

CHALLENGES OF LAND BANKING FEASIBILITY IN ADAMA; A
CASE OF BOLE SUB CITY



GOSA TOLA GUDISA

A Thesis Submitted to the Department of Geomatics Engineering

School of Civil Engineering and Architecture

Presented in Partial Fulfilment of the Requirement for the Degree of Master's in
Geoinformatics

Office of Graduate Studies

Adama Science and Technology University

May, 2022

Adama, Ethiopia

CHALLENGES OF LAND BANKING FEASIBILITY IN ADAMA; A
CASE OF BOLE SUB CITY

GOSA TOLA GUDISA

ADVISOR: ROBA GEMECHU (PHD)

A Thesis Submitted to the Department of Geomatics Engineering

School of Civil Engineering and Architecture

Presented in Partial Fulfilment of the Requirement for the Degree of Master's in
Geoinformatics

Office of Graduate Studies

Adama Science and Technology University

May, 2022

Adama, Ethiopia

APPROVAL SHEET

I, the Major advisor of the thesis entitled “Challenges of Land Banking Feasibility in Adama; A Case of Bole Sub City” and developed by Gosa Tola Gudisa, hereby certify that the recommendation and suggestions made by the board of examiners are appropriately incorporated into the final version of the thesis.

Roba Gemechu (PhD)

Advisor

Signature

Date

We, the undersigned, members of the Board of Examiners of the thesis by Gosa Tola Gudisa have read and evaluated the thesis entitled “Challenges of Land Banking Feasibility in Adama; A Case of Bole Sub City.” and examined the candidate during open defense. This is, therefore, to certify that the thesis is accepted for partial fulfillment of the requirement of the degree of Master of Science in Geo- Informatics.

Chairperson

Signature

Date

Internal Examiner

Signature

Date

External Examiner

Signature

Date

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

Head of Department

Signature

Date

School Dean

Signature

Date

Office of Postgraduate Studies, Dean

Signature

Date

DECLARATION

I declare that this thesis proposal entitled “Challenges of Land Banking Feasibility in Adama; A Case of Bole Sub City.” is my own work and has not been submitted to any university for similar purpose. The references used in this proposal are duly recognized by proper citations.

Gosa Tola_____

Name of student

Signature

Date

RECOMMENDATION OF ADVISORS

We, the advisor(s) of this thesis, hereby certify that we have read the revised version of the thesis entitled “Challenges of Land Banking Feasibility in Adama; A Case of Bole Sub City” prepared under my guidance by Gosa Tola Gudisa. submitted in partial fulfillment of the requirements for the degree of Master’s of Science in Geo-informatics. Therefore, we recommend the submission of revised version of the thesis to the department following the applicable procedures.

Roba Gemechu (PhD)

Major Advisor/Supervisor

Signature

Date

Co-advisor/Co-supervisor

Signature

Date

ACKNOWLEDGEMENT

First and foremost, I want to praise the Almighty God, the Lord of everything, who is credited for the completion of this Thesis work. This work wouldn't be completed without the assistance of several persons and organizations, all of whom I gratefully acknowledge. I would like to deeply acknowledge My Major Advisor, Dr. Roba Gemachu (PhD) for his supervision, support, guidance, helping me overcoming the obstacles, and answering all my questions, during the time of my thesis work.

Next, my Special thanks go to Adama Science and Technology University for their study and related research activities to achieve my research objectives. Lastly, but not least my great gratitude goes to my family, for their encouragement and relentless help throughout my MSc study.

TABLE OF CONTENTS

Contents	Page
APPROVAL SHEET	i
DECLARATION	ii
RECOMMENDATION OF ADVISORS	iii
ACKNOWLEDGEMENT	iv
LIST OF TABLE	viii
LIST OF FIGURE	ix
LIST OF ACRONYMS	x
ABSTARCT	xi
1. INTRODUCTION	1
1.1. Background of Study Area	1
1.2. Statement of the problem	3
1.3. Objective of the study	4
1.3.1. General objective	4
1.3.2. Specific objectives	4
1.4. Research Questions	4
1.5. Significance of the study	4
1.6. Scope of the study	5
1.7. Delimitation and Limitation of the study	5
1.8. Organizations of the Thesis	5
2. LITERATURE REVIEW	7
2.1. Theoretical Framework	7
2.1.1. Land Banking	8
2.2.2. Land banking definition	8
2.1.3. History of Land Banks	10
2.1.4. Land Inventory system	11
2.2. Land banking system in Europe and world Experiance	11
2.3. Land Bank Benefits	12
2.3.1. Land Banking Feasibility	12
2.4. Challenges of Land Banking	13
2.4.1. Vacant and Abandoned properties	13

2.5. The critical elements for successful land bank initiatives	14
2.6. Empirical Review	16
2.6.1. <i>Global practice of Land Banking system</i>	20
2.6.2. <i>Land Banking Practices in Africa</i>	21
2.6.3. <i>Land banking Practice in Ethiopia</i>	21
2.7. Conceptual frame work	22
2.7.1. <i>Source of Buildable Land, by type Classifications</i>	24
2.8. The Role of Geospatial Technologies in the land banking system.	26
2.9. Lessons drawn from the review	26
2.10. Research Gaps	27
3. MATERIALS AND METHODS	28
3.1. Description of study area.....	28
3.1.1. <i>Location Description</i>	28
3.1.2. <i>Topography</i>	30
3.1.3. <i>Climate and Rainfall</i>	30
3.1.4. <i>Population and Population Density</i>	31
3.1.5. <i>Land Use Of Study area</i>	32
3.2. Research design.....	33
3.2.1. <i>Approaches to the Research</i>	34
3.3. Methods of data collection	34
3.3.1. <i>Data Sources</i>	34
3.3.2. <i>Software used</i>	35
3.3.3. <i>Population and sampling Technique</i>	35
3.4. Data Analysis Methods	36
3.4.1. <i>Geodatabase development and Geospatial analysis tools for Land Banking System</i>	37
3.4.2. <i>Land Use land cover Map and Methodology for clarification of LULC</i>	40
3.4.3. <i>Criteria For The Evaluation of Land Use/Cover Classification</i>	42
3.4.4. <i>Factors and limitations considered in lulc</i>	43
3.4.5. <i>Land use and land cover(LULC) Classification</i>	43
3.4.6. <i>Techniques for classifying urban land use land cover</i>	46
3.4.7. <i>Methods adopted for accuracy assessment</i>	47
3.4.8. <i>Change analysis and Vacant land extraction in study area</i>	49
4. RESULTS AND DISCUSSION	50

4.1. Spatial Analysis.....	50
4.1.1. <i>Land use land cover analysis</i>	50
4.2. Major challenges of land banking practices in Bole Sub City	52
4.2.1. <i>Urban land information system</i>	53
4.3. Land banking operation in Adama city	54
4.3.1. <i>Sources of land for the land bank</i>	54
4.3.2. <i>Land acquisition</i>	54
4.3.3. <i>Land holding and site preparation</i>	55
4.3.4. <i>Disposition</i>	55
4.3.5. <i>Spatial distribution and quantity of Land bank in Adama City</i>	56
4.4. Land Bank Benefits.....	57
4.5. Analysis of the data collected from the Municipality and Professionals	59
4.5.1. <i>Causes of Urban vacant Land in Study area</i>	59
4.5.2. <i>Condition of Vacant Land in Adama</i>	59
4.5.3. <i>Availability of vacant land in adama</i>	59
4.6. Analysis of the data collected from the respondent.	60
4.7. Discussion	64
5. CONCLUSION AND RECOMMENDATION	66
5.1. Conclusions.....	66
5.2. Recommendations	67
REFERENCE.....	69
APPENDIXIS	72
Appendix i: Questionnaire Survey	72
Appendix ii: Interview of land bank Experts/officers	77
Appendix iii: Sample Site Survey of Vacant lots.....	78

LIST OF TABLE

Table Number and Title	Pages
3.1: Projected Population by kebele in 2011 by sex, sex ratio and Population density	31
3.2. Data types and sources	34
3.3 Software and Material used for this study	35
3.4. Presents the specifications of sentinel-2 bands.....	44
3.5. Major Categories & Sub-Categories of lulc description	45
4.1 Accuracy Assesment and confusion matrix lulc images of 2022	50
4.2 Area coverage of lulc in 2022 bole subcity	52
4.3. Shortage of finance.....	61
4.4: Respondents Gender Frequency Table	61
4.5: summary of interview questions by land bank experts responses.....	62
4.6: summary of respondents (Degree of agreement) Lack of modern land recording system.	63

LIST OF FIGURE

Figure Number and Titles	Pages
3.1. Location map of bole sub city Adama.....	29
3.2. Elevation and slope map of Study area	30
3.3 land use of study area (Sources AdamaCity structural plan,2019).....	32
3.4. Technological scheme of the study.	37
3.5. work flow of geodatabase design in land banking sytem.....	39
3.6. Geodatabase and its structure	40
3.7. diagram show the work flow of spatial analysis 1 st phase.....	41
3.8.Ortho photo of bole subcity (sources Adama city admnistration2012,and 2017)	42
3.9. Diagram show the spatial analysis of lulc classification procedure	47
4.1. Lulc map of bole subcity in 2022.	51
4.2. vacant Land lots in Bole sub City's land bank (<i>Source: Generated by Author data Obtained from City administration and own classification</i>)	56
4.3: vacant lots from city administration and mapped by Author.((sources adama City Administration).....	57
4.4 Picture showing the benefit of Land Bank.	58
4.5: The common barriers, to the conversion of vacant and abandoned properties into productive uses. Source: Alexander, Frank S., 2005)	58
4.6 Aerial photo of study area 2005,and 2009 (<i>sources adama City Administration</i>).	60
4.7: The graph show gender respondent frequency.....	62
4.8. The graph show frequency of interview lack of modern land banking system.	63
4.9. summary of respondents (Degree of agreement) Lack of modern land recording system.	64

LIST OF ACRONYMS

GIS	Geographical Information System
LIS	Land Information System
CSA	Central statistical Agency
CDC	Community Development Corporations
LBA	Land Bank Authority
ECA	Europe and Central Asia
USA	United State of America
UOS	Urban open spaces
SVM	Support Vector Machine
HSR	High spatial resolution
MUDHo	Ministry Of Urban Development, And Housing
LUR	land use regulation
GTP	Growth and transformation plan
Tiff	Tagged image file format

ABSTARCT

Urban land management is regarded as a vital means to achieve urban sustainable development. Land banks are governmental organization that is established for the purpose of converting vacant, abandoned and foreclosed properties into useful factor of production. Land banking was officially established in Adama town under the land Management and Administration office of the City. The land banking practice has been facing a number of challenges since its establishment. The general objectives of this study is identify the major challenges of land banking practices and to show the role of geospatial technology in improving land banking system in Bole sub. Methodologically the study use Master plan of city, Satellite images of 2022 aquired from USGS sentinel 2A with spatial resolution of 10m. Create a geodatabase for accomplishment of spatial analysis information and identify current land use types in study area Using GIS and Erdas software.while descriptive data analyzed by SPSS. Spatial analysis, Stratified random sampling and purposive sampling techniques supposed was used to get appropriate data and address the main objective of the study.to overcoame the problem stated in above the paper pimarly this research develop well designed central database(Geodatabase) which store, manipulate and checking property details of each parcel. this can help experts to know the current land use and owner of land. Additionally minimize overlapping of parcels with each other.The study was found out that the main challenges of land banking in Bole sub-city include poor organizational structure, lack of modern land information system, weak financial sources, lack of skilled manpower and weak urban governance system. Hence, land banking is lots of advantages of economic development of the sub city and has good future development of the town, in order to address the future need of urban land for various development activities and achieve governmental plans.

KeyWords: Geospatial technologies,land banking and challenges, GIS

1. INTRODUCTION

1.1. Background of Study Area

Land banking is defined as the advance acquisition and reservation of land before development. The concept of land banking was first initiated in Amsterdam in late 1890s. Land banking was also adopted by several western countries such as Sweden (since 1904), Canada (since 1950's) and France (since 1958) during the last century (Atmer, 1987; Carr and Smith, 1975). Since the 1970's several pilot projects of public land banking were carried out in some American cities as well (Huang, et al., 2002). Land banking is the process or policy by which local governments acquire required properties and convert them to productive use or hold them for long-term strategic public purposes. Land banks are public authorities or special purpose not-for-profit corporations that specialize in land banking activities.

Recent researches showed that public land banking approach are initiated in some developing countries. In central Europe, such as Bulgaria and Hungary, public land banking is being practiced to solve the problem of fragmentation of agricultural lands (Van Dijk and Kopeva, 2006). In Zimbabwe, a public land banking process named "land resettlement" is used to control social tensions arising from imbalanced distribution of resources, local overpopulation, unemployment and involuntary displacement in the past (Harts-Broekhuis and Huisman, 2001). Some Southern Asian cities including India and Bangladesh are also currently implementing land banking policy (Huang, 2010).

Land banking can be undertaken by other public agencies, and not all communities need to create a separate land bank. Adama, is the City found in Oromia region, is an upcoming secondary city that is expected to triple its 2010 population by 2040, growing from 253,000 to over 954,000 inhabitants, and growing in area more than fivefold (Esaton-calibra, E. (2020). While it is known as a popular city for weekend breaks from Addis and is a common choice for conferences and work events, it has also found itself at the nexus of multiple migrations including internal migration from conflict, and trafficking. It is the first main stop along the country's newly restored colonial railroad line, and therefore represents an important site of both industrialization and urbanization. As part of this, the municipal and federal government is focusing on city planning in a way that has largely not been possible in older cities such as Addis Ababa.

Due to this combination of urbanization and forced migration, it presents an important site for understanding how to support local government and other actors in receiving forced migrants settling both formally and informally in the city as well as those aiming to move onwards.

The fundamental goal of urban land-use is to ensure sustainable development of urban areas. Through effective implementation it controls urban expansion within the planned boundary, conserves ecologically sensitive areas, ensures effective use of existing resources and balanced development, and supports smart growth. Understanding of the level of plan implementation supports the plans' effectiveness and success, consenting for the enhancement of plans and the planning process in subsequent planning.

Similarly, housing and community development departments commonly lack capacity for property management, and are constrained by state and local laws in the terms for disposition of property. There is a dangerous tendency for local governments to look at land banks as the complete solution to the challenges they face.

Many countries in world have a long tradition for applying land banking instruments as part of an active land policy. The experiences in countries like USA, Europe and Central Asia (ECA) clearly demonstrate that land banking instruments can also be relevant in countries. However, there has so far been no comprehensive document, which could provide practical guidance and recommendations to policy and decision makers, lawyers and land tenure professionals in our country.

(Kuria *et al*, 2009). A Geospatial Information System is a unique geographic database that can provide a great deal more problem solving capabilities than using a simple mapping or adding data to an online mapping tool. Some of the benefits such a system offers include: increased efficiency, increased revenue, better communication within the organization, better decision making, better storage and updating of data, efficient information retrieval and the ability to trade in the data collected.

The main objective of the research was study is identify the major challenges of land banking practices and examine its feasibility study by creating Geodatabase for efficient land banking security system to display the location of vacant land in landbank and attach the information of the customers and aid in the processing of land transfer. This will be accomplished through showing the distribution of the vacant land Bank, countering fraud in the land banking sector in the office by connecting land parcels with customer information,

minimizing human error during data entry by maintaining a single database and putting in place mechanisms to validate data entry and assigning responsibility for database modification.

Lack of modern land information system especially cadaster is also one key challenges for BoleSubcity land banking office. Although the use of Auto Cad and other application software such as excel for recording land information is much better than the old manual system, such system is prone to problems like overlapping of polygons which can lead to land related disputes if the recording and/or drawing is not done with care. More than half of both resident and professional respondents also agree that the land banking office in Bole sub city lacks modern land banking system. This, in turn, can result in increase of illegal land grabbing and expansion of squatter settlement which deteriorates revenues collection, investment promotion, and satisfaction of different stakeholders such as the public and private investors.

1.2. Statement of the problem

Land banks play vital roles in the process of converting vacant, abandoned, and foreclosed lands into economically productive use. The creation of lands bank is a good indication of incapability of conventional real estate market to acquire and redevelop such properties of legal and administrative problem (MISCHIU, 2019). Report made by the Adama City administration in June 2021 show that it has lost over 16 million birr because of illegal land grabbing by real estate developers and the problem of implementing projects or entering into action in the specified time by these developers on the lands that they acquired for various developmental activities or projects such as provision of houses for high income groups. In a bid to curb such problems the city administration has exerted utmost efforts to return about 43,500 square meters of land which was illegally grabbed by different real estate developers in different sub cities of Adama City into its land banks. This research will aimed to Identify the major challenges of land banking and feasibility of land banking attempts taking Bole sub city as the case study.

Problem Justification The area was chosen for study because it represents a part of The urban pattern that is almost partially developed and has an established physical pattern that is difficult to change (Azizah Ismail, 2019). It is the area in which our urban problems are most serious and numerous, and is one in which there is a great need for replanning and rebuilding.

The presence of vacant land here indicates that is being used, and suggests the possibility that such land might be useful for the rebuilding of urban areas. The Choice of a community for a study area was made arbitrarily; guided solely by the factors of proximity, accessibility, and the availability of information (ORBICON, 2015). Several papers have been published on the same journal expressing different opinions and analyses. Moreover, challenges of land banking based on theoretical analysis, Evans (2004) agreed with Flenchner (1974) that land banking practice gives city governments power to intervene in the land market, resulting in either higher or lower land price by setting the expected growth of the value of the location.

1.3. Objective of the study

1.3.1. General objective

The general objectives of this study is identify the major challenges of land banking practices and to show the role of geospatial technology in improving land banking system in Bole sub city, Adama City.

1.3.2. Specific objectives

The specific objectives are to;

1. Identify the main challenges in land banking practice.
2. Assess the institutional capacity of land banks in addressing problems in Bole sub city.
3. Show the role of geospatial technology in improving land banking system.

1.4. Research Questions

The following research questions are designed as follows.

1. What are the main Challenges of land banking practice in Bole sub city?
2. How effective is the institutional capacity of land banking in addressing problems related to land banking in sub city?
3. How are Geospatial technologies helping us to manage and challenges of land banking problems?

1.5. Significance of the study

The significance of this study is supposed to have the following; for city administrative it will give an important input for Experts in urban land banking systems. Also it serve as an important asset for urban land banking institution in Adama City especially on how to address problems related with land banking practice. Generally it will also play an important

role in forwarding ways on how to develop well organized land banking systems in the City so as to satisfy the needs of the customers with better service. topic will serve as a spring board for future researchers or individuals who want to undertake studies on land banking or related areas in different country, city and towns.

1.6. Scope of the study

The scope of this study involves Bole sub city of Adama Town and is meant to address the challenges of land banking practice in the sub city. The sub city constitutes around three kebeles.

However, from those Kebele's the study bounded to only two kebele (Goro and Dedacha Arara) kebeles will be the main target of the study for sampling purposes. Moreover, the study will be limited to the challenges of land banking practice in content.

Based on available primary and secondary data, the research will draws general picture of the sub city's land banking by assessing practice and challenges. The updated Aerial photo of city were used to identify the different land covers, sample coordinate points will collect using handheld GPS for confirmations of current land uses.

1.7. Delimitation and Limitation of the study

This study aimed at Asses challenges of land bank and its feasibility in study area.however, due to the existing limitation of availability of data, and intended depth of analysis, land Uses details are not considered in this study. Like all other scientific researches, this study has some limitations. The study try to assess the challenges of land banking in the case bole sub city by taking only most important variable at sub city levels. In addition there was limited data avilable during data collection.

1.8. Organizations of the Thesis

The thesis paper generally comprises of five chapters beginning from introduction (explaining backgrounds of the problem, setting purpose and objectives) and ends at analysis, results and discussion. Chapter two reviews of literature terminologies and technical problem solving methods from the literatures. Both theoretical and empirical concepts of land banking challenges anf feasibility study are explained in detail. Primary the challages of land banking geospatial related literatures that describe efforts on land banking system at a global, continental, country and local contexts and participatory organizations reports are also summarized. In Chapter Three, Historical, Physical and backgrounds of the study area is explained in detail.in this chapter also presents the research design,

methodology and methods followed as well as the backgrounds of implemented data are involved. Brief description of data and datasets used as inputs of analyses is also specified in the same chapter. Chapter four analyses and discusses the practical solutions of the problem towards the achievement of the designed purpose and objectives set in chapter one. The thesis is finalized by Summarization, Conclusions and Recommendations of the author in this last chapter(five).

2. LITERATURE REVIEW

2.1. Theoretical Framework

There is no one single definition of land banking. The land banking concept can be applied in a variety of different ways depending on the context and whether it is applied by the private sector or public sector. Land banking is not only a tool for public authorities it is also used by private investors speculating on land value as a profit making endeavour.

The concept of a land bank is to acquire and purchase vacant and underutilized property with the future goal of productive reuse of the land (GLEFC, 2005). Land is a term widely used throughout the world but definitions are not frequently given. Our objective is just to fix the appropriate limits when approaching land cover and land use, to describe the physical foundations; the reference areas to be taken into account for land cover and land use. As a first rule, consider the objects above Earth's surface. This approach is easily understandable for land cover. For land use, the situation is definitely more complicated. In most African countries, land lies at the heart of social, political and economic life; it also has a major historical and spiritual significance. At one time, land was deemed as an almost inexhaustible resource in Africa, but the rapid population growth and market development are creating mounting complication and pressures on it, especially on land close to towns and cities and land of high productive value (World Bank, 1999).

