

Urban Expansion and Its Impact on the Livelihood of Peri-Urban Communities: A Case Study of Bishoftu Town, Ethiopia



Tekle Bedo Geresu

A Thesis Submitted to

The department of Architecture

School of Civil Engineering and Architecture

Presented in Partial Fulfillment of the Requirement for Master of Science degree in Urban
Planning and Design

Office of Graduate Studies

Adama Science and Technology University

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Adama, Ethiopia

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Advisor:- Dr. Yared Girma

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DECLARATION

I hereby declare that this Master Thesis entitled “**Urban Expansion and Its Impact on the Livelihood of Peri-Urban Communities: A Case Study of Bishoftu Town, Ethiopia**” is my original work. That is, it has not been submitted for the award of any academic degree, diploma, or certificate in any other university. All sources of materials that are used for this thesis have been accordingly acknowledged through citation.

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I, the Advisor of this thesis, hereby certify that I have read the revised version of the thesis entitled “**Urban Expansion and Its Impact on the Livelihood of Peri-Urban Communities: A Case Study of Bishoftu Town, Ethiopia**” prepared under my guidance by **Tekle Bedo** and submitted in partial fulfillment of the requirements for the degree of Masters of Science in **Urban Planning and Design**. Therefore, I recommend the submission of the revised version of the thesis to the department following the applicable procedures.

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LIST OF ACRONYMS

BSP	Bishoftu Structural Plan
CBD	Central Business District
CSA	Central Statistic Authority
FGD:	Focus Group Discussion
GIS	Geographical Information System
GPS	Global Positioning System
LULC	Land Use/Land Cover
OUIP	Oromia Urban Institute of Plan
UNDESA	United Nations Department of Economic and Social Affairs
USGS:	United States Geological Survey
UTM	Universal Transverse Mercator

ABSTRACT

Urban expansion is a global phenomenon that is rapidly transforming peri-urban areas. While urban expansion can bring some benefits to peri-urban communities, it has also a significant negative impact on their livelihoods. Many studies have been done on urban expansion in recent decades, but the effects of this rapid growth have not been fully understood. In many developing countries, such as Ethiopia, there is a growing awareness of the need to understand the relationship between urban expansion and the livelihoods of farmers. Hence, the aim of the study is to assess the impact of urban expansion on the livelihoods of peri-urban community in Bishoftu town. The study uses a mixed-methods approach, combining quantitative and qualitative data collection methods. The quantitative data was collected from a survey of 280 peri-urban communities, while the qualitative data was collected from focus group discussions and key informant interviews. GIS and remote sensing were used to analyse the phenomena of agricultural land transformation into urban land use. In order to achieve these, satellite data of Landsat TM for 1991, ETM for 2002, 2013 and 2023 have been obtained and processed. The Maximum Likelihood Algorithm of Supervised Classification has been used to generate land use/land cover maps. The findings of the study revealed that built-up area increased by 35.4km² within 32 years. In Bishoftu town built-up land was increased from 7.6 km² in 1991 to 43.3 km² in 2023. The change matrix shows that built-up areas expanded at the expense of grasslands (9.9 km²), forest land (2.8 km²), bare land (6.34 km²), swampy (1.9 km²) and farm land (14.4 km²). This implies the city's built-up area expansion is characterized by horizontal growth, leaving the peri-urban environment and livelihoods at risk. The study found that urban expansion in Bishoftu town was mainly driven by population growth, infrastructure accessibility, reclassification of former rural settlements into new urban settlements, the town's topography, its proximity to Addis Ababa, and land speculation. The findings of the study show that urban expansion has had a negative impact on the livelihood of peri-urban communities in Bishoftu town. The study found that urban expansion has led to the loss of agricultural land, displacement of farmers, and disruption of livelihoods. A survey of residents in Kurkura Denbi and Kajima Kebele found that 35% of respondents had lost 1 to 2 hectares of land due to urban expansion, followed by 29% (0.5 to 1 hectare) and 14% (2 to 3 hectares). Agricultural land was the most commonly lost type of land, accounting for 49%, followed by grassland (36%). This loss of land has led to a loss of income for peri-urban farmers. The study also found that compensation for lost land was not made on time for the affected farmers and was not fair or adequate to sustain the livelihoods of the affected households. To mitigate the negative impacts of urban expansion on peri-urban communities and make urban expansion orderly and sustainable, it is essential to develop and implement comprehensive land use plans that take into account the needs of peri-urban communities, provide training and support to peri-urban farmers to help them adapt to the changing environment, and invest in infrastructure and services in peri-urban areas.. The findings of this study have important implications for policymakers and planners in Ethiopia and other developing countries. The study highlights the need to carefully consider the impact of urban expansion on peri-urban communities and to develop strategies to mitigate the negative impacts.

Keywords: *Bishoftu; Expropriation; Livelihood; Peri-Urban; Displacement; compensation*

CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

Urbanization is a global phenomenon that has existed since the earliest human civilizations, such as the Babylonians (Truschnegg, 2013). It is now a growing trend in all parts of the world, especially in developing countries, where it is happening at an alarming rate. This trend is leading to both an increase in the number of cities and the physical size of existing cities (Puplampu, & Boafo, 2021). Urban areas currently account for more than 55% of the world's population, and this proportion is projected to increase to 68% by 2050 (Profiroiu, et.al. 2020). Of this growth, 90% is expected to take place in developing countries (Oyelaran-Oyeyinka, & Lal, 2016). In the next two decades, developing countries are expected to experience much faster population growth than developed countries. UN-Habitat estimates that the annual growth rate in developing countries will be 2.27%, compared to just 0.49% in developed countries. This, combined with the trend of urbanization, suggests that cities in developing countries will become more urbanized than cities in developed countries at a faster pace (Baye, et.al. 2020).

Over the next 40 years, cities in Africa are expected to experience the world's fastest urban growth. 800 million Africans will move to metropolitan areas or give birth there. 60% of the predicted population in Africa would reside in cities and towns by 2050, where there will be close to 1.5 billion people. African cities are already expanding quickly, and the continent may have up to 15 megacities with populations more than 10 million by 2050. By 2050, it is anticipated that even Egypt, which is highly urbanized, will have doubled its urban population (Yuen & Kumssa, 2016).

Apparently, cities are places of both enormous opportunities and unprecedented challenges. On the one hand, cities are a place of potential challenge, which makes cities more and more vulnerable to natural disasters, pollution, and the effect of climate change. On the other hand, cities are the place of immense opportunities that makes cities a vehicle to tackle these major urban challenges. For example, cities are the major contributors to the global economy and the driving forces of sustainable development (Parnell, 2016).

Urban expansion, the changing of land use from rural to urban, is a complex social and economic phenomenon. It is influenced by a variety of factors, including the physical

environment, transportation infrastructure, land use patterns, social structure, and economic type. However, it is most strongly influenced by the population and economy of a city (LinLi, et.al. 2003).

Manatsa et al. (2008) argue that urban areas are physically expanding into peri-urban areas in order to accommodate the growing population and economy. As the population of a city increases, so does the demand for housing, commercial space, and infrastructure. This can lead to urban expansion into peri-urban areas (Puplampu & Boafo, 2021). Economic development can also lead to urban expansion. Economic growth can lead to increased investment in cities, which can create new jobs and attract new residents. This can lead to urban expansion as people seek out housing and other amenities in the city (Chen, et.al. 2014).

Peri-urban areas are the transition zones between cities and rural areas. They are areas where traditional farming practices are often in conflict with new economic, residential, and recreational development (Mandere and Anderberg 2010). Peri-urban areas are neither fully urban nor fully rural, and they offer a mix of services and amenities that are less than what is available in cities and less than what is available in rural areas (Adeboyejo 2007).

Urban expansion has a complex impact on peri-urban areas and their livelihoods, with both positive and negative outcomes (Weldearegay, et.al. 2021). When well-planned and managed, urbanization can be a force for development, leading to increased demand for agricultural products from nearby urban areas and providing access to developed extension services and new opportunities for non-farm employment (Satterthwaite and Tacoli, 2003; Alaci, 2010).

Despite the potential benefits of urban expansion, such as increased economic opportunities and access to services, unplanned urban expansion, which is common in most developing countries, negatively affects the natural environment and livelihoods in peri-urban areas (Ablo et al., 2020). Martellozzo et al. (2015) found that ten million people are displaced each year due to development activities, of which six million are displaced by urban expansion. Urban expansion globally leads to the loss of agricultural land, forests, natural beauty, parks, and other resources (Pham et al., 2011). Furthermore, the consequences of horizontal urban expansion include not only the loss of land, which is the primary source of income for farmers, but also the eviction of farming households, which disrupts their livelihoods (Arku,

2009). Such negative consequences can lead to increased household poverty and damage to the peri-urban environment (Marshall et al., 2009).

Nassar et al. (2019) predict that arable land in Southeast Asia, Western Asia and North Africa, South and Central Asia, and East Asia could shrink by up to 10%, 10%, 8%, and 7% respectively by 2050. Lu et al. (2011) argue that urban expansion is a major driver of land use change, including agricultural land. This problem is particularly severe in Sub-Saharan African countries, such as Ethiopia, where there is a lack of effective urban land use planning and community participation in planning and implementation processes (Fenta et al., 2017; Nassar et al., 2019).

Ethiopia is urbanizing rapidly, with an average annual urban growth rate of 4.5% between 2010 and 2020 (Benti, et.al. 2022). This rapid growth is mainly driven by high natural population growth and rural-urban migration (Begna, 2017). To accommodate this growth, most urban centers in Ethiopia are expanding horizontally into peri-urban areas; which was not properly controlled by appropriate planning intervention, weak implementation capacity, weak institutional capacity as well as lack of good governance in cities or towns (Talema & Nigusie, 2023). This expansion is having a negative impact on the livelihoods and socio-economic conditions of the communities inhabited in peri-urban areas (Tamirat, 2016).

Bishoftu town, a rapidly growing town in the Oromia Regional State, is facing a number of problems caused by urban expansion. One of the main problems is the conversion of farmland and forest into residential, commercial, and other urban land uses. The town's initial master plan was created in 1954, and it has been revised several times since then. However, the town has grown much faster than the master plans have anticipated. In 1984, the town covered 3,280 hectares of land. Ten years later, its area had increased to 4,520 hectares. Today, the town covers over 18,940 hectares. This rapid expansion has resulted in the expropriation of large track of land from local farmers, who have then been displaced from their homes and livelihoods. This land has then been used for private investments and urban development. Hence, this study aims to assess the impact of urban expansion on the livelihoods of peri-urban communities in Bishoftu Town.

1.2. Statement of the problem

Urban expansion as a dynamic process of land use change is a complicated social/economic phenomenon. It may be linked with details related to topography, transportation, land use, social structure and economic type, but it is generally related to demography and economy in a city (LinLi et al., 2003).

Urbanization, the process of urban expansion may involve both horizontal and vertical expansion of the physical structure of urban areas. It can result in loss of agricultural land, natural beauties, range lands, parks and sceneries (Melesse, 2004). According to the World Urbanization Prospects reported by the United Nations (UN, 2012), from 1965 to 2010, the global population increased from 3.3 billion to 6.9 billion, and the total amount of population will exceed 9.3 billion by 2050. Along with the population growth, more and more people chose to live in urban areas. The percentage of the world's population residing in urban areas increased from 35.5% in 1965 to 51.6% in 2010 and this number will reach at 67% in 2015 (UN, 2012).

Unplanned urban expansion, a major problem in many Ethiopian cities and towns due to lack of effective planning, weak implementation capacity, and poor governance, has led to a range of social, economic, environmental, and political problems, as well as negative impacts on the livelihoods of peri-urban communities (Firew, 2010; Mulu, 2016; Debela et al., 2016).

Similar to other urban center in Ethiopia, Bishoftu town, one of the fastest growing towns in Oromia regional state, is experiencing a rapid change in land use land cover because of its urban expansion. This rapid urban growth has resulted in the loss of prime agricultural land, a decline in agricultural output, the relocation of peasants, and a change in their way of life. Bishoftu town today has faced a problem in relation to natural resource and the environment which are caused by urban expansion. Among others, the conversion of farm land and forest area into different urban land uses, such as residential, commercial land and other activities are the main ones.

Bishoftu town is experiencing rapid, irregular, and uncontrolled urban expansion, which is converting large swaths of land to urban use and negatively impacting the environment and the livelihoods of farmers in the surrounding area (Adam, 2010). The town's structural plan increased from 12,100.6 hectares in 2001 to 18,940.9 hectares in 2020, reflecting this

expansion. This unplanned urban expansion, poorly developed land use planning, or improper implementation that does not consider the needs of peri-urban communities is causing the loss of agricultural, grazing and bare land, displacement of farmers, and disruption of livelihoods.

While problems caused by urban expansion are evident in Bishoftu town, no detailed studies have been conducted. However, there are a few studies that have examined the consequences of urban expansion for neighboring farmers (Adem, 2010) and the factors that determine income variation due to urbanization in the urban fringe areas of Bishoftu town (Musba & Alemayehu, 2021). These studies overlooked the detailed impact on livelihoods, particularly the social effects of displaced farming households. The impact of urbanization on farmers' sustainable employment, assets, social networks, and social bonds has not yet been assessed. Additionally, the extent, magnitude, and potential impact of Bishoftu town's horizontal urban expansion have not been investigated using geospatial technologies such as remote sensing and GIS techniques. Therefore, this study aims to fill these knowledge gaps by assessing urban expansion and its impact on the livelihood of the peri-urban community in Bishoftu town using multi-temporal satellite image analysis supported by field surveys, key informant interviews, and focus group discussions.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of this study is to investigate the impact of horizontal urban expansion on the livelihoods of the peri-urban communities of Bishoftu town

1.3.2. Specific Objectives

The specific objectives of the study are: -

- ◆ To assess the changes in land use patterns in the study area due to urban expansion
- ◆ To identify the underlying drivers of urban expansion in Bishoftu town
- ◆ To examine the most significant impacts of urban expansion on the livelihoods of peri-urban communities in Bishoftu town.

1.4. Research Questions

In light of the above problem statement and objectives, the study has the following questions.

- ◆ How has urban expansion in Bishoftu town changed land use patterns in the peri-urban area?
- ◆ What are the key factors that are driving urban expansion in Bishoftu town?
- ◆ What are the most significant impacts of urban expansion on the livelihoods of peri-urban communities in Bishoftu town?

1.5. Significance of the Study

Bishoftu town is one of the fastest growing towns in Ethiopia, and its rapid expansion is having a significant impact on the peri-urban communities that surround it. These communities are often the most vulnerable to the negative impacts of urban expansion, such as land loss, displacement, and loss of access to resources.

The findings of the study will be significant for a number of reasons. First, they will provide policymakers with a better understanding of the impact of urban expansion on peri-urban livelihoods. This information can be used to develop more effective policies to mitigate the negative impacts and support peri-urban communities in adapting to urban expansion. Second, the study will contribute to the body of knowledge on the impact of urban expansion on peri-urban communities in Ethiopia. This knowledge can be used to inform the development of policies and programs in other peri-urban areas of Ethiopia. Third, the study will raise awareness of the challenges and opportunities that peri-urban communities face in Ethiopia. This awareness can help to build support for policies and programs that support peri-urban communities in adapting to urban expansion. Finally, the findings of this research can be used as a starting point for further research in the related sectors and subjects.

1.6. Scope of the study

The thesis scope encompasses spatial and thematic dimensions. Thematically, the study focused on assessing the impact of horizontal urban expansion on the socioeconomic status of peri-urban communities in Bishoftu town, with a particular focus on financial, social, physical, and natural capital. The study also explored the drivers of urban expansion in the study area and how to overcome the challenges it poses to peri-urban livelihoods.

Spatially, the study was limited to two peri-urban kebeles (Kurkura Denbi and Kajima) out of the thirteen kebeles surrounding the town. This was because the livelihoods of the peri-urban communities in these two kebeles have been more heavily influenced by urban expansion than in other kebeles.

1.7. Limitation the Study

All research studies face limitations throughout their lifecycle. This study also had some limitations during its conduct. The first limitation was a lack of secondary data sources, specifically the inefficient provision of information by the urban municipality. In addition, the researcher faced some other challenges related to respondent behavior during interviews and questionnaire completion. These challenges included respondents failing to answer questions fully and correctly, and not attending focus group discussions when invited.

1.8. Operational Definition

- ✧ **Urban expansion:** The process by which urban areas expand into surrounding rural areas. This can be measured by the rate of increase in urban land area, the number of new buildings constructed, or the population growth of urban areas.
- ✧ **Livelihood:** The means by which people meet their basic needs for food, shelter, clothing, healthcare, and education. Livelihoods can be based on a variety of activities, including farming, fishing, trade, and employment in the formal and informal sectors.
- ✧ **Peri-urban communities:** Communities that are located on the outskirts of urban areas. These communities are often characterized by a mix of urban and rural characteristics, such as a mix of agricultural and non-agricultural land uses.
- ✧ **Impact:** The effect of urban expansion on the livelihoods of peri-urban communities. This can be measured by changes in income, employment, access to land and resources, and food security.
- ✧ **Socioeconomic impacts:** The social and economic effects of urban expansion on peri-urban communities. These impacts can be positive or negative, and can include changes in income, employment, education, health, and social networks.

