and unkempt land can contribute to feelings of insecurity, stress, and anxiety among residents. Additionally, such land can lead to conflicts or boundary disputes, with unclear property lines or competing interests creating tensions between neighbors or developers.

The lack of development can further erode community cohesion, as vacant lots often disrupt the sense of unity and belonging that thriving neighborhoods foster. Moreover, the

prevalence of undeveloped land may contribute to an increase in social crime, including criminal activities like vandalism, drug use, and gang-related violence, as these empty spaces can become breeding grounds for illegal behavior and antisocial activities. These social challenges underscore the broader impact of underdeveloped land on the overall quality of life in the area (Habtamu, 2022). In this case, the study was conducted in relation to the socio-economic effect that was come up with the existence of undeveloped vacant area in the sub city. As the data collected from the respondents, the following effects are happened due to the existence of unutilized vacant land within the study area summarized in table 4.12.

Table 4.17. The Primary Social effects of undeveloped vacant land

Social effects of undeveloped vacant land	Frequency	Percentage
Decline in Mental Well-being	9	4.6
Conflict or boundary disputes	45	23
Reduced Community Cohesion	74	37.8
Social crime (criminal activities like vandalism, drug use, and gang-related violence.)	68	34.7
Total	196	100.0

(Sources: questionaries' survey analysis and own calculation, 2025)

The table above presents respondents' views on the social effects of undeveloped vacant land. According to the responses, 4.6 % of respondents reported a decline in mental well-being due to the presence of unused land, indicating a sense of insecurity or distress. A larger portion, 23%, identified conflicts or boundary disputes arising from unclear property boundaries or competing interests. The most prominent concern, shared by 37.8 % of respondents, was the reduction in community cohesion, as vacant land disrupts the unity and connection within the neighborhood. Additionally, 34.7% of respondents noted an increase in social crime, including activities such as vandalism, drug use, and gang-related violence, often taking place in these neglected areas. These findings highlight the significant social challenges posed by undeveloped vacant land.

Environmental effects of undeveloped vacant land: Undeveloped vacant land can have several detrimental environmental effects on the surrounding area. One significant impact is plan distortion, where the presence of unused land disrupts urban planning and hampers the proper development of infrastructure and public spaces. Additionally, vacant land often

leads to soil degradation and erosion, as the lack of vegetation and development can cause the soil to lose its structure, making it more prone to washing away during rainfall.

Furthermore, such land can contribute to human health problems, as neglected spaces may attract pests, pollutants, and other hazards that pose risks to residents. Vacant land also encourages urban sprawl, as unplanned and scattered development spreads outwards, leading to inefficient land use. Lastly, poor water drainage is a common issue, as undeveloped land can obstruct natural water flow, leading to flooding and other drainage problems in nearby areas. These environmental challenges emphasize the negative consequences of leaving land undeveloped and underutilized. Table below show Environmental effects of undeveloped vacant land.

Table 4.18: Environmental effects of undeveloped vacant land

Environmental effects of undeveloped vacant land	Frequency	Percentage
Plan distortion	15	7.7
Soil Degradation and Erosion	38	19.4
Loss of aesthetic value of the town	33	16.8
Problems on human health	30	15.3
urban sprawl	40	20.4
Water Drainage Issues (Undeveloped land can contribute to poor water drainage)	40	20.4
Total	196	100.0

Table 4.18 above presents the responses of participants regarding the environmental effects of undeveloped vacant land. According to the data, the most significant concern identified by respondents is urban sprawl, accounting for 20.4 %, which reflects how underutilized land contributes to the uncontrolled expansion of urban areas, increasing pressure on infrastructure and the environment. Soil degradation and erosion follow closely at 19.4%, indicating respondents' awareness of how vacant land, lacking vegetation and proper management, leads to the deterioration of soil quality and increased erosion. The loss of aesthetic value of the town is noted by 16.8% of respondents, suggesting that neglected and unsightly land negatively impacts the visual and social appeal of urban neighborhoods. Problems related to human health are identified by 15.3 %, highlighting concerns about health risks arising from pollution, pest infestation, and waste accumulation on such lands. Finally, plan distortion is reported by 7.7% of respondents, emphasizing how vacant land disrupts urban development plans and leads to inefficient land use. These findings

underscore the multifaceted environmental challenges posed by undeveloped vacant land and the importance of integrating these concerns into urban planning strategies.