Land is a major source of income of the public through efficient and effective property tax, direct tax on land, rent on public land, development land tax, capital gains tax that need to be guided by the available land policy and management. Good land management helps to improve the social and economic lives of millions of poor people. But little seriousness is shown for rational land management. The result of this is shown in a continuous increase of land prices leading to land speculation, scarcity of developed urban land particularly for housing and to the proliferation of slums and extra illegal settlements with little or no infrastructure services (Alexander; 2011).

Many countries in Western Europe have a long tradition for applying land banking instruments as part of an active land policy. As mentioned before, researchers very often focus on only a specific aspect of the development process or a specific criterion. Consequently, there is little research documented that encompasses all significant key criteria. For instance, Van Dijk and Kopeva (2006), Gilbert (2009), Tian and Ma (2009),

Aryetey and Udry (2010), Coimbra (2011), and Zhang (2012) recognized the importance of governmental influence to land bank development success.

The researcher Marosan *et al.* (2014) focuses on defining the value framework for evaluation of land banks/funds. Other researchers, considered other perspectives. Feeney *et al.* (2000) interviewed students about the issue of one's background beliefs when interpreting information; and (Fujii, 2016) studied key actors to evaluate the impact of land banks and community development corporations and the impact of land banks and community land trusts, respectively. Further, Fisher and Robson (2006), Sheykh *et al.* (2013), Valtonen *et al.* (2017) researched the importance of risk analysis and used a combined methodology of secondary data and a case study/studies. Finally, governance was also found to be a key criteria of land bank development projects (Green *et al.*, 2016). The investigation was based on some form of primary research (survey, case study, or observation) in each of the aforementioned articles.

Other researchers were more comprehensive in their coverage of key challenges of land banking but attempted to categorize them differently.

Wang *et al.* (2011) using grounded theory-based qualitative research. His study conceptualizes thirty key factors and seven trends for airport-city development via interviews with focus groups and experts Based on the research by Natasha and Hassan (2015) highlights four independent

2.1.1. Land Banking

Land banking involves the purchase of land now for future uses. In the case of open space planning, land banking involves acquisition of land prior to development of an area, or in preparation for needing to mitigate future development impacts. For example land banking can be used to develop a greenbelt, to preserve areas of shoreline, or to protect ecologically valuable land such as wetland. (Alexander; 2011).

2.2.2. Land banking definition

There is no one single definition of land banking. The land banking concept can be applied in a variety of different ways depending on the context and whether it is applied by the private sector or public sector. Land banking is not only a tool for public authorities it is also used by private investors speculating on land value as a profit-making endeavor. Land banking in the context of the public sector in developed countries is most often discussed as a strategy for dealing with: Urban renewal, Preserving open spaces and Stabilizing property

and land values in a particular area (Cleveland State University, 2005). Technically, Land banking is the practice of purchasing land with the intent to hold onto it until such time as it is useful or profitable to release the land for housing or other purposes' (Alexander; 2011). (Smart growth, 2005) A land bank is a public authority created to efficiently hold, manage and develop tax-foreclosed property. Land banks act as a legal and financial mechanism to transform vacant, abandoned and tax-foreclosed property back to productive use.

Generally, land banks are funded by local government's budgets or the management and disposition of tax-foreclosed property. (Van Leeuwen, 2004) In addition, a land bank is a powerful location incentive, which encourages redevelopment in older communities that generally have little available land and neighborhoods that have been blighted by an out-migration of residents and businesses.(Edward and Bradshaw,2003) While a land bank provides short-term fiscal benefits, it can also act as a tool for planning long-term community development. Successful land bank programs revitalize blighted neighborhoods and direct reinvestment back into these neighborhoods to support their long-term community vision.

Land banks are not financial institutions. They are public or community-owned entities created for a single purpose: to acquire, manage, maintain, and repurpose vacant, abandoned, and foreclosed properties the worst abandoned houses, forgotten buildings, and empty lots.

Land banks across the country are often created to replace an antiquated system of tax foreclosure and property disposition. Land banks replace those liquidation¹¹ based systems generally comprised of the sale of tax liens (the uncollected tax receivables of a given municipality) or public tax auctions are essentially liquidation systems, wherein government trades their interest in tax-delinquent property to speculators, often for pennies on the dollar. Those systems place a higher premium on the modest collections derived from such transactions, with no consideration for the impact such a transaction will have on surrounding properties. That impact, in cities across America, is devastating to a neighborhood struggling to hold its own in an already weakened market. Those local governments sell interest in properties to investors who view property not as real estate, but as an investment on paper to be sold to another investor or simply represent a loss in the larger pool of properties or tax liens they may have acquired. It is rare that such sales lead to reinvestment in those properties. Families don't shop for the family home at tax lien sales,

and developers don't seek the site for their next multi-million dollar deal at the courthouse auction.

A land bank is the alternative to such systems, as they give communities the opportunity to repurpose abandoned properties in a manner consistent with the communities' values and needs: demolishing unsalvageable homes and creating open green space or a community garden, restoring interesting buildings, or simply holding land in careful stewardship until a new purpose can be determined. Land banks treat properties as real estate, not as a disposable commodity that, once used, no longer has a meaningful purpose (www.hud.gov/nspta).

2.1.3. History of Land Banks

Land banks first emerged in the 1960s as an urban planning tool. Over the past two decades, land banking has become an increasingly important tool for cities challenged by vacant and abandoned properties. Many urban industrial centers throughout the nation were built for populations that simply were either never achieved or that were abandoned due to sprawl.

The Ohio land banking legislation has become a model for other states, such as New York and Georgia. County land banks are nonprofit organizations whose mission is to strategically acquire properties, and return them to productive use, reducing blight, increasing property values, supporting community goals, and improving the quality of life for county residents. While each county land bank is somewhat different, customized to the unique needs of the community it serves, land banks typically have three main functions.

Acquire and consolidate vacant parcels through purchases, donations, or intergovernmental transfer from public foreclosure holdings. Clear title to land and prepare parcels for transfer to a third party for redevelopment or reuse. Prioritize land for disposition or reuse, selling land for redevelopment to a third party.

Dan Kildee founded the Genesee County Land Bank. Kildee is nationally regarded as a pioneer in community development and neighborhood stabilization. Kildee delivered the keynote address at The First Convening of Ohio Land Banks in Cleveland in 2011. The opportunity ahead today, Thriving Communities Institute is helping counties across Ohio establish their own land banks.

By definition, a parcel of land is a unique commodity fixed in location and not interchangeable with competing products. Unlike the demand for discrete products that are

fungible in nature, the inelasticity of the land market does not generally allow prices and consumption to adjust to relative demand and available supply.

Furthermore, property titles consist of sets of separable but connected interests which, when held by parties disconnected from each other and from the land, leads to a variety of dysfunctional conditions. Land banking offers an approach to resolving these market inefficiencies.

2.1.4. Land Inventory system

Land inventory is the process of counting any property, with a particular focus on public and state ownership, which is a map and human resource, and is essentially a collection of data showing ownership, size and service (Ayida, 2021) cited in (Abebe, 2010). It is also a data base of the lands and their uses within the community including both developed and undeveloped land. Land inventory is conducted to specify and define land management unit locations, their boundaries without onsite fixations, identification of unused, irrationally used or misused lands and other land characteristics (Housing, 2004). Land inventory is a way of promoting land management systems (LMS), land management, land development, planning for land use, land transactions, and management of natural resources.

2.2. Land banking system in Europe and world Experience

At the world wide there are so many practice While land banking is a widely applied land management instrument in Western Europe (e.g. in Belgium, Denmark, France, Germany, the Netherlands, Portugal, Spain) the analysis clearly identified that efforts to introduce full scale land banking instruments in Central and Eastern Europe have until recently largely failed. The examples of Western European countries, which apply different types of land banking functions (e.g. acquisition and sale and lease facilitation) show that land banking may be efficiently used in different conditions and adapted accordingly (Gorgan, M. 2020). Different countries apply different combinations of land banking functions. Some of the Central European countries (e.g. Croatia, Hungary, Lithuania) have made efforts to apply some of these land banking functions in their national context, assigned responsible institutions and conferred them some of the necessary rights to operate. However, mainly due to the lack of a clear and sustainable policy on land banking these efforts have so far failed. The experiences show that clear policy decisions must be made to start a successful implementation of the instrument and a long-term policy vision established to make land banking sustainable.

As seen in recent FAO projects related to land management in Eastern Europe and Central Asia, there is in a number of CEE countries (e.g. Armenia, Azerbaijan, North Macedonia, Montenegro and Turkey) clearly a renewed interest to explore the options to develop land management instruments such as land banking (including the lease facilitation) and related instruments like an active management and privatization of state-owned agricultural land. The interest and need for such instruments is driven either by the need to support the introduction of land consolidation and building up fully operational national land consolidation programmed or by a political wish to combat excessive land abandonment. Some countries have both drivers at the same time. Agricultural land markets are in general still weak in many countries in Eastern Europe and Central Asia and the above mentioned land management instruments including land banking are strongly contributing to their development. The ongoing and planned FAO project activities at country level will greatly benefit from the identification of good European practice for land banking.

2.3. Land Bank Benefits

While abandoned and vacant properties depress property values, discourage property ownership, and attract criminal activities in the surrounding area, a land bank provides tools to quickly turn these tax-reverted properties back into usable parcels that reinvest in the community's long-term vision for its neighborhoods. Land bank programs act as an economic and community development tool to revitalize blighted neighborhoods and business districts. Land banks can benefit urban schools, improve tax revenues, expand housing opportunities, remove public nuisances, assist in crime prevention and promote economic development. (Detroit.Kirwin2004)

2.3.1. Land Banking Feasibility

Land banking has been applied in the Ethiopia for many years both by public sector entities, such as government funded development corporations and by private entities, either to provide housing and other needs of employees, or for future profit. It is not surprising that this rapid population growth has put pressure on the local real estate market, resulting in rising costs for unimproved land to support new residential development. The feasibility of a Land Bank program must be considered in light of the objectives for the Land Bank program. The primary objectives for the Land Bank program include: Establish a program that will facilitate the production of affordable housing by providing land that affordable

housing developers can feasibly purchase. Establish a program that can help to ensure that appropriate sites will be available in the future for the development

2.4. Challenges of Land Banking

While many benefits to establishing land banks in communities, there are also many challenges in operating and maintaining them. Several U.S. municipalities have had challenges with running their land banks. Atlanta's land bank has a lack of sufficient acquisition funds for both Community Development Corporations (CDC) and the land bank authority (LBA). (<http://www.lisc.org/resources/>).

In addition, they have a need for ongoing improvement Coordination among community development departments of local governments, the LBA and the Tax Commissioner (Andrew Whitaker, 2018). Cleveland's land bank challenges are the capitalization of projects, the CDC's limited capacity to take and rehab land acquired from the land bank and the time consuming administrative procedures, including the legislative process and aldermanic approvals. (Ibid,2005) CDCs want the City to go beyond supporting primarily tax-delinquent vacant properties and take the lead on tax delinquent properties that have existing structures and the possibility of environmental contamination. (Ibid, 2005) Genesee County's land bank challenges are whether urban tax-reverted properties have enough value to be purchased, even with the latest Land Bank Fast Track legislation. (Wyckoff, Mark. 2003) In addition, there are concerns whether there will be enough revenue generated by the sale of these properties to pay the costs associated with administering a Redevelopment Fast Track authority.

2.4.1. Vacant and Abandoned properties

A vacant property/land as has been empty for a minimum of six months and has had no construction done on it for six consecutive months. Many times, people think vacant properties are abandoned; in fact, a vacant property is not the same as an abandoned one. It's a fine line but an important distinction. (Yinesu, 2019) Over the past 40 years, a combination of conditions in many cities around the country has resulted in a growing incidence of vacant, abandoned, tax-delinquent, and foreclosed properties. There is extensive debate on what drives the life cycle of neighborhoods, from periods of decline and deterioration to their renaissance and rejuvenation. A much greater consensus exists as to the harms vacant and abandoned properties inflict on communities. As potential fire hazards and sites for drug trafficking, vacant and abandoned properties signal to the larger community that a

neighborhood is on the decline, undermining the sense of community and discouraging any further investments. These disinvestments often spread across neighborhoods and affect the overall health of a city.

While both pose significant problems, vacancy and abandonment are not synonymous. Vacant can be defined as property that is unoccupied. It is more common in commercial areas, and oftentimes a property is vacant simply because a property owner is holding onto it as a long-term investment. Abandonment, on the other hand, is a far stronger concept.

An abandoned property suggests that the owner has ceased to invest any resources in the property, is foregoing all routine maintenance, and is making no further payments on related financial obligations such as mortgages or property taxes. Though abandoned by the owner, tenants may still occupy the property, or squatters may live there without permission. Properties that are vacant and abandoned are often tax- delinquent as well. In fact, property tax delinquency is the most significant common denominator among vacant and abandoned properties.

Tax-delinquent properties are problematic for local governments not only because of the likelihood that they are vacant and abandoned, but also because of their negative impact on tax revenues. While some property owners may fail to pay property taxes due to a lack of financial resources, others choose to milk the equity from the property and then abandon it. The lengthy periods of time required by antiquated property tax foreclosure systems only encourage a property owner's decision to neglect further investments.

The prevalence of vacant and abandoned properties never occurs in a vacuum. It always occurs in a particular set of social and economic conditions heavily influenced by federal, state, and local policies and by social and cultural biases.

Public policies may create stable neighborhoods but they also may create conditions which lock the poor into urban slums replete with deteriorating properties. Class and race are reflected in, if not embodied by, land use plans, and the neighborhoods in decline tragically receive the fewest resources. No attempt to confront growing inventories of vacancy and abandonment can succeed without acknowledging the social and cultural biases that shape our policies. (Frank S. Alexander, 2015)

2.5. The critical elements for successful land bank initiatives

There are four critical elements for successful land bank initiatives

(a) Connect the Land Bank to the tax collection and foreclosure system.

Tax collection is the principal interaction with abandoned properties as owners typically do not pay taxes on abandoned property. The effective use of the governments 'superior tax lien can be the primary mechanism of acquisition of the properties. Further, connecting the economics of tax collection to the management and disposition of properties coming through the process is a critical element. The land bank model captures that revenue stream and utilizes those financial resources to manage the properties held by the land bank. In both scenarios, the property would be lost to the owner this improved' system simply places that process and the earnings derived from the collection process under the control of the community, not out-of-state speculators. It is imperative that any such public system include a strong foreclosure prevention effort.

(b) Scale the land bank at the metropolitan level, or around the most diverse real estate market possible.

Land banks are most effective when they are not relegated to ownership of only the worst of the foreclosed or abandoned properties. A common fallacy of tax foreclosure or property abandonment is that it is all junk property. While most of the properties titled to land banks would meet that definition, it is the case that a small percentage of tax-foreclosed properties have some market value occasionally significant value. By scaling the land bank around a diverse market, the possibility is increased that more valuable properties conveyed to private ownership through a land bank will generate revenues to be used in managing and improving the most difficult properties.

(c) Ensure a Land Bank is policy driven and transparent in policies and transactions.

The public for good reason is often suspicious of any government role in the real estate market. In the case of these properties, of course, the government already owns the property as a result of tax foreclosure. Still, it is critical that the operation of a land bank be fair and predictable. To build public confidence in a Land Bank, the adoption of well-considered policies and priorities that govern to whom and for what purpose properties are sold or transferred. Terms and pricing policy must be clear and uniform, as well.

(d) Emphasize community engagement and participation.

The land held by Land Banks is typically scattered among neighborhoods throughout the community. So, the Land Bank has neighbors, sometimes thousands of them. The most successful Land Banks engage those neighbors on the policies and practices that determine the outcomes for those neighborhoods. Public acceptance of the hard choices that will

inevitably need to be made regarding property held by a Land Bank is much more likely when those neighbors have a voice a formal voice in policy and operations. By formalizing that process, through regular neighborhood meetings, and in some cases with the formation of a Community Advisory Council, Land Banks get public input on terms that make that input more meaningful than if that input comes in the form of uninvited anger or frustration with land use decisions. Sources (www.hud.gov/nspta).

2.6. Empirical Review

While numerous descriptive accounts and legal papers have been published on the topic of land banks, to the best of our knowledge, there are many literature review evaluations has been done in the past Among them;

Huang. D., (2012), conducted a study on “*Land Banking Mechanism and Its Effects on Urban Development: A Case Study of Guangzhou, China*” The main purpose of the study attempts to explore land banking mechanism and its effects on urban development comprehensively in lights of theories of new institutional economics and urban spatial structure applying the diachronic public policy analytical framework. Spatial data for land supply records since introduction of land banking mechanism are collected and processed with GIS software.

The data methods of Exploration on data collected through GIS analysis illustrated that land banking mechanism strengthens city government’s capacity to instruct changes in both macro level urban form and micro level-built environment.

Methods of data Analysis on statistics data and budgetary reports of Guangzhou Municipal Government demonstrates that with land banking mechanism gains of Land Use Right conveyance are providing supplement income for the city government, which is approximately 30% of the traditional tax-based fiscal income. Financing values of Guangzhou city’s land bank are developed by land banking loans and establishment of the urban development financing platform. Supplement fiscal income and financing values of land banking greatly improve local governments’ leading role in urbanization process mainly through investment on urban infrastructures.

As a result A total of 53.98 billion RMB yuan for land development and local facility provision will be funded through land banking operation within the new town; 21.99 billion RMB yuan will be allocated for the compensation of land resumption from collective villages and for the rebuilding of housing for the rural community; 12.6 billion RMB yuan

will be spent for municipal and public facilities (including local road network, local municipal facilities, urban green space, schools, hospitals, etc., excluding metro lines and expressways); 3.149 billion RMB yuan will be spent for land resumption and compensation for current industrial sites; and the remaining 7.04 billion RMB yuan is for tax and other unexpected expenses.

Findings in this study show that both LUR sales income from land banking mechanism and loans or debts secured by the city land bank contributes a significant amount of investment to urban development.

Tariku. Y., (2019) Conducted a study on “*The challenges of land banking in Addis Ababa; the case of kolfe keranyo sub-city*” The main objective the study was of identifying the main challenges of land banking practice in kolfe keranyo sub city of Addis Ababa city. the study also evaluates the major problem from which Report made by the Addis Ababa city administration in November 2010 show that it has lost over 96 million birr (5.8 million Dollar) because of illegal land grabbing by real estate developers. The study co-found the problem of implementing projects or entering into action in the specified time by these developers on the lands that they acquired for various developmental activities or projects such as provision of houses for high income groups.

Data collection methods they used for the study was Stratified random sampling and purposive sampling techniques were used to get appropriate data and address the main objective of the study. As the result the study has found out that the main challenges of land banking in kolfe keranyo sub city in particular and Addis Ababa city in general include poor organizational structure, lack of modern land information system, weak financial sources, lack of skilled manpower and weak urban governance system.

Finally, they conclude Lack of well-defined organizational structure is one of the most serious challenges of land banking practice in Addis Ababa city in general and kolfe keranyo sub city in particular. Although the land banking was established in 2009/2010 under land development, banking and urban renewal project office, there is no clear directive on organizational structure of the office as yet. Shortage of adequate skilled manpower is another challenge of land banking practice kolfe keranyo sub city of Addis Ababa city.

Generally, we recommend if the study was used spatial data and verification with map its useful and strengthen the study.

Griswold and Norris. (2017) Conducted with the title “*challenges of land banking A study by Michigan State’s Land Policy Institute*” found that residential properties that could be acquired by the Genesee County Land Bank had much larger negative impacts on surrounding property values than did vacant lots (Griswold and Norris, 2017). Because the residential structures eligible for land bank acquisition (land bank inputs) reduced surrounding property values more than vacant lots (land bank outputs), the authors concluded that the land bank’s demolitions increase surrounding property values.

This study evaluates the effectiveness of the land bank by estimating spatially corrected hedonic price models using sales near the land-bank homes. The land bank reduces the negative externalities of the properties it acquires. Its largest impact is the preservation of equity in unsold homes. they also estimate the recovered value for homes sold during the study period and the property tax revenue that may have been forgone, absent the land bank.

Problem Faced with the challenges of blighted properties at a never-before-seen scale, the central counties of Ohio’s eight largest urban centers each established land banks under the new authorizing legislation. The key features of the new entities will be mentioned here, and more detailed descriptions can be found in Alexander (2005) and Fitzpatrick (2010). Ohio counties that establish a land bank can permanently allocate to it a portion of the county-wide collections of delinquent property taxes. The new land banks are also allowed to seek state, federal, and philanthropic grants. Bonds can be issued by new land banks and the proceeds used to acquire and demolish properties.

A purposive sampling technique was used to select the respondents for the study and data was collected using structured questionnaire. Using data from when the land bank began acquiring properties through and they determine the impact that properties we know will be acquired by the land bank has on surrounding property values. They also determine the impact that post-demolition properties have on surrounding home values. These estimates are in addition to our estimates of the negative externality from vacant lots and tax delinquent properties, as in Griswold and Norris.

As a result, the land bank evaluated here, the Cuyahoga Land Bank, acquires some properties through property-tax foreclosure, but a majority of its inventory comes from foreclosing lenders. Individual lenders have entered agreements such that any property they foreclose upon valued below a certain amount (such as \$20,000) is donated to the Cuyahoga Land Bank.

The lenders frequently include a contribution to cover part of the cost of demolishing the home. The land bank has been able to sell some properties to community development corporations and vetted private redevelopers. However, most of the properties acquired by the Cuyahoga Land Bank would cost more to repair than could be recovered by their sale, so they will eventually be demolished.