- ✧ **Environmental impacts:** The physical and ecological effects of urban expansion on peri-urban communities. These impacts can be positive or negative, and can include changes in air quality, water quality, biodiversity, and land use.
- ✧ **Adaptive capacity:** The ability of peri-urban communities to make changes to their livelihood practices in response to the challenges and opportunities of urban expansion. This can be influenced by a variety of factors, such as access to credit, land, and resources.
- ✧ **Kebele:** is the lowest administration unit in the Ethiopian government's administration hierarchy.
- ✧ **Displacement of framers:** This refers to those farmers who were expropriated of their farmlands in the rural-urban fringe. Thus, results to the change/functional movement or displacement of farmers from that specific area.
- ✧ **Coping strategies:** The strategies that peri-urban communities use to deal with the negative impacts of urban expansion. These strategies can include diversifying livelihoods, changing agricultural practices, and migrating to urban areas.

1.9. Organization of the Research

This research is divided into five chapters. The first chapter is introduction, which includes the background of the study, statement of the problem, research questions and objectives, scope of the study, significance of the study, limitation of the study and organization of the paper.

The second chapter examines review of related literature that focuses on the basic concepts of urban expansion, drivers of urban expansion, positive and adverse effects of urban expansion on the communities in the peri-urban area, and possible solutions for the consequence of urban expansion. Furthermore, it reviewed empirical literatures related with the topic including the research gap and conceptual framework of the study.

The third chapter briefly presents description of the research design and methodology used in the study while the fourth chapter contains data analysis, presentation, and interpretation (research result and discussion). The fifth chapter is conclusion, recommendation, and direction for future research.

CHAPTER 2: REVIEW OF LITERATURES

2.1. Theories of Urban Expansion

Urban expansion is the physical extension of the geographical footprints of towns, cities, and metropolitan areas into the surrounding countryside. It is a global phenomenon, driven by population growth, economic development, and technological change (Angel, 2023). There are a variety of different theories, each with its own strengths and weaknesses.

One of the most influential theories of urban expansion is the concentric zone model, developed by sociologist Ernest Burgess in the early 1920s. This model suggests that cities grow in a series of concentric rings, with the central business district (CBD) at the core and different types of land uses radiating outward. The innermost ring is typically characterized by high-density commercial and industrial activity, followed by a ring of mixed-use residential and commercial areas, then a ring of low-density residential areas, and finally a suburban ring of agricultural and undeveloped land (Reiffenstein, 2017).

Another important theory of urban expansion is the sector model, developed by economist Homer Hoyt in the 1930s. This model suggests that cities grow in a series of wedges radiating outward from the CBD. Each wedge is characterized by a different type of land use, such as high-income residential areas, industrial areas, or transportation corridors (Fujita, 2013).

The concentric zone model and sector model were both developed in the early 20th century, and they have been updated and refined over the years to reflect changing trends in urban growth. However, both models remain influential in the field of urban planning today.

In addition to the concentric zone model and sector model, there are a number of other theories that have been used to explain urban expansion. Some of these theories focus on the economic factors that drive urban growth, such as the agglomeration economies that businesses can achieve by clustering together in cities. Other theories focus on the social and cultural factors that influence where people choose to live, such as the desire for access to jobs, schools, and other amenities (Abdullahi, et.al. 2017).

In recent years, there has been a growing interest in the spatial interaction models of urban expansion. These models use complex mathematical equations to simulate the movement of

people and businesses within and between cities. Spatial interaction models can be used to predict how urban areas will grow and change in the future, and they can be used to evaluate the impacts of different planning policies (Li, & Gong, 2016).

Urban expansion is a complex phenomenon, and there is no single theory that can fully explain it. However, the theories discussed above provide a useful framework for understanding the patterns and drivers of urban growth, as well as the consequences of this growth for cities and their surrounding regions.

2.2. Concept of Urbanization and Urban Expansion

Urbanization is a major topic of discussion in the development sector. Some people believe that urbanization is a positive change for people, while others believe that it has negative consequences. The United Nations (UN) and Gollin et al. (2013) argue that urbanization can lead to economic growth and improved living standards for people living in both urban and peri-urban areas. They point to the fact that cities are often centers of innovation and economic activity. However, Mondal (2010) argue that urbanization can have negative consequences, such as increased pollution, poverty, and crime. They also argue that urbanization can lead to the displacement of farmers and the loss of agricultural land. To better understand the debate on urbanization, it is important to define what urbanization is and what drives it. Urbanization is the process of increasing urban population, the growth of urban areas, and the increasing proportion of people living in urban areas. It is a form of metropolitan growth that is a response to a variety of economic, social, political, and environmental factors (Cohen, 2006)..

Urban expansion is the physical expansion of the built-up area of cities and towns into the surrounding countryside. It is a complex process that is driven by a variety of factors, including population growth, economic development, and government policies. Recent studies of urban expansion (e.g., Angel et al. 2012) have shown that this process is often fragmented and can leapfrog over vacant open spaces. However, these vacant spaces eventually fill in as urban expansion continues. Urban expansion also tends to occur at lower densities on the urban periphery than in central cities. This is because land on the urban periphery is typically cheaper than land in city centres (Brody, 2013).

The term "urban expansion" indicates the spatial or physical enlargement of built-up areas. Urban land expansion is one of the main indicators to measure the intensity of urbanization. Urban expansion is the most easily identifiable characteristic of the process in the spatial dimension. Bloch et al., (2015) defined that as the process of land conversion from non-built-up land use categories into built-up developed land over time. It is possible for a city to experience urban growth without expansion if this growth is absorbed within existing settlement boundaries. Conversely, expansion can occur without growth where new developments are created to facilitate lower population densities for an existing community. Recent studies have shown that urban land consumption per capita has been increasing over time. This is due to a number of factors, including economic development, cheaper transportation, and the desire for more space (Seto et al. 2011).

Urban expansion is a complex issue that is often resisted by citizens groups and municipalities. This resistance can lead to cities not preparing adequate lands for expansion, which can have negative consequences. A typical claim of those resistant to urban expansion is that urban population growth can be accommodated by the densification of the existing footprints of cities, not requiring any incursion into the rural periphery to convert new lands to urban use (Angel, et.al. 2021). A study by Angel et al. (2023) found that in a global sample of 200 cities, the average share of the increase in population during the period 1990–2014 that was accommodated by the densification of the existing footprints in 1990 was 23%, while the remaining 77% was accommodated in expansion areas built during the same period.

In conclusion, urban expansion is the principal mechanism by which cities accommodate their population growth. It is a complex issue with no easy solutions. However, it is important to understand the factors driving urban expansion and the potential impacts, both positive and negative.

2.2. Trends of Urbanization

Urbanization is the process of people moving from rural areas to urban areas, resulting in an increase in the number of people living in towns and cities. This process has been ongoing for centuries, but it has accelerated in recent decades due to a number of factors, including economic development, technological advances, and climate change. According to the United Nations Department of Economic and Social Affairs (UNDESA), (2014) the world's urban

population is expected to reach 6.74 billion by 2050. This means that two-thirds of the world's population will be living in urban areas by that time.

Rapid urbanization is happening in many parts of the world, and is expected to continue in the coming decades. In 1800, only 2% of the world's population lived in urban areas. By 1900, this number had increased to 15%. However, the pace of urbanization accelerated significantly in the 20th century. In 1950, only 30% of the world's population lived in urban areas. By 2007, this number had increased to 50%, and it is projected to reach 68% by 2050 (Zhang, 2016). This rapid urbanization is having a significant impact on the world. It is leading to the growth of megacities, which are cities with a population of over 10 million people. There are currently 34 megacities in the world, and this number is expected to increase to 43 by 2030 (Varquez, & Kanda, 2023).

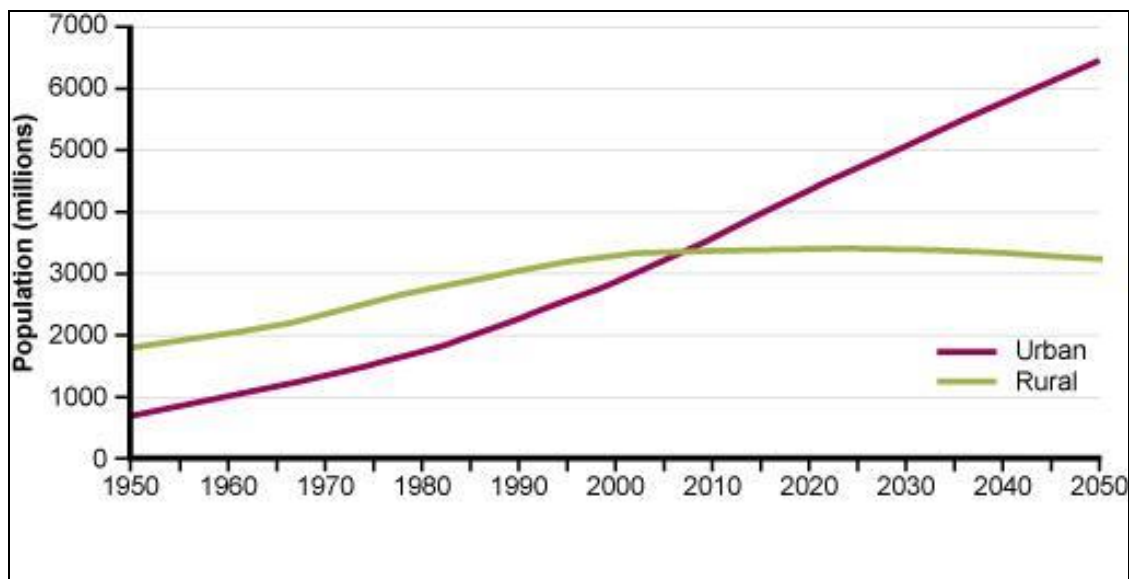


Figure 1: Urban and rural population of the world, 1950–2050

The rapid urbanization process in the developed world was mainly caused by industrialization in Europe and North America in the 19th and 20th centuries. For example, in the United States, only 5% of the population lived in cities in 1800, but this number had increased to 50% by 1920. This rapid urbanization was due to a number of factors, including the growth of manufacturing industries, the expansion of transportation networks, and the availability of jobs in cities (Kundu, & Pandey, 2020). Since 1950, the pace of urbanization has slowed down in most developed countries. This is due to a number of factors, including the decline of manufacturing industries, the rise of the service sector, and the increasing affluence of the

population. Some large cities in developed countries have even lost population as people have moved to smaller towns and rural areas (United Nations, 2018).

The urbanization process in the developed world has almost come to an end. However, urbanization is still a major issue in developing countries, where the majority of the population still lives in rural areas. In the developing world, the percentage of the population living in cities has increased from 17.8% in the mid-20th century to over 40% today. By 2030, it is estimated that this number will reach 60%. Most of this urban growth will occur in Asia, Africa, and Latin America. These regions will account for 54%, 32.5%, and 6.8% of the total urban population growth, respectively. This rapid urbanization is putting a strain on resources in developing countries. Cities need more infrastructures, such as roads, water, and sanitation, to accommodate their growing populations. They also need to create jobs and provide affordable housing (Jedwab, et.al. 2014).

2.3. Drivers of Urban Expansion

Urban expansion is a complex phenomenon that is influenced by a variety of factors. These factors can vary depending on the specific city or region, and they can also change over time. In Indonesia, for example, global and external economies, local demographic, infrastructural, and natural elements are all driving forces of urban expansion. However, the relative importance of these factors can vary from place to place. In Jakarta city, the core of the megacity, global and external economies are more important than local factors. This is because Jakarta is a major economic and financial center, and it is closely connected to the global economy. Outside the core of the megacity, local factors such as demographics and infrastructure are more important. This is because these areas are less developed, and they have less access to global markets. In many developing countries, the core driving forces of urbanization and urban expansion are political, economic, social, educational, natural population increase and lack of urban planning (Pravitasari et al. 2015).

2.3.1. Demographic factors

According to a study by Kassahun and Tegegne (2018), two of the most important factors driving urban expansion are in-migration (both rural-urban and urban-urban) and natural population growth. Urban growth is essentially a combination of two demographic processes. The first is rural-urban migration, which has been a major driver of urban expansion since the beginning of cities. People migrate from rural to urban areas in search of economic

opportunities, to escape rural insecurity, or to avoid environmental or economic problems. The second type of growth is natural, which is caused by both rising fertility and falling mortality rates.

Economic, legal, and private sector participation are all forces that drive urban expansion and change in settlement patterns in peri-urban zones. Each of these forces can have both positive and negative impacts on the livelihoods of farmers in peri-urban areas. The central government's intervention was considered to be the primary factor in the expansion of peri-urban Bangkok (Jonkory, 2009).

2.3.2. Political factors

During times of political unrest, families are often forced to flee their homes in rural areas. They may be displaced by violence, conflict, or the destruction of their homes and livelihoods. These families often migrate to urban areas in search of safety, shelter, food, and employment. When large numbers of people migrate to cities, it can put a strain on the city's resources. The cities may not have enough housing, food, or jobs to support the influx of new arrivals. This can lead to the development of slums, which are informal settlements that lack basic infrastructure and service (Osman, & Abebe2023). Slums are often located on the outskirts of cities, where land is cheap and there is less government oversight. They are typically overcrowded and unsanitary, and they lack access to clean water, sanitation, and healthcare. The residents of slums are often marginalized and discriminated against, and they may face high levels of crime and violence. The problem of slums is a major challenge for cities around the world. It is a complex issue with no easy solutions. However, there are a number of things that can be done to address the problem, such as providing affordable housing, creating jobs, and improving infrastructure and services in slums. The studies by Abraha and Samson (2016), Teketel (2015), and Pravitasari et al. (2015) all found that political unrest can lead to the development of slums in cities.

2.3.3. Economic factors

Economic factors cause urban expansion by creating opportunities for people to earn a living and improve their quality of life. Cities offer a wider range of jobs, higher wages, and better access to education, healthcare, and other amenities than rural areas. As a result, people are drawn to cities in search of better economic opportunities cities (Zhang, Xie, 2019). One of

the most important economic factors that drives urban expansion is industrialization. When industries move to cities, they create new jobs and attract workers from rural areas. This is because industries need access to a large pool of labor, transportation networks, and other infrastructure that are more readily available in cities (United Nations, 2017).

Another important economic factor is economic development. As cities grow and develop, they become more attractive to businesses and investors. This is because cities offer a larger market for goods and services, and they provide a more educated and skilled workforce. As a result, businesses and investors are willing to invest in cities, which further drives urban expansion (Choe, & Roberts, 2011). Economic factors can also lead to urban expansion through suburbanization. Suburbanization is the process by which people move from central cities to the surrounding suburbs. This is often driven by the desire to find more affordable housing, larger homes, and better schools. Suburbanization can lead to the expansion of urban areas, as new housing developments and commercial centers are built in the suburbs (Nechyba, & Walsh, 2002).

2.3.4. Social factors

Social factors are key drivers of urban expansion, influencing the movement of people and businesses to cities and their peripheries (Yiran et.al. 2020). These factors include:

Rural-to-urban migration: This is a major contributor to urban expansion, as people from rural areas move to cities in search of better job opportunities, education, and healthcare. Rural-to-urban migration is often driven by poverty, lack of land, and environmental degradation in rural areas (Lall, & Selod, 2006).

Changing social norms and aspirations: People are increasingly choosing to live in cities because they offer a variety of social and cultural amenities, such as restaurants, cafes, museums, and theaters. Cities are also seen as places of opportunity and excitement, where people can pursue their dreams and aspirations (Sassen, 2001).

Government policies: Government policies can also play a role in urban expansion. For example, government investments in transportation infrastructure can make it easier for people to live in suburbs and commute to work in the city. Tax breaks and other incentives for businesses can also attract businesses to move to suburban areas (Gordon, & Vining, 1991).

2.3.5. Lack of urban planning

Urban expansion is the outward growth of urban areas into surrounding rural areas. It is caused by a number of factors, including population growth, economic development, and technological change. However, lack of urban planning is a major driver of urban expansion (Basu, et.al. 2023).

Urban planning is the process of designing and managing the development of urban areas. It involves setting goals for the future growth of a city or town, and developing policies and regulations to achieve those goals. Effective urban planning can help to control urban expansion and create more sustainable and livable cities (Pinson, 2004). However, many cities and towns lack comprehensive urban planning. This can lead to a number of problems, including urban sprawl. Urban sprawl is a type of urban expansion that is characterized by low-density development, single-use zoning, and a reliance on cars (Habibi, & Asadi, 2011).

According to Watson (2009), there are a number of ways in which lack of urban planning can cause urban expansion. For example, if a city does not have a zoning code in place, developers may be free to build anywhere they want. This can lead to development in areas that are not suitable for development, such as floodplains or wetlands. Additionally, if a city does not have a long-term vision for its future growth, it may be more likely to approve development projects that are not in the best interests of the community. For example, a city may approve a new housing development without also planning for the necessary infrastructure, such as roads and schools. Finally, a lack of public participation in urban planning can also lead to urban expansion. If residents do not have a say in how their city or town develops, they are less likely to support projects that are designed to control urban expansion (Ma, 2017).