4.4.3. Potential Benefits of Vacant Land in Urban Areas

Undeveloped vacant land can have several negative economic effects on a city or urban area. One of the primary consequences is a decrease in revenue collection and tax income for local governments, as vacant land typically generates lower property taxes compared to developed properties. This reduction in revenue limits the financial capacity of municipalities to invest in essential public services and infrastructure development, such as roads, water supply, and sanitation systems. The presence of large areas of undeveloped land also discourages private investment, as investors are often reluctant to commit resources to areas lacking in infrastructure or economic activity. This hesitance, in turn, restricts job creation and results in limited employment opportunities for residents. Furthermore, the abundance of vacant land can lead to a general decline in property values within the nearby areas, which further reduces the wealth of property owners and the attractiveness of the area for future development. Overall, the economic impact of undeveloped land extends beyond lost tax income, creating a cycle of underinvestment and stagnation in urban growth.

However, if managed strategically, vacant land can also present significant opportunities for urban revitalization and economic development. For instance, repurposing vacant land for community gardens, affordable housing, or small-scale commercial enterprises can stimulate local economies, create jobs, and enhance community engagement. In some cases, temporary uses such as pop-up markets or cultural events can attract visitors and generate short-term revenue, which may pave the way for more permanent development. Additionally, the development of vacant land can increase property values in surrounding areas, leading to higher tax revenues and improved public services. Therefore, while vacant land poses challenges, it also holds the potential to contribute positively to urban development when leveraged effectively.

4.5. Discussions

The study of undeveloped vacant land in Gelan Sub-City highlighted major inefficiencies in urban land use, despite the city's rapid urbanization and high demand for land. Municipal records showed that approximately 94.29 hectares of land across three woredas (Bira Bone, Sida Awash, and Andoodee) had been returned to the land bank but remained unused. Field surveys confirmed that 89.9% of these landholders had legal title deeds, yet most plots remained idle due to factors like financial constraints, lack of permits, and weak institutional support. This disconnect between legal ownership and development points to significant administrative and policy enforcement gaps.

Most of the vacant land was designated for residential use (61.7%), with others allocated for commercial, mixed, or institutional purposes. Plot sizes varied, suggesting both small and large landholders face different challenges from limited finances to land speculation. None of the parcels were fully developed, and many were only partially utilized or fenced, in violation of national land lease regulations. These patterns, along with the scattered spatial distribution of vacant lots, reflect broader socio-economic and governance challenges that hinder effective land development and urban growth in the sub-city.

The survey results indicate that undeveloped vacant land is not confined to a single location but rather dispersed throughout the sub-city. This irregular distribution complicates urban planning and disrupts the continuity of infrastructure networks. The scattered presence of vacant lots across otherwise developed neighbourhoods contributes to urban fragmentation and reduces the efficiency of land service delivery. Several factors were identified as key contributors to the existence of undeveloped land. A dominant 36.7% of respondents pointed to socio-economic constraints, particularly the low financial capacity of landowners, as a primary barrier to development. Land speculation, cited by 5.1 %, further contributes to the issue, with owners holding land in anticipation of future value increases rather than immediate development. Other contributing factors include market instability (20.9%), property tax burdens (15.8%), and poor access to loans (9.7%).

Institutional weaknesses also play a significant role. 26.5% of respondents highlighted the lack of effective regulatory enforcement and policy implementation as major obstacles. Without consistent enforcement of development requirements, landowners face little pressure or incentive to develop their plots. Additionally, zoning changes and land use plan

revisions initiated by government agencies (8.7%) create uncertainty, discouraging investment. Infrastructure gaps (14.8%) and inefficiencies in land registration systems (21.9%) also slow the development process by increasing bureaucratic complexity and delaying legal transactions. Beyond the causes, the consequences of this underutilization are clearly felt. Socio-economically, vacant land leads to reduced employment opportunities 11.7% of respondents noted the loss of potential jobs in construction, services, and industry. More significantly, 39.3% reported that property values decline in areas with visible land vacancy, reducing neighbourhood desirability and investment appeal. Environmentally, vacant land contributes to plan distortion, where gaps in land development hinder the organized expansion of public infrastructure and services.

The study reveals that Gelan Sub-City struggles with inefficient urban land use due to widespread undeveloped vacant plots, despite most owners having legal rights to develop their land. Key barriers include bureaucratic inefficiencies, weak governance, and financial constraints. This underutilization of land limits economic growth, affects service delivery, and contributes to housing shortages. To address these issues, stronger land management strategies are needed, including better regulatory enforcement, infrastructure development, and support for low-income landholders to promote sustainable urban growth.