David e. Mischiu. (2019) conduct a study on “*A critical review of land banking in the United States*” the main objectives of this study were critical evaluation of land banking’s on the ground activities through case studies offers some context to the otherwise largely positive narratives quantifying land banks’ successes over time that have been incorporated in most land bank program evaluations and policy studies thus far. Land bank activity reports have focused on quantitative metrics by which program objectives and results are compared; number of properties sold, amount of revenue generated, number of community partnerships.

In other word the study also identifies the problems faced by Flint, Genesee County, and many other Michigan localities by the late 1990s were by no means unique or locally specific. Negative effects on municipal tax revenues and operating budgets caused by deindustrialization, population loss, disinvestment and abandonment were already well established in many northeastern and Midwestern localities. Michigan’s identification of property abandonment as a problem in need of policy attention followed largely in the footsteps of other states, including Missouri, Ohio, Kentucky, and Georgia. A general focusing of disinvestment in localized urban areas was becoming increasingly discernible in the collective public mind (Beauregard, 1993), even if the specific problem of tax delinquent property abandonment was arguably more nuanced. In Michigan, state and federal policy fixes had been deployed by the early 1990s to address disinvestment in declining or economically forlorn areas through location-based financial incentives (CRC, 1999). The study goes into greater detail on land banking approaches as they are manifest in a few select geographic case studies, and what these case studies suggest regarding influence, motivations, local embeddedness, and equity outcomes of land banking.

While an evaluation of case studies in this vein may offer some lessons of import to other localities (or to those case study localities themselves), the selection of case studies is appreciably limited and, par the course, context-dependent.

Finally, they conclude the Evaluations have relied on quantitative assessments to highlight success, while the very operationalization and indirect effects of land banking and land banks

have not been substantively questioned. Irrespective, the land banking model shows no sign of being substantially altered or renounced any time soon. (Alexander, 2015) Land banks have also been incorporated into economic development policy toolkits, particularly in instances where land banks are not the owners of last resort and have the ability (or the mandate) to build inventory through targeted acquisition. The use of land banking as a tool for economic development harkens back to when land banking was little more than a fringe topic in land use law and urban planning policy circles, proposed as a means of controlling urban growth. While the earliest land banks in St. Louis and Cleveland were reactionary, and developed as a means of controlling urban decline, land banks in the fashion of Genesee County have occasionally reassumed the role of a growth control mechanism.

However, whereas land banking was initially imagined as a means of controlling the outward expansion of urban development, growth management strategies in the latter day involve the revalorization and control over growth within already hollowed-out Urban cores.

2.6.1. Global practice of Land Banking system

Land banking In USA: It is difficult to present a comprehensive analysis of international best practice in land banking given the dominant of USA oriented literature. Recent analysis that has been done again relates primarily to land banking in the USA. Frank Alexander's piece 'A guide for the creation and operation of land banks 'is the most comprehensive description of land banks and it discusses the best practice among the largest land bank in USA. Alexander is at point to point out that each of these land banks is different in its structure, legal composition and objectives and furthermore that each bank is organized according to the need and specification of the city or state in which it is based. Land banks need to be structured to meet the unique needs of their locality, argues (Frank S.A, 2011)

Land Banking in Netherland: In the path of the last 70 years three major developments determined the scope of land banking in the Netherlands:

- From 1930 – 1970 five large areas were reclaimed from the shallow seas in central and northern Netherlands (approximately 175,000 ha).
- During the fifties and sixties large tracts of agricultural land were claimed from nature areas (heath land).
- From 1960 onwards the Dutch Government facilitated a farm restructuring process by subsidizing the exit of inefficient agricultural holdings for the benefit of farm

enlargement of potentially sound enterprises (from 250,000 farms in 1945 to 90,000 at 2011).

2.6.2. Land Banking Practices in Africa

Land Banking Practice in Ghana: Land ownership in Ghana is broadly divided into three, namely: customary ownership, state ownership and split ownership (a partnership between the state and the customary owners). About 80% of land total land surface of Ghana belongs to traditional owners. The rest lands are public and private lands acquired out of traditional land holdings. State lands are those which have been expressly acquired by the state through compulsory acquisition by statute for public good. Such state lands are scattered throughout the country with their boundaries cadastral surveyed and mapped out. They vary in sizes, from small to very large depending on the purpose of the acquisition. Leases of these lands are granted to statutory institutions and private individuals for development (Kwesi, 2010). The government of Ghana has created land information banks in order to facilitate investment in different types of land use such as agriculture, real estate developments, industrial, commercial and other uses. For instance in 2008 a land banking committee were set up to identify potential lands for investments. The assignment of gathering data on available lands for investment was commissioned by the ministry of lands, forestry and mine, ministry of local government, rural development and environment and ministry of food and agriculture.

2.6.3. Land banking Practice in Ethiopia

According to the constitution of Ethiopia (1995), the right to own rural and urban land as well as natural resources belongs only to the state and the peoples of Ethiopia. Land is an inalienable common property of the nations, nationalities and peoples of Ethiopia. In fact the right of Ethiopian peasants to free allotment of land and not to be evicted is guaranteed. Therefore, in order to overcome the aforementioned problems, the new system requires a modern land information system, skilled manpower that implements the system, adequate land market, and good governance for proper land management in order to promote sustainable development through preventing land speculation, squatter settlements and unplanned urban expansion.

The 1994 Ethiopian Constitution draws a broad framework for land policy in the country and enshrines the concept of public land ownership and the inalienability of landholdings.

The Ethiopian Constitution asserts state ownership of land; there are no private property rights in land. Article 40(3) states (Ethiopia Land Policy and Administration Assessment USAID/Ethiopia May 2004).

Constitution has not been forthcoming, and local government officials are reluctant to develop laws and policies that have not been sanctioned by the federal government. However, different regional governments have begun to implement their own policies and land policy is taking shape. Though not formalized, the salient features of these emerging regional policies are similar and appear to reflect a degree of consensus within the ruling party.

A general re-division of land among the households of each peasant association is not anticipated in the foreseeable future because holdings are already so small that it would reduce them even further below subsistence levels. However, this general policy will not prevent individual peasant associations from re-dividing land if their councils deem it necessary.

- Land can be inherited according to the provisions of the civil code.
- Land can be rented, though the government may regulate the conditions of leases.
- The transfer of land use rights between households for compensation does not seem to be anticipated.

2.7. Conceptual frame work

i) Land Acquisition: Land acquisition is a process where government takes possession of land for public purposes for its own use or for private entity by paying compensation to its owner. Land Acquisition Act was of 1894. Recently the act was replaced by Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 which come in operation we 1st January, 2014. (<https://www.quora.com/>). The land acquisition process for land banking is critical. If government entities wish to acquire and hold land, they need to purchase it first. International land banking practice has occurred in situations where the public sector has been able to purchase land cheaply. Given the scale of land purchase for land banking, managing the cost of and is vital.

ii) Land management :Land management is the process of managing the use and development (in both urban and rural settings) of land resources. Land resources are used for a variety of purposes which may include organic agriculture, reforestation, water resource management and eco-tourism projects. Land management can have positive or

negative effects on the terrestrial ecosystems. Land being over or misused can degrade and reduce productivity and disrupt natural equilibriums.

The management of large parcels of land over a long time period requires considerable resources. Maintenance and security issues are vital especially in locations where land is in prime position for economic, transportation and social opportunities. Alexander (2005) recommends that land banking should have a specific geographical focus and that land is purchased for the purposes of productive reuse.

iii) **land development:** Land development means the process of acquiring land for residential housing construction, and of making, installing, or constructing nonresidential housing improvements, including, without limitation, waterlines and water supply installations, sewer lines and sewage disposal and treatment installations, steam, gas and electric lines and installations, roads, streets, curbs, gutters, sidewalks, storm drainage facilities, other related pollution control facilities, and other installations or works, whether on or off the site, which HDA deems necessary or desirable to prepare such land primarily for residential housing construction within the Commonwealth. (U.S.D, of Housing and Urban Development, Office of Policy Development and research, 2016) One of the core functions of land banks is managing the redevelopment of the parcels of land. The land can be transferred to private developers or non-profit organizations. However as public entities, they need to ensure when redevelopment does happen, it does so within the interests of the local community and according to their strategic objectives.

iv) **Land Information System (LIS)** Land information system tell us one central point has to be made. No accountability, transparency, and effective management are possible without adequate knowledge about the qualities and quantity of public land, related legislation and regulations (where is what and what is where). Many governments share a common problem. They do not know where and how much public property they own and what rights are attached to it, where all of the existing information is located in a complex institutional environment and how complete, accurate, reliable and relevant the information is for planning and decision making. There is wide divergence in approaches and institutional arrangements for managing state land information (Treasury Board of Canada, 2000).

Effective and efficient land administration requires a land information system which can be defined as a system for acquiring, processing, storing and distributing information about

land. This requires a formal registration system which is accurate, current and accessible to the public (including online access). Without an information system/land registry no effective land administration can be expected. Land registration is carried out with the prime objective of providing safe and reliable foundation for the acquisition, utilization and disposal of rights on land (AACCSA, 2016).

Land information systems (LIS) are not only a geo-database but are a combination of technology, data, people and institutional capacity. To create a LIS that is a useful way to support urban land management in developing countries, all these components should be in place, and they should have equal attention and be developed at the same level (UN-Habitat, 2012). The fascination with and initial emphasis of LIS on technology (hardware and software) has gradually been replaced with a focus on data. Web-based data sources, and especially the availability of high and very-high resolution satellite images, are important as a spatial data source for urban land management. Many exciting LIS and GIS platforms like Google Earth now exist to present land information that could assist decision-making on urban land management.

The secondary function of land registration is to provide information. Many such registrations will produce cadastral maps that portray the legal parcel and framework of an area. It is generally recognized that efficiency in the property market is enhanced through government aiding security of title through the provision of reliable information about properties through land registration and cadasters.

Grover and Elia (2011) argued that state land is potentially vulnerable to loss encroachment, land grabbing and adverse possession which could be protected through land registration. An issue is to what extent state and public-sector bodies are required to protect their title through registration. They further noted that for those countries in which the state owns the land, the issue of land registration and maintenance of cadasters is not one of the states protecting its interests against potential incursion by the private sector since by definition this is impossible.

2.7.1. Source of Buildable Land, by type Classifications

There are many ways that "vacant land" and "buildable land" can be defined. These was support land banking to control land lots in details. so We have to pick one. An organization that is internally consistent and Classification scheme for urban land also identification of vacant land for land bank development shown in (Figure 2.1).

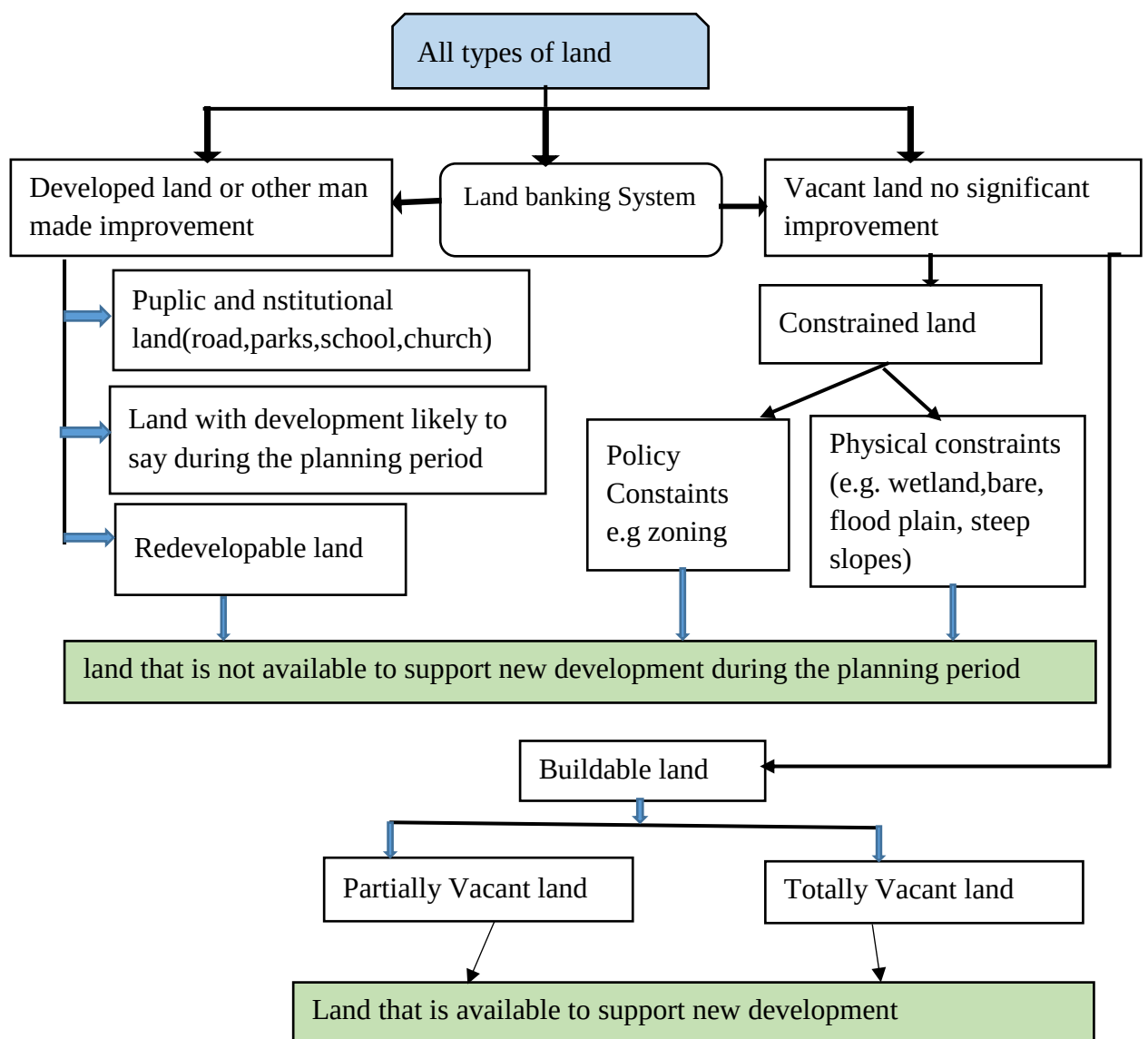


Figure 2.1: Conceptual frame work of the study

The above figure show in two phase diagram the 1st one the land that is not available to support new development during the planning period and the second phase (below Buildable land) is show that is available to support new development during the planning period.

2.8. The Role of Geospatial Technologies in the land banking system.

Geospatial technology is a multidisciplinary field that includes disciplines such as photogrammetry, remote sensing, mapping, geographic information systems (GIS), geodesy, and global navigation satellite system (PunCheng, 2001). As the U.S. Department of labor defined, the geospatial industry can be considered as “an information technology of practical fieldwork that acquires, manages, interprets, integrates, displays analyzes, or otherwise use data focusing on the geographic, temporal, and spatial context” (Klinkenberg, 2007). Ethnological progress relates to geospatial software and analyzes of geospatial data are some of them. The integrated approach of geospatial technologies such as GPS data, remote sensing imagery, aerial photographs, Google Earth and GIS are valuable in the development of modern Geoinformation.

2.9. Lessons drawn from the review

The literature review conducted as part of this study covers both theoretical (conceptual) and empirical literature. The theoretical part provided clear insight to understand the conceptual background on land banking, land inventory of vacant lots, as well as the empirical review parts reveals the experience of different countries on the practice of land banking procedures and livelihood related support provided to sustain affected societies. The major lesson learned from both review parts includes, land acquisition, land transferring, for public purpose needs to follow legal procedures in order to avoid an arbitrary taking of private properties without commensurate payment of compensation. It also indicates the government may be able to purchase land through the land market. government cannot rely on land markets alone to ensure that land is acquired when and where it is needed. In order to obtain land when and where it is needed, governments have the power of compulsory acquisition. This show the government depended on compulsory acquisition in order to provide land at the time of required and at the appropriate location. the conceptual review part clearly identifies that before undertaking any development intervention, understanding the underling conditions, and the geospatial approach solution to the land bank challenges and developing land by modern system, developing database.

2.10. Research Gaps

There are several studies performed recently about Assessing challenges of Land banking and study across the world. The previous sections have given an extensive review of the related theories and studies on the issues of land banking. This review shows that the proposed study on the land banking challenges and its effects on urban development should be conducted based on a multi discipline research framework.

(Ryan McNeil, 2021) The existing literature is too fragmented to facilitate a systematic assessment of the land bank and its challenges. Therefore, revisiting land banking as a government intervention tool for land use policy from a comprehensive approach can improve the understanding of the core issues of the challenges and its possible effects. Such an improved understanding can help create innovations and reforms towards more sustainable development models for different socioeconomic environments (Tsinghua,2012). Specifically, in the field of national research on land banking practices in Ethiopia, many Ethiopians studies report and discuss the significant growth of the practices in the land banking challenges of different cities and counties.

Regarding land Inventory in ethioipan cities and towns urban land creation and management activities are exacerbated by a multitude of issues that together have led to inefficiency, nonresponsiveness to land-related problems, public complaints/dissatisfaction, and artificial land shortages for development against the illegal occupation of large parts of public land by speculators and informal developers (Zeluel et al.,2017). The efficient and effective management of land and its related resources depends on the availability of good knowledge about the land. Some of the studies have constructed a comprehensive and analytical framework with up-to-date theories and research methods. because of the lack early started of land inventory in our country. Without such comprehensive and analytical framework, some fundamental issues, such as the reason why local governments enthusiastically promote land banking sytem in country and the efficiency of the land banking and its effects on urban development, still remain at the stage of preliminary discussions.

3. MATERIALS AND METHODS

3.1. Description of study area

3.1.1. Location Description

Geographically Adama is located in East Shewa Zone, Oromia, Ethiopia. Its geographical Coordinates are between 8°32'00'' to 8° 38' 00'' N and 39°14'00'' to 39°19'30'' E. its altitude height of 1600 meters above mean sea level, 80 km southeast of Addis Ababa. The city sits between the base of an escarpment to the west, and the Great Rift Valley to the east.

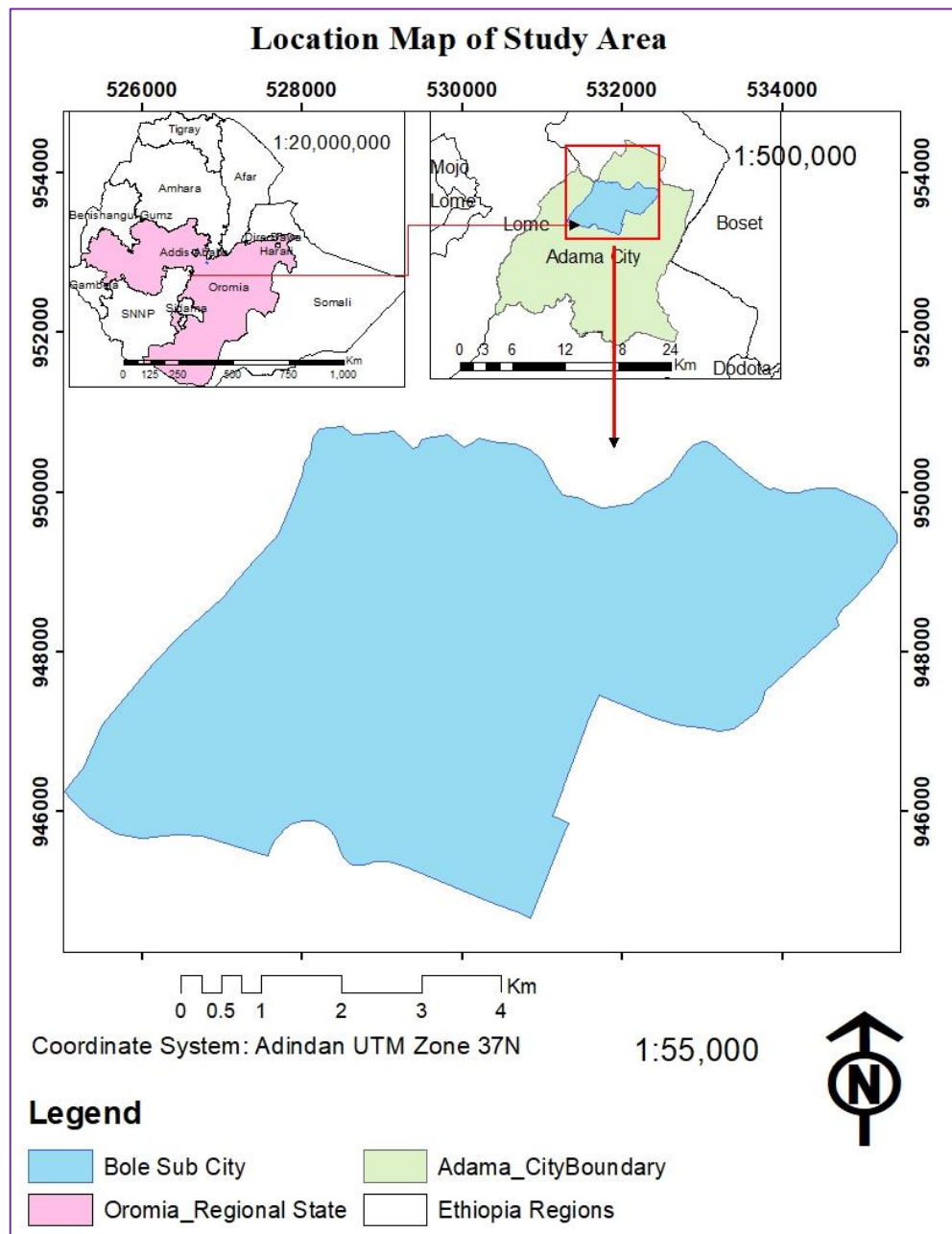


Figure 3.1. Location map of bole sub city Adama.