2.4. Impacts of Urban Expansion

The impact of urban expansion on rural farming communities in the periphery is complex and multifaceted. There is no single theory that can adequately explain all of the potential effects, both positive and negative (Talema, & Nigusie, 2023). However, modernization theory and dependency theory provide some useful insights. Modernization theory suggests that urban expansion can lead to economic growth and improved access to services for rural farming communities. However, it also warns that this process can be disruptive and lead to social inequality (Almandoz, 2014). Dependency theory, on the other hand, argues that urban

expansion often occurs at the expense of rural communities, which are exploited for their resources and labor (Emeh, 2013).

In the context of developing countries, urban expansion is often associated with unplanned development and a lack of infrastructure. It is also evident that even in planned activity the development of infrastructure usually does not correspond to the large tract of land that develops in a low-density pattern. Thus urban expansion consequently results social, environmental and economic problems to the society (Koroso, et.al, 2021).

2.4.1. Social Challenges

Rapid and unplanned urbanization can lead to urban violence and social unrest for a number of reasons. First, it can lead to widening inequalities. Urban areas tend to be more concentrated with wealth and power, while rural areas are often more impoverished. This can lead to a sense of resentment and frustration among the urban poor. Second, urban areas can be more competitive for scarce resources, such as jobs, housing, and land. This can lead to conflict and tension, especially between different social groups. Third, weak city governance can make it difficult to maintain law and order. This can create a climate of impunity, where criminals believe they can get away with their crimes. Finally, rapid and unplanned urbanization can lead to a breakdown of traditional social networks. This can leave people feeling isolated and vulnerable, which can make them more susceptible to violence (Scott, 2015). The example of San Pedro Sula, Honduras, is a tragic illustration of how these factors can combine to create a very dangerous environment. The city has a long history of poverty, inequality, and violence. In recent years, the city has experienced rapid and unplanned urbanization, which has exacerbated these problems. As a result, San Pedro Sula has one of the highest murder rates in the world (Lehmann, 2015).

One of the negative impacts of urban expansion is that it can lead to displacement, dislocation, and segregation. Displacement occurs when people are forced to leave their homes and communities due to urban development. Dislocation occurs when people are forced to move to a new place, but they are not provided with the resources or support they need to adjust to their new environment. Segregation occurs when different groups of people are separated from each other, often by physical or social barriers (Alamneh, & Abebe, 2023).

Urban expansion can cause displacement, dislocation, and segregation in a number of ways. For example, when land is cleared for new development, people who live in informal settlements or on land that is claimed by the government may be forced to leave. Additionally, when new roads or infrastructure are built, they can divide communities and make it difficult for people to access essential services (Chettry, 2023).

Displacement, dislocation, and segregation can have a number of negative consequences for individuals and communities. For example, people who are displaced may have difficulty finding new housing and employment. They may also lose their social networks and sense of community. Additionally, segregation can lead to social inequality and discrimination. In the context of extended urban areas, people who live in these areas may still live partly rural lifestyles, but they are not fully integrated into the urban economy or society. They may have difficulty accessing essential services and may not have a say in how their communities are developed (Carter, 1995)

2.4.2. Environmental Challenges

Urban expansion is one of the most significant environmental challenges facing the world today. As cities grow larger and more populous, they consume more resources, produce more waste, and become more vulnerable to the effects of climate change (Li, et.al. 2022).

One of the biggest environmental challenges of urban expansion is the loss of natural habitat. As cities grow, they encroach on forests, wetlands, and other natural areas. This can lead to a loss of biodiversity and ecosystem services. For example, forests play an important role in regulating water flow and air quality. When forests are cleared for urban development, these services are lost, which can have negative consequences for human health and well-being (Puplampu, & Bofo, 2021).

Another environmental challenge of urban expansion is air and water pollution. Cities are often major sources of air and water pollution. Air pollution can cause respiratory problems and other health problems. Water pollution can contaminate drinking water and make it unsafe to drink (Dodman, 2016).

Urban expansion can also lead to increased flooding. Cities are often located near the sea or natural waterways. As cities grow, they encroach on these areas, which can make them more vulnerable to flooding. Climate change is also increasing the risk of flooding in coastal cities.

Migration from rural areas to cities is at least partially driven by the increasing prevalence of extreme weather. Extreme weather events such as droughts, floods, and storms are becoming more common due to climate change. This is driving people to migrate from rural areas to cities in search of safety and better opportunities. However, cities are often more vulnerable to the effects of climate change, so this migration can make people more vulnerable in the long run (Lehmann, 2015).

One of the most significant negative impacts of urban expansion in developing countries is the loss of productive and fertile agricultural farmland and forest (Yuan, et.al. 2022). There are a number of reasons why urban expansion often occurs at the expense of agricultural land and forest in developing countries. One reason is that agricultural land is often located in prime areas that are also attractive for urban development. For example, agricultural land is often located near cities, which makes it convenient for people to live and work. Additionally, agricultural land is often relatively inexpensive, which makes it attractive to developers (Gebre, & Gebremedhin, 2019). Another reason why urban expansion often occurs at the expense of agricultural land and forest in developing countries is that there are often weak land use regulations and planning processes. This can lead to unplanned and uncontrolled urban expansion, which can encroach on agricultural land and forest (Tessema, 2017).

The loss of agricultural land and forest to urban expansion can have a number of negative consequences for developing countries. One consequence is that it can reduce food security. When agricultural land is lost to urban development, it reduces the amount of land available to produce food. This can lead to higher food prices and increased hunger and malnutrition. Another consequence of the loss of agricultural land and forest to urban expansion is that it can damage the environment. Agricultural land and forest play important roles in regulating the climate, protecting water resources, and providing habitat for wildlife. When agricultural land and forest are lost, it can lead to environmental problems such as soil erosion, water pollution, and biodiversity loss (Minwuyelet, 2005).

2.4.3. Economic Challenges

Urban expansion presents a number of economic challenges, both for cities and for the surrounding rural areas. One of the biggest challenges is the cost of providing infrastructure and services to new urban areas. This can include things like roads, bridges, schools,

hospitals, and water and sewer systems. The cost of infrastructure can be especially high in developing countries, where cities are growing rapidly and often in an unplanned way (Kuddus, et.al. 2020).

Another challenge is the loss of farmland and other productive land to urban development. This can lead to higher food prices and reduced food security. Additionally, urban expansion can lead to environmental degradation, such as air and water pollution, which can also have negative economic impacts. Finally, urban expansion can exacerbate social inequality. This is because the benefits of urban growth are often concentrated in the hands of a small number of wealthy people, while the costs are borne by the poor and marginalized. For example, urban expansion can lead to displacement of low-income residents, who are often forced to move to less desirable areas with fewer job opportunities and access to services (Ha, et.al. 2019).

2.4.4. Positive Impacts of Urban Expansion

Rapid urban growth in major cities poses enormous opportunities for the future sustainable development of a country. Large cities are expected to be centers of innovation and wealth creation. They can also be more efficient in terms of resource use than smaller cities. For example, large cities can have more efficient public transportation systems, which can reduce greenhouse gas emissions and improve air quality. Large cities can also have more concentrated populations, which can make it easier to provide essential services such as education, healthcare, and sanitation (Keno et al, 2019).

Urban expansion has led to economic growth in peri-urban communities by creating new jobs and businesses. This can be particularly beneficial for communities that are located near major transportation corridors or that have access to natural resources that are in demand. (Efrem, 2017) Moreover, urban expansion can also lead to improved access to services such as education, healthcare, and transportation in peri-urban communities. This is because urban areas tend to have a higher concentration of public services and infrastructure. In addition to this, urban expansion can also lead to increased land values in peri-urban communities. This can be beneficial for landowners, who may be able to sell their land for a higher price (Cattaneo et al, 2022). Furthermore, urban expansion can also create new opportunities for development in peri-urban communities. For example, new businesses and industries may be established in these areas, or new housing developments may be built (Amina et.al 2018).

2.7. Rural- Urban Linkage

Rural-urban linkages are the reciprocal flows of people, goods, services, money, and environmental services between rural and urban areas. They can be represented by linkages between sectors (e.g., between agriculture and manufacturing). In addition, rural-urban interactions can include “rural” activities taking place in urban centres (such as urban agriculture) and activities often classified as urban (such as manufacturing and services) taking place in rural settlements (Akkoyunlu, 2015).

There are a number of theories that attempt to explain the nature and dynamics of rural-urban linkages. One of the most influential theories is the central place theory, which suggests that the size and distribution of urban settlements is determined by their role in providing services to the surrounding rural areas. Larger urban centres provide a wider range of services, while smaller urban centres provide a more limited range of services (Hsu, 2012).

Another important theory is the modernization theory, which suggests that economic development is characterized by a shift from rural to urban areas. This shift is driven by a number of factors, including the growth of the industrial sector, the development of transportation and communication infrastructure, and the increasing demand for urban services (Annez, & Buckley, 2009).

In recent years, there has been a growing interest in the role of rural-urban linkages in promoting sustainable development. This is because rural-urban linkages can play a role in promoting economic growth, reducing poverty, and improving access to essential services. Rural-urban linkage refers to the complex and interconnected relationship between rural and urban areas. These linkages can be economic, social, cultural, and environmental (Mercandalli, et.al. 2023).

Economic linkages between rural and urban areas include the flow of goods and services, labor, and capital. Rural areas produce food and other raw materials that are consumed in urban areas. Urban areas produce manufactured goods and services that are consumed in rural areas. Rural workers also migrate to urban areas in search of jobs. Social linkages between rural and urban areas include the movement of people, ideas, and information. People move between rural and urban areas for a variety of reasons, including education, employment, and family. Rural and urban communities are also interconnected through social media,

television, and other forms of communication. Cultural linkages between rural and urban areas include the sharing of values, beliefs, and traditions. Rural and urban communities often have shared cultural heritage. They may also share similar cultural practices, such as language, religion, and food traditions. Environmental linkages between rural and urban areas include the flow of water, air, and pollutants. Rural areas provide urban areas with clean water and air. However, rural areas can also be polluted by runoff from urban areas (Akkoyunlu, 2015; Mercandalli, et.al. 2023).

Rural-urban linkages are complex and multifaceted. They can have both positive and negative impacts on both rural and urban communities. It is important to understand the nature and dynamics of rural-urban linkages in order to develop policies and programs that promote sustainable development (Brian et al., 2014).

2.9. Urbanization and Urban expansion trend in Ethiopia

Urbanization in Ethiopia is a recent phenomenon conditioned by historical factors (Markakish, 1984). Ethiopia is characterized by low level of urbanization even by African standards, where only 16percent of the populations live in urban areas (CSA, 2011) but the rate of growth is one of the highest in the world (UN, 2008). Such high growth rate; nonetheless, is not often accompanied by development in socio-economic services and infrastructure, and economic and employment capacity of the urban centers to support the growing population (Teller and Assefa, 2010).The establishment of many medium-sized towns in Ethiopia are in fact as a result of sociopolitical and military reasons (Markakish, 1984) and some due to the establishment of roads connecting Addis Ababa to different parts of the country and in some cases the construction of Ethio-Djibouti railway; whereby towns like Akaki, Bishoftu, Modjo and Adama were formed as urban-industrial complex (Markakish, 1984).

Urban growth and urbanization process in Ethiopia is characterized by high primate city development (Dejene, 2011); though according to Teller and Assefa (2010), such a pattern is declining due to the emergence and growth of regional capitals. The spatial distribution of urban centers in Ethiopia is unbalanced, and there is a large disparity between the levels of urbanization among the various regions. According to data obtained from different sources, the total number of urban centers in Ethiopia is close to 1,000; and the level of urbanization is

a little more than 19%. Despite this low level of urbanization, there is rapid urban growth. According to UN population projection (2012), the urbanization rate of Ethiopia is 3.6%. With this pace, the level of urbanization will only be 36% in 2050.

For instance, four regions (Oromiya, Amhara, SNNP and Tigray) account for about 70% of the national urban population. On the other hand, the national urban system in terms of sheer number of urban centers is dominated by small urban centers as there are only fifteen urban centers with population size of 100,000 or more: Addis Ababa, Mekele, Adama, Gondar and Dire Dawa are the largest cities with population sizes greater than 250,000; Hawasa, Bahir Dar, Jimma, Dessie, Jijiga, Shashemene, Bishoftu, Harar, Sodo and Arba Minch are medium-sized cities with population ranging from 100,000 to 250,000; while the remaining are small towns (CSA, 2007).

In spite of the low level of urbanization, inadequate housing resulting in homelessness, overcrowded living arrangements, poor sanitation and shortage of health and educational services and employment opportunities are common features of most urban centers in Ethiopia. On the other hand, different study documents indicate that apart from the different forms of urbanization and urban sprawl, urban centers surrounding Finfinne exhibit distinct features of urbanization; almost all urban centers surrounding the capital exhibit common features of high land settlements, resultant decline in agricultural land and production, high rate of squatter settlements and informal land acquisitions, replacement of domestic economic activities, high rates of migration from different parts of the country, and out migration of inhabitants to the periphery are some of the major socio-economic changes.

Among these, Bishoftu is the center of national, regional and local administration and politics, economy and finance, social services such as education and health. It is the second largest city in East Shewa zone next to Adama and currently serving as district administrative center and provide relatively better services. Bishoftu is among the fastest growing cities in Ethiopia with a strong population growth with average annual growth rate of 5.5%. Bishoftu has grown from a population of 21,220 people in 1967 to close to 400,000 inhabitants today. Such an increase of population in the city was a result of the big migration of people from rural areas for employment and business opportunities.

Taking into account the size of population projected by the NUDSP draft report, which is larger than the projections made by the CSA, about 3.2 and 8.4 million additional youth population is expected by 2025 and 2035, respectively, which translates into higher demand for jobs and basic social services. For instance, the demand for additional housing units until 2025 and 2035 is estimated to be close to 3.0 and 7.8 million, respectively, which is considerably higher than the estimates made based on CSA's projection. Similarly, the number additional primary hospitals which would be required until 2025 and 2035 have been projected to be around 120 and 310, respectively. Likewise, about 960 and 2,500 primary schools and 170 and 450 secondary schools would be required to cater the demand for education by the additional school age population to be expected in 2025 and 2035, respectively. Projections to be made regarding urban population growth and future demand for jobs and services should therefore consider the component method of population projection, which the CSA used for the first time in its more recent projection, as this would allow factoring in rural-urban migration, which is an important component of population growth that should be considered when making projections about urban population (MUDHCo & ECSU, 2015).

2.10. Livelihoods of peri-urban communities

Peri-urban communities are those that lie on the outskirts of cities and towns. They are often characterized by a mix of urban and rural land uses, including agriculture, industry, and residential areas. Peri-urban communities play an important role in supporting urban centers by providing food, water, and other essential resources (Kleemann, et.al. 2017).

The livelihoods of peri-urban communities in Ethiopia are diverse, but they are often characterized by a high degree of vulnerability. Many peri-urban residents are employed in informal sectors, such as agriculture, petty trade, and construction. These jobs are often low-paying and insecure, and workers are often exposed to hazardous working conditions (Mohammed, et.al. 2020).

One of the biggest challenges facing peri-urban communities in Ethiopia is rapid urbanization. As cities expand, peri-urban land is increasingly being converted to non-agricultural uses, such as housing, industry, and infrastructure. This can displace peri-urban

farmers and other land users, and make it more difficult for them to access the resources they need to make a living (Lukas, & Dana, 2017).

Another challenge facing peri-urban communities in Ethiopia is climate change. Climate change is already having a negative impact on agricultural production in Ethiopia, and this is likely to worsen in the future. This could lead to food insecurity and increased poverty in peri-urban areas.

Despite the challenges they face, peri-urban communities in Ethiopia are resilient and resourceful. They have developed a variety of strategies to cope with vulnerability and improve their livelihoods. Some common strategies include (Lukas, & Dana, 2017; Mohammed et.al. 2020).

- **Diversification:** Peri-urban residents often diversify their livelihoods by engaging in a variety of different activities. This helps to reduce their risk if one activity fails.
- **Migration:** Many peri-urban residents migrate to cities in search of better job opportunities. However, migration can also be risky and expensive.
- **Self-help groups:** Peri-urban residents often form self-help groups to pool resources and support each other. These groups can provide access to credit, training, and other resources that can help to improve livelihoods.

2.11. Empirical literatures

Worldwide, a significant amount of farmland is consumed by urban growth into its periphery. For instance, China loses nearly to a million hectares of arable land annually as a result of the country's growing urbanization in order to meet demands for building roads, commercial centers, and industrial and residential buildings, among other things (Dayong N, Citation 2004). This poses a number of difficulties, including the provision of basic necessities and the creation of employment possibilities, that may be beyond the capacity of the economies of developing countries. The process of urbanization in Third World nations appears to be more a result of rural push factors than of urban pull forces, in contrast to the situation in affluent countries at comparable levels of development (Adem, K. and Fenta, Citation2012).

Women and young people are the main victims of urbanization in Ethiopia because it is neither participative nor supportive of farmers who are compelled to abandon their land and property on the periphery (Gebeyehu et al., Citation2022). According to Gebeyehu et al. (Citation2022), the consumption expenditure of evicted households was decreased by 5936.92 Ethiopian Birr compared to non-evicted households. Besides the economic impacts, the displacement of suburban dwellers due to rapid expansion of urban centers also has social welfare and socio-cultural related effects on the life of the displaced people. Social welfare influences such as food insecurity and homelessness and socio-cultural influences like marginalization, the weakening of social bond between the displaced people which directly resulted from the dismantlement of the previously held social cohesion within the smallholders (Muluwork, Citation2014).