5: CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The analysis of undeveloped vacant land in Galan Sub-City reveals significant inefficiencies in land utilization, with a total of approximately 94.29 hectares of land identified as undeveloped and returned to the land bank from areas such as Gelan (25 hectares), Sida Awash (20 hectares), and Andode (35 hectares). Among the 140 residential plots identified, 61.7% are intended for residential use, 15.3% for commercial and mixed-use, 16.8% for industrial use, and 6.1% for other purposes. The results indicate data from field survey identified by analysis area of 924.217 hectares in totals are undeveloped and vacant plots. Despite the fact that around 90.3% of these plots possess legal title deeds, and over 92% of the landholdings exceed 200 square meters, development has not materialized on most of them. In terms of land acquisition methods, leasehold agreements dominate at 52 %, while 12.8% of the land was informally purchased from local farmers, and another 10.7% was inherited. These findings highlight a transition zone where formal and informal systems coexist, further complicating urban land governance.

A key insight from the study is the extended duration of land underutilization, with 43.9% of the plots remaining undeveloped for more than ten years. The reasons behind this stagnation are multifaceted. Socio-economic constraints play a major role, with 26.5% of landowners citing poor financial capacity as a primary reason for not developing their plots. Additionally, 7.1% of respondents hold the land for speculative purposes, while 21.9% are discouraged by market instability, particularly the rising cost of construction materials. Institutional factors further exacerbate the issue 26.5% of owners identified weak regulatory enforcement and poor policy implementation as critical barriers, and 23.5% pointed to zoning restrictions and government-initiated changes in land use plans.

These challenges collectively reflect a deeper structural problem in land administration and urban planning in the sub-city. The existence of large tracts of undeveloped land, despite legal ownership and defined use, highlights gaps in policy enforcement, investment support mechanisms, and urban growth management. The socio-economic impact of such vacant lands is also significant, as they represent lost opportunities for housing, commercial activity, and local economic development. Therefore, effective strategies including stronger regulatory frameworks, targeted financial support for low-income

landowners, and better coordination between government and private stakeholders are crucial for transforming these idle plots into productive urban assets and supporting sustainable urban expansion in Galan Sub-City.

The analysis of spatial distribution of land use data reveals a significant portion of land within the study area remains undeveloped across various sectors, including social services, mixed residential, manufacturing, and commercial uses. Despite being allocated and acquired some for over a decade these plots have seen little to no development. A total of hundreds of hectares remains idle, indicating poor land utilization. Furthermore, the majority of landowners possess legal title deeds and tenure security, yet fail to develop their plots in accordance with the land use plan. This widespread underdevelopment not only hinders urban growth but also violates national land lease regulations, which mandate timely development. As a result, these lands may be subject to reclamation by the government. The findings underscore an urgent need for improved land management, enforcement of development timelines, and strategic policy intervention to ensure efficient and effective land use.

5.2. Recommendations

Given that the primary objectives of this study were to identify undeveloped vacant land within Galan Sub-City and to provide guidance for its future development, a series of practical and policy-oriented recommendations are essential to move from identification to action. To address these issues and facilitate productive urban development, the local government must begin by strengthening land management systems and enforcing existing land development regulations. A dedicated institutional body should be established or empowered to monitor undeveloped plots, follow up with landowners, and enforce development timelines, ensuring that land does not remain vacant indefinitely.

Alongside regulatory enforcement, financial barriers must be addressed. Since a large number of landowners cited lack of capital as the primary reason for not developing their land, the sub-city administration should work with financial institutions to offer targeted support such as affordable construction loans, subsidies, or incentives for cooperative development among low-income landowners.

Public education and transparency regarding land policies are also crucial. Many landowners may be unaware of zoning changes, legal obligations, or available support. The city should implement awareness campaigns and provide easily accessible information on land use planning, development procedures, and financial assistance programs. Moreover, since a portion of land was acquired through informal means such as direct purchases from farmers there is a need to formalize and regularize these holdings to ensure legal clarity and encourage investment in development.

Strategic land use planning should also guide the redevelopment of identified vacant plots. The sub-city must align its infrastructure investments with these areas, ensuring that basic services such as roads, electricity, and water are made available to incentivize development. Updating and adapting zoning plans to accommodate evolving market demands can also encourage quicker development of vacant land. Lastly, the 94.29 hectares returned to the land bank should be used proactively. These lands should be allocated for public-benefit projects such as affordable housing, green spaces, and mixed-use developments that meet the city's growing needs.

To address the issue of undeveloped vacant land in Galan Sub-City, it is recommended that the municipality strictly enforce land lease regulations, implement a real-time monitoring

system, and introduce both incentives for timely development and penalties for prolonged land idleness.