This study focuses on urban area, where land banking and vacant land are complex arranged. It is clear that the land parcels distribution present vary in terms of in shape and density. To clarify the influence of land parcels characteristics on cadastral boundary morphology, one subcity which include three kebele urban regions are substed and selected for investigate as shown in above figure. separately, as shown in Figure.

3.1.2. Topography

The topography of this study area is characterized by flat land that is surrounded by ridges. The study area is particularly flat with slopes varying between 0 and 40.2% (Figure 3.2). According to the extracted elevation of the study area from DEM, the study area is located along an elevation fall under range from 1614 to 1971m. The topography of the study area is illustrated in (Figure 3.2A and 3.2B)

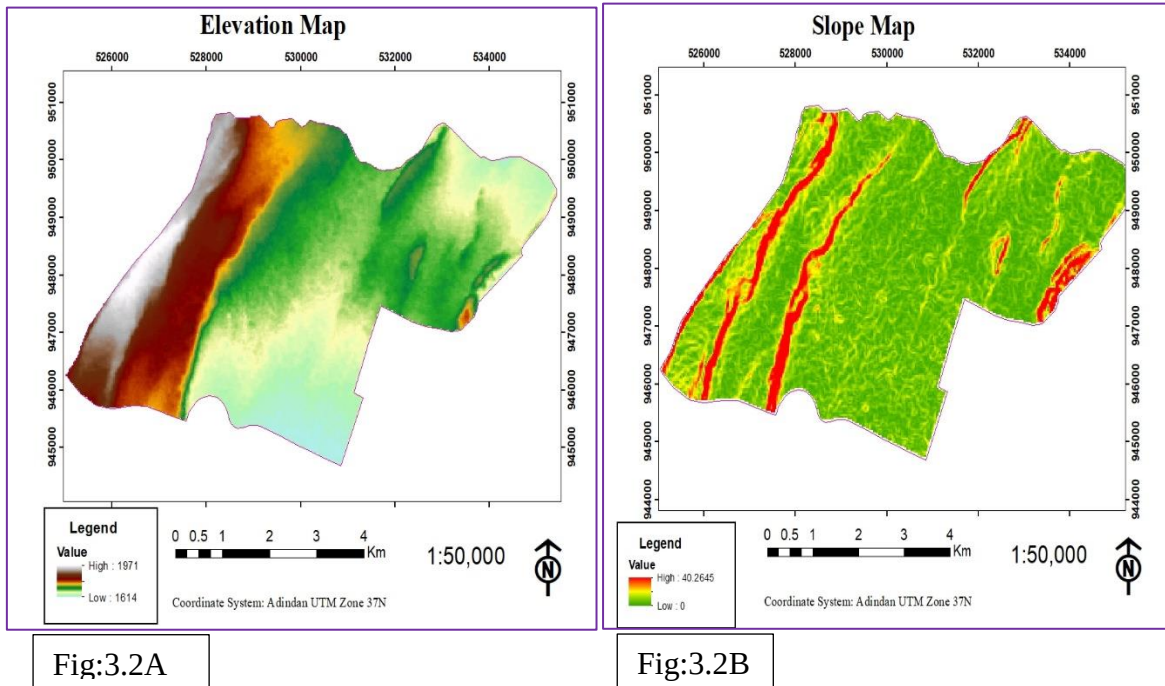


Figure 3.2. Elevation and slope map of Study area

The above left side labeled by figure 3.2A show Elevation map bole sub city and right side figure 3.2B Slope map of bolesubcity.

3.1.3. Climate and Rainfall

Adama Average monthly temperatures and weather, sunny and cloudy days. The Annual rainfall and snowfall in Adama 2015-2021. Average monthly temperatures (day and night), Average yearly precipitation (rain and snow) and days of wet weather per month in Adama. Warm, sunny months for a trip to Adama. In general the City enjoys favorable climatic conditions due to its geographical locations surrounded by plateaus that experiences moderate temperature and rainfall which is favorable for life. Rainfall mostly occurs in the summer season. It receives abundant and heavy rainfall every year during this season. As report on socio economic of addama city during the past five consecutive years the maximum average and minimum average annual temperature was 29.4° c and 15.8 c in the year 2014/15

and 2012/13 (2007 and 2005 E.C) respectively. Similarly, the maximum annual total and minimum annual total rainfall was 934.8 mm and 736.5 mm in the year 2016/17 and 2012/13(2009 and 2005 E.C) correspondingly *sources (Socio-economic profile of Adama, 2020).*

3.1.4. Population and Population Density

According to the last three consecutive censuses conducted in the country, Adama Town showed a large increase in population. In the first Ethiopian population and housing census, which was held in May 1984, Adama had a population of 77,237. The second population and housing census conducted in 1994 reported that Adama had a total population of 127,842 of whom 61,965 were males and 65,877 were females. According to the third Ethiopian population and housing census which was conducted in 2007 (the most recent year for which data are available), 220,212 people of whom 108,872 males and 111,341 females were inhabited in Adama. Based on this the projected population of Adama Town including four subs urban Ganda's under the City administration in 2018/19 (2011 E.C) was 433,046 of whom male 216,046 and female 217,000 (Socio-economic profile of Adama, 2020).

With an area of 35.1164 square Kilometers, Adama has a population density of 2002.794; all are urban inhabitants. A total of 60,174 households were counted in this city, which results in an average of 3.66 persons to a Household, and 59,431 housing units. (Wikipedia n.d). The pattern of spatial distribution of population shows difference among different quarters of the city. The density of population varies from area to area. The central parts of the city have high population density in comparison with the urban expansion areas. The urban kebele with the biggest population in study area is Dadacha Arara (04), whereas, the urban kebele with the least population is Daka Adi and Goro kebele is the second denced kebele. *sources (SCA Socioeconomic profile of Adama, 2020).*

The specific study area of bole subcity include three kebele namely; Dadecha Arara,Goro, and Daka Adi population are described in #Table 3.1

Table 3.1: Projected Population by kebele in 2011 by sex, sex ratio and Population density

Kebele	population			Ratio to total population	Total area in hectare	Population density/ hectare	Sex ratio (F:M)
	male	female	Total				

Dhadacha arara	17,046	18,677	35,723	8.25	256.039	139	1.096
Goro	10,036	9,399	19,435	4.49	54.921	353	0.937
Daka adi	7,650	7,523	15,173	3.5	1683.566	9	0.83
Total	34732	35599	70331	16.24	1994.526	501	2.863

(Source CSA, office Adama socioeconomic profile of adama, 2020/2021)

3.1.5. Land Use Of Study area

The term “Land use” used to describe the human use of land. It represents the economic and cultural activities (e.g., agricultural, residential, industrial, mining, and recreational uses) that are practiced at a given place. Public and private lands frequently represent very different uses. Urban land use comprises which activities are taking place where and their level of spatial accumulation, which indicates their density, intensity, and concentration. (*International Encyclopedia of Human Geography Second Edition*, 2020).

According to Adama City report of 2019 land use in bole sub city is total cover 3175.82 hectare which highly covered by (Open space, Green, Reserved Areas, Recreation and Enviromental Sensetitive Area) cover 53% of other land use exceeding with residential land use which is 30.3% while the rest 17% land use of study area is covered by different landuse as shown below (fig#3).

Land use types description labed in below map

1=Residence 2= Commerce and Businness 3= Service

4=Open space, Green, /Reserved Areas, Recreation and Enviromental Sensetitive Area

5=Administration 6=Industry and Manufacturing, Ware House, Dipots and Worksh

7=Road, Transport, Utilities and Infrastructure 8=Water Bodies

9=Under Construction

10=Mixed use

12=Gorge

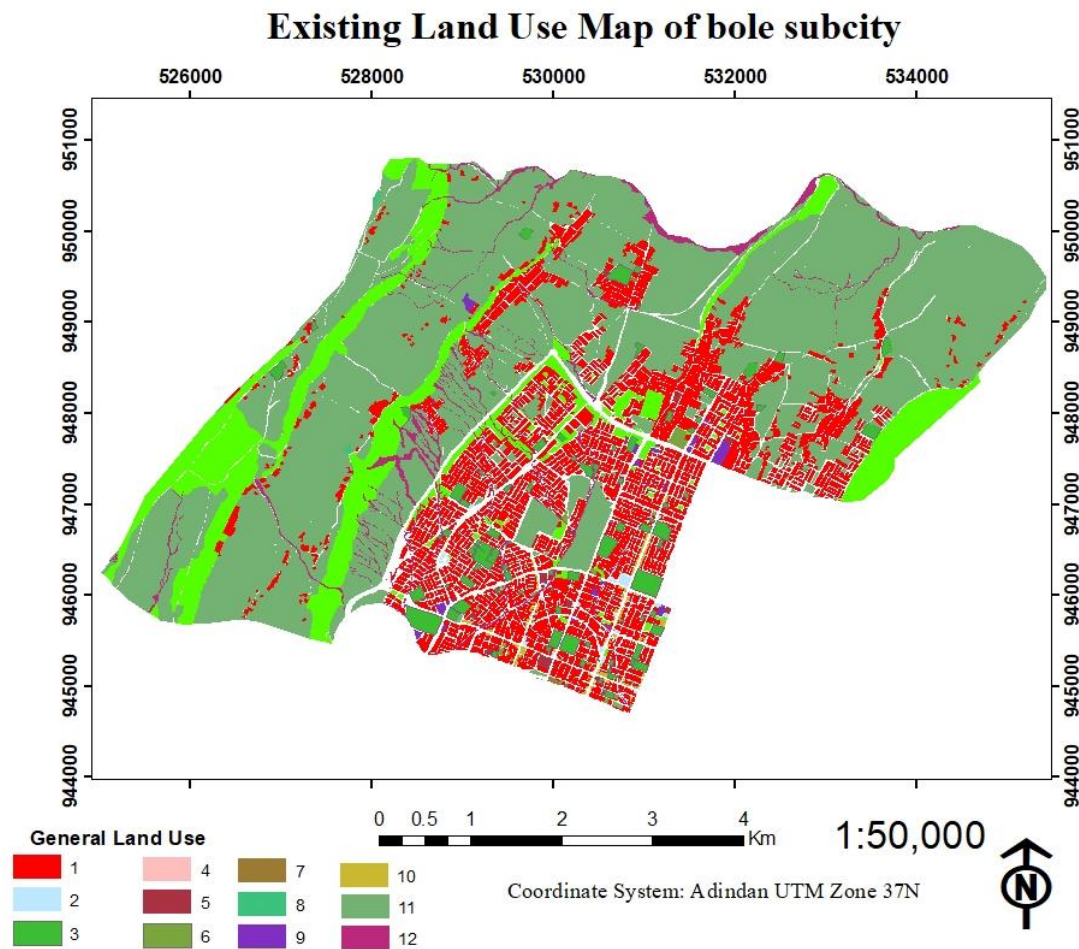


Figure 3.3 land use of study area (Sources AdamaCity structural plan,2019)

3.2. Research design

The main objective of this research is to analyze and the challenges that hinder land banking practices in Bole sub city and view future development of a well-organized modern land banking system in the sub city. The study will use descriptive design and employed mixed (qualitative and quantitative) data in order to address the above issues.

In general the Research design in this study describe details of Approach to the reseach and research types. The conceptual structure or the design of the research project that the researcher followed in conducting the research is essential to clearly define and visualize the whole image of the work. Defining the research design highly contributes towards result findings by showing overall highlights of methods. Therefore, before the commencement of the research techniques, it is imperative to prepare tracks of the research by assembling all the requirements for the problem solving objective.

3.2.1. Approaches to the Research

In this study, spatial analysis, both Quantitative and Qualitative research approaches are implemented to get the final result and it can be known as Mixed Approach as described in research design. Even though the qualitative side has more weightage than the quantitative, it is difficult to attain the objective of the study without the involvement of both. there are different types of researches to be employed based on the goal (purpose), Type of data, Field of study, or the objective of the research.

3.3. Methods of data collection

3.3.1. Data Sources

For this research both primary and secondary sources will be used. The primary data includes questioners and interview. The secondary data sources include secondary document such as land proclamation, policies Central statistical Agency (CSA) documents and internet. Summary of data sources describe in (table 3.2)

Table 3.2. Data types and sources

Data required	Types of data	Sources of data	Software process and Purpose of data
Subcity Boundary	shapefile	Adama Municipality	ArcGis and Erdas(to extract Boundary and Land use)
Satellite image	.tif(2022year), (10m resolution)	USGS	ArcGis and Erdas (LULC_classification)
Aerial photo	.tif(2012,2017 years) (0.15m resolution)	Adama Manucipality	ArcGis and Erdas (Landuse identification)
DEM	Raster/grid	USGS	ArcGis and Erdas (to show Topography of the study area.)

First hand data will collected by employing interview and distributing questionnaire. Interview Will held with concerned government officials working in land banking offices or in land related departments. Questionnaires will distribute to respondents. Secondary data was also collected from land banking offices CSA and others.

3.3.2. Software used

ArcGIS desktop is widely used software for this study. The three components of ArcGIS desktop like Arc Map, Arc Catalog, and Arc Toolbox have been used to create the geodatabase, editing, data management and storage, geo referencing data from different sources, performing spatial analysis, and finally maps layout. (gilo,2021) cited in (Asefa & Mindahun, 2020). In this study, ERDAS imagine 2015 was also another software used to process aerial photo and prepare land use land cover of study area which was then became input for analysis in GIS environment. Garmin handheld GPS was utilized in this study for collection of spatial data (X,Y) and identification current area during field survey.

Table 3.3 Software and Material used for this study

Software/equipment	Software version	Purpose of software's
Erdas Imagine	V2015	Aerial photo, Satellite Image processing
ArcGIS	v10.8(ESRI)	Data analysis, store, process, digitize, edit and map preparation
Google earth	Current version	Identify updated timely land coverage.
MS-Office, Excel	2019(Microsoft)	Writing thesis reports ,Row data process and report
SPSS	V26	Analysis respondent questionnaire & interviews
GERMIN Hand held gps(2m) accuracy		Collection of coordinates from field

3.3.3. Population and sampling Technique

A population is a distinct group of individuals, whether that group comprises a nation or a group of people with a common characteristic. In statistics, a population is the pool of individuals from which a statistical sample is drawn for a study. In order to strike the intended objective the concerned government offices and different agencies, sub city officials and households will be considered as the main target of population.

Target population and Sample: The sample frame for study will include the list of employees of land bank office, relevant Officials, as well as households found in sub-city from sample frame from three kebele of which the researcher will collect relevant data for the study.

Sampling techniques and sample size: For this study, the sampling unit is employees in the office of land banking and transfer office, some selected officials and households in three

kebeles. According to central statistics Agency (CSA) report, there are 70,331 households residing in the study areas. According to the information obtained from land banks and transfer office of subcity who visited the office in the year 2021/22 was 100 out of which 20 from daka adi areas, 30 from Oda areas and 50 from dadacha arara kebele. So as to gain a reliable data as much as possible 50% of the population i.e. 50 people were taken as the sample for this particular study.

Stratified sampling of probability was employed as a sampling method using three different areas as strata and the sample was distributed based on the share of the population of the three kebele (Dadacha Araaraa, AtenaTera, and sole area (local name 07areas). Accordingly, the sample constituted 10 from Dadacha Arara($20 \times 50\% = 10$), 15 from AtenaTera($30 \times 50\% = 15$) and 25 from Bole/07 area($50 \times 50\% = 25$). Besides nonprobability sampling techniques of purposive and judgmental method was used to select government officials working in land banking and transfer so as to get adequate information on land banking challenges from professionals point of view. A total of 25 professionals related to land banking were offered questionnaire out of which only 21 professionals returned the field questionnaire.

3.4. Data Analysis Methods

Data analysis analysis techniques in this study use both spatial analysis and descriptive. spatial analysis of the LULC dynamics and identification of vacant for land bank development in study area using geospatial technology. The data that was collected and analyzed by using mainly software like ArcGIS 10.8, ERDAS IMAGINE 2015, MS-Excel 2019 and SPSS described statistically including percentage, frequency tables and chart will employed in order to answer the research question. The general work flow followed in this research illustrated on next page (figure 3.2).

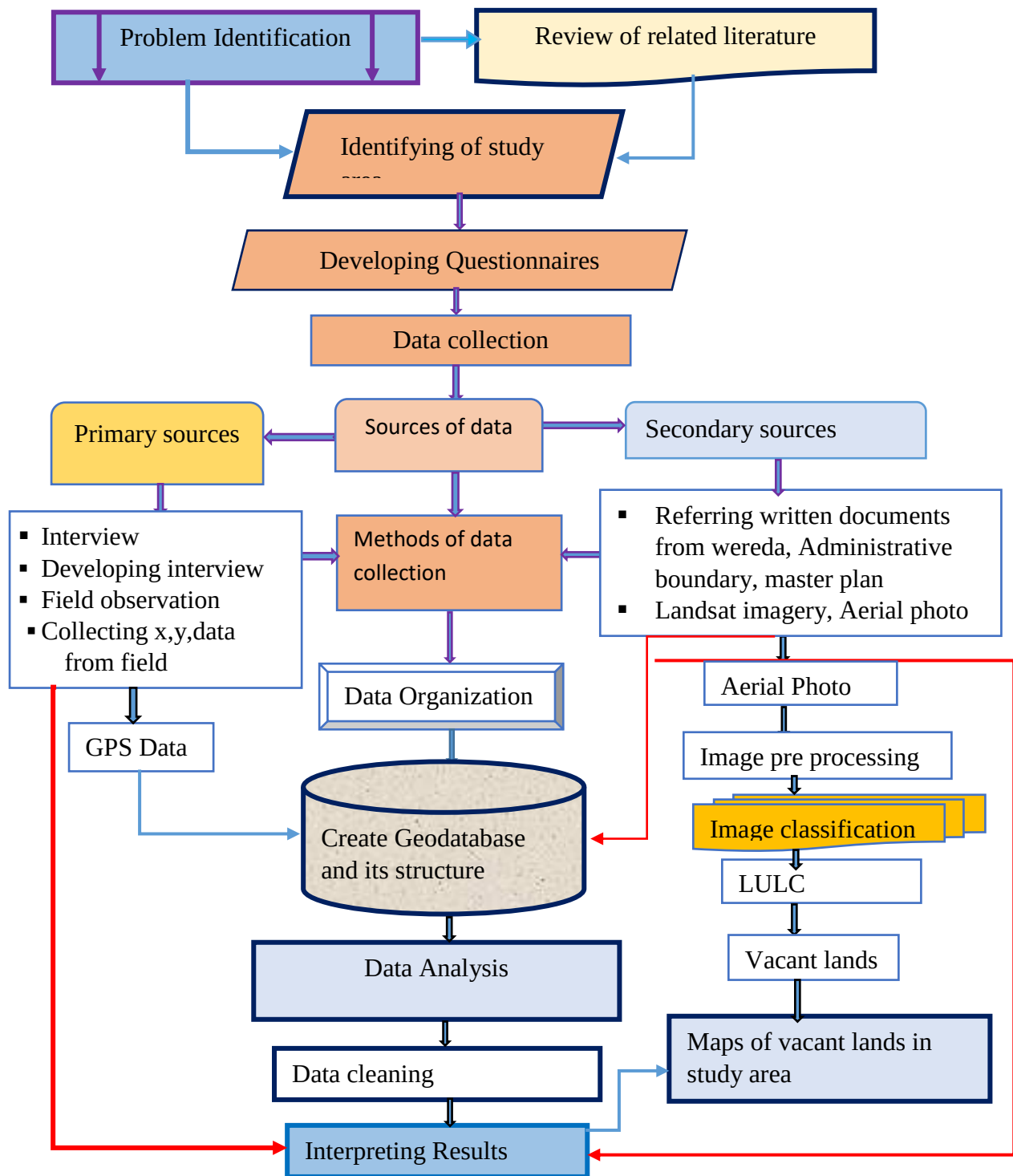


Figure 3.4. Technological scheme of the study.

3.4.1. Geodatabase development and Geospatial analysis tools for Land Banking System

A Geospatial Information System is a unique geographic database that can provide a great deal more problem solving capabilities than using a simple mapping or adding data to an

online mapping tool (Kuria *et al*, 2009a). Some of the benefits such a system offers include: increased efficiency, increased revenue, better communication within the organization, better decision making, better storage and updating of data, efficient information retrieval and the ability to trade in the data collected.

GIS can be a useful tool for decision making supporting verification as it makes location related decisions and analysis very easy. It makes the analysis simple and precise if the inputs are correct. Thus one can have the benefits of analysing spatial data as well as socio-economic data from within a GIS platform. In landbanking someone went to take property/land such as plots and buildings, the use of GIS can be very instrumental since the assets are positioned on the surface of the earth and therefore possess spatial qualities which can be used to accurately locate the asset and all the available information on it.

GIS can be used in the form of an Land Information System (LIS) which contains parcel information such as owner information, parcel size, parcel definition, land use and administrative information. This information can prove imperative to giving institutions when assessing the collateral offered by borrowers and ascertaining their legality, nature and condition of the asset. The LIS may also be used to get legal information such as if there are any charges on a parcel put up as collateral and save the institution a lot of money and time (Khan, 2016).

In this study both spatial and non-spatial information on land holders, vacant land, unregistered and registered properties was collected and stored in a spatially aware database. From this database, a solution was developed that allowed checking land and personal information to be interrogated prior to processing his/her application to take land from land bank. This solution will minimize human error, avoid overlapping of land, reduce fraud in the land banking sector and provide a spatial representation of all property used.