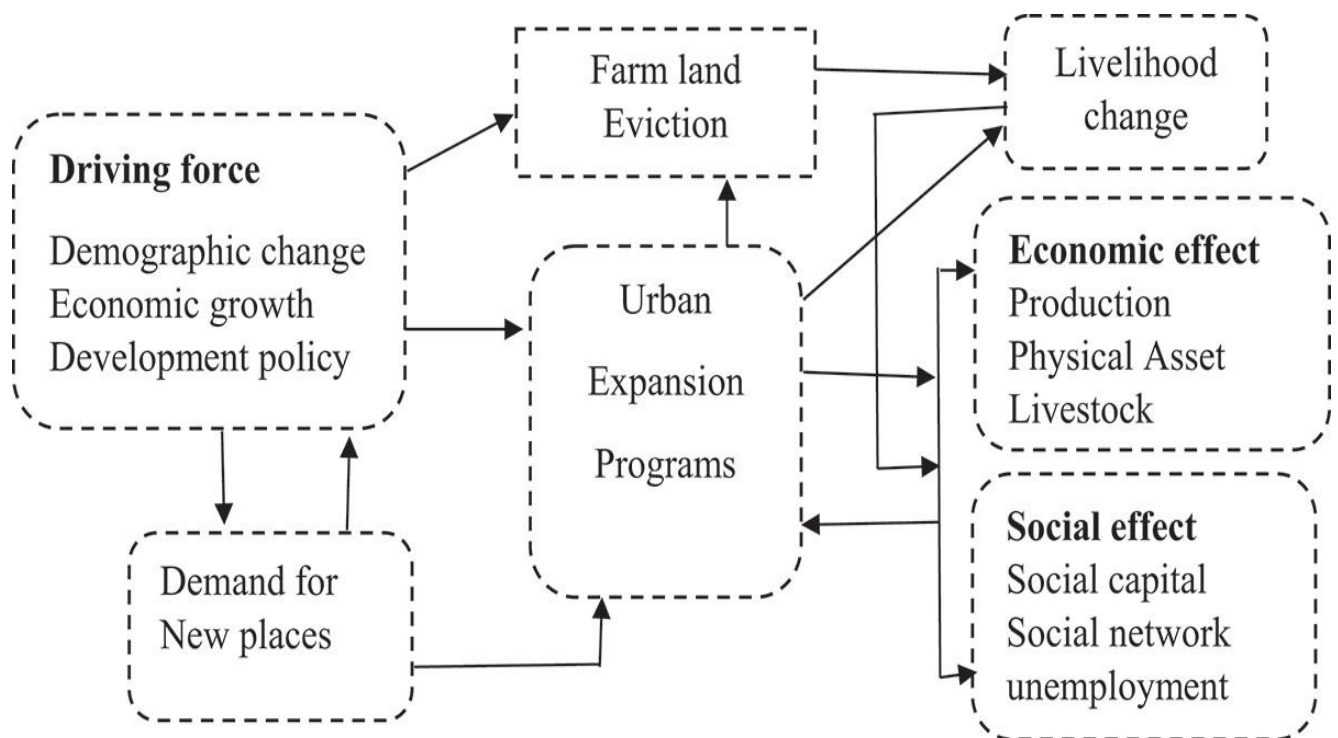
Furthermore, the nonfarm sector of the economy was not built to take in displaced farming populations. Because of this, marginalized rural communities that are displaced as a result of urban growth suffer from poverty, food insecurity, and hopelessness (Mohammed et al., Citation2020). But according to Wogedie (2018), there is no discernible difference between the livelihood outcomes of the displaced farming community and the non-displaced farming community when utilizing the PSM model of the nearest neighbor matching estimator.

2.12. Theoretical and Conceptual Framework of Urban expansion

Numerous theoretical studies have attempted to comprehend the causes of and effects of urban growth, particularly on peri-urban agricultural communities. For this investigation, the three urban growth theories put forth by Barnes et al. (Citation2012) were helpful. According to the theory of population growth, an increase in the urban population either through natural growth or through rural-to-urban migration emerges to the city's outskirts. According to the economic growth theory, increased per capita income and employment rates will raise demand for new housing units and related infrastructure. Also, the development of new industries on urban outskirts forced farmers to lose their land. The third factor is government development strategies that place an emphasis on using restrictive land use laws to promote urban development. This viewpoint contends that different approaches to managing land use and development may be impeding the economic and social phenomenon of urban periphery's agricultural communities (Barness et al., 2001). In addition, the lack of appropriate planning policies and the failure to enforce such policies are the main causes of

unrestrained urban expansion, which disturbs zoning structures (for residential, commercial, industrial, institutional and other land uses) and ultimately poses a threat to the agricultural populations of developing nations who live in the cities' environs.

On the other hand, the sociological urban expansion theory placed more focus on the contribution that human action, social networks, and interpersonal interactions have made to a range of transformations, including social, political, economic, and other developments (Briassoulis, Citation 2002). The human ecology theories, put forth by Robert Park and Ernest Burgess in 1925 and relating behavioral patterns to their physical and social contexts in urban and rural settings, were closely tied to this theory. To be more specific, it is essential to understand the conceptual framework shown in Figure below, which aimed to illustrate the motivations, dynamics, and impacts of urban growth on peri-urban populations.



Conceptual framework

Source: (Tadele, Melkamu ,Tora et al 2023)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Description of the Study Area

Bishoftu town geographical location is between 8° 45' and 8° 47' north latitude and between 38°56' and 39° 00' east longitude. It covers an area of approximately 189 km². The city is located in the Oromia Region, East Shewa Zone, Ada'a Wereda. It is situated 47 kilometers southeast of Addis Ababa and 52 kilometers from Adama. The city is bordered by the kebeles (neighborhoods) of Erer Selassie to the north, Ude and Giche Garababo to the south, Hidi and Dembalo to the east, Dire town peasant association to the west, and Dukam Town Administration to the northwest.

The town has 13 kebeles, and an estimated a total population for Bishoftu of 200,000, of whom 95,600 were men and 104,400 were women. The town is rich in different natural and manmade attractive areas. From mountains, Mount Yerer is a well-known mountain around the town. Moreover, the town has 8 lakes which are both natural and artificial. These are: Lake Kuriftu, Babogaya, Bishoftu, Hora-arsedi, Green, Kilole, Chalalaga and Balabala.

The altitude of Bishoftu city is ranging from 1748m-1955m high above mean sea level. Therefore the city is situated at an average elevation of 1851.5m above sea level. Thus, it belongs to “Weyina Dega”/ temperate zone/ or agro-climatic zone.

The mean monthly maximum temperature of Bishoftu city ranges from 29.1°C (February) to 32.6°C (May). And the mean monthly minimum temperature ranges from 5.4°C (October) to 3.77°C (December). The medium annual temperature ranges from 7.5°C to 27°C that make an average of 17.3°C. The rainfall of Bishoftu is grouped under the category of type II- rainy seasons in Regime IID of Ethiopian rainfall regimes classifications. This is a Region of Small Rains in winter, Big Rains in summer, merging together. It is characterized by slightly a quasi-double maxima rainfall patterns, with a small peak in October, November, February and a maximum peak in July. The mean annual rainfall recorded in the year 2022. has shown that July is the highest rainy month with a mean rainfall of 294.72mm in July and October, November, February (0.0mm) least recorded..

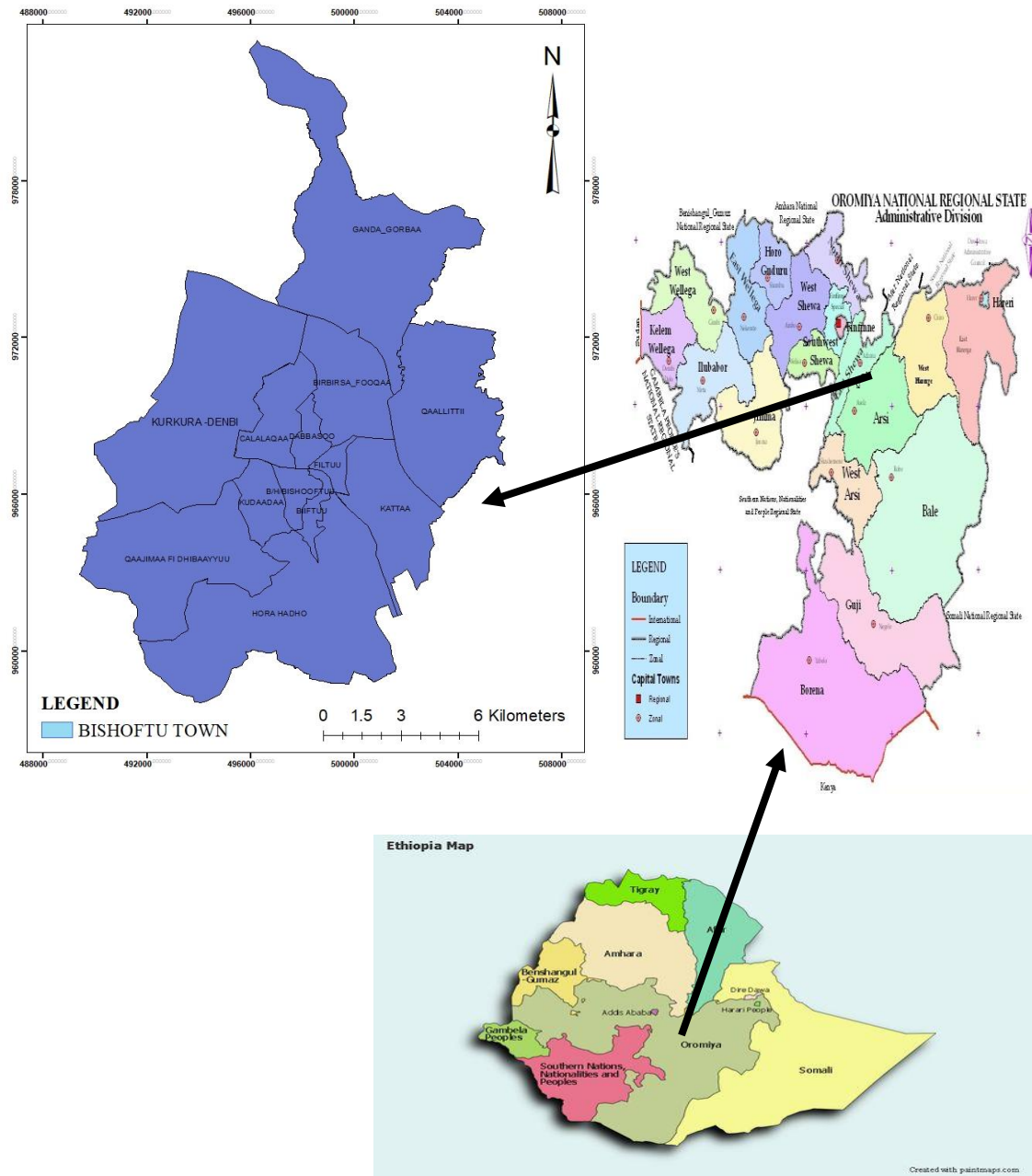


Figure 2:- Map of the study area

3.2. Case Study Area Selection

The study selected two peri-urban kebeles, Kurkura Denbi and Kajima as a case study site, out of the thirteen kebeles surrounding the Bishoftu town for the following reasons:

- **Livelihoods heavily influenced by urban expansion:** The study sought to understand the impact of urban expansion on the livelihoods of peri-urban communities. Kurkura Denbi and Kajima were selected because they are two of the

kebeles surrounding Bishoftu town that have been most affected by urban expansion. Based on the information obtained from the municipality officials, many farmers in Kurkura Denbi have lost their land to urban development. In Kajima, there has been a rapid influx of people from rural areas, which has put pressure on local resources.

- **High magnitude of horizontal expansion and the spread of squatter settlements:** Horizontal expansion is a type of urban expansion that occurs when cities grow outwards, rather than upwards. Squatter settlements are informal settlements that are often built on land that is not legally owned by the occupants. Kurkura Denbi and Kajima were selected because they are two kebeles that have experienced a high degree of horizontal expansion and the spread of squatter settlements. This makes them ideal settings for the study to investigate the challenges and opportunities associated with urban expansion in peri-urban areas.
- **Number of farmers who lost their farmland:** The number of farmers who lost their farmland was also considered as a factor to select the kebeles as a case study area. Based on the information obtained from the municipality, 805 and 565 farmers were those who lost their land in Kurkura Denbi and Kajima site respectively from 2004 to 2022. This suggests that Kurkura Denbi and Kajima are two kebeles where the livelihoods of farmers have been heavily impacted by urban expansion.

In summary, the two kebeles were selected for the study because they are two peri-urban kebeles that have been heavily influenced by urban expansion, both in terms of the magnitude of the horizontal expansion and the spread of squatter settlements. This made them ideal settings for the study to investigate the impact of urban expansion on the livelihoods of peri-urban communities.

The two kebeles selected for this study are representative of the other kebeles surrounding Bishoftu town in several ways. First, both kebeles have been heavily influenced by urban expansion, which is a common experience for many peri-urban kebeles. Second, Kurkura Denbi and Kajima have experienced a high magnitude of horizontal expansion and the spread of squatter settlements, which are also common features of peri-urban areas. Third, Kurkura Denbi and Kajima have a high number of farmers who have lost their land to urban expansion, which is a major challenge facing many peri-urban communities.

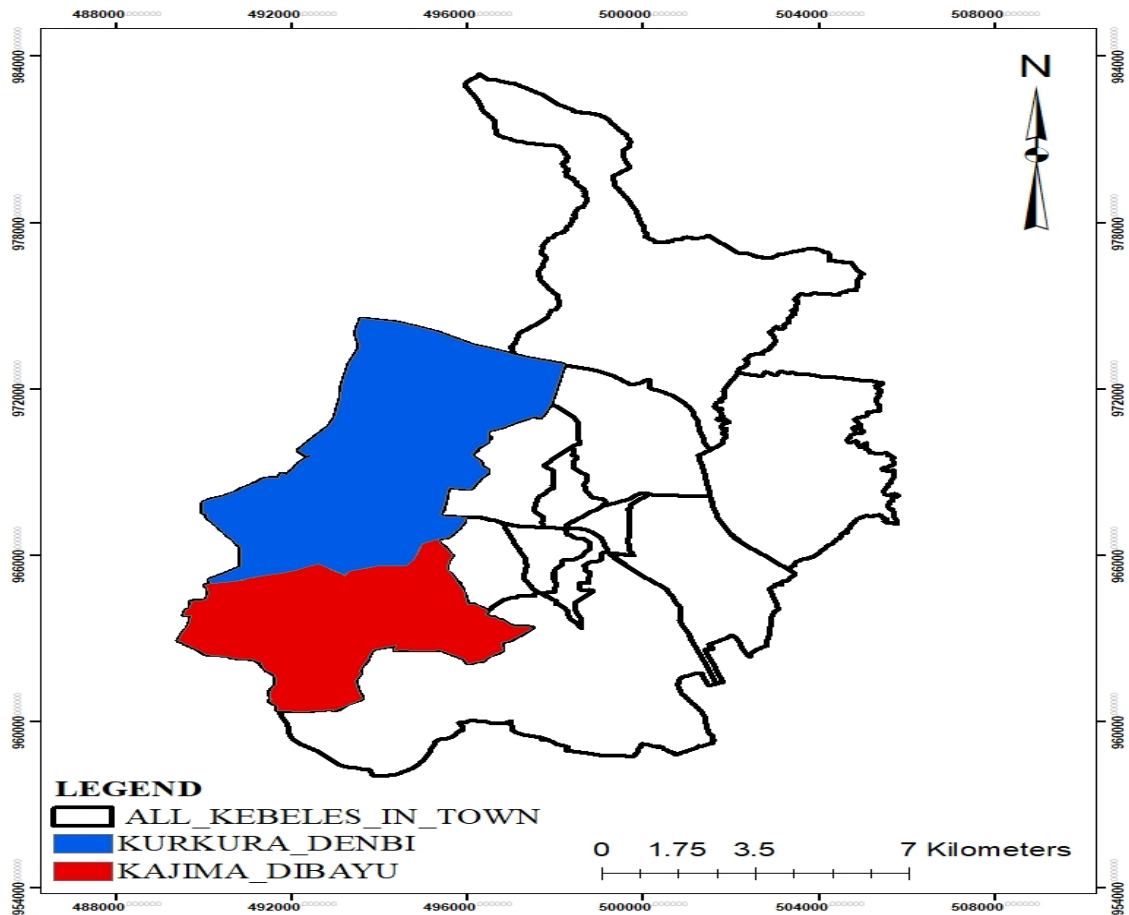


Figure 3:-Selected kebele

3.3. Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It is needed because it facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible yielding maximum information with minimal expenditure of effort, time and money (Kothari, 2004). Based on this, among various research methodologies in order to achieve the intended objectives of the study, descriptive research design was employed. In this study both qualitative and quantitative research approaches were employed aiming at assessing urban expansion and its impact on the livelihood of peri-urban community in the case of Bishoftu Town. Qualitative method was adopted to identify the impact of urban expansion on the livelihood of peri-urban community. Moreover, qualitative method was also used to assess efforts made by municipalities, and other governmental organization in overcoming the effects of urban expansion on the livelihood of

peri-urban community. Whereas, since the late 1970s, several categories of quantitative approaches have been developed with the advancing computer technology, the quantitative approach was be used to assess and predict the dynamics of urban expansion in the study area.