- ❖ Encouraging public-private partnerships and enhancing the capacity of urban planning staff will also be critical in accelerating development.
- ❖ Additionally, raising community awareness on the importance of land utilization and launching targeted campaigns can help shift public behavior.
- ❖ For future researchers, this study provides a foundation for investigating the socio-economic barriers to development, assessing the broader impacts of vacant land on urban growth, and exploring successful land management practices in comparable contexts.
- ❖ By applying these recommendations, Galan Sub-City can move from identifying vacant plots to actively transforming them into productive urban spaces, fostering efficient land use, better living conditions, and sustainable urban development.

Scope for Further Study: Future research could build on this study by investigating the socio-economic barriers that prevent landowners in Gelan Sub-City from developing their plots. This includes exploring financial constraints, access to credit, and the impact of market instability on construction projects.

- ❖ Additionally, examining the broader impacts of vacant land on urban growth such as the effects on housing availability, economic development, and public services would provide a deeper understanding of the long-term consequences of underutilized urban land.
- ❖ Moreover, further studies could focus on successful land management practices in similar urban contexts, identifying models that could be adapted to Gelan Sub-City.
- ❖ Investigating the effectiveness of public-private partnerships in land development and the role of incentives and penalties in encouraging timely land utilization would also be valuable.
- ❖ Lastly, research into community awareness programs and their impact on shifting public attitudes toward land use could offer insights into how behavioural change could support sustainable urban growth and efficient land development.

REFERENCES

- Adams, D., Disberry, A., Hutchison, N., & Munjoma, T. (2002). Vacant Urban Land: Exploring Ownership Strategies And Actions. *Town Planning Review*, 73(4), 395–416. <https://doi.org/10.3828/Tpr.73.4.2>
- Adigeh, D. T., & Dagnew, B. (2020). *Urban Land Management Practices And Challenges: The Case Of Injibara Town, Northwest Ethiopia*. 11(8), 1746–1757.
- Banerjee, T., & Loukaitou-Sideris, A. (2012). Companion To Urban Design. In *Choice Reviews Online* (Vol. 49, Issue 05). <https://doi.org/10.5860/Choice.49-2740>
- Bieretz, B., & Schilling, J. (2019). *Pay For Success And Blighted Properties*. 1–22.
- Branas, C. C., Rubin, D., & Guo, W. (2012). Vacant Properties And Violence In Neighborhoods. *ISRN Public Health*, 2012, 1–9. <https://doi.org/10.5402/2012/246142>
- Chali, C. E., Dereje, D. T., Endalew, E. A., & Scholar, G. (2024). *Spatial-Temporal Trend Of Urban Sprawl With Land Use Land Cover Change In Central Ethiopia , Addis Ababa*. <https://doi.org/10.20944/Preprints202402.0352.V1>
- Ehrhardt, D., Behnisch, M., Michaeli, M., & Jehling, M. (2025). Understanding Incremental Densification – Determinants Of Residential Infill On Vacant Lots. *Landscape And Urban Planning*, 260(April), 105375. <https://doi.org/10.1016/J.Landurbplan.2025.105375>
- Gemeda, B. S., Girma Abebe, B., & Eckardt, F. (2021). Urban Land Speculation; Failure Of Land Market. *Survey Review*, 53(376), 1–7. <https://doi.org/10.1080/00396265.2019.1661165>
- Growth, U. (2018). *Undeveloped Land : Is It A Development Opportunity Or A Planning Problem ?* 179, 81–92. <https://doi.org/10.2495/Ug180081>
- Haas, A. R. N., & Kopanyi, M. (2017). Taxation Of Vacant Urban Land: From Theory To Practice - Policy Note. *International Growth Center, London School Of Economic And Political Science: London, UK, July*.
- Habtamu, G. (2022). Making Vacant Land Work: Assessment Of Vacant Land Utilization In Wolayta Sodo Town, SNNPR, Ethiopia. *Journal Of Environment And Earth Science*, 7(11), 633–652. <https://doi.org/10.7176/Jees/12-7-01>
- Han, H. (2021). The Impact Of Abandoned Properties On Nearby Property Values. In *Housing Policy Debate* (Vol. 24, Issue 2, Pp. 311–334). Taylor & Francis. <https://doi.org/10.1080/10511482.2013.832350>
- Han, H. S. (2014). The Impact Of Abandoned Properties On Nearby Property Values. In *Housing Policy Debate* (Vol. 24, Issue 2, Pp. 311–334). Taylor & Francis. <https://doi.org/10.1080/10511482.2013.832350>