Geodata base design and Creating: A geodatabase is the physical storage of geographic information (spatial, aspatial, metadata, and relationship) inside a relational database management system. It contains layers vector data representing features and raster data representing images and grid surfaces. Each layer represents particular types of features that have been used for spatial analysis.

In this study, a common personal geodatabase was built using Universal Transverse Mercator projection system world geodetic system 1984 to store, query, and manage both

spatial and non-spatial data that could be used for the final analysis to achieve the proposed objectives.

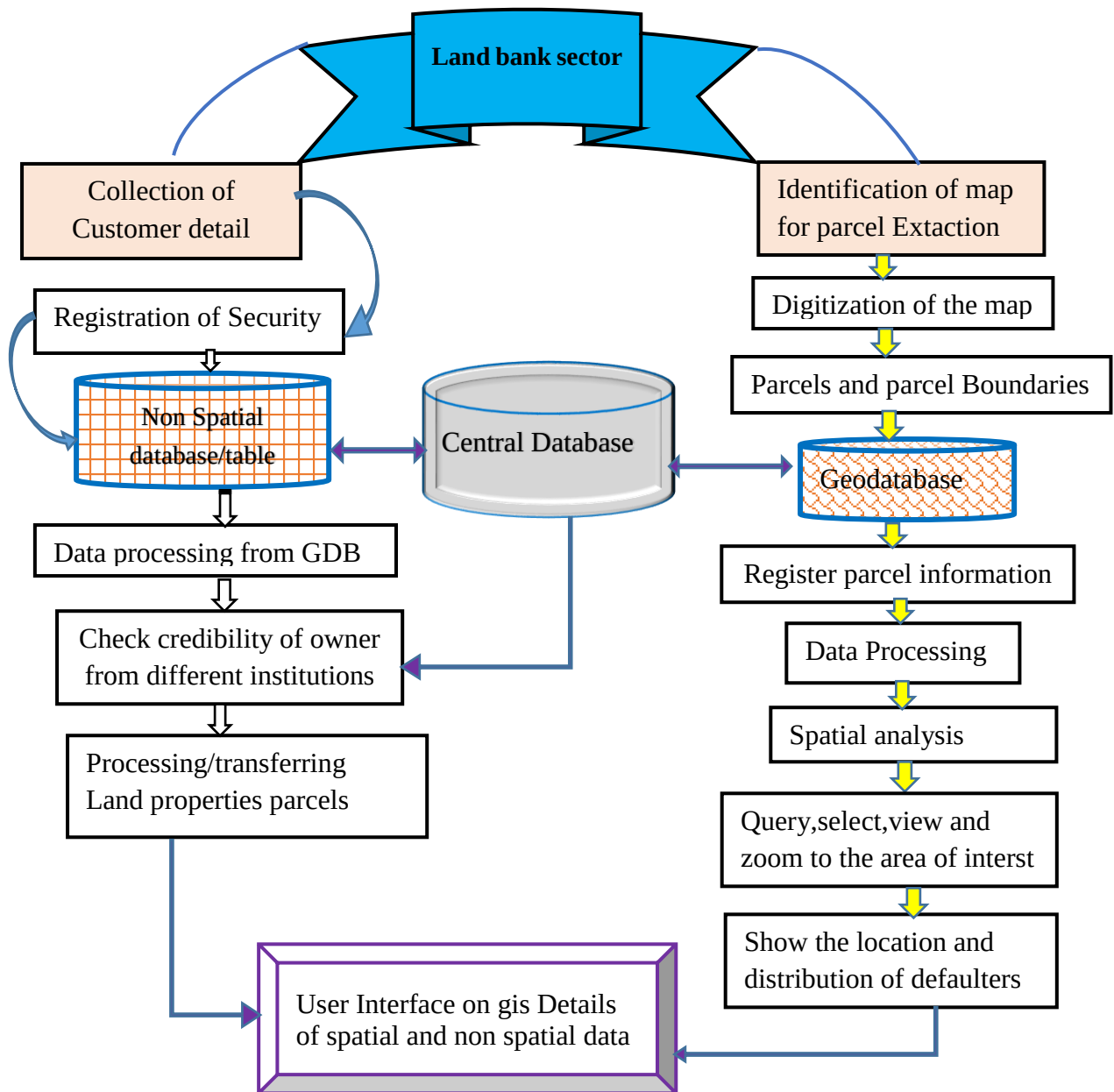


Figure 3.5. work flow of geodatabase design in land banking sytem

The above diagram show the process and procedure of land banking sector transfer land to owner/customer.while they transfer/give properties to individual person or group they cross check from all organization level by level,starting from manucipality mayor of city office, subcity administration and at kebele level. All the non spatial entities required for the system were stored in a database table, with spatial entities stored in a separate Environmental Systems Research Institute (ESRI) geodatabase. The non-spatial database in geodatabase

table was used to store the land holders information such as applicants' names, information such as location, area sqm, area type, land use type and the location of a customer assets. The spatial database can be used to show the spatial details location of the applicant, information and land to be transferred zoom to it and show the distribution of the parcels in land banking. In geodatabase personal geodatabase named by Bole Subcity land bank.gdb was created with Feature datasets for the area and line feature geometry in single personal geodatabase. Using ArcGIS functions, Sub city boundary, Kebele boundary, block and parcel were created and digitized from Georeferenced maps and Aerial photo and then stored in a common personal Geodatabase which is shown in (Figure #3.6).

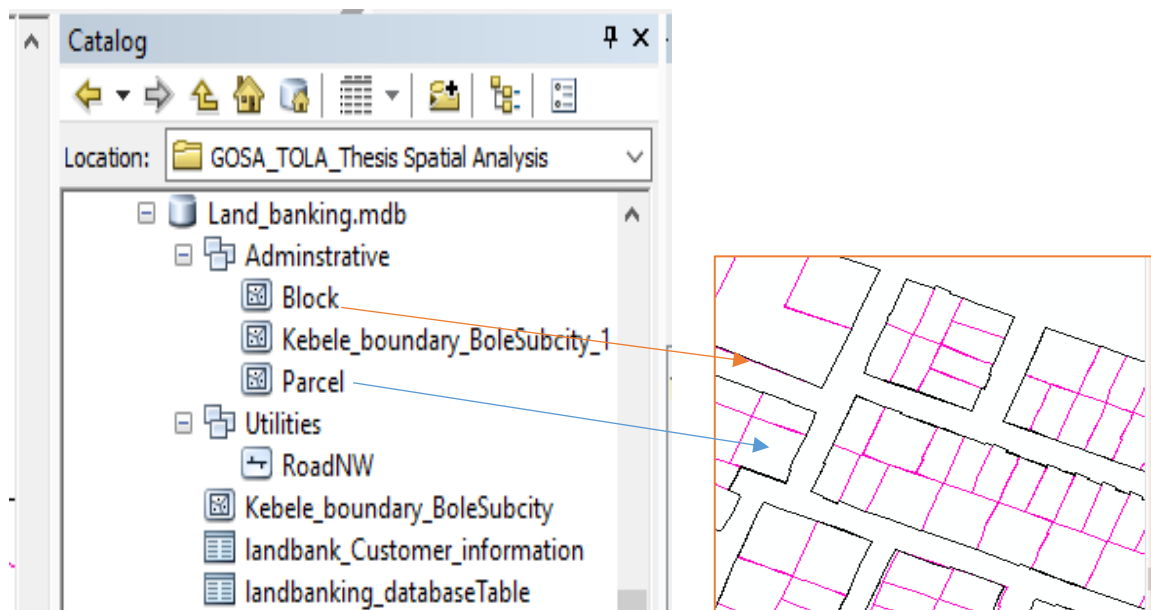


Figure3.6. Geodatabase and its structure

Figure above show Geodatabase and sample digitized Parcel detailed. (sources Adama City land Inventory)

3.4.2. Land Use land cover Map and Methodology for clarification of LULC

Both qualitative and quantitative techniques have been used for developing the urban land-use land cover classification. The map prepared was based on aerial photographs and satellite images with limited field check of current year(2022) General Work flow of spatial analysis for study area(Fig#3.7)

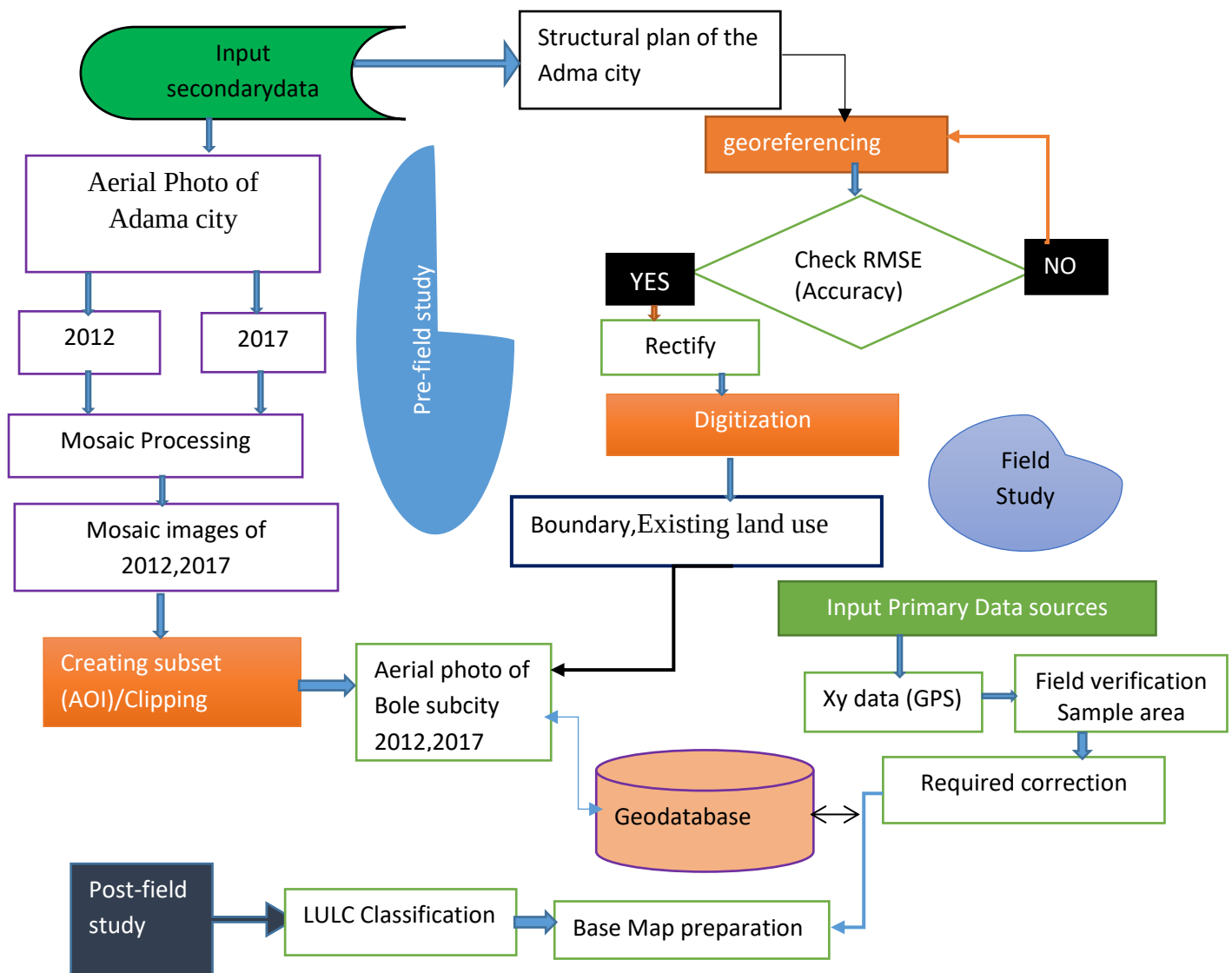


Figure 3.7. diagram show the work flow of spatial analysis 1st phase

(i) Pre-Field Study

The aerial photographs covering Adama City were first arranged in the form of a mosaic to demarcate areas of interest (BoleSubcity). The stereo-pairs were then selected for mosaicking. The area was identified and corrected by mosaic in Erdas imagine. Image mosaic is a technique that combines several images with overlapping parts (the images may be obtained at different times, different viewing angles or by different sensors) into a large-scale seamless high-resolution image For land-use mapping purposes, a transparent overlay of suitable size was used. online google earth image data also used for currently verification of parcels.



Figure 3.8.Ortho photo of bole subcity (sources Adama city administration 2012,and 2017)

(ii) Field Study

A rigorous field verification of some sample areas was made parcel-by-parcel by going through each area systematically to find the percentage of change if any. Each parcel on the ground was checked and any changes were noted in the field record. Also, corrections in the field map were made and verified.

(iii)Post-Field Study

After field verification and necessary corrections in the base map, the land-use map was prepared. Errors under each land-use land cover classification unit were tabulated separately and were calculated for the analysis of errors.the results was shown in result and discussion part that show the change of land-use land cover per unit area in each year. this can be by identification of vacant lots changes in each year.

3.4.3. Criteria For The Evaluation of Land Use/Cover Classification

In order to provide a framework for the evaluation of a land-use land cover classification scheme for the urban area of Bole sub City, it was essential to consider the functional land-uses peculiar to an study area settlement. Within the scope of this study, the factors of significance to Aerial photo identification only were taken into consideration. However, it is recognized that some relevant quantities such as socio-economic and cultural factors affecting land-use should be analyzed from other sources to make a comprehensive study.

3.4.4. Factors and limitations considered in lulc

The system for lulc classification had to be evolved around the data obtainable from the existing photography. Due to high density of mixed-type uses and lack of open space around residences in the study area, it was found difficult to specify micro uses of the buildings. Detailed classification of such areas was, therefore, not attempted. The classification of categories such as residential and commercial was made on parcel basis, parcels generally conforming to the layout of the streets. Small commercial establishments such as retail trade, wholesale trade, warehouses, restaurants, etc. could not be identified separately because of poor photographic resolution and the absence of indicators. Such land-uses were grouped under a single category Central Market. In other way due to the small scale of photography and inadequate photo resolution, certain landuses were generalized and grouped together. Land-use such as agriculture, areas under construction or under development, sandy area, and excavated areas were classified under a main heading of Open Space. Land having no specified use has been classified under the category of Vacant Land. Large services such as educational, administrative, power houses water tanks, etc., and the industrial categories of land uses were recognized individually and delineated on a unit basis. In general the details of lulc shown in (table#3)

3.4.5. Land use and land cover(LULC) Classification

Earlier it is mentioned that sentinel 2a data for 2022 of USGS have been used for image classification. Supervised image classification technique and ERDAS Imagine (version 2015) software is used for image classification. For detecting each individual class properly, maximum number of signatures from the images have collected and merged. One issue that should be mentioned that the appropriate classification rules and method used may depend on the scale at which the classification is carried out. As described by Blaschke et al. (2008), the spectral variability or heterogeneity within a land class at fine scale may make the pixel-based approach less robust, causing it to generate the erroneous classification of pixels. It is found that the object based classification method can overcome this spectral variability problem by utilizing not only the spectral information but also the topological relationships between image objects and obviously, resolution of image is one of the major concerns here.

Table 3.4. Presents the specifications of sentinel-2 bands.

Band name	Sensor	Band number	Sentinel-2A		Sentinel-2B		Resolution (meters)
			Central wavelength (nm)	Bandwidth (nm)	Central wavelength (nm) – 2	Bandwidth (nm) – 2	
Coastal aerosol	MSI	1	443.9	20	442.3	20	60
Blue	MSI	2	496.6	65	492.1	65	10
Green	MSI	3	560.0	35	559	35	10
Red	MSI	4	664.5	30	665	30	10
Vegetation Red Edge	MSI	5	703.9	15	703.8	15	20
Vegetation Red Edge	MSI	6	740.2	15	739.1	15	20
Vegetation Red Edge	MSI	7	782.5	20	779.7	20	20
NIR	MSI	8	835.1	115	833	115	10
Narrow NIR	MSI	9	864.8	20	864	20	20
Water vapour	MSI	10	945.0	20	943.2	20	60
SWIR – Cirrus	MSI	11	1373.5	30	1376.9	30	60
SWIR	MSI	12	1613.7	90	1610.4	90	20
SWIR	MSI	13	2202.4	180	2185.7	180	20

Source <https://sentinel.esa.int> 2022

Table above show the detailed information of satellite images used for this study area Sentinel2 its resolution in meter, wave length ,and description for each bands (B1-B12) Sources(USGS,2022 online access)

Land cover data documents how much of a region is covered by forests, wetlands, impervious surfaces, agriculture, and other land and water types. Land use shows how people use the landscape whether for development, conservation, or mixed uses.

Based on the above criteria, the following land-use classification was used:

Urban agriculture :Urban agriculture can be defined shortly as the growing of plants and the raising of animals within and around cities. The most striking feature of urban agriculture, which distinguishes it from rural agriculture, is that it is integrated into the urban economic and ecological system urban agriculture is embedded in and interacting with the urban ecosystem.

Built Up area: "Built-up area" is defined as the presence of buildings (roofed structures). This definition largely excludes other parts of urban environments or human footprint such as paved surfaces (roads, parking lots), commercial and industrial sites (ports, landfills, quarries, runways) and urban green spaces (parks, gardens). An urban area, or built-up area,

is a human settlement with a high population density and infrastructure of built environment. Urban areas are created through urbanization and are categorized by urban morphology as cities, towns, conurbations or suburbs.

Open Space: Open space or Bare land is areas with no dominant vegetation cover on at least 90 % of the area or areas covered by lichens/moss. Open space is any open piece of land that is undeveloped (has no buildings or other built structures) and is accessible to the public. Urban open spaces (UOS) are defined as publicly accessible open places designed and built from human activity and enjoyment. These may include parks and community gardens, children's playing areas, green corridors, downtown civic plazas and squares, pedestrian streets and market places.

Open Space is land that is not intensively developed for residential, commercial, industrial or institutional use. It serves many purposes, whether it is publicly or privately owned. It includes agricultural and forest land, undeveloped shorelines, undeveloped scenic lands, public parks and preserves.

Table:3.5. Major Categories & Sub-Categories of lulc description

s/n	Lulc Categories	Lulc sub categories
1	Built up area	Residential use ,Commercial use, Industrial use
2	Urban agriculture	Croplands,pasture,groves,vineyards,horticulture areas
3	Open space	Sundy area,beaeches,bare exposed rocks,and stip mines,mixed barren land
4	Vacant land	No building,left space or parcel between residential/builtup
5	Forest land	Shrub,bush,Desiduous,evergreen,mixed,shrubs

Vacant land : Vacant land is defined as the area left as open space between residential parcels, etc. that is land still underdeveloped. its a neglected parcel of property that has no buildings on it. In many cases, houses were on these lots, but as they fell into disrepair they were burned or demolished. It can be zoned for either residential, industrial or commercial usage depending on the area. vacant land is any land that has no permanent improvement on it. This definition does not include lots with derelict foundations, parks and play grounds, cemeteries, golf courses, institutional grounds, commercial gardens, and land used for the sale of automotive vehicles.

Forest land: An area or region covered with forests or reserved for forests. Forest lands are Land covered by trees, forests, woodlands. land covered with forest or reserved for the growth of forests. A forest is an area of land dominated by trees. This does not include evergreen species commonly associated with wetlands.

3.4.6. Techniques for classifying urban land use land cover

Urban land use information plays an important role in urban management, government policy-making and population activity monitoring. However, the accurate classification of urban functional zones is challenging due to the complexity of urban systems. Many studies have focused on urban land use classification by considering features that are extracted from either high spatial resolution (HSR) remote sensing images, but few studies consider both features due to the lack of available models. also use Support vector machines (SVMs) which are a set of supervised learning methods used for classification, regression and outliers detection. The advantages of support vector machines are; Effective in high dimensional spaces. In this study, we use a supervised Maximum likelihood classification framework to identify dominant urban land cover type.