3.4. Data Type and Sources

To achieve the major objective, the study has used hybrid data from secondary and primary source. Primary data were collected from per-urban communities, elderly people, and municipal experts. The primary data collection methods included field surveys, structured questionnaires, in-depth interviews with key informants, and focus group discussions. Secondary data were collected from books, journals, official reports, websites, legal documents, aerial photographs, Landsat imagery, and previous study documents.

Specifically, to assess urban expansion in the study area, Landsat imagery of 1991, 2002, 2013, and 2023 was acquired from the United States Geological Survey (USGS) (Table 1). The years were selected based on significant events such as changes in government, structural plan formulation, urban reforms, and the quality and availability of Landsat images. These data were used to produce historical land use/land cover maps of the study area and urban expansion changes.

Table 1: Landsat data used for the LULCs classification

Landsat type	Date of acquisition	Map projection	Projection units	Datum	UTM zone	WRS Path & row	Resolution/pixel size (m)	Source/origin
L5_TM	1991	UTM	Meters	WGS 84	37	168 / 054	30m x 30m	Image courtesy of the U.S. Geological Survey
L7_ETM	2002	UTM	Meters	WGS 84	37	168 / 054	30m x 30m	Image courtesy of the U.S. Geological Survey
L7_ETM	2013	UTM	Meters	WGS 84	37	168 / 054	30m x 30m	Image courtesy of the U.S. Geological Survey

LANDSAT_8/L1_TP	2020	UTM	Meters	WGS 84	37	168 / 054	30m x 30m	Image courtesy of the USGS
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3.5. Material and Software used for the study

The following materials and software will be used for the accomplishment of this study.

Material used:-

- Handy GPS: - GPS was used for collecting different points which will be used for ground truth
- Photo camera: - Photo camera was used to take some pictures during the field observation.

Software's that were be used for this study includes:-

- ArcGIS 10.2 was be used to make analysis of all the GIS work in the thematic layers.
- ERDAS software was used for classification of the satellite images.
- MS Access and MS Excel was be used to create the attribute databases and import or export to GIS environment for next implementation.
- SPSS was used to compute statistical tests
- MS word was used to write of this entire research work and printing

3.6. Sampling techniques and sample size determination

To achieve the intended objective of the study both of random sampling and purposive sampling methods were employed. Purposive sampling method was used to select the kebeles. The usage of the purposive sampling technique in the study was not arbitrary, but based on its strength in helping select key kebeles from which detailed information could be obtained to have a better understanding of specific events and activities. Accordingly, Kurkura Denbi and Kajima kebeles were selected from 13 kebeles found in Bishoftu town. The main criteria for selection of the kebeles were that they have been heavily influenced by urban expansion, have experienced a high magnitude of horizontal expansion and the spread of squatter settlements, and have a high number of farmers who have lost their land to urban

expansion. The selection of the kebeles was done in consultation with experts from the Municipality and Kebele Administration.

The sampling frame to identify respondents was the list of 1270 households who were displaced farmers from their land. Bishoftu town municipality report indicated that in Kurkura Denbi and Kajima kebeles 805 and 465 farming households respectively have had their assets expropriated as a result of urban expansion between 2004 and 2022. Therefore, 1140 were used as the total population to calculate the sample size for the study. Accordingly, the sample size of the respondents was determined using a formula (Eq.1) developed by Yamane (1967).

$$n = \frac{N}{1 + N(\alpha)^2} \text{-----Eq.1}$$

Where: n= sample size of the study population

N=Number of households

α =the margin of error, and

1=constant

Thus, actual sample size was calculated as follows:

$$n = \frac{1270}{1 + 1270(0.05)^2}$$

$$n = \frac{1270}{4.175}$$

$$n = 304$$

Accordingly, out of 1270 households, 304 sample informants were selected for household surveys. In order to increase the accuracy of the research results, the research operated at a 95 % level of confidence with a margin of error of 5%. A proportional to size allocation method was employed to obtain a representative sample size for each kebele. In proportional to size sampling, subjects are selected in proportion to their occurrence in the population (Grove et al., 2013). This means that the sample per kebele was determined by the percentage contribution of households by each kebele to the total number of households (1270) in the two kebeles (Table 2).

Table 2 *Sample size for the households*

Selected kebeles	Number of Households	Sample size used
Kurkura Denbi	805	193
Kajima	465	111
Total	1270	304

To select the sample households, a simple random sampling method was used. This means that every household on the registered list of households that had their assets expropriated as a result of urban expansion in each kebele had an equal chance of being selected in the sample. To do this, a table of random numbers was used. Each household on the list was assigned a number, and then random numbers were drawn from the table. The households that corresponded to the random numbers were then selected for the sample. Once the requisite sample size (n) was reached, the household head or one mature member of the household (age > 18) was invited to respond to the survey questions. The sample included both households that have been fully displaced from their locality to make room for new urban land uses and those who lost most of their agricultural land but still reside in their former residence on what is left after expropriation. The researchers got in touch with displaced farmers who had relocated to the other part of the town by using a snowball non-random sampling technique.

The study also included interviews with 15 key informants from different offices in the Town's and kebele Administration and community elders, and one focus group discussion (FGD) in each of the two sample kebeles with a minimum of six participants each. The key informants were interviewed to get their perspectives on the impact of urban expansion on peripheral farming communities, while the focus group discussions were held to explore the experiences of peripheral farming communities in more detail and to identify common themes and challenges.

3.7. Data Collection Instruments

3.7.1. Questionnaires

The researcher used questionnaires to collect data from all respondents in the selected sample. The questionnaires were designed to address the socio-economic impacts of urban

expansion on peri-urban agricultural communities. The items on the questionnaires were originally prepared in English and then translated into Oromifa. The Oromifa questionnaires were then back-translated into English to ensure that the translation was accurate. The questionnaires contained both closed-ended and open-ended questions.

3.7.2. Key Informant Interview

An interview is a fundamentally a conversation that involves a face-to-face verbal exchange between two or more people, in which the interviewer attempts to draw information or expressions of opinions and beliefs from the interviewee(s). This method is important for additional information with a greater possibility of flexibility. Therefore, the researcher conducted face-to-face structured personal interviews with 15 officials, and community elders were interviewed as part of the study using prepared interview guides. Professionals and office managers who are working directly on the problem believe they have more detailed data than others. Furthermore, it is helpful to obtain the necessary information from local elders, who are better able to describe changes that have occurred through time than other young people.

3.7.3. Focus Group Discussion

Focus groups discussions are a type of collective interview where the researcher encourages discussion among participants to generate rich data. Focus groups discussion typically consist of a researcher and two groups of 6-8 participants each. Focus groups are one of the most important techniques for gathering participants' opinions, attitudes, values, and expectations on a particular topic.

Focus groups were used in this study to collect data on the growth of the town and how it affected the rural farming communities' way of life. Two separate focus groups were held, each with 6-8 participants. Participants included representatives of displaced farming communities from each sample kebele, leaders of social institutions, officials from various administrative tiers, those in charge of managing the land, and experts with experience in the field of the study. These households were affected by municipal expropriation policies that had an impact on their livelihoods. Open-ended questions were asked to foster a positive environment for the focus groups and to focus on the historical development of the town and its impact on the livelihoods of local farming communities.

3.7.4. Field Observation

The researcher observed the study area to collect data and verify the findings of the interviews. This was done through physical inspection, reconnaissance, sketches of problem areas, and photographs. Observation was the main data collection method for this study, as it allowed the researcher to gather information about the current state of urban expansion and its impact on the surrounding environment. This method also allowed the researcher to capture a wide range of interactions between the urban and rural environments.

3.7.5. Satellite Image processing

The act of examining and interpreting images with the aid of a computer to correct the enhancement and feature extraction treated as digital image processing.

3.8. Data Image Analysis

3.8.1. Data Image Pre-Processing

Data pre-processing consists of steps that must be completed before the primary data analysis and information extraction. To meet the research objectives, multi-temporal satellite images such as Thematic Mapper (TM) (L5TM) for 1991, Enhanced Thematic Mapper (L5ETM) for 2002 and Operational Land Image, Land sat 8, Thermal Infrared Sensor, or Precision and Terrain Correction (L1TP) for 2013 and 2023 with a path of 168 and row 054. And a map (i.e., Topographic) with a scale of 1:100,000 is used to produce data patterns for nearly three decades (30 years). Finally, for further processing, the raw data is georeferenced and clipped with the study area's boundaries.

3.8.2. Data Image Geometric Correction

For this particular research paper, the processing of these Landsat images are geometrically rectified with street and stream junctions on the satellite images, as well as a 1:100,000 scaled topographic map of the research area. After being georeferenced, the raw data is clipped using the study area's boundaries for further processing using Arc GIS software.

3.8.3. Data Image Enhancement

Image enhancement is used to improve visual analysis by improving the apparent contrast between scene components this is done. When an image is enhanced, the distinctive characteristics become more visible, allowing for better image analysis, categorization, and

interpretation. Image enhancement is also used to improve the image's details by assigning the image's min and max brightness levels to min and max display values, which is done on image pixels, making the interpretation of the visual simpler and helping the researcher in analysis quality. In this case, the image's low dynamic range is stretched to the entire dynamic range, which is 0 to 256, using histogram equalization. Furthermore, on the satellite images of the corresponding years, spatial improvement of Kernel 5 by 5 of high pass filtering was performed.

3.8.4. Data Image Classification Analysis

To determine the land use and land cover (LULC) classification types for each reference year (1991, 2002, 2013, and 2023), a pixel-based supervised image classification with the maximum likelihood classification algorithm (Lillesand & Kiefer, 2000) was applied. The major LULC types used in this study are built-up areas, Bare land, swampy, Agriculture, water bodies, forest and Grass land. A description of these types is provided in Table 2 below.

Table 3 Description of LULC classification schemes used in the study

S/N	LULC class	Description
1	Built-up	Built-up areas are areas used for residential, commercial, manufacturing, institutions, transportation, communication, and utilities
2	Agriculture	Irrigated and rain fed arable lands, crop land with crops, farming and fallow fields
3	Bare land	Bare lands were quarry sites, open spaces sands and rocky areas, and the like.
4	Grass land	Areas with grass cover along ridges steep slopes and plain areas used for grazing
5	Swampy	Includes areas that are permanent and seasonal muds, waterlogged, marshy and water bodies especially during the rainy season
6	Water bodies	Including river, stream and lake
7	Forest	Areas covered by trees forming closed or nearly closed canopies

Ground truth points from different sources were used to train and assess the accuracy of land use and land cover (LULC) maps for each reference year. A minimum of 50 samples per class is recommended for maps smaller than 4000 km² and with fewer than 12 classes (Lillesand et al., 2008). Bishoftu town has an area of 189.8 km² and seven LULC classes, so at least 50 random ground points were collected per class. The following sources were used to collect ground truth points for the years 1991, 2002, and 2013:

- Google Earth high-resolution images
- Researcher's personal experience
- Local community knowledge

For the 2023 reference year, ground truth points were collected through field visits and visual interpretation of Google Earth high-resolution images.

It is impossible to create a digitally generated land cover map of remote sensing imagery without errors. These errors can happen during data collection or image processing. Therefore, it is important to assess the accuracy of the classification to ensure that the results are reliable. Accuracy assessment is an essential part of studying image classification and land use/land cover detection. It helps us to understand and estimate changes accurately. It also shows how well the classification results match the real world. In this study, the accuracy of the land cover maps for 1991, 2002, 2013, and 2023 was assessed using a method called error matrix. This method compares information from reference sites to the information from the classified image for a number of sample areas. Overall accuracy, producer's and user's accuracies, and Kappa statistic were calculated from the error matrix for each year. The accuracy assessment of this project was calculated as the follows formulas;

$$\text{Users Accuracy} = \frac{\text{Number of Correctly Classified Pixels in each category}}{\text{Total number of classified pixels in that category (The Row Total)}} * 100 \text{-----Eq.2}$$

$$\text{Producer Accuracy} = \frac{\text{Number of Correctly Classified Pixels in each category}}{\text{Total number of classified pixels in that category (The Column Total)}} * 100 \text{----Eq.3}$$

$$\text{Kappa Coefficient (T)} = \frac{(TS - TCS) - \sum (\text{Column Total} * \text{Row Total})}{TS^2 - \sum (\text{Column Total} * \text{Row Total})} * 100$$

$$\text{Over Accuracy} = \frac{\text{Total Number of Correctly Classified pixels (Diagonal)}}{\text{Total Number of Reference Pixels}} * 100 \text{-----Eq.4}$$

Finally, the land use/land cover changes for the periods 1991-2002, 2002-2013, and 2013-2023 were quantified using post-classification analysis. The percentage of land use/land cover change detection was calculated using the following formula:

$$\text{Percentage LULC Change} = \frac{(\text{Area final year} - \text{Area initial year})}{\text{Area initial year}} \times 100 \text{-----Eq.5}$$

The results of the study show that positive values indicate an increase in the area of LULC, while negative values indicate a decrease. To show how LULC classes have changed over the 30-year period, a change detection matrix was created by overlaying the classified maps from 1991 and 2023. This was done using the "Tabulate Area" function in ArcGIS 10.2.

3.9. Data Analysis of the Socioeconomic part

The study combined quantitative and qualitative data for this analysis. The method of data analysis adopted is a mixed-methods approach. All completed questionnaires were collected, edited and analyzed. Quantitative data was analyzed using descriptive statistical analysis, particularly the mean, frequency distribution tables, percentages, and standard deviation. Qualitative data from focus group discussions, key informant interviews and personal observations were written and organized in notebooks, coherently and verbally explained. This key informant interview data was organized as oral/narrative data.

3.10. Ethical Consideration

In the writing process of the thesis, a researcher needs to anticipate the ethical issues that may arise during a study. Research will involve collecting data from people, about people. Researchers need to protect the research participants; develop trust with them; promote the integrity of research: guard against misconduct and impropriety that might reflect on the researcher and university; and cope with new challenging problems (Israel & Hay, 2006).

The collected data was purely used for academic purposes and therefore, an introduction letter from the university was obtained and issued to respondents to assure them of the same. Informed consent from each research participant was obtained and utmost privacy and confidentiality were maintained at all levels of the study.

CHAPTER FOUR

RESULT AND DISCUSSION

As discussed in the previous chapter, this study investigated the impact of horizontal urban expansion on the livelihoods of the peri-urban communities of Bishoftu town. This chapter presents the findings of the study, organized into four main sections: demographic information, changes in land use patterns due to urban expansion, underlying drivers of urban and impacts of urban expansion on the livelihoods of peri-urban communities.

4.1 Response Rate

The study used a structured and unstructured questionnaire to address the research problem. A total of 304 questionnaires were prepared and finally engaged in conducting this survey. They were all administered in the study area; however, only 280 questionnaires representing 92% of the total number were returned valid for analysis. In addition, 15 key informants were purposefully selected from different offices to answer the interview questions. The analysis was based on the 280 completed questionnaires and the qualitative data from the 15 key informants and two focus group discussions.

4.2 Background of the Respondents

4.2.1 Sex Composition of Respondents

Figure 4 shows that 14% of the respondents to the survey were female and 86% were male. This indicates that participants of both sexes actively participated in the survey. This implies that both gender groups were surveyed for their perceptions of urban conditions before and any livelihood implications after urban expansion.

In other words, the survey results will be used to understand the experiences of both men and women living in urban areas, both before and after urban expansion. This is important because urban expansion will have different impacts on different groups of people, including men and women. For example, women may be more likely to be displaced from their homes by urban expansion, or they may have difficulty finding jobs in the new urban environment (Talema, & Nigusie, 2023).