- Hohl, B. C., Kondo, M. C., Rupp, L. A., Sadler, R. C., Gong, C. H., Le, K., Hertlein, M., Kelly, C., & Zimmerman, M. A. (2023). Community Identified Characteristics Related To Illegal Dumping; A Mixed Methods Study To Inform Prevention. *Journal Of Environmental Management*, 346(August), 118930. <https://doi.org/10.1016/j.jenvman.2023.118930>
- Kim, G. (2016). The Public Value Of Urban Vacant Land: Social Responses And Ecological Value. *Sustainability (Switzerland)*, 8(5). <https://doi.org/10.3390/Su8050486>
- Kim, G., Miller, P. A., & Nowak, D. J. (2018). Urban Vacant Land Typology : A Tool For Managing Urban Vacant Land. *Sustainable Cities And Society*, 36(September 2016), 144–156. <https://doi.org/10.1016/j.scs.2017.09.014>
- Koroso, N. H. (N.D.). *Urbanization & Urban Land Use Efficiency In Ethiopia - NH Koroso Phd Thesis*.
- Koroso, N. H. (2022). *Urbanization And Urban Land Use Efficiency In Ethiopia: Remote Sensing And Institutional-Based Analysis*.
- Koroso, N. H., Lengoiboni, M., & Zevenbergen, J. A. (2021). Urbanization And Urban Land Use Efficiency: Evidence From Regional And Addis Ababa Satellite Cities, Ethiopia. *Habitat International*, 117(September), 102437. <https://doi.org/10.1016/j.habitatint.2021.102437>
- Lee, R. J., Newman, G., & Planning, U. (2020). *HHS Public Access*. 14, 306–319. <https://doi.org/10.1080/1747423x.2019.1706655.A>
- Leonard, A. (2022). *The Phenomenon Of Urban Vacant Lands And Abandoned Building Structures In Ghanaian Cities : A Case Study Of Fumesua , Kumasi , Ghana Abstract : 11(6)*, 27–41.
- Mao, L., Zheng, Z., Meng, X., Zhou, Y., Zhao, P., & Yang, Z. (2022). Landscape And Urban Planning Large-Scale Automatic Identification Of Urban Vacant Land Using Semantic Segmentation Of High-Resolution Remote Sensing Images. *Landscape And Urban Planning*, 222(January 2021), 104384. <https://doi.org/10.1016/j.landurbplan.2022.104384>
- Meier, F. (2018). Growing Cities : Urbanization In Africa. *The History Of African Development*, 1–17.
- Model, T. O. (2013). *Vacant Building Review : Environmental Scan*. 1–13.
- Mohamad Selamat, I. A., Maruthaveeran, S., Mohd Yusof, M. J., & Shahidan, M. F. (2023). Planning Tools To Revitalise Urban Vacant Land From Ecological Perspectives: A Systematic Review. *Urban Science*, 7(2). <https://doi.org/10.3390/urbansci7020058>
- Mutuli, E. (2016). *An Assessment Of Urban Decay In Residential Neighbourhoods: A Case Study Of Jerusalem Estate, Eastlands, Nairobi. June*.

- Newman, G., Newman, G., Park, Y., Bowman, A. O. M., & Lee, R. J. (2018). Vacant Urban Areas : Causes And Interconnected Factors Vacant Urban Areas : Causes And Interconnected Factors. *Cities*, 72(February), 421–429. <https://doi.org/10.1016/j.cities.2017.10.005>
- Pan, Y., Teng, T., Wang, S., & Wang, T. (2024). Impact And Mechanism Of Urbanization On Urban Green Development In The Yangtze River Economic Belt. *Ecological Indicators*, 158(January), 111612. <https://doi.org/10.1016/j.ecolind.2024.111612>
- Pickett, S. T. A., Cadenasso, M. L., Grove, J. M., Boone, C. G., Groffman, P. M., Irwin, E., Kaushal, S. S., Marshall, V., Mcgrath, B. P., Nilon, C. H., Pouyat, R. V., Szlavecz, K., Troy, A., & Warren, P. (2011). Urban Ecological Systems: Scientific Foundations And A Decade Of Progress. *Journal Of Environmental Management*, 92(3), 331–362. <https://doi.org/10.1016/j.jenvman.2010.08.022>
- Porter, L. C., De Biasi, A., Mitchell, S., Curtis, A., & Jefferis, E. (2019). Understanding The Criminogenic Properties Of Vacant Housing: A Mixed Methods Approach. *Journal Of Research In Crime And Delinquency*, 56(3), 378–411. <https://doi.org/10.1177/0022427818807965>
- Roude, G. D., Wu, K., Richardson, L., Tucker, A., Moss, L., Kondo, M., Morrison, C. N., Branas, C. C., Gustat, J., & Theall, K. P. (2024). The Impact Of Vacant And Abandoned Property On Health And Well-Being: A Qualitative Inquiry. *Applied Research In Quality Of Life*, 19(4), 2125–2145. <https://doi.org/10.1007/S11482-024-10325-W>
- Song, X., Zhao, G., & Wu, Z. (2020). *Urban Vacant Land In Growing Urbanization : An International Review*. April. <https://doi.org/10.1007/S11442-020-1749-0>
- Vom Hofe, R., Parent, O., & Grabill, M. (2019). What To Do With Vacant And Abandoned Residential Structures? The Effects Of Teardowns And Rehabilitations On Nearby Properties. *Journal Of Regional Science*, 59(2), 228–249. <https://doi.org/10.1111/Jors.12413>
- Zimmermann, W. (2008). Effective And Transparent Management Of Public Land Experiences, Guiding Principles And Tools For Implementation. *FIG Article Of The Month, December 2008*, 17.