Overall spatial analysis of lulc classification in study area Bole subcity shown(**Fig#3.8**)

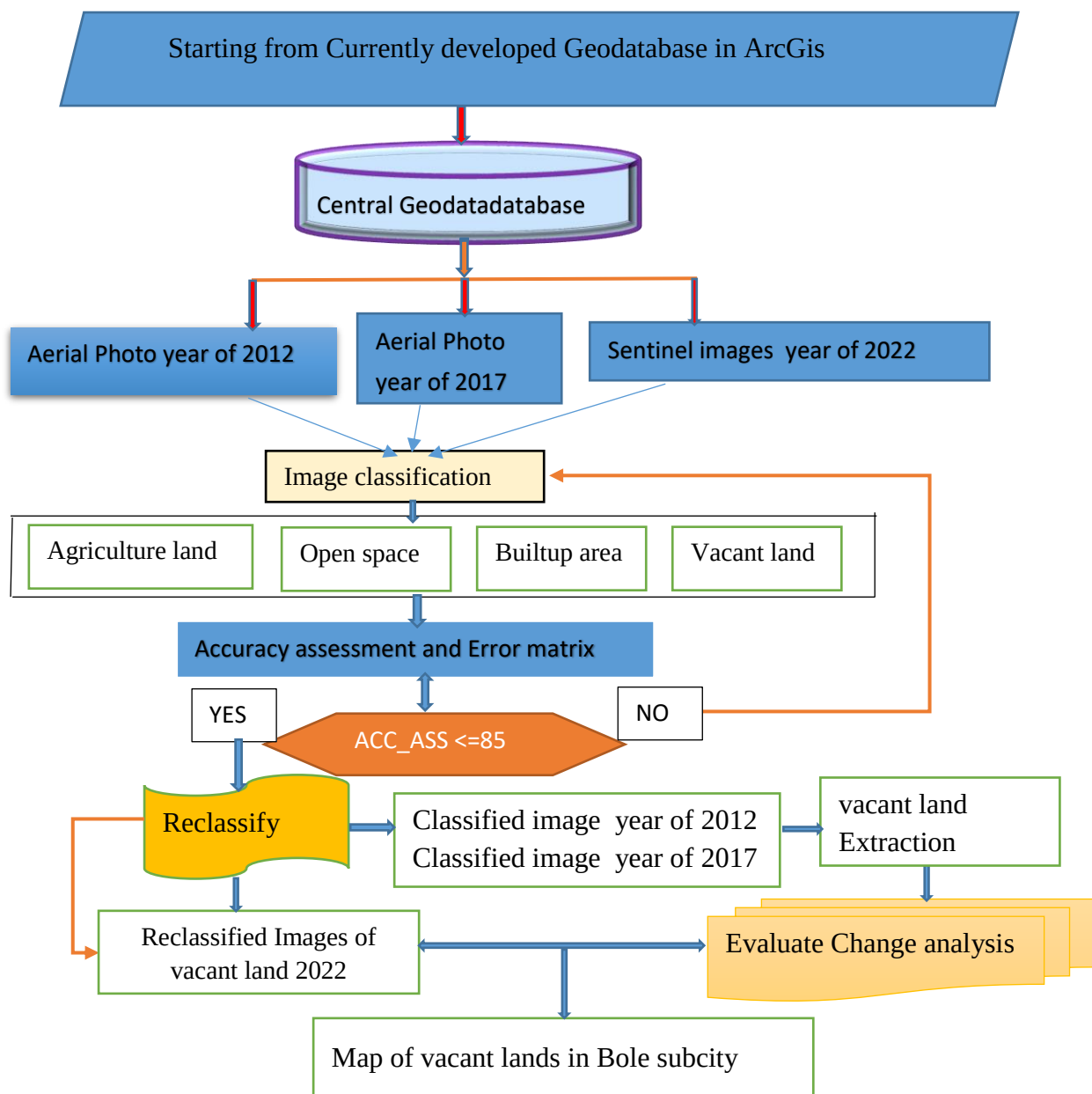


Figure 3.9. Diagram show the spatial analysis of lulc classification procedure

3.4.7. Methods adopted for accuracy assessment

The term accuracy is typically used to express the degree of correctness of a map or classification in thematic mapping from remotely sensed data. The increased usage of remote sensing data and techniques has made geospatial analysis faster and more powerful; however, the increased complexity also creates increased possibilities for errors (Dagistanli et al., 2018). The accuracy assessment for supervised technique has been made through a confusion or error matrix. A confusion matrix contains information about actual and predicted classifications done by a classification system (Prisley and Smith, 1987; Hay, 1988;

Jupp, 1989; Czaplewski, 1992; Van Deusen, 1996; Yuan, 1997). The pixel that has been categorized from the image is compared to the same site in the field. The result of an accuracy assessment typically provides the users with an overall accuracy of the map and the accuracy for each class in the map.

The user's accuracy measures the commission error and indicates the probability that a pixel classified into a given category actually represents that category on ground (Zhou et al., 1998; Congalton and Green, 1999; Khorram, 1999; Lunetta et al., 2001). Producer's and user's accuracy are derived from following formula:

Producer's Accuracy (Errors of omission): Producer's Accuracy measures the percentage of correctly classified pixels from a sample data or indirectly indicates errors of omission for a particular class. Producer's accuracy was calculated from dividing the number of correctly classified pixels in each category (on the major diagonal) by the number of training set pixels used for that category (the column total). It is calculated as:

$$\text{Producer's Accuracy} = \left(\frac{C_i}{C_t} \right) * 100 \dots\dots\dots \text{Equation (1)}$$

Where, C_i = correctly classified sample locations of the reference data or column and
 C_t = total number of sample locations of the column.

User's Accuracy (Commission error): user's accuracies are computed by dividing the number of correctly classified pixels in each category by the total number of pixels that were classified in that category (the row total). This result is a measure of commission error. It is calculated as:

$$\text{User's Accuracy} = \left(\frac{R_i}{R_t} \right) * 100 \dots\dots\dots \text{Equation (2)}$$

Where, R_i = correctly classified samples in the row and R_t = total number of samples in the row.

Overall Accuracy: Overall accuracy was computed by dividing the total diagonal (i.e., the sum of the correctly classified sample units) by the total number of sample units in the error matrix. This value is the most commonly stated accuracy assessment statistic.

$$\text{Overall Accuracy} = \left(\frac{S_d}{n} \right) * 100 \dots\dots\dots \text{Equation (3)}$$

Where, S_d = sum of values along diagonal and, n = total number of samples.

Kappa Coefficient: Kappa coefficient can be used as another measure of agreement or accuracy. Kappa was used to measure the agreement or accuracy between the remote sensing

derived classification map and the reference data as indicated by the major diagonals and the chance agreement. This was indicated by the row and column totals. Kappa values can range from +1 to -1. But, as there should be a positive correlation between the remotely sensed classification and the reference data, positive values were expected. Landis and Koch (1977) taken the possible ranges for kappa into three groups: a value greater than 0.80 (i.e., 80% and above) represent strong agreement; a value between 0.40 and 0.80 (i.e., 40%–80%) represents moderate agreement; and a value 0.40 (i.e., 40% and below) represents poor agreement.

$$K^{\wedge} = \frac{n \sum_{i=1}^r x_{ii} - \sum_{i=1}^r (x_{i+} \cdot x_{+i})}{N^2 - \sum_{i=1}^r (x_{i+} \cdot x_{+i})} \dots \dots \dots \text{Equation (4)}$$

Where r = number of rows in the error matrix; X_{ii} = number of observations in row i and column i (on the major diagonal); X_{i+} = total of observations in row i (shown as marginal total to right of the matrix); X_{+i} = total of observations in column i (shown as marginal total at bottom of the matrix) and N = total number of observations included in matrix.

3.4.8. Change analysis and Vacant land extraction in study area

Land Use Land Cover (LULC) changes analysis is one of the most useful methodologies to understand how the land was used in the past years, what types of detections are to be expected in the future, as well as the driving forces and processes behind these changes.

Post-classification comparison approach was employed for change analysis of land use and land cover changes by comparing independently produced thematic maps for 2012, 2017 and 2022. Then, the classified land use and land cover maps were compared to show the changes between each year, i.e., 2012–2017, 2017–2022 and 2012–2022 for the study area. It was also possible to calculate the amount of increase and/or decrease of each category of LULC and see the changes in percentage in each year (Lambin et al., 2001).

LULC change statistics were computed in two different ways:

Total LULC change in hectare were calculated using the following equation:

$$\text{Total LULC change} = \text{Area final year} - \text{Area initial year} \dots \dots \dots \text{Equation (5)}$$

Where, area is extent of each LULC type. Positive values suggest an increase whereas negative values imply a decrease in extent.

4. RESULTS AND DISCUSSION

In this chapter analysis and results are reported so as to draw the inferences of the study results from spatial data analysis and interview was analysed. The analysis mainly focuses on the major challenges of land banking practice such as poor institutional capacity, weak land information system, and efficiency. The analyses of data are presented in tabular form and in figures or pictorial presentation. This chapter provides the original work or contribution by the researcher. In the discussion, part we interpret the results in details. The discussion is used to highlight the importance of the study and describe the limitations of the study and implications. Moreover, the interpretation of the analyzed data is also detailed using tables, graphs chart and figures. finally, the chapter analyses the prospect of land banking for the future urban land development in the study area.

4.1. Spatial Analysis

4.1.1. Land use land cover analysis

In the study area dominant LULC are five classes and have been generated. Few other LULC classes can be generated but their proportion is too small is not even shown clearly. For those undefined pixels have been incorporated within neighbouring classes by classification system. Total 100 sample sites from Google earth and ground verification are selected for accuracy assessment. Besides the overall accuracy, of individual classes is calculated in a similar manner. The two approaches are user's accuracy and producer's accuracy.

Table:4.1 Accuracy Assessment and confusion matrix lulc images of 2022

Classified Data	Reference Data					Row Total	User Accuracy (100%)
	Open Space	Builtup Area	Open Forest	Farm land	vacant lands		
Open Space	3250	1	7	11	42	3311	98.2%
Builtup Area	33	1001	0	0	0	1034	96.8%
Open Forest	0	61	516	0	0	577	89.4%
Farm land	0	0	0	875	25	900	97.2%
vacant Lands	36	1	61	0	406	504	80.6%
Column Total	3424	1064	584	886	473	6326	
Producer Accuracy(100%)	95%	94%	88%	99%	86%		
<u>Overall Accuracy = 95.61 (%) Kappa Statistics $K^{\wedge}= 0.924$</u>							

The overall accuracy assessment of lulc classification of bole subcity year of 2022, is 95.61% which best accuracy and 0.924 of kappa coefficient.

The producer's accuracy is derived by dividing the number of correct pixels in one class divided by the total number of pixels as derived from Reference data. It includes the error of omission which refers to the proportion of observed features on the ground that is not classified in the map. Meanwhile, user's accuracy is computed by dividing the number of correctly classified pixels in each category by the total number of pixels that were classified in that category (Story and Congalton, 1986).

The LULC maps generated after running a maximum likelihood supervised classification in ERDAS IMAGINE software. (Fig#4.1)

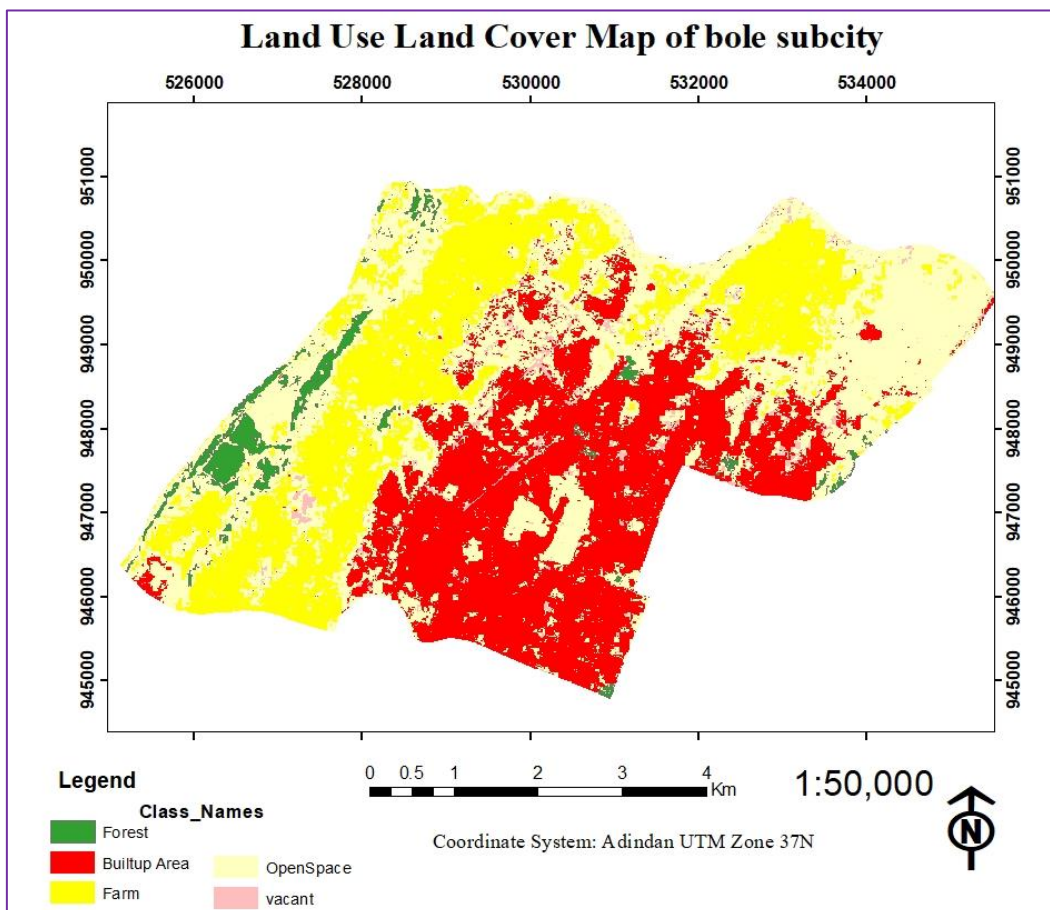


Figure:4.1. Lulc map of bole subcity in 2022.

The above figure show that classification of lulc map of adama bole subcity in 2022; The results showed that, over the study period the dominant land cover type in the study area was Builtup area around 31.48 % of the total area. While the vacant land cover 2% from total area in the study area In general the total area of 35.2 km² . Area of 11.09 km² (31.48%) was

covered by built-up while the remaining area was farm land 9.12 km^2 (25.90%), open forest 1.10 km^2 (3.13%), open space 13.05 km^2 (37.05%) and vacant lands 0.86 km^2 (2.44%) shown in Table 4.2

Table 4.2 Area coverage of lulc in 2022 bole subcity

Class_Names	areasqkm	Persentage
Builtup Area	11.09	31.48
Farm	9.12	25.90
Forest	1.10	3.13
OpenSpace	13.05	37.05
vacant	0.86	2.44
Total	35.23	100.00

4.2.Major challenges of land baking practices in Bole Sub City

Land banking efforts in the Adama city have been vulnerable by several obstacles, the most important of which involve the structural and operational characteristics of a land-banking agency. These are the difficulty of operating at a regional scale, the problem of linking land banking to the planning process, and the scarcity of financial resources. Furthermost cities are facing serious problem in the provision of land for different purposes such as residential, commercial and industrial because of the rapid increase of population which is mainly the result of rural-urban migration and natural birth.

Land banking is one of the mechanism whereby municipalities at different levels can acquire, manage and dispose land efficiently if the process is implemented properly. Since land banking has been put to practice in study area, there have been efforts to acquire land from different sources such as illegally occupied lands, vacant land and underdeveloped lands and enter the land into the land bank of Adama city (*sources Adama city report,2012 e.c and survey interviews with land bank office*).

However, the land banking practices has been challenged by a number of problems associated with poor institutional capacity, lack of well skilled man power to implement land banking programs efficiently and effectively, lack of public awareness on the benefits of urban land banking systems has to be based on a reliable land information system which can provide adequate service whenever the need arise from customers. The current land recording system in the city is by far better than the manual systems the city used to employ

for land recording many years ago. The current computer based land recording system for land banking is also poor as it is only employing software such as auto-cad and to some extent geographic information system (GIS) software.

The current land recording system in bole sub city is showing good status but missing a powerful land information system called cadaster which can be used for various purposes such as legal purposes, ownership recording, mapping, location identification, mixed or multi-purposes etc. Sources; (*Interview with land banking official at central level*)

4.2.1. Urban land information system

The Ethiopian ministry of urban development, and housing has launched the implementation of urban land information system. This is to curb the problems of mismanagement and increase the real pension in urban areas through the establishment of the cadastre and real property registration system. The use of modern land information system specially the use of cadaster is an important element that can facilitate the practice of proper land management strategies such as land banking process. The traditional manual land information systems which have been in use for centuries all over the world specially in under developing country such as Ethiopia, are nowadays being replaced by modern land information systems with the introduction invention of modern hard ware technologies, up-to date application soft-ware, and operating system. Information is the base for effective planning, making sound decision, and speeding implementation of any land related developmental activities. Accurate, complete and up-to date information is required to make land acquisition, land management, and land disposition activities problem solving strategies as they are the main tasks done by land banking offices all over the world.

According to the results analysis from data collected by interview and site visiting in study area Highly land overlapping is shown. This due to the subcity is Lack of up-date and accurate land information, on the contrary, leads to dire problems such as land disputes, loss of revenue, illegal land grabbing squatter settlement, poor infrastructure and public service provisions and ultimate poor land development and/or urban poverty.

The land banking system currently employed by the land banking office of the city administration is poor. It is based on mainly using auto-cad and to some extent Geographic Information system (GIS). However, since there is no state-of-the-art sort of cadastral system which can be utilized for multi-dimensional purpose at the moment, it is common to see overlapping polygons one belonging to the land banking office and the other belonging to

private individual owners. Such inconvenience coupled with the involvement of illegal land grabbers who use this gap as an opportunity inevitably leads to ineffective land banking practices in the city.

4.3. Land banking operation in Adama city

4.3.1. Sources of land for the land bank

Sources for land bank for commercial development and industrial uses in our country could be divided into five major categories, which is in accordance with the national regulation, including: (1) State owned land after resumption by law; (2) Land acquired through purchase; (3) Land acquired through preemption; (4) Agricultural land acquired through the process of conversion to construction land and expropriation; (5) Other sources designated according to other laws or state level regulations.

For land bank of commercial development, the sources are mainly state owned land after resumption by law, land acquired through purchase and agricultural land acquired through the process of conversion to construction land and expropriation. For industrial development, the source is mainly agricultural land acquired through the process of conversion to construction land and expropriation. For the land bank indemnificatory apartment, more emphasis is given to purchase of Land Use regulation of current state owned construction land to provide more convenient location for the low income group and shorten the land acquisition process.

4.3.2. Land acquisition

The land banking authorities are responsible for implementation of the plan. During the implementation process, local land banking authorities will also need to go through the administrative approval process as an applicant for a development project including project approval, planning permit for site selection, land conversion approval, land use permit and environmental impact assessment.

The budget for land banking operation is also included in the annual plan for land banking in consultation with the Bureau of Development and Reform as well as the Bureau of Finance.

Acquisition without compensation: According to current land management regulations, municipal government can resume the Land uses right without compensation in three categories of circumstances:

(1) The former owner of LUR reduces and such LUR was obtained by administrative allocation. For example, when the city re-locates the municipal infrastructure such as state owned enterprises go destroys, the Land Use regulation could be resumed by the municipal government and put back into the land bank of the city. (2) The development intention or development phrasing is not consistent with the contract of state owned LUR sales. the most usual situation is when that the site is considered to be unused for over two years after the LUR is supplied municipal government can resume the LUR without compensation after a hearing and recognition process. (3) When the process for approval of land utilization is a violation of the land use regulations, the Land use regulation can also be resumed without compensation as penalty.

Acquisition with compensation: For the situation of acquisition with compensation, there are also three categories of circumstances in which standard for compensation vary: When the acquisition is made because of public interest or implementation of urban planning, the base amount of compensation is firstly assessed by pricing consultant firms according to a set of standard assessment methodologies. However, this base amount of compensation is usually lower than the market price and such acquisition are often put on heat debate between the land development centre and the former land users.

4.3.3. Land holding and site preparation

After the land acquisition process, the land is registered under the name of the land banking authorities. During the period of holding, the land banking authorities are responsible for conservation and management of the sites of the land bank. Land banking authorities can use the land bank as a tool for municipal financing activities. Before the site preparation operation, the land lots as well as existing buildings or structures can be temporality utilized by the land banking authorities through leasing or other means.

4.3.4. Disposition

Disposition of lands from the land bank is made according to the annual land supply plans by the municipal government. Land lots for supply should obtain detail planning control requirements such as land use intention, floor space, supply of public facilities, urban design requirements etc. For land supply of land for public uses including public facilities, municipal facilities transportation and indemnificatory apartment lots, after the project approval process the land is supply through administrative allocation without conveyance

fee. The majority of lots in the land bank are supplied through public listing, bidding or auction. Lots for commercial development including commodity housing, office, whole sale, tourism are required to be sale in the public manners above. When there are more than one applicant for industrial and ware house lots, the lot should also be supplied through public manners.

4.3.5. Spatial distribution and quantity of Land bank in Adama City.

Data of spatial distribution and quantity of Adama City's land bank by the end of 2010 were collected from land administration office in 2012 reports from cadaster which is done by experts. Data collected include a map illustrating land acquisition and disposition of land lots in adama City's land bank in subcity.