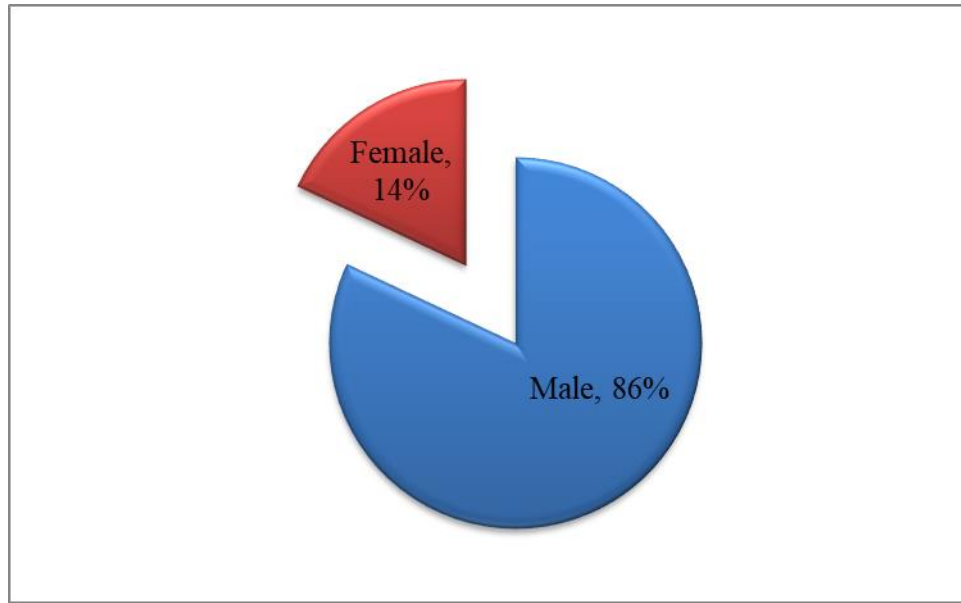


Figure 4:- Sex Composition of Respondents

4.2.2 Age Composition of Respondent

The age distribution of the household heads in the study area was relatively even, with most respondents falling between the ages of 30 and 60 (81.6%). There was a smaller percentage of respondents under the age of 30 (4.3%) and over the age of 60 (13.98%) (Figure 5). This suggests that the majority of respondents are economically productive and have a good understanding of the historical expansion of the town, as well as their livelihood strategies before and after the urban expansion.

In other words, the data shows that the study area has a diverse population of household heads of all ages, but most are economically productive and have a good understanding of the town's history and development. This is important because it means that the respondents have a wide range of perspectives and experiences that can be drawn on to inform the research project.

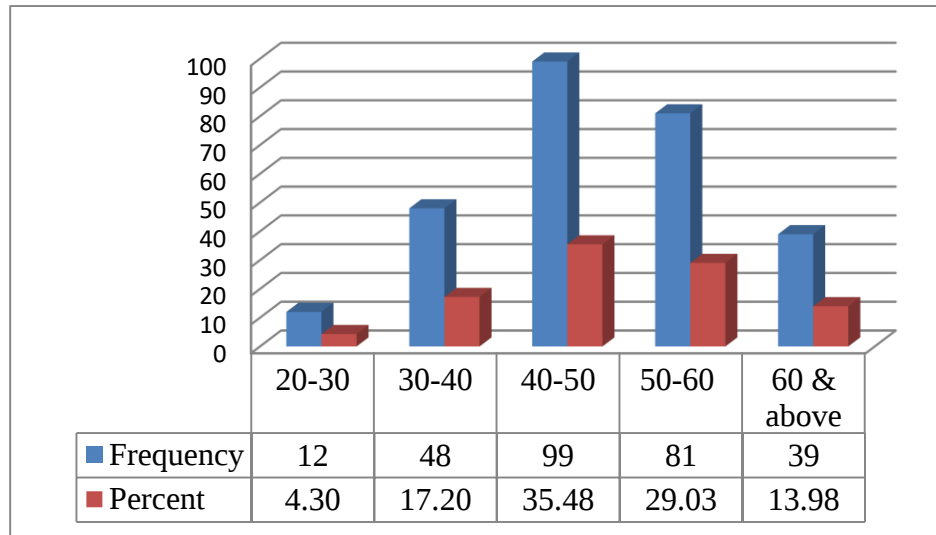


Figure 5:- Age Composition of Respondents

4.2.3 Marital status of the respondents

The household survey found that 8.2% of the respondents were single, 75.1% were married, 12.1% were divorced, and 4.6% were widowed (Figure 6). This means that the majority of the farm household heads in have families that depend on them. This implies that urban expansion is not only affecting the livelihoods of farm household heads, but also the livelihoods of their families. When urban expansion takes away farmland, it not only takes away the income of the farm household head, but it also takes away the income that the farm household head's family relies on. This can have a devastating impact on the family's ability to meet their basic needs.

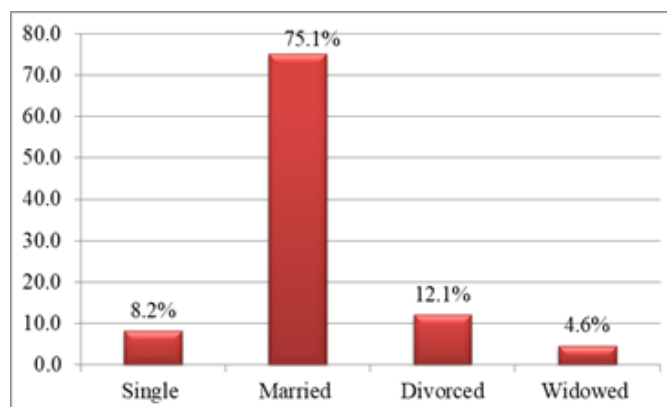


Figure 6:- Marital status of the respondents

4.2.4. Educational level of the respondents

Data on educational status was gathered because it plays an important role in determining how people make a living. Figure 6 shows the educational background of the people who were interviewed. Of the total number of people interviewed, 35.4% could not read or write, 30.7% could read and write but had not completed elementary school (grades 1-8), 22.5% had completed elementary school, 10% had completed secondary school (grades 9-12), and 1.4% had completed college or university. Based on the findings of this study, the farmers in the study area are generally not well-educated.

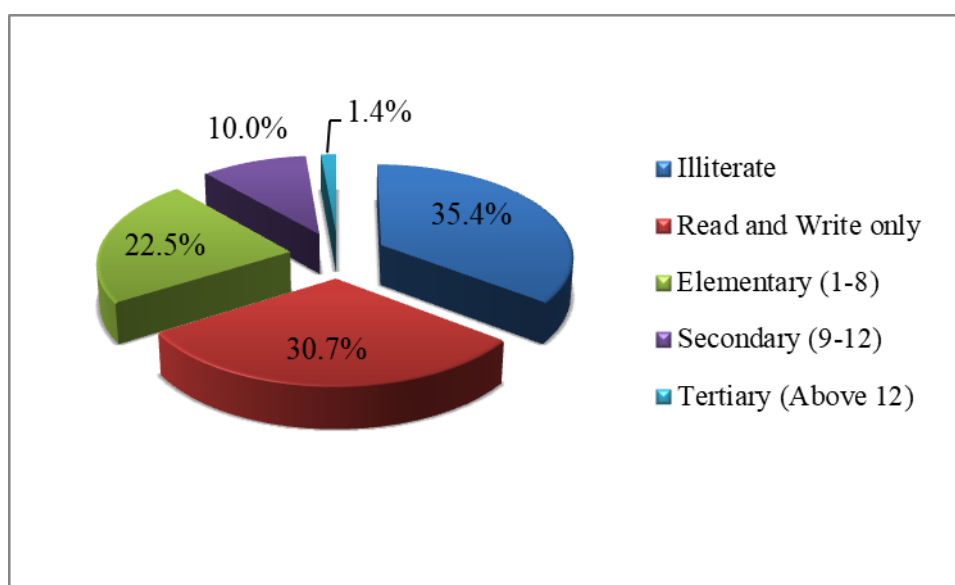


Figure 7:- Education level of the respondents

4.2.5. Households' Family Size

The survey results show that 54.3% of the respondents have families of 5 to 8 members, while 41.1% have families of 1 to 4 members. This indicates that the areas around the study town are densely populated. There are many studies that have shown that large family size can be a challenge for livelihood and food security. For example, a study conducted in Nigeria found that households with large family sizes had significantly lower food security scores than households with small family sizes. This is because it can be difficult to provide enough food for a large family, especially when resources are limited. Urban expansion can have a negative impact on the livelihoods of families in several ways. First, it can lead to the loss of farmland, which can be devastating for families who rely on agriculture for their income. Second, it can lead to displacement, which can force families to move to new areas

where they may not have access to the same resources and opportunities. Third, it can lead to increased competition for jobs and other resources, which can make it more difficult for families to make ends meet. In the context of urban expansion, it is important to consider the impact that it will have on the livelihoods of families. This is especially true for families with large family sizes, who may be more vulnerable to the negative effects of urban expansion.

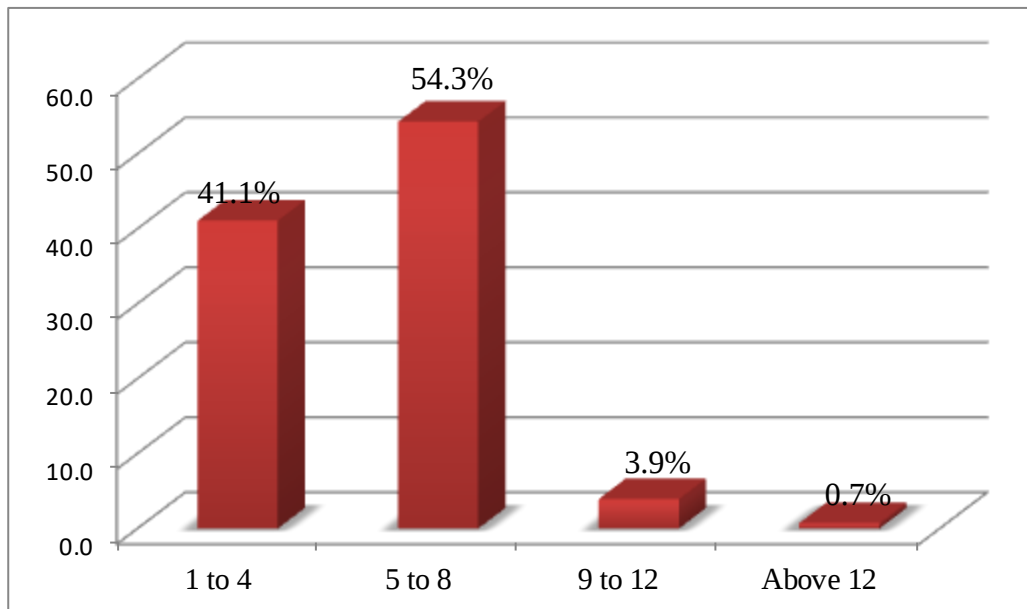


Figure 8:- Family size of the respondents

4.3 Changes in land use patterns in due to urban expansion

4.3.1. Land Use-Land Cover /LULC/ Dynamics of 1991

As shown in Figure 9, in 1991 agriculture, grass land, water body, forest and settlement covers comprised 67.16 km², 46.36 km², 3.8 km², 25.7 Km² and 7.9 km², respectively of the total 189.8 km² in the study area. The majority of the land use/cover in this period of investigation was occupied by agricultural land (35.4%), which was followed by grass land (24.4%) and forest (13.6%) and bare land (12.9%). The built-up areas composed of a very insignificant composition (4.2%) in the study area for this specific period of time. This land use pattern is common in many developing countries, where agriculture is a major economic activity. However, it is important to note that this land use pattern can change over time. For example, as a country develops, the amount of land used for agriculture may decrease, while the amount of land used for urban development may increase.

It is also important to note that the land use pattern in the study area may vary from other areas of the country. For example, areas with more fertile soil may be used more for agriculture, while areas with less fertile soil may be used more for grassland or forest.

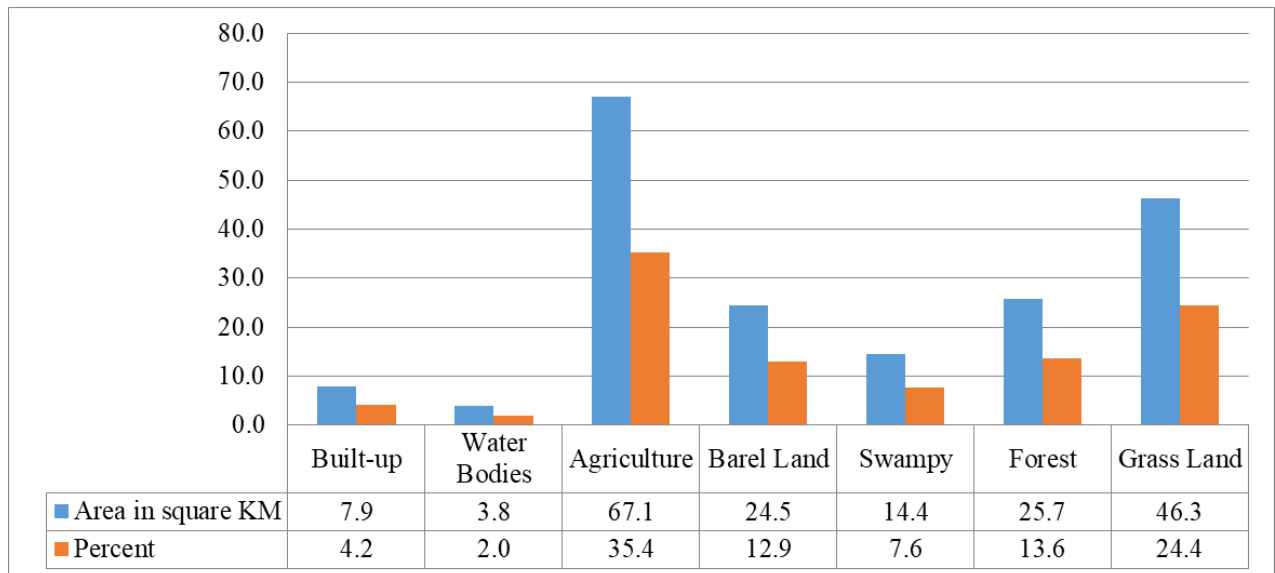


Figure 9: Land Use-Land Cover /LULC/ Dynamics 1991

According to the land use and land cover (LULC) change analysis in Figure 10, in 1991, the majority of the western, northwestern, and southwestern parts of the town were dominantly covered by grasslands. In contrast, most of the eastern and southeastern areas were broadly covered by forests and farmlands. During the same period, built-up areas were only found in the central parts of the study area (Figure 10). This LULC pattern suggests that the town was still relatively small and underdeveloped in 1991. The majority of the land was used for agriculture and grazing, with only a small portion of the land used for urban development. However, it is important to note that this is just a snapshot of the LULC pattern in 1991. It is likely that the LULC has changed significantly in the years since then, as the town has grown and developed.

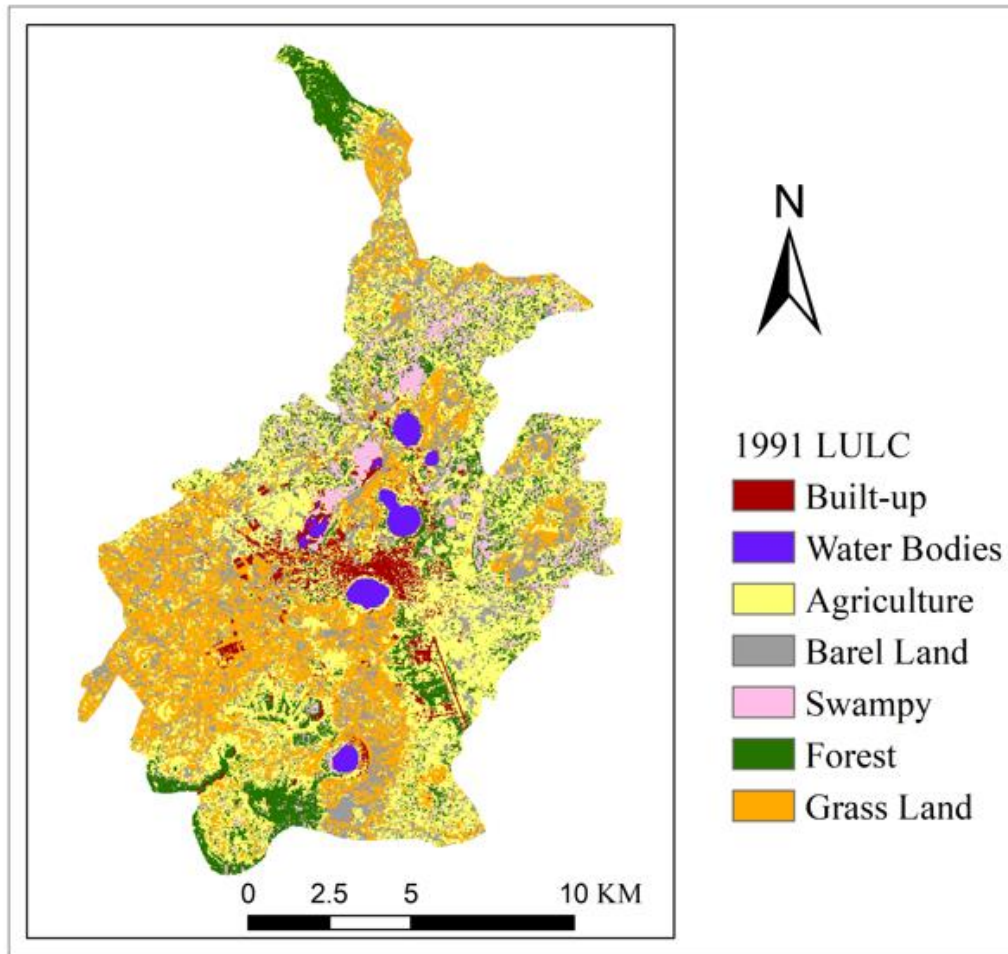


Figure 10: Land use-Land cover Map of 1991

4.3.2. Land Use-Land Cover /LULC/ Dynamics of 2002

During the period of 2002, land use and land cover (LULC) change analysis in the study area showed a tremendous decline in forest, swampy, and bare land covers compared with 1991 data. Forest cover decreased from 25.7 km² to 14.5 km², swampy cover decreased from 14.4 km² to 12.8 km², and bareland cover decreased from 24.5 km² to 11.7 km². On the other hand, the coverage of built-up and agricultural areas increased from 7.9 km² and 67.1 km² in 1991 to 15.5 km² and 79.3 km² in 2002, respectively.