APPENDIX

Appendix 1.1 presents detailed information on the location of vacant and undeveloped land areas in Gelan Sub-City, based on field data collected directly by the researcher. These on-site observations were conducted to verify and cross-check the alignment of current land conditions with the official local development plans and proposed land use designations. The appendix provides GPS-based coordinates, plot boundaries, and physical characteristics of the sites, confirming that many of the parcels remain unused despite being earmarked for specific purposes such as residential housing, commercial zones, or industrial projects. This ground-truthing process strengthens the reliability of the study by ensuring that the documented undeveloped plots correspond with the actual land use inconsistencies observed in the field.

Appendix 1.1: Vacant land and undeveloped area location collected data

s/n	Easting	Northing	Remark	s/n	Easting	Northing	Remark
1	485581.9	975195.5	vacant	48	481170.8	976181.1	vacant
2	485289.4	975446.4	vacant	49	480539.4	976622.1	vacant
3	484204.1	975629.7	vacant	50	482513.9	976628.3	vacant
4	484642.8	975076.3	vacant	51	483009.9	976481.5	vacant
5	485120.8	974717.3	vacant	52	482517.2	976644.4	vacant
6	485362.7	975772.3	vacant	53	481655.9	976427.6	vacant
7	484903.6	975818.8	vacant	54	481786	976319.6	vacant
8	484840.8	975613.9	vacant	55	481299.1	977112.9	vacant
9	484935.4	975770.9	vacant	56	483476.2	975090.5	vacant
10	484874.7	975939.4	vacant	57	483656.8	975057.9	vacant
11	484849.5	975542.1	vacant	58	480821.2	975735.6	vacant
12	485232	975076.6	vacant	59	480815.5	975740.2	vacant
13	485188.6	975074.7	vacant	60	480868.3	975843.8	vacant
14	485097.4	975109.4	vacant	61	480655.1	975904.3	vacant
15	484626.7	975064.3	vacant	62	480809.9	976055.6	vacant
16	481355.3	975524.3	vacant	63	480976.1	976103.4	vacant
17	481277.7	975661.1	vacant	64	481165.1	975880.1	vacant
18	481213.7	975723.4	vacant	65	480922.7	976372	vacant
19	481619.6	975092.2	vacant	66	481126.5	976325.1	vacant
20	481197.7	975644.4	vacant	67	480965.9	976254.8	vacant
21	481216.1	975609.9	vacant	68	481182.5	976241.1	vacant
22	481287	975709.4	vacant	69	480722.8	976207.1	vacant
23	481171.2	975878.1	vacant	70	480364.3	976542.1	vacant
24	481133.1	975933.6	vacant	71	482420.3	975709.5	vacant
25	481086.8	975987.1	vacant	72	481128.2	975626.5	undev.vacant
26	480934.7	975895.8	vacant	73	480966.7	975826.3	undev.vacant
27	481247.3	976042.4	vacant	74	481339.4	975435.3	undev.vacant