Data collected from adama city land administration also illustrates two types of sources of land lots in the land bank including acquisition from rural collectives and acquisition of urban land lots for redevelopment. Extracted vacant land in study area (fig#4.2)

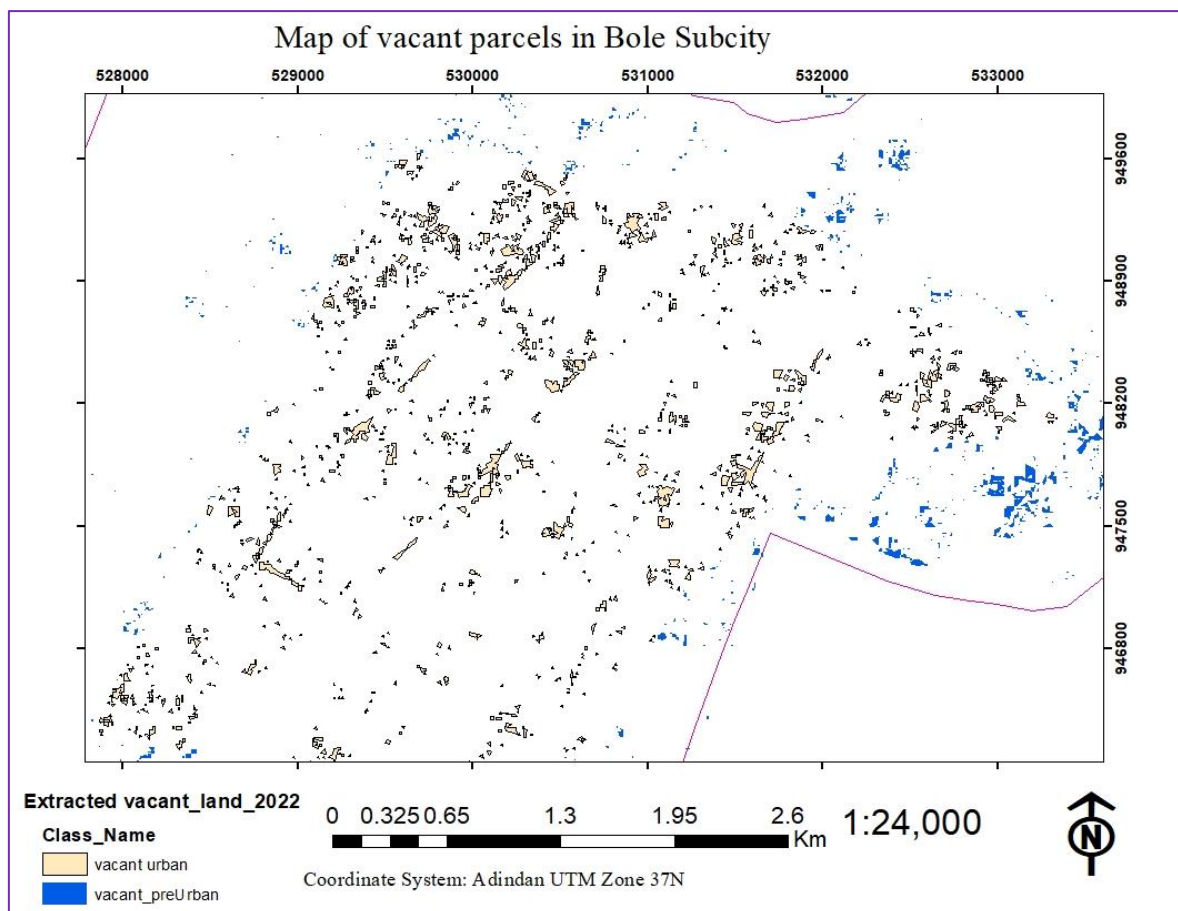


Figure: 4.2. vacant Land lots in Bole sub City's land bank (Source: Generated by Author data Obtained from City administration and own classification)

According to lulc classification and google earth timely verified land lots covering area of 0.386 km² which accounts for 48.1% of total area of land lots in the land bank, were acquired from rural collectives. land lots covering area of 0.416km² were acquired by resumption of urban land accounting for 51.89% of total area of land lots in the land bank. The distribution of sources of land acquisition proofs that expansion towards the rural area is the main direction of land acquisition for the land bank in study area.

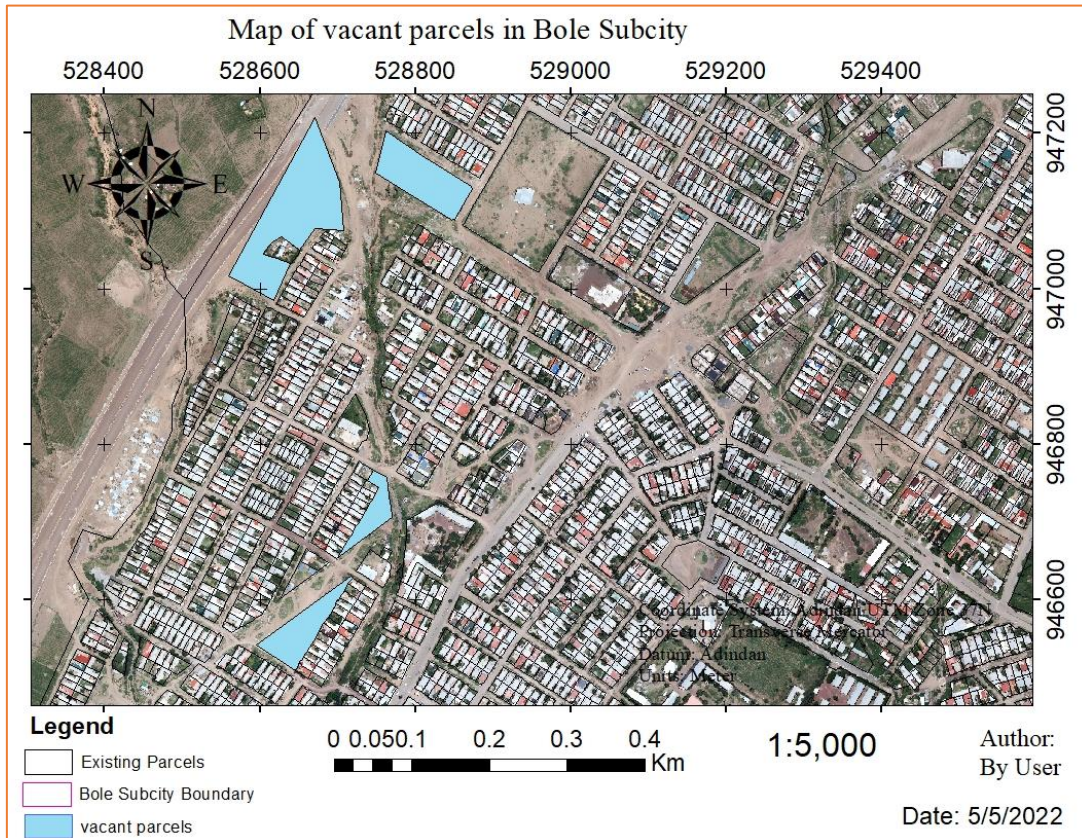


Figure 4.3: vacant lots from city administration and mapped by Author.(sources adama City land Administration).

4.4. Land Bank Benefits

Land Bank Benefits While abandoned and vacant properties depress property values, discourage property ownership, and attract criminal activities in the surrounding area, a land bank provides tools to quickly turn these tax-reverted properties back into usable parcels that reinvest in the community's long-term vision for its neighborhoods. Land bank programs act as an economic and community development tool to revitalize blighted neighborhoods and business districts. Land banks can benefit urban schools, improve tax revenues, expand housing opportunities, remove public nuisances, assist in crime prevention and promote economic development.



Figure 4.4 Picture showing the benefit of Land Bank.

Source:(Kirwan Institute for Study of Race & Ethnicity, 2004 Ohio State University.)

By transferring vacant and abandoned properties to responsible land owners through a land bank program, local governments benefit because they avoid the significant cost burden of property maintenance, like mowing and snow removal, as part of their nuisance abatement responsibilities. In addition, local governments benefit from increased revenue because the new property owners pay taxes on the property.

Land bank programs can increase the variety of mixed-income housing offered and provide more opportunities for affordable housing.

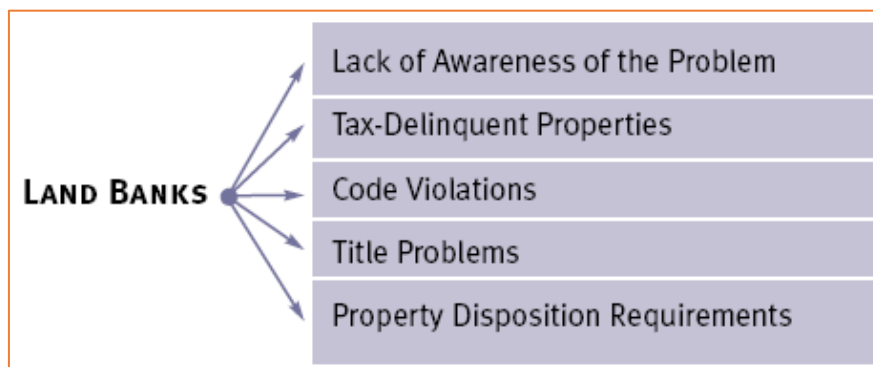


Figure 4.5: The common barriers, to the conversion of vacant and abandoned properties into productive uses. Source: Alexander, Frank S., 2005)

4.5. Analysis of the data collected from the Municipality and Professionals

According to the municipality, official's vacant land is "a public land which is not allocated for any development activities but by fulfilling infrastructure and making available for future development". the city has A cadaster system GIS and cad Master Plan for the past decades but it does not include the information concerning the Urban Vacant Land, which is included and combined with the reserved lands in the city.this shows the landbanking office has no central database to store and for further analysis/reports.

4.5.1. Causes of Urban vacant Land in Study area

When we see, the Vacant Land coverage in study area approximately around 38.1 hectares is found in the urban expansion zone and the reaming 48 hectares is found in the centre of the city. According to the results shown The amount of land in the subcity has decreased during the past decade. The causes for this decrease are; a) Population in-migration , b) City administration policy to encourage land reuse (e.g. Infill), c) Micro enterprises, d) City land use policies, e) A growing local economy, f) Private development initiatives, g) Others, includes Environmental Protection for buffer zone and land speculation as a means of earning money.

4.5.2. Condition of Vacant Land in Adama

The current conditions accurately describe the physical characteristics of vacant land in our city, Vacant land tends to be: In oversupply,In undersupply,Vacant for too long,In the wrong location, Odd-shaped parcels, Micro enterprises Not assembled in sufficiently large parcels, Others, the kind of development, which is haphazard and not easily accessible because of various reasons.

4.5.3. Availability of vacant land in adama

Currently as we try to see the city officials know about the availability of vacant land through, 1st) Most of the time City officials/Departments get the information through informal feedbacks from end users and other departments of the authority. 2nd) When a period of time given for a land holder for the development of the land passes and the land sites idle.3rd) through Base map review in the process of Master Plan revision (it takes a long time because most of the time the time for the revision of the master plan is about ten years interval). 4th) information from Private developers when they found a vacant land and producing a feasibility study and submitting for the authority. finally through Study of certain areas or location for expansion and relocation.

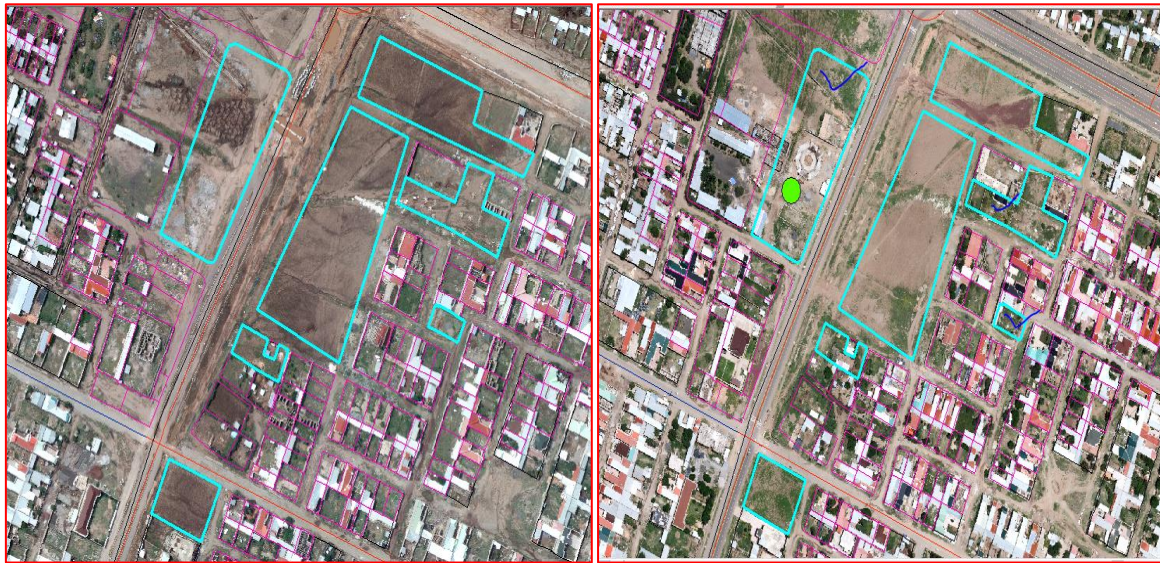


Figure 4.6 Aerial photo of study area 2005, and 2009 (sources adama City Administration).

From the above figure vacant land covered 43389m² in the last five years decreased to 26891m² area this indicate 40% vacant land is undeveloped and it five to seven year this can decrease income and development of city and misuse of land bank.

4.6. Analysis of the data collected from the respondent.

According to the data collected Majority of the land and land related professionals and the public believe that there is acute shortage of skilled manpower at all levels. The central land banking office lacks surveyors does not have land banking officer. Questionnaire distributed to land banking and /or related professionals regarding shortage of skilled manpower indicates that around 65.80% of the professionals believe that there is serious shortage of skilled manpower in land banking offices of subcity (Appendix 1 Question #No19). The remaining 34.20% feel that there is no as such significant shortage of skilled manpower and that the gap created by shortage of skilled manpower can be compensated by giving training and incentives for the available skilled professionals.

According to respondents regarding Financial Capacity The land banking office does not have its own income sources or does not raise any funds or generate revenues its own. The land banking office is mandated only to acquire land and transfer it to other concerned bodies such as the land management and investment office. Unlike the trends of land banking practice experienced by land banking offices in other part of the world which are involved in three major activities, namely, land acquisition, land management and disposition, as it is

described in the previous section of this paper, the land banking office in Adama city is limited only to acquiring land and protecting or safeguarding it till the land is transferred to other concerned governmental bodies. The land banking office does not develop land and sell the land to customers. As a result, it faces shortage of financial resources to undertake its activities effectively and efficiently. which results show 60% of respondents Agree that theres a shortage of financial while 40% are disagree. Table 4.3 For example, there is a serious shortage of vehicles for land banking officers especially for land banking police who are expected to guard the lands acquired by the land bank office.

Table 4.3. Shortage of finance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	15	60.0	60.0	60.0
	Disagree	10	40.0	40.0	100.0
	Total	25	100.0	100.0	

According to respondent information Lack of modern land recording system in bole subcity The details of respondent gender frequency shown in table#4.2 and histogram chart (figure #4.7).

Table 4.4: Respondents Gender Frequency Table

Gender		Frequency	Percent
	Male	19	76.0
	Female	6	24.0
	Total	25	100.0

Histogram chart Gender

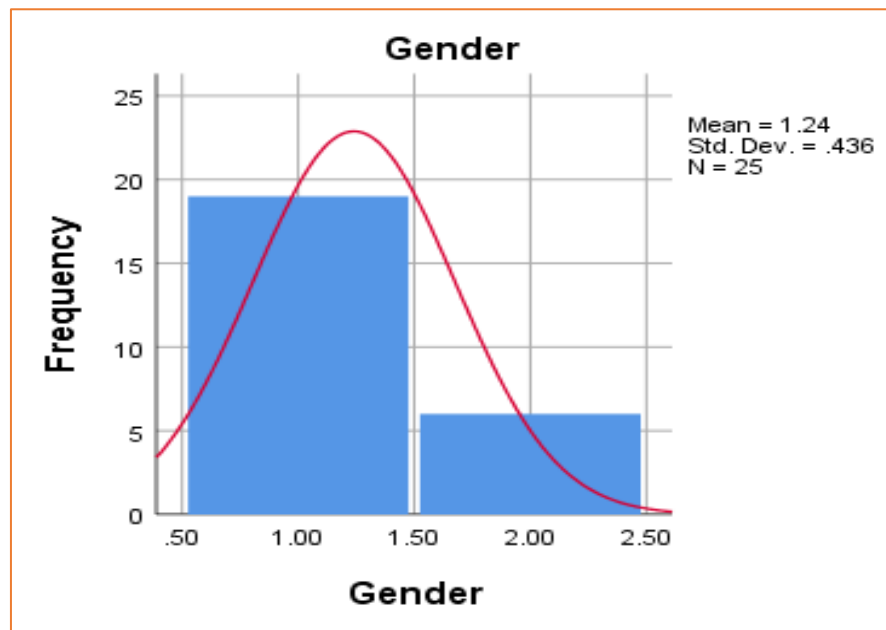


Figure 4.7: The graph show gender respondent frequency.

The above graph show total number of participant respondents of 25 which 76% of them are male and the rest 24% are female.

The results show analysis from a response of interview (Appendix 1) question **No:#Q005** Does your office have modern land banking system?, question **No:#Q006** Does your office use GIS and/or cadaster for effective management of land? And question **No:#Q007** Lack of modern land recording system (Degree of agreement: Very Agree, Agree, Neutral, Disagree) are summarized as shown in (Table#4.3 - 4.4 and figure #4.8 - 4.9) respectively.

Table 4.4: summary of interview questions by land bank experts responses

Does your office have modern land banking system?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	10	40.0	40.0	40.0
	No	15	60.0	60.0	100.0
	Total	25	100.0	100.0	
Does your office use GIS and/or cadaster for effective management of land?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	16	64.0	64.0	64.0
	No	9	36.0	36.0	100.0
	Total	25	100.0	100.0	

Source: field survey (April 2022) and SPSS.

According to response obtained from land banking and/or land related professionals (table 4.3), more than 60% of the respondents believe that the land banking office lacks a modern land banking system and 36% does not use cadaster for registering land.

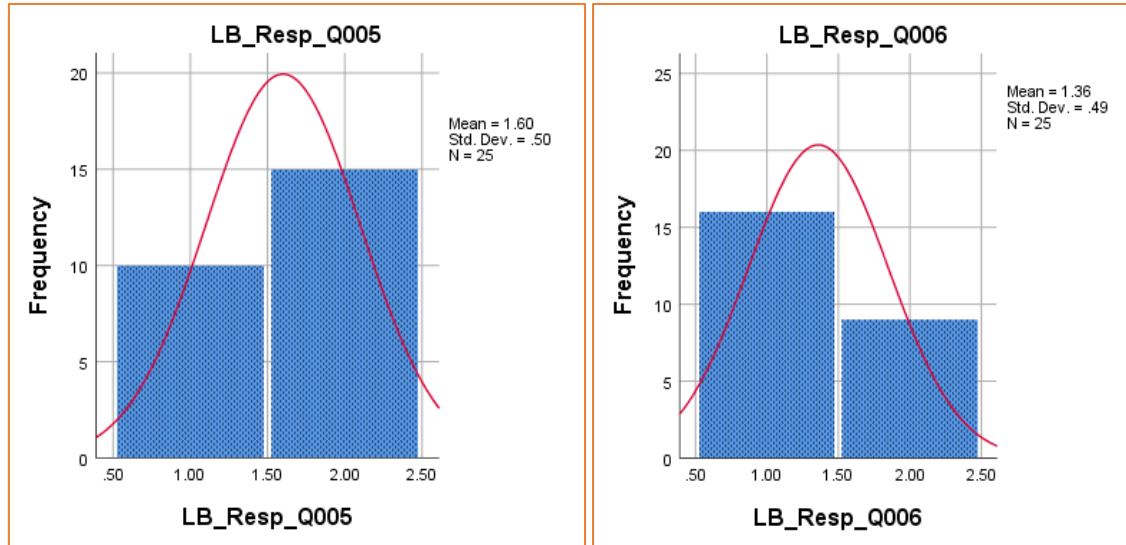


Figure 4.8. The graph show frequency of interview lack of modern land banking system.

They argue that efficient and uptodate land recording system facilities basic land banking processes such as land acquisition land development. It promotes investment, boosts revenue, ensures satisfaction of customers, and highly deters illegal land grabbing as it shuts the room for illegal settlement and expansion of illegal occupation of land by real estate developers.

Table 4.5: summary of respondents (Degree of agreement) Lack of modern land recording system.

Lack of modern land recording					
		Frequency	Percent	Valid Percent	Cumulative Percent
	Very Agree	9	36.0	36.0	36.0
	Agree	8	32.0	32.0	68.0
	Neutral	6	24.0	24.0	92.0
	Disagree	2	8.0	8.0	100.0
	Total	25	100.0	100.0	

The above table show that the respondents 36% of total are very Agree theres a lack of modern land recording system in land banking.

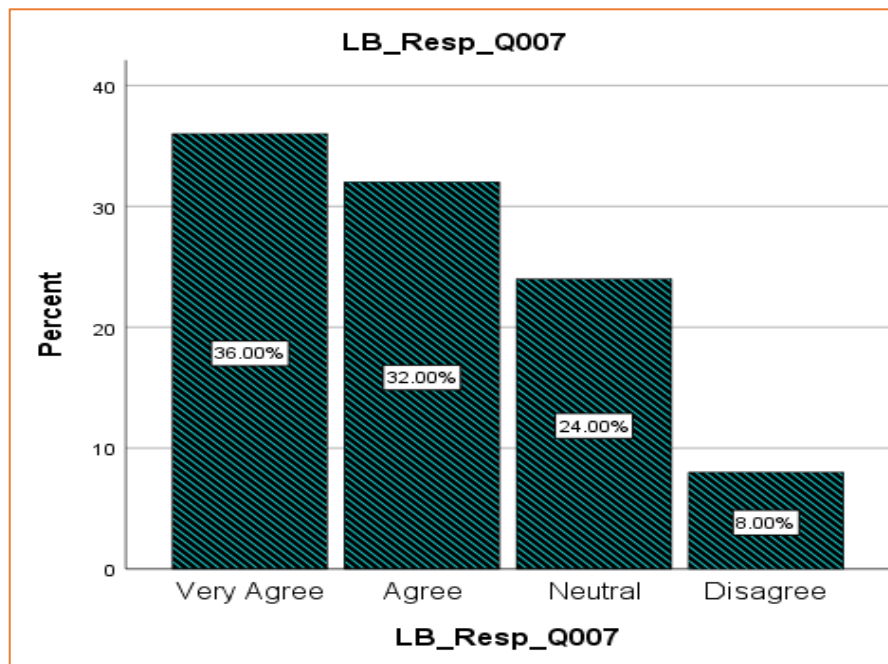


Figure 4.9. summary of respondents (Degree of agreement) Lack of modern land recording system.