These changes can be attributed to urban expansion, which is the process of cities and towns growing and expanding into surrounding areas. Urban expansion is often driven by population growth and economic development. As cities and towns grow, they need more land for housing, businesses, and infrastructure. This can lead to the conversion of forests, wetlands, and other natural areas into urbanized areas.

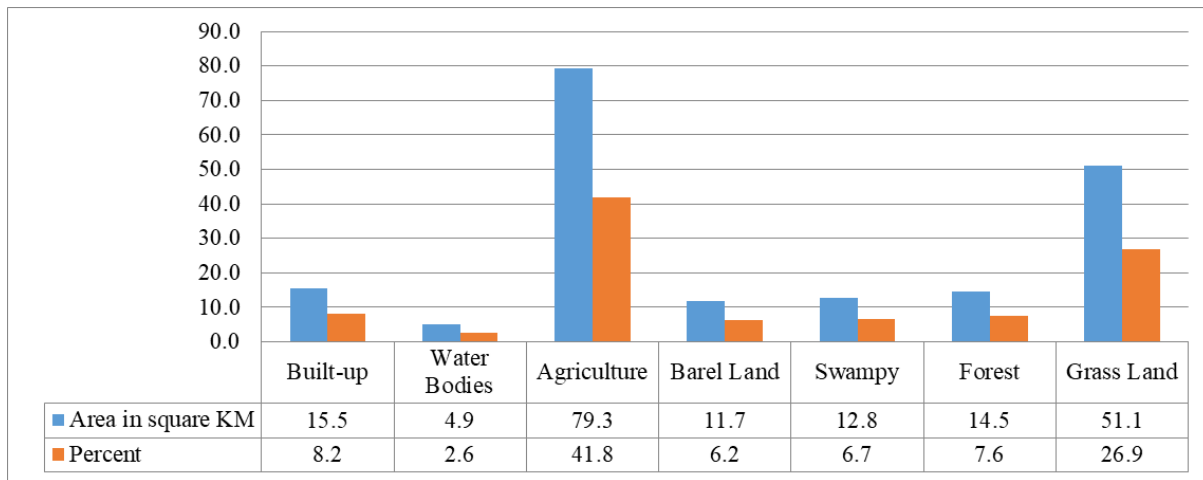


Figure 11: Land Use-Land Cover Dynamics of 2002

The most significant change that can be witnessed from this period as compared to 1984 is the settlement area which increased tremendously from 7.9km² to 15.5km² with the difference/change of 7.6 km². This means that the settlement area almost doubled in size during this period. When compared to 1991 built up area has expanded to the west and east of the study area in 2002 (Figure 12).

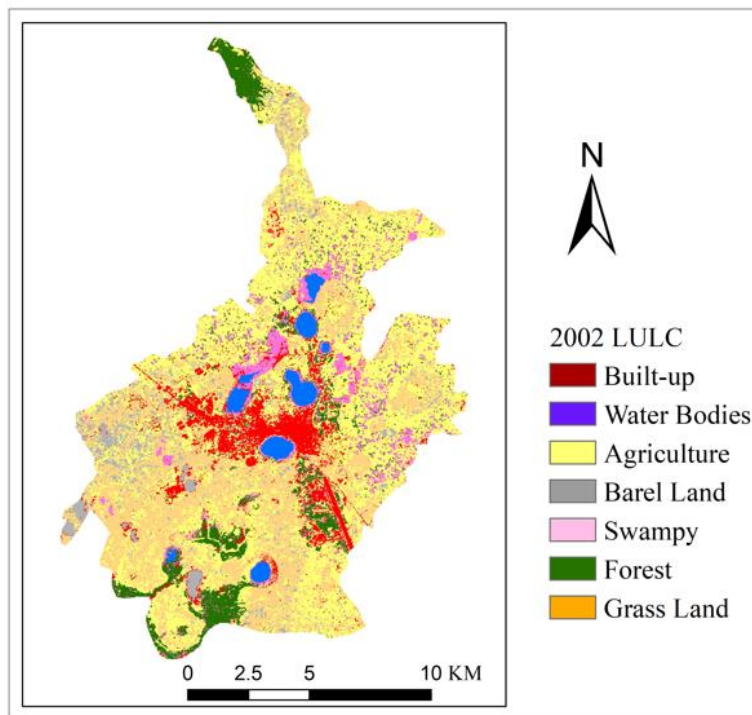


Figure 12: Land use-Land cover Map of 2002

4.3.3. Land Use-Land Cover /LULC/ Dynamics of 2013

In 2013, farmland was the largest land use type in the area, covering 40.9% of the total land area (77.6 square kilometers). However, between 2003 and 2013, there was a significant increase in the amount of built-up area, from 15.5 square kilometers to 27.8 square kilometers. This increase in built-up area is likely due to urban expansion, which is the process by which cities grow and expand into surrounding areas.

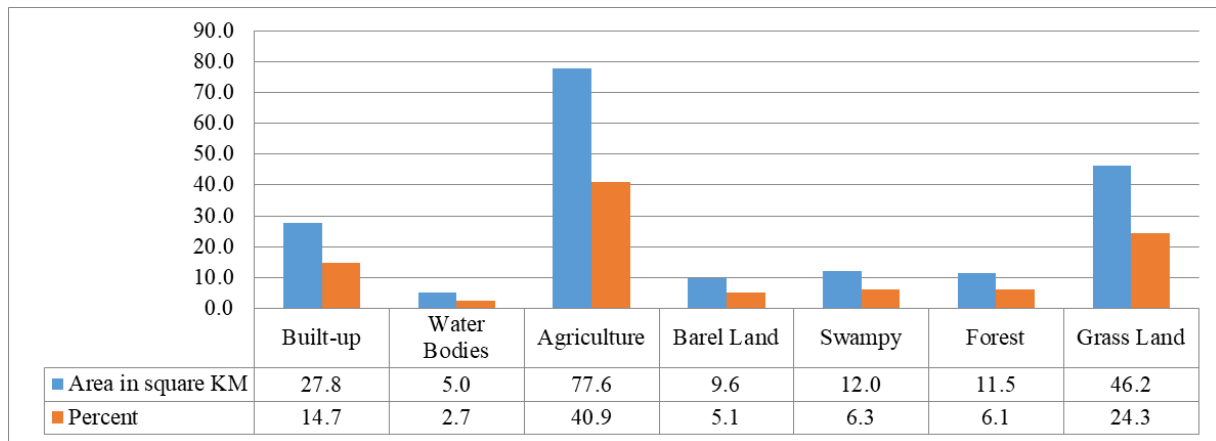


Figure 13: Land Use-Land Cover /LULC/ Dynamics of 2013

Grassland is the second-largest land use type, covering about 46.2 square kilometers of land. However, this area has significantly decreased by 4.9 square kilometers since 2002. This is due to the increasing area of human settlements, which has grown from 15.5 square kilometers to 27.8 square kilometers, contributing to the degradation of forests. Additionally, during this period, there has been a slight decrease in the area coverage of forests and bare lands (Fig. 13). According to the land use and land cover (LULC) change analysis in Figure 13, in 2013, the majority of the western, northeaster, and central parts of the study area were dominantly built-up. In contrast, the southern part of the study area was dominantly covered by farmland.

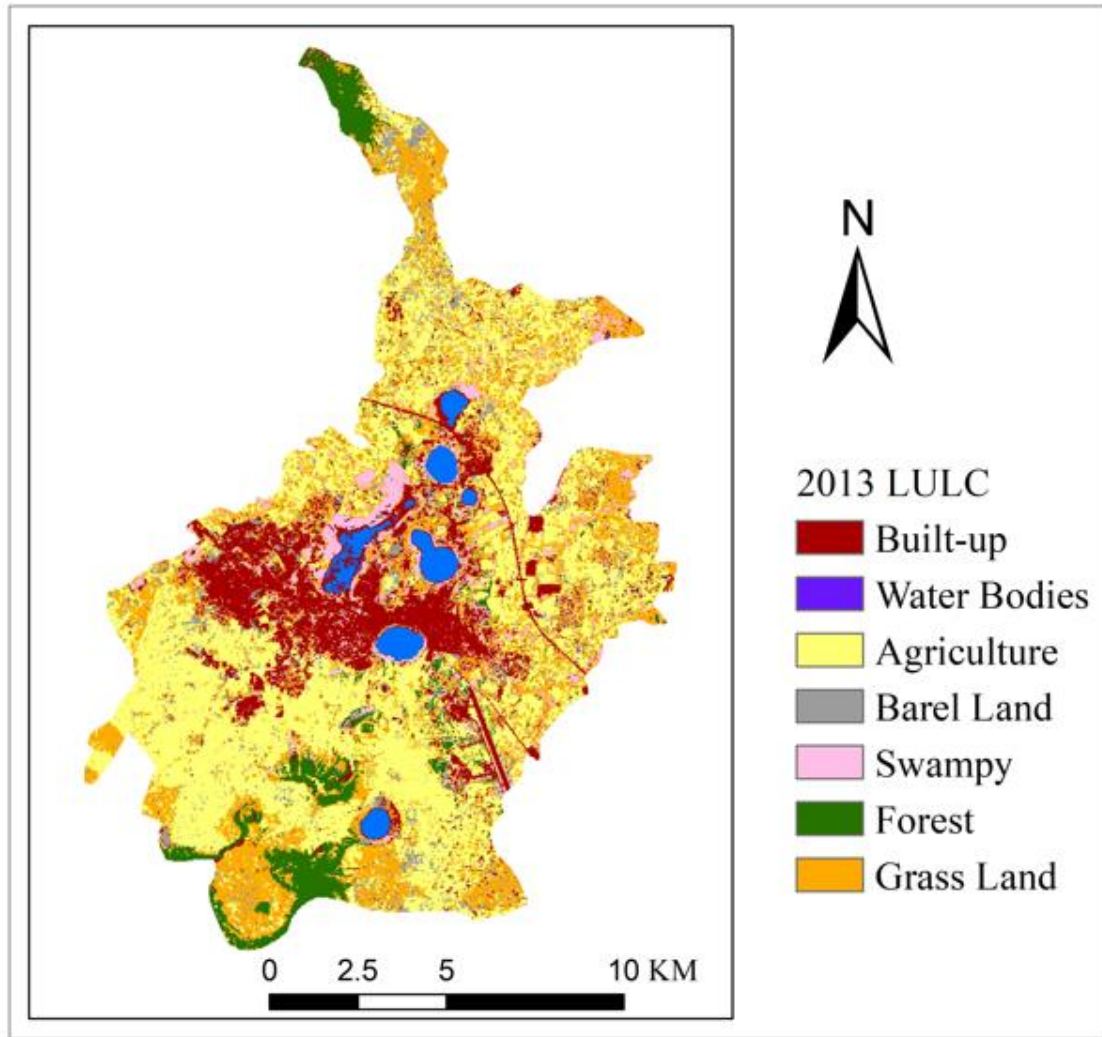


Figure 14: Land use-Land cover /LULC/ Map of 2013

4.4.4. Land Use-Land Cover /LULC/ Dynamics of 2023

Over the past 30 years, the land use and land cover (LULC) of Bishoftu Town has changed dramatically. In 2023, 43.3 square kilometers (22%) of the total area of the town were covered by built-up areas, while the remaining area was covered by other LULC classes. This was the year in which the most significant LULC change occurred. Agricultural land declined sharply to 64.7 square kilometers (34.1%), while built-up areas increased by 22% compared to 2013, when they covered 14.7 square kilometres. Other LULC classes declined dramatically and were converted to built-up areas over the 30-year period.

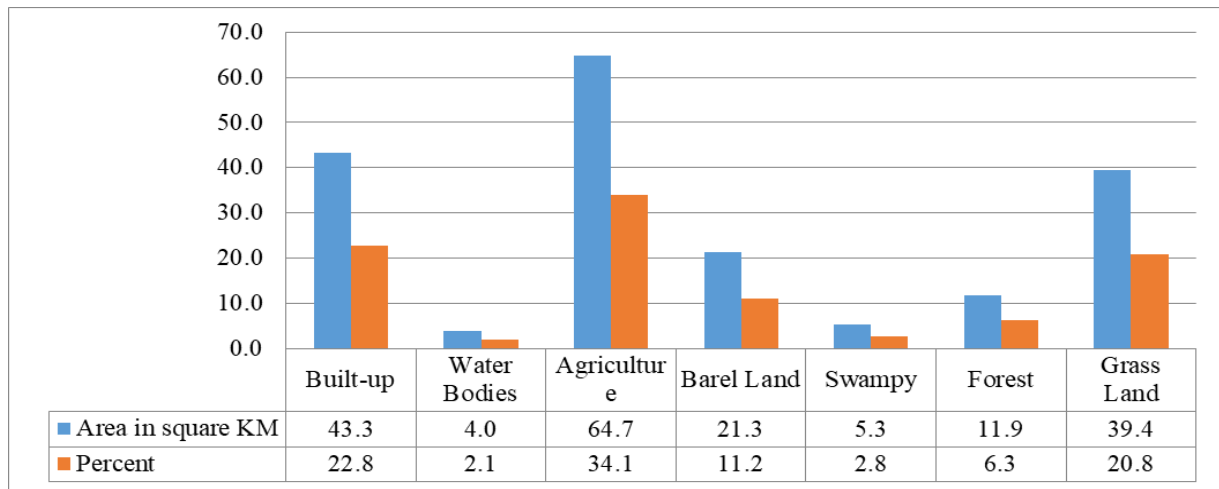


Figure 15: Land Use-Land Cover /LULC/ Dynamics of 2023

The accelerated increase in built-up areas at the expense of other LULC classes is attributed to the alarming population growth caused by natural increase, rural-urban migration, and urban-urban migration in the study area (Figure.15 and 16).

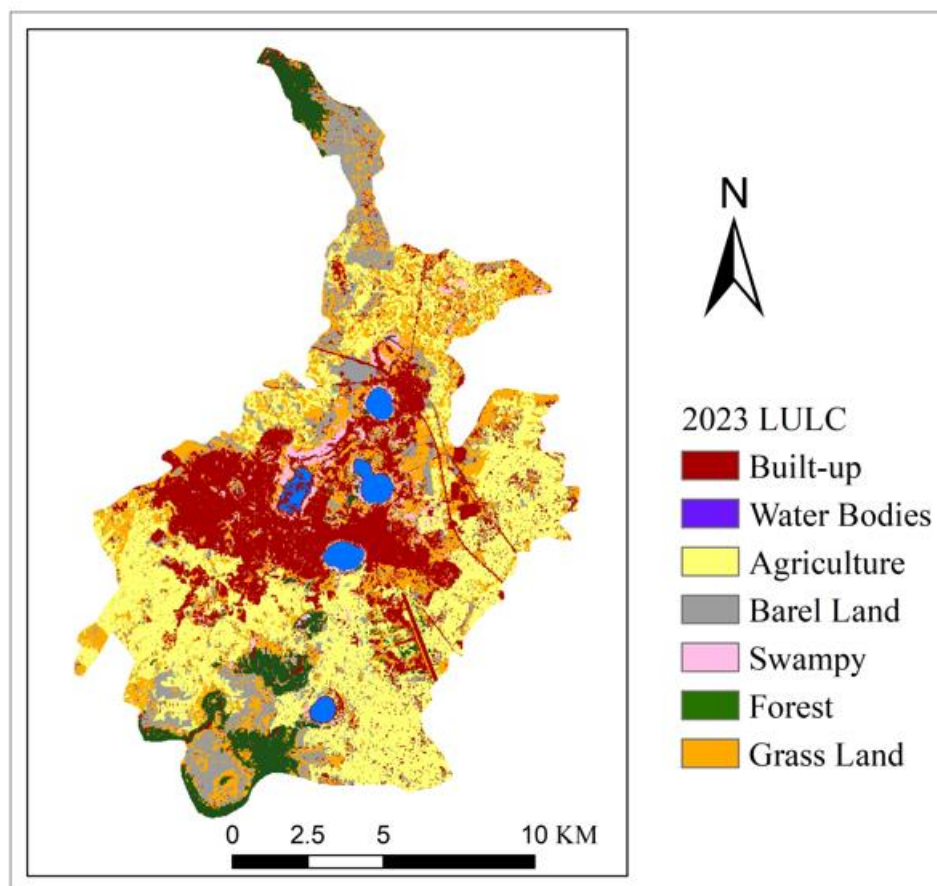


Figure 16: Land use-Land cover /LULC/ Map of 2023

4.4.5. Land use/land covers change Detection of Bishoftu town

The land use/land cover change scenario was developed for the change detection analysis to understand and quantify the trend of the land use land cover change in general and built up area change in particular for each three periods of the studies. In addition, the built up area cover change in the form of maps and statistics has been assembled to examine the specific nature and extent of the built up area cover changes between the stated dates of imageries in the study area. In the case of the study area, the land use/land cover change scenario shows that built-up area is increasing rapidly. This suggests that urban expansion is occurring at a fast pace. The local government should carefully consider the potential negative impacts of urban expansion and develop policies and programs to mitigate these impacts. Land use land cover changes in different periods of time and change rate has presented below in (Figure 17).