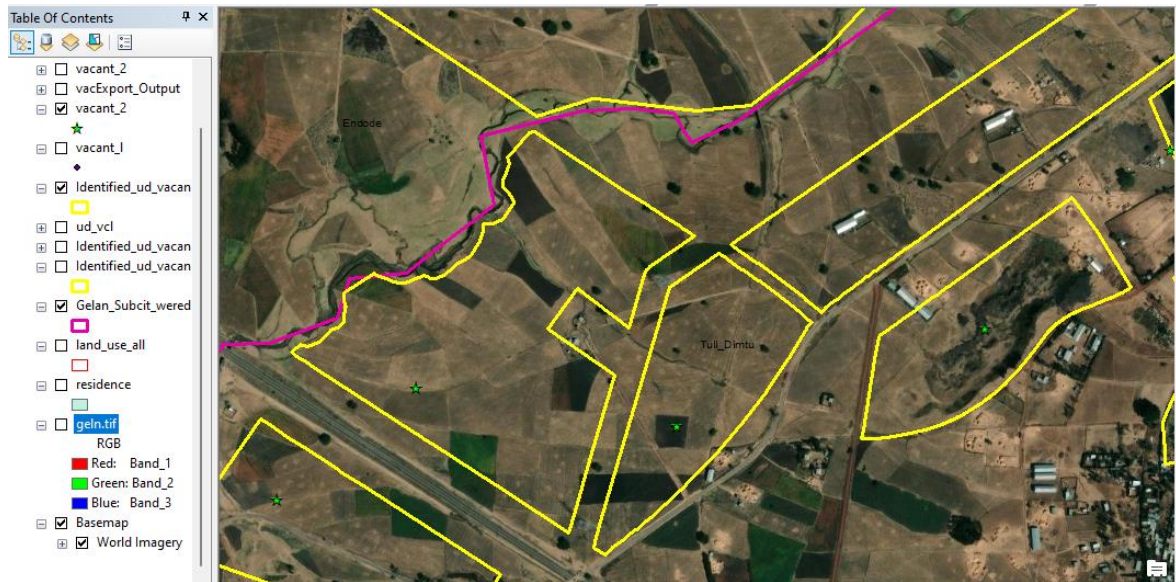
28	481445.3	976068.9	vacant
29	481014.5	975972.3	vacant
30	481425.4	975794	vacant
31	481769.6	975827	vacant
32	481755.3	975892	vacant
33	481726.7	975900.2	vacant
34	481666.8	975974	vacant
35	481661.3	975965.9	vacant
36	481712.4	976038.3	vacant

75	481368	975493.6	undev.vacant
76	485659.9	976870.8	undev.vacant
77	481368	975493.6	undev.vacant
78	485659.9	976870.8	undev.vacant
79	481787.5	975870.9	vacant plots
80	481681.6	975005.6	vacant plots
81	481661.4	975964.4	vacant plots
82	482339.6	975139.7	vacant plots
83	480008.6	975882.9	vacant plots

s/n	Easting	Northing	Remark
37	481445.7	976014.4	vacant
38	481153	976045.2	vacant
39	481243.9	975695.9	vacant
40	481170.7	975889.6	vacant
41	480939.1	975737.1	vacant
42	480923.1	975868.1	vacant
43	480828	976021.8	vacant
44	481170.7	975889.6	vacant
45	481464.2	976073.9	vacant
46	480813.1	976060.5	vacant
47	480947.3	976209.6	vacant
103	479569.6	976828.5	vacant plots
104	479747	977040.5	vacant plots
105	479948	977168.8	vacant plots
106	480313.8	977198.8	vacant plots
107	480613.7	977048.8	vacant plots
108	480850.3	976979.1	vacant plots
109	480843.4	977091.7	vacant plots
110	480832.3	977165.6	vacant plots
111	480331.5	977204.8	vacant plots

s/n	Easting	Northing	Remark
84	480249.6	975949.3	vacant plots
85	480689	975602	vacant plots
86	480963.5	975575.7	vacant plots
87	481570.8	975123.9	vacant plots
88	481871.1	975142	vacant plots
89	482305.2	975118.9	vacant plots
90	482081.9	974925.6	vacant plots
91	480979.3	975135.6	vacant plots
92	482509	976624.3	vacant plots
93	481275.9	977121.4	vacant plots
94	480817.5	977096.5	vacant plots
95	480166.3	976696	vacant plots
96	479812	976384	vacant plots
97	479729.3	976335.8	vacant plots
98	479634.6	976416.2	vacant plots
99	479620.9	976488.6	vacant plots
100	479625.3	976486.2	vacant plots
101	479596.4	976571.4	vacant plots
102	479553.1	976739.9	vacant plots

In this appendix: The green star (points) marks the central point of the vacant land identified and recorded by the researcher. The yellow lines represent the proposed land use plan for the sub-city, illustrating intended zoning or development areas. Additionally, the images used in the background serve as the base map, providing geographical context and spatial reference for the analysis.





APPENDIX 1.2: QUESTIONNAIRE AND INTERVIEW:

ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

COLLEGE OF CIVIL ENGINEERING AND ARCHITECTURE (COCEA)

Department of Architecture and Urban Planning & Design



STRUCTURED QUESTIONNAIRE AND INTERVIEW

BY TESHOME TUFA ARADA

Dear Respondents,

I am Teshome Tufa Arada, a researcher at Adama Science and Technology University; Department of Architecture (Msc Specialization in Urban Planning & Design).