Finally more than 36% (graph 3 above) of the peoples Very agree that the land banking system lacks modern land recording system. They feel that the land banking office acquires only very small portion of illegally grabbed lands since it does not have adequate information about all the illegally held lands in the city because lack of modern land recording system. They affirm that there are still lots of in land in the hand of illegal grabber and the government is missing large amount of money which could otherwise have been acquired from such lands by various means such as land tax.

generally if there is lack of modern land registration in subcity a problem like overlapping households parcel, misuse of land and etc was accured. because land is transferd by city administration,subcity and kebele level.

4.7. Discussion

The lack of an official definition and/or survey of vacant and abandoned land and properties complicate efforts to understand the extent of the problem in Ethiopia especially in city like Adama There is lack of proper Urban Land Management; especially the vacant lands which are found in the periphery of the city and lands which are occupied by institutions, and private developers etc.

Coordination problems among different agencies; the agencies are like the developers of the policies and the implementers of policies. There is high instability in Land Management in

the past but recently the administration formulated a new body known as Land Bank which facilitates the Collection and Distribution of Urban Land specially those the Vacant ones. There is no smooth and uni-directional work for distribution in the land management institute. This is facilitated by different policies which were proposed during different times and governed by different political views; this process back fires the previous decisions and destroys the trend rather than maintaining and modifying the existing policies facilitating the land management.

The challenge from land recycling pressurized both inner city and the outskirts' urban vacant land. The study has found that illegal use and criminal activity to be rampant in vacant land (Crime rates on blocks with open vacant land were twice as high as rates on matched blocks without open vacant land.) The concentration of abandoned properties in inner city areas burdens with the majority of the problems associated with vacant land.

The future prospect of land banking development is promising both at bole sub city level as well as at Adama city level. There are tendencies of governmental policies to change from agricultural-led to industry-led economic policy at the end of the growth and transformation plan (GTP) period and the need of land keeps on increasing with the increase of population and developmental activities. This will create a good opportunity for the growth of land banks as they will be active participants in land acquisition, land management, and land development so as to address the land requirement for the effective implementation of governmental policies.

5. CONCLUSION AND RECOMMENDATION

5.1. Conclusions

The main objective of the research was to identify the major challenges of land banking and its feasibility as well as investigate the process and extent of development of urban vacant land and the land development practice in Bole subcity. Urban land development literature emphasizes a development that starts with land development and ends with property development rather than Vacant Land (it is appropriate to say that at present there is no concern about Vacant Land rather than Reserved Land). The development of Vacant Land is a multifaceted program and should be, therefore considered at least in three directions which are economic, social, and environmental. It has been already discussed by many researchers, especially in the Model of Land Use change Management as ‘a three legged stool’.

Land bank challenges firstly the related to Vacant land development it can generate new economic activities, increase tax revenue, improve transportation and physical amenities, and increase safety. And it can help cities resolve their Brownfield problems as well as reinforce “smart growth” practices by accommodating growth and development within existing urban areas. But not only cities bear the responsibility of addressing vacant and abandoned land. State administration plays an important role also, because local improvement of the redevelopment process often depends on state-level legislative reforms that are not always forthcoming.

generally, many situations have moved to improvement local redevelopment efforts with traditional financial mechanisms. State-authorized development authorities, for example, play a key role in local urban renewal programs, and typically can levy and collect taxes, issue bonds, and receive public and private grants to promote economic development activities. Tax increment financing, meanwhile, is increasingly being used to generate needed funds for the redevelopment of particular districts, whether those identified in a renewal plan, or others targeted by the local government.

To conclude, the main objective of the research was to examine challenges of land banking and investigate the process and extent of development of urban vacant land and the land development practice in Bole subcity. Urban land development literature highlights a development that starts with land development and ends with property development rather

than Vacant Land (it is appropriate to say that at present there is no concern about Vacant Land rather than Reserved Land). And there must be differentiation between reserved land and Urban Vacant Land. Urban vacant land is one of the positive aspects of the urban world and we must use it wisely other than destroying it.

Finally according to respondents response Lack of modern land information system especially cadaster is also one key challenges for BoleSubcity land banking office. Although the use of Auto Cad and other application software such as excel for recording land information is much better than the old manual system, such system is prone to problems like overlapping of polygons which can lead to land related disputes if the recording and/or drawing is not done with care. More than half of both resident and professional respondents also agree that the land banking office in Bole sub city lacks modern land banking system. This, in turn, can result in increase of illegal land grabbing and expansion of squatter settlement which deteriorates revenues collection, investment promotion, and satisfaction of different stakeholders such as the public and private investors.

5.2. Recommendations

Based on the problems, literature review, key findings and opportunities the following ideas are recommended by researcher to overcome the challenges of land bank in Adama case of bole subcity. Those are: primarily the land banking must develop well designed central data base(Geodatabase) which store, manipulate and currently checking property details of each parcel. this can help experts to know the current land use us and owner of land. This can be minimize overlapping of parcels with each other. In order to solve the main challenges that land banking office of Bole subcity the following recommendation are forewarded by researcher:

- ✚ The land banking office should be equipped with modern land information system (LIS) such as cadaster supported by appropriate skilled professionals so as to make the land banking process up-to date, efficient, effective.
- ✚ The land banking office should have a clear directive with a well-defined organizational structure, and staffing norms based on approved establishment.
- ✚ The number of skilled manpower and the educational qualification background required for each activity of the land banking office should be clearly identified and appropriate ,personnel should be assigned for each post of the office.

- ✚ The land banking office should be given the authority or be encouraged to have its own revenue base and involve in developing land and transferring or selling the developed land and adequate budget should also be allocated for the land banking office.
- ✚ use modern land information system (GIS,Database,CAD) Creation and promotion of community land trusts should be encouraged so that the public can participate in making effective use of local land protecting the land from illegal grabbing or wastage of land because of being vacant or underdeveloped.
- ✚ Proclamation, directives, procedures, and programs of the land banking office must be disclosed to the public via various media such as television, radio, newspaper and brochures, and public meeting should also be arranged at local levels so as to inform about latest developments of land banking process and results.
- ✚ The practice of good governance should be strengthened and principle of good governance such as transparency, accountability, efficiency, and responsibility must be adhered to administration practice by public officials in order to promote democracy and active participation of the public in land banking processes and land related developmental activities.
- ✚ Different governmental department should work in cooperation, coordination, and integration so as to make the land banking process part and parcel of the overall developmental activities and make effective use of land by different stakeholders.

REFERENCE

- Andrew whitaker. (2018) *land banking is for less of a problem than the challenges of the planprocess.*
- Avtar.R., Aggarwal, R., & Kumar, P. (2020). *Utilizing geospatial information to implement SDGs and monitor their Progress.* 192(1), 1–21.
<https://doi.org/10.1007/s10661-019-7996-9p>
- AACCSA (2016,) A Study on the Impact of the Current Land Lease Law on Business.
- Abadi, D. (2020) IDP-led Women’s Assistance: New roles for traditional groups Rethinking *Refuge Platform, Refugee Studies Centre, University of Oxford.*
- Easton-Calabria, E., Abadi, D., and Gebremedhin, G. (2020) A call to action: mobilizing local resources in Ethiopia for urban IDPs. *Forced Migration Review*, 63, 58-60.
 Available at: <https://www.fmreview.org/cities/eastoncalabria-abadi-gebremedhin>
- Ag, K. (2016). Managing the data challenge in banking more and more data.
- Brooks et.al (April 2004). *Harnessing Community Assets: A Detroit Land Bank Authority.*
- Barau, A. S. (2014). *Feature - Article Geospatial technologies, indigenous.*
- Damen, B. J. (2004). *Land banking in The Netherlands in the context of land consolidation.* 1–5.p
- Duhamel, C. (2002). *Land Policy and Administration Assessment USAID/Ethiopia-Vol-*
- Easton-Calabria, E. (Forthcoming) Success Twinned by Challenge: An urban IDP response in Ethiopia.
- Economics, B. A. (2000). L and bank international land banking practices : *Considerations for Gauteng Province.* (n.d.).
- Frank, S. (2015). *Land Banks and Land Banking* 2nd edition.
- Folger, P. (2009). *Geospatial Information and Geographic Information Systems (GIS): Current Issues and Future Challenges.*
- Hartvigsen, M., Versinskas (2021), European good practices on land banking and its application in *Eastern Europe and Central Asia European good practices on land banking and its application in Eastern Europe and Central Asia.* 21–25.pp

- Europe, E. (2010). Wrap-up and Conclusions Regional Workshop on Land Tenure and Land Consolidation Land Banking and Public Land Management Prague
FAO guidelines. 1–7.p
- Dale, P. F., & McLaren, R. A. (1996). *GIS in land administration 1 introduction*
- Habte, B. and Kweon, Y. J. (2018) Addressing internal displacement in Ethiopia. *Forced Migration Review*, 59, 40-42. Available at:
<https://www.fmreview.org/GuidingPrinciples20/habte-kweon>
- Kothari, C. R. (1990). *Research Methodology: Methods and Techniques*. (2nded). Wachira, Prakashan.
- Kasa, L., Zeleke, G., Alemu, D., Hagos, F., & Heinimann, A. (n.d.). *Impact of urbanization of addis abeba city on peri-urban environment and livelihoods*. 1–30.
- Local Initiatives Support Corporation. (2005). Atlanta Case Study: *Model Practices in Tax Foreclosure and Property Disposition*.
- Uri, D., & Seymour, J. J. (1976). *Land Banking as a Redevelopment Tool for the City of Providence*.
- Navratil, G. (2020). *Applications of GIScience for Land Administration*.
<https://doi.org/10.3390/ijgi9070416>
- Namazian, Z., & Roghanian, E. (n.d.). *A decision problem for bank branch site selection: A GIS Mapping perspective with Maximal Covering Location Problem: A case study of Isfahan, Iran*.
definition and. 859–876.pp
- T., & Law, F. (2020). *Brief on land banking study*. December, 1–7.pp
- Great, T., & Environmental, L. (2005). *Best Practices in Land Bank Operation The, City of Cleveland*. June.
- Krabben, E. Van Der. (2020). *Land use management strategies Asian Development Bank Institute* (Issue 1191).
- Stebek, E. N. (2015). *Challenges in Access to Urban Land for Business Activities under Ethiopian Law : Between Oligarchy and Broad-based Private Sector*. 37–82.
- Silva, D. A. (2011). Land banking as a tool for the economic redevelopment of older industrial cities. *2009(111)*, 607–641.pp
- Iv, J. F. (2019). How Modern Land Banking Can Be Used to Solve REO Acquisition Problems Land Banking : Then and Now Distressed REO properties represent

opportunities for *local governments to help stabilize or revitalize areas struggling with population loss and excess* Some Roadblocks on the Path to Acquiring REO Properties. 145–150.pp

Nurul, S., Syed, A., Jaafar, M. N., Naim, M., & Mohd, A. (2019). *Key criteria for land bank investment*. 13(1), 1–18.p

Ohio State University, (April 2004) *The Multiple Benefits of Land Banking and Comprehensive*

Land Bank Planning for Detroit. Kirwin Institute for the Study of Race & Ethnicity

Pagano, M. & Bowman, A. (2000). *Vacant Land in Cities: An Urban Resource*, Survey Series, The Brookings Institute.

Tims, W. (2009). Department of technology and built environment gis model for the land use and development master plan in rwanda

Technology, etal, R. (2018). *Good practices and emerging trends on geospatial technology and information applications for the Sustainable Development Goals in Asia and the Pacific*. 1–48.

Tonder, Denmark, March (2004), *Land Banking / Land Funds as an Instrument for Improved Land Management for CEEC and CIS*

Tariku. Y., (2019) Conducted a study on “*The challenges of land banking in Addis Ababa;the case of kolfe keranyo sub-city*”

UN Ethiopia (2019) Durable Solutions Initiative launched in Ethiopia. 6 December.

<https://ethiopia.un.org/en/27655-durable-solutions-initiative-launched-ethiopia>

UNHCR (2019) Ethiopia Country Refugee Response Plan: The integrated response plan for refugees from Eritrea, Sudan, South Sudan and Somalia (2019–2020). Available at:

<https://data2.unhcr.org/en/documents/download/67744>

Yimer, F. A. (2014). *Fit-for-purpose land consolidation : an innovative tool for re-allotment in rural ethiopia thesis_gobaw_bz*.

APPENDIXIS

Appendix i: Questionnaire Survey

ADAMA SCIENCE AND TECHNOLOGY UNIVERSITY

SCHOOL OF CIVIL ENGINEERING AND ARCHITECTURE

POST GRADUATE STUDY IN GEOINFORMATICS ASTU 2022 GC

QUESTIONNAIRE SURVEY STRUCTURE

QUESTIONNAIRE SURVEY OF THE RESEARCH ON ASSESSING
CHALLENGES OF LAND BANKING AND EXAMINE ITS FEASIBILITY
IN ADAMA; A CASE OF BOLE SUB CITY, ADAMA, ETHIOPIA.

Dear Participant, this information will only be used for our research.

We thank you very much for your help and cooperation.

I. Respondent information

Answer the following questions according to the given instruction.

1. Gender: Male ☐ Female ☐

2. **Age:** ☐ less than 20 ☐ [20 –30] ☐ [30 – 40] ☐ [40 – 50] ☐ 50 and
above

3. **Marital status:** ☐ Single ☐ Married

4. **Education level:** ☐ Illiterate ☐ Primary school ☐ Secondary School
☐ Diploma ☐ degree/ BSC ☐ Masters/MSc ☐
above

5. **Occupation:** ☐ Private employee ☐ Government employee ☐ Self-
employed

6. **Employee staff type:** ☐ Administrative staff ☐ Manager ☐ Technical
expert

7. Are you live in Adama bole subcity? YES ☐ NO ☐ Mention others ☐

If your answer is YES for How long have you lived in Bole sub city ?

(a) ☐ Less than 5 years (b) ☐ 10-15 (c) ☐ 15-20 (d) ☐ 20-30 (e) ☐ more than 30

8. have you your own residential/home YES ☐ NO ☐

9. How did you get your land?

(a) ☐ Lease hold (b) ☐ Free hold (c) ☐ Occupied vacant land (d) ☐ occupied
abandoned land (e) ☐ Bought land from farmer (f) ☐ Other

10. Have you got your land and building registered? YES ☐ NO ☐ If "No" why?

.....
.....

11. How often do you go to the land banking office?

A) ☐ Regularly B) ☐ sometimes C) ☐ Rarely D) ☐ Never

12. Have you ever received any brochures, or participated in a meeting called by the
land banking office? A) yes ☐ B) No ☐

13. Are you aware of the plan and/or some activities of the land banking office

A) yes ☐ B) No ☐

14. Do you know how land is acquired by land bank officer? A) yes ☐ B) No ☐

If your answer is 'No' why? A) No information B) ignorance of residents C)
complex to know.

15. Do you think the land banking system of the land bank office in your sub city is
satisfactory? A) yes ☐ B) No ☐

If question no 15 "No " what do you think is the impact on land development?

16. Land banking can increase revenues of the government.

Agree ☐ disagree ☐ Neutral ☐

17. Are there lands in your local area which should be acquired by land banks?

A) yes ☐ B) No ☐

If question number 17 "yes", what type of land? (You can tick more than once) A) Abandoned B) Vacant C) Tax foreclosed D) Illegally grabbed E) other If "other" (describe it in

short)_____

18. In your area are there already occupied land/property transferred to other person?

A) yes ☐ B) No ☐

If your answer is YES what do you think its reason? You can select more than 2(two)

(a) ☐ lack of land banking system (b) ☐ problem of Administration/management

(c) ☐ land is not registered in land bank system

(d) ☐ miss understanding of community.

(e) ☐ lack of land expert (f) ☐ corruption case. (h) if there's other please describe in short_____.

19. Do you think that the land banking office is facing any challenges to give adequate service for its customers? Fill below table based on given instruction:

Degree of agreement 3 Very Agree 2 Agree 1 Neutral 0 Disagree

S/N	Expected challenges	Degree of agreement (response)			
		0	1	2	3
1	Lack of adequate skilled man power	☐	☐	☐	☐
2	Absence of abandoned vacant or foreclosed land	☐	☐	☐	☐
3	Shortage of finance	☐	☐	☐	☐
4	Corruption	☐	☐	☐	☐
5	Ineffective use /management of acquired land	☐	☐	☐	☐
6	Lack of modern land recording system.	☐	☐	☐	☐
7	Other constraint	☐	☐	☐	☐

20. What do you think are the benefits of land banking for the public?

.....

22. Based on your understanding, what do you are the main challenges and benefits land banking practice in your city/Subcity?.....

II. Questionnarrie for Expers/land related professionals

1. What is your current position in the land banking office (land sector)?

2. How long have you been working for this organizations or in this Office?_____

3. Land bank activity has positive impacts on home values and is shown to reduce mortgage foreclosure and crime rates.

Agree ☐

disagree ☐

if other ☐

4. What form of land transfer does your office employ? (you can tick more than once)

(a) ☐ Allotment (b) ☐ Auction (c) ☐ Negotiation (a) ☐ Other

If -other please specify

5. Does your office have effective modern land banking system? (a) ☐ Yes (b) ☐

No

if -no, why? And what impacts does this have on land banking?

6. What are the procedures to acquire land for land banking?

7. Does New and specific insight about the impact, benefit and challenges that land banks

in Adama subcity face were identified? YES ☐ NO ☐ Mention others ☐

8. Did you **agree** that land banks did not do enough to promote their work to the broader community and felt that many of their fellow residents held misconceptions about what the land bank's purpose was?

Agree ☐

disagree ☐

if other ☐

9. If you agree what concepts of about land bank given to the community even among informed bellows significant to reduce more confusion over:

- ☐ The role of the land bank
- ☐ How the land bank acquires properties
- ☐ Where the land bank is and how it is active in the community.

If there's another conception mention here.

10. In your sub city/office /land sector what kinds of other challenges facing land banks.

- ☐ Community displeasure with the length of time some properties are held;
- ☐ Political turnover, which can lead to change in levels of support; and,
- ☐ Insufficient and unreliable funding to support staff and programs.

If there's another challenges write below specified line.

11. In your sector/ land banks on property itself does it include Each property has its own unique attributes such as,

- ☐ Vacant lot or structure, ☐ condition of structures (internal and external)
- ☐ Mortgage status ☐ tax status, and ☐ occupancy status.

☐ if there's other please specify _____, _____

12. Different types of neighborhoods have different housing values, amenities, disamenities and socioeconomic attributes. Did you **Agree** These components tend to group together into housing submarkets and are well documented?

Agree ☐ disagree ☐ if other ☐

13.What's Factors impact regional economic competitiveness, housing demand and employment trends?

- ☐ Geographic location, ☐ Industry composition, ☐ Transportation capacity and ☐ Technology infrastructure ☐ if there's other please specify.

14.What is your general comment about challenges of land banking in your land sector and feasibility?

⊗ **Challenges of land banking?**

⊗ **Feasibility of land banking in government sector/for community?**

THANK YOU!

Appendix ii: Interview of land bank Experts/officers

Respondent Information

➤ would you introduce yourself, your position and Experience in Land Banking sector?

Name: _____

Position: _____

Experience: _____

➤ Interview Date and time: March 20, 2022 start from 02:00-10:30am

➤ Location: Adama Land Administration Office.

1. In your office what are the Educational level academic requirements for employment in land banking office?

a/ Grade 10 and above b/ Technical level c/ First degree d/ Second degree and above

2. What are the powers and mandates given to the land banking office? And its organizational structure?

3. Who are the main clients of your office? (Describe in percent if possible).

1. Real estate developer 's 2. individuals 3. government organization 4. NGO 5. others

4. What are the main problems related with man power in your office?

1. Lack of experience 2. unfamiliarity with rules and regulation 3. Salary dissatisfaction

5. Does your office have modern land banking system? YES/NO If no why?

_____.

6. Does your office use GIS and/or cadaster for effective management of land? YES/NO
If no why?

_____.

7. How do you evaluate or assess the institutional capacity of your office in:

1. Technology_____

2. Manpower_____

3. Coordination_____

4. Financial capability_____

8. What technology does the land banking office use to acquire, manage and dispose
Land? _____,

_____.

9. Which detailed procedures do you use in the three main process:

1. Land acquisition_____

2. Land management_____

3. Land disposition_____

10. Do you believe that the land banking system currently in use is effective?

1. Yes 2. No For either answer why?

_____.

Appendix iii: Sample Site Survey of Vacant lots

Pt_NO	Northing	Easting	Remarks
1	530316.783	947433.184	Vacant lots
2	528911.386	947520.700	Vacant lots
3	528803.278	947340.520	Vacant lots
4	530316.783	947433.184	Vacant lots
5	528911.386	947520.700	Vacant lots
6	528803.278	947340.520	Vacant lots
7	528180.373	946017.491	Vacant lots
8	528211.261	946244.002	Vacant lots

9	528751.799	946722.763	Vacant lots
10	531218.918	947631.167	Vacant lots
11	531244.847	947,897.008	Vacant lots
12	531127.372	947886.953	Vacant lots
13	531707.241	948156.664	Vacant lots
14	531772.725	948267.392	Vacant lots
15	531639.772	948257.073	Vacant lots
16	531872.738	948290.411	Vacant lots
17	530850.915	948603.810	Vacant lots
18	530718.325	948408.150	Vacant lots
19	530877.506	948654.610	Vacant lots
20	530967.993	948486.732	Vacant lots
21	530174.606	948869.849	Vacant lots
22	531785.544	948128.115	Vacant lots
23	531886.086	948016.461	Vacant lots
24	531,157.263	947,535.877	registered
25	531,172.080	947,507.302	registered
26	531,172.609	947,581.385	registered
27	531,176.313	947,466.556	registered
28	531,021.796	947,442.744	registered