I am conducting a study entitled "Assessing the Development Potential of Vacant Land in Urban Areas: A Case Study of Gelan Sub City, Sheger City Ethiopia." The purpose of this research is to identify undeveloped vacant land and analyze the associated environmental, social, and economic challenges.

Your participation is invaluable to the success of this research. Please complete the following questionnaire, filling in the blank spaces and marking the appropriate boxes. All information provided will be used solely for academic purposes and will be kept strictly confidential.

Thank you for your time and cooperation!



Name of data collector: _____



Date of data collection: ____/____/____



Place of data collected: Subcity: Gelan /Woreda_____

February 2025

Adama Ethiopia

Dear Respondents

(Please answer all questions and circle your choice/fill where applicable)

SECTION 1: RESPONDENT INFORMATION

(A). General Information of area and data collection

1. Name of data collector _____
2. Date of data collection _____
3. SubCity_____ /Woreda_____ (place of data collected)
4. Name of Kebele/village (LocalName) _____

(B). Household demographic characteristics (circle answer)

1. **Gender of respondents:** [a] Male [b] Female
2. **Age of respondents:** [a] 15-30 [b] 31-40 [c] 41-50 [d] 51 and above
3. **Educational level:** [a] illiterate [b] can read and write [c] primary or secondary [d] Collage (TVET) [e] first Degree and above
4. **Employment status:** [a] Unemployed [b] Self employee [c] Government employee [d] NGO employee [e] Others.
5. **Income level:** [a] less than 1000ETB [b] 1001-2000ETB [c] 2001-5000ETB [d] 5001 ETB and above

SECTION 2: Questionnaire to be filled by individual and experts regarding undeveloped land (vacant) in urban area.

1. Land acquisition system (how did you get your land?)
[a] Lease hold [b] inheritance, [c] bought from farmers [d] occupied vacant land.
2. what is the total area of land acquired in m² ?
[a] ≤ 200 m² [b] 200-400m² [c] 400-500 m² [d] 500-1000 m² [e] > 1000 m² and above
3. Land Tenure System: [a] Have a title deed [b] Do not have a title deed.
4. The condition of the land use type?
[a] Residential [b] Commercial [c] Industrial [d] other
5. What a Period of time since acquired the plot?
[a] ≤ 6 month [b] 6-12 month [c] 1-4 years [d] 5-10 years [e] ≥ 10 years

► **FACTORS THAT CONTRIBUTE TO THE EXISTENCE OF UNDEVELOPED VACANT LAND IN URBAN**

6. Socio-economic factors (*causes of undeveloped vacant land.*)

- [a] Poor financial capacity of the owners (low income group)
- [b] Urban decline and neighborhood change
- [c] Market instability (prices increase time to time about construction materials)
- [d] Land reserved for future construction (land speculation)
- [e] Property tax burden
- [f] Poor provision of loan

7. Institutional factors

- [a] Poor Coordination Among Government Agencies
- [b] Complex and protracted bureaucratic processes
- [c] Inadequate Regulatory Enforcement and Implementation
- [d] Inadequate provision of infrastructure & services
- [e] Zoning restrictions (land use plan change by government)
- [f] Inefficient land registration and management, coupled with a lack of proper due diligence prior to land allocation, has resulted in instances of double allocation of the same parcel.

► **SOCIO-ECONOMIC EFFECTS OF UNDEVELOPED VACANT LAND**

8. economic effects of undeveloped vacant land

- [a] decreases revenue collection and tax income
- [b] reduces infrastructure development
- [c] discourages the investments of town
- [d] limited employment opportunities
- [e] depressed property values property value

9. Social effects of undeveloped vacant land

- [a] Decline in Mental Well-being
- [b] Conflict or boundary disputes
- [c] Reduced Community Cohesion

[d] Social crime (criminal activities like vandalism, drug use, and gang-related violence.)

10. Environmental effects of undeveloped vacant land

[a] Plan distortion (Undeveloped vacant land can disrupt urban planning efforts by creating gaps in the intended layout of a city or town).

[b] Soil Degradation and Erosion

[c] Loss of aesthetic value of the town

[d] Problems on human health

[e] urban sprawl (migration from the core and create informal settlement around the periphery)

[f] Water Drainage Issues (Undeveloped land can contribute to poor water drainage, as there is often no proper system in place to manage rainwater runoff).

11. What interventions can the town administration or municipality implement to control undeveloped vacant land?

12. How can the town administration address the issue of vacant land to encourage future development?

13. What measures can municipalities take to manage and develop undeveloped vacant land?

14. What strategies can town administrations use to promote the development of vacant land in the future?

15. How can local governments intervene to ensure the productive use of undeveloped vacant land in urban areas?

Any comment and suggestions

THANK YOU IN ADVANCE!