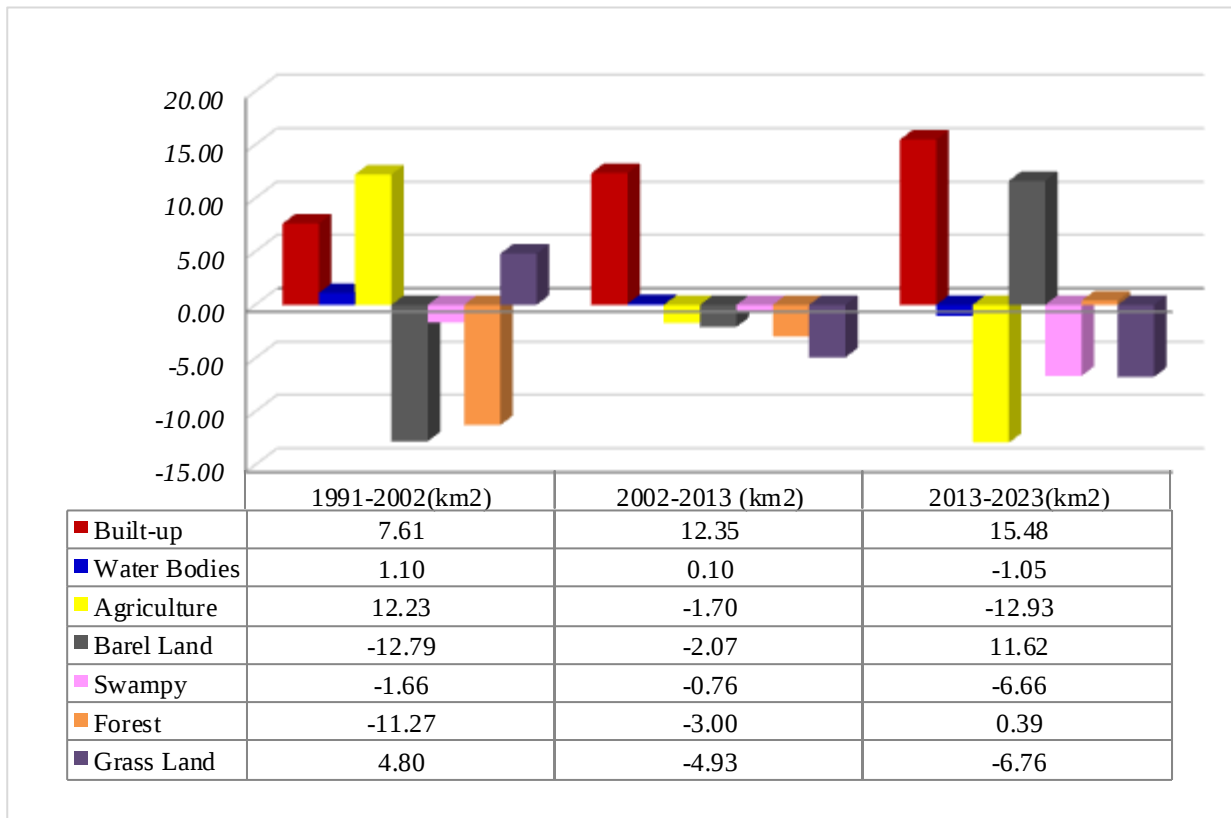


Figure 17: Land use land cover changes in different period of time.

As shown in Figure 17, the land use/land cover (LULC) in the study area has changed significantly over the past 32 years (1991-2023). Built-up area has increased rapidly from 7.9

square kilometers to 15.5 square kilometers (by 7.61 square kilometers) in the first analysis period (1991-2002) and from 15.5 square kilometers to 27.8 square kilometers (by 12.3 square kilometers) in the second analysis period (2002-2013). In the third analysis period (2013-2023), built-up area increased even faster, from 27.8 square kilometers to 43.3 square kilometers (by 15.5 square kilometers). This represents a total gain of 35.4 square kilometers of built-up area over the 32-year period. On the other hand, all other LULC classes have decreased over the first, second, third, and entire study periods. The total loss of farmland, forest, grassland, swamp, and bare land is 2.4 square kilometers, 13.9 square kilometers, 6.9 square kilometers, 9.1 square kilometers, and 3.2 square kilometers, respectively, over the 32-year period.

To understand the major land cover change source and destination in Bishoftu Town, a change matrix was created based on land cover data from 1991 and 2023 (Tables 4). The change matrix shows the areal distribution of land cover/land use classes that have undergone transformation from one type to another, been lost, or remained intact. The change matrix shows that built-up areas expanded at the expense of grasslands (9.9 km²), forest land (2.8 km²), bare land (6.34 km²), swampy (1.9 km²) and farm land (14.4 km²). This indicates that the increase in urban built-up areas came mainly from the conversion of farmlands, grasslands, and forest during 1991–2023. These results are consistent with the literature review, which mentions that urbanization has mainly exerted strong pressure on existing land use, and the most affected land use is agricultural land, which is transformed to built-up areas at a very high rate (Basudeb Bhatta et al., 2011).

Table 4 Change detection matrix of LULC types between 1991 and 2023

	LULC	2023							Total
		BUILT-UP	WATER_BODY	AGRICULTURE	BARE_LAND	SWAMPY	FOREST	GRASS_LAND	
1991	Built-up	7.7	0.0	0.1	0.0	0.0	0.0	0.0	7.9
	Water Bodies	0.2	3.5	0.0	0.0	0.0	0.0	0.0	3.8
	Agriculture	14.4	0.3	22.8	7.4	2.3	3.8	16.2	67.1
	Bare Land	6.3	0.0	8.5	4.7	0.3	0.1	4.6	24.5
	Swampy	1.9	0.2	5.3	1.4	1.0	0.6	4.1	14.4
	Forest	2.8	0.0	6.9	1.9	1.1	7.1	5.9	25.7

	Grass Land	9.9	0.0	21.1	5.9	0.6	0.4	8.5	46.3
	Total	43.3	4.0	64.7	21.2	5.3	11.8	39.3	189.7

The findings of the study revealed that built-up areas in Bishoftu Town are expanding at the expense of crop, grassland, and forestlands. This is a common trend in urbanizing areas around the world, as cities grow and expand into surrounding areas. Urban expansion can have a number of negative impacts, including the loss of agricultural land and other natural resources.

The study's findings are consistent with those of other studies on urban expansion in Ethiopia. For example, Tadess et al. (2001) found that built-up areas in Addis Ababa were expanding at the expense of agricultural land, grassland, and forestlands. Amente (2009) also found that agricultural land, grassland, and forest in the Selti area of Addis Ababa were being converted to built-up areas.

The expansion of built-up areas in Bishoftu Town is having a significant impact on the livelihoods of people living in rural areas. Many farmers have been displaced from their land or have had their farm size reduced as a result of urban expansion. This has forced them to shift to new livelihood strategies, such as working in the construction industry or selling goods and services in urban areas.

4.4.6. Accuracy Assessment

LULC classification accuracy was assessed quantitatively using an error matrix which is the commonly used method in LULC classification accuracy assessment. Accuracy assessment in this study revealed the overall accuracies of 86%, 90%, 92%, and 88% were calculated for 1991, 2002, 2013, and 2023, respectively. This implies that all classifications are in the acceptable range because an overall accuracy of each year is greater than 85% and the kappa coefficient greater than 0.80 represents strong (almost perfect) agreement is an indicator for a strong accuracy. The summarized of the error matrix table results are shown in Tables 5.

Table 5 : Accuracy Assessment of 1991 to 2023

LULC Type	1991		2002		2013		2023	
	PA	UA	PA	UA	PA	UA	PA	UA
BUILT_UP	97.0	92.9	94.4	97.1	95.9	100.0	92.1	100.0
WATER_BODIES	100.0	98.6	100.0	98.6	98.6	97.1	100.0	98.6
AGRICULTURE	78.8	96.9	82.4	80.0	81.8	90.0	74.3	74.3
BARE_LAND	94.4	72.9	100.0	87.1	95.3	87.1	84.1	75.7
SWAMPY	95.6	92.9	84.0	90.0	92.2	84.3	93.0	94.3
FOREST	77.8	100.0	85.7	94.3	100.0	98.6	88.3	97.1
GRASS_LAND	90.0	81.8	86.7	84.4	80.2	84.4	80.3	74.0
Overall accuracy	86%		90%		92%		88%	
Overall kappa statistics	0.83		0.88		0.90		0.85	

4.5. Factors Contributed to urban expansion in Bishoftu town

To identify the main factors contributed to urban expansion in Bishoftu town the respondents were surveyed. Based on the household survey, the respondents identified a number of factors that contribute to urban expansion in Bishoftu town. These include, population growth, infrastructure accessibility, reclassification of the former rural settlement into new urban settlement, topography of the town, proximity to Addis Ababa, and land speculation. The figure 18 below presents the response of the respondents related to the factors contributing to urban expansion.

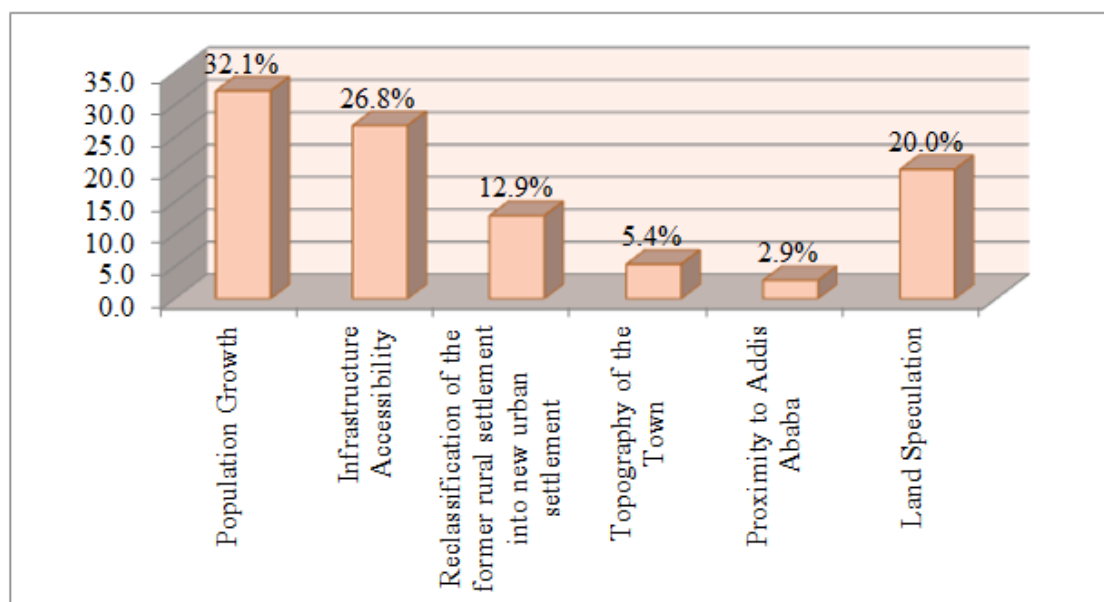


Figure 18: Factors contributing to urban expansion

The factors identified by the respondents has discussed in detail in below sub-section by supporting with the information obtained from interview, focus group discussion and field observation.

4.5.1. Population Growth

Based on the above figure, 32.1% of the respondents identified population growth as a main factor for urban expansion in Bishoftu town. This means that more than one-third of the respondents believe that population growth is a major reason why Bishoftu is expanding so rapidly. Based on the information obtained from the key informant interview and focus group discussion, there are a number of reasons why population growth leads to urban expansion. One reason is that as more people move to a town, there is a greater demand for housing, businesses, and other services. This demand has led to the development of new neighbourhoods and the expansion of existing ones.

Another reason why population growth leads to urban expansion is that it puts a strain on existing infrastructure and resources in the town. As the number of people living in a town increases rapidly, the town may not have enough water, roads, or schools to serve everyone. This has led to the development of new infrastructure and resources in new areas, which can contribute to urban expansion. In addition, the focus group discussion revealed that people are moving from rural areas to Bishoftu in search of better job opportunities, education, and healthcare services. This rural-to-urban migration is also contributing to population growth in the town.

In line with the results of this study, Kassa's (2014) research found that population growth is the most common factor contributing to urban expansion in developing countries. More specifically, Kassa's study found that population growth leads to an increase in the demand for housing, land, and other resources in urban areas. This has led to the development of new suburbs on the outskirts of cities, as well as the densification of existing urban areas.

4.5.2. Infrastructure Accessibility

Infrastructure has long been a major driver of urban expansion in Ethiopia. This is due to the fact that infrastructure provides the essential services and amenities that people need to live and work in urban areas (Terfa, et.al. 2019). According to a survey, 26.8% of the respondents identified infrastructure facility as a main factor for urban expiation in Bishoftu

town. Focus group discussions also revealed that many people migrate from rural to Bishoftu town to access better social infrastructure, such as education, transportation, health, electricity, and communication.

According to studies conducted Kasraian et.al. (2019), and Terfa, et.al., (2019), there are a number of reasons why infrastructure accessibility is such an important driver of urban expansion. First, it makes it easier for people to commute to and from work, school, and other activities. This has made new areas more attractive to live in, especially for people who work in the city center. Second, infrastructure accessibility can make it easier for businesses to operate. For example, businesses that rely on transportation to receive goods or ship products will be more likely to locate in areas with good transportation access. Third, infrastructure accessibility can improve the quality of life in new areas. For example, access to parks, recreation facilities, and other amenities can make new areas more desirable places to live.

4.5.3. Topography of the Town

The other reason that contributes to urban expansion in Bishoftu town is the nature of topography. Based on the above figure, 5.4% of the respondents identified topography of the town as a main factor for urban expansion in Bishoftu town. According to the key informant interview, the town is located on a relatively flat plateau, which makes it easy to build and develop new infrastructure. The surrounding mountains also provide a natural barrier that helps to protect the town from flooding and other natural disasters. one of the key informant revealed that:

“...new development in Bishoftu town occurs on the outskirts of town, where the land is more affordable and there is more space available. As a result, the town is spreading out in all directions, rather than growing in a more concentrated manner.” Key informant interview, 2023

4.5.4. Proximity to the Capital

The study by Choe and Roberts (2011) found that proximity to the capital was a major driver of urban expansion in China. The study found that cities closer to the capital grew faster than cities further away from the capital. The study also found that the economic benefits of being close to the capital were greater for larger cities than for smaller cities. The finding of the

study by Choe and Roberts (2011) support the findings this study. This study found that 2.9% of the respondents identified proximity to the capital as a main factor for urban expansion in Bishoftu town.

Overall, the evidence suggests that proximity to the capital is a major driver of urban expansion in both developing and developed countries. The economic, social, and cultural advantages that proximity to the capital can offer attract people and businesses from all over the country, which can lead to rapid urban growth.

4.5.5. Land Speculation

Land speculation is the practice of buying land with the expectation of selling it for a profit, often in the short term. It is be a major driver of urban expansion, as speculators often buy land on the outskirts of towns and cities, in anticipation of future development. This can lead to the conversion of agricultural land and other open spaces into urban areas, even if there is no immediate need for such development (Oyalowo, 2022). According to a survey, 20% of the respondents identified land speculation as as a main factor for urban expansion in Bishoftu town. With regards to the consequences of land speculation the views reflected by most of the key informant and FGD participant were more or less similar and can be summarized as follows:

“..... One consequence of land speculation in our town is that it has led to the displacement of local people, particularly farmers. As land prices rise, farmers are often forced to sell their land to speculators, and they then have difficulty finding new land to farm or graze their livestock.” Key informant interview, 2023

“.....another consequence of land speculation in our kebele is that it has led to the development of unplanned settlements. Speculators often build low-quality houses and other structures on land that they have purchased, without regard for basic planning and infrastructure needs. This has led to a number of problems, such as overcrowding, and poor sanitation.” Key informant interview, 2023

The study's findings corroborate those of Girma et.al. (2023), who discovered that the major driver of urban expansion in Dukem town is land speculation. This means that the two studies found similar results, which suggests that land speculation is a significant problem in towns.

4.5.6. Reclassification of the former rural settlement into new urban settlement

Based on the above figure, 12.9% of the respondents identified Reclassification of the former rural settlement into new urban settlement as a main factor for urban expansion in Bishoftu town. This is because it has led to the development of new urban areas on the outskirts of existing cities and towns. According to studies, reclassification of former rural settlements into new urban settlements can have a number of positive consequences, such as providing better services to rural residents and creating new economic opportunities. However, it can also have a number of negative consequences, such as the displacement of farmers, the loss of agricultural land, and the expansion of urban sprawl (Tekalign, 2023). Based on the information obtained from the key informants and field observation, in Bishoftu town reclassification of former rural settlements into new urban settlements contributes to urban expansion in a number of ways. First, it provides new land for urban development. This is important in areas where there is a high demand for land, such as Bishoftu town. Second, reclassification has led to the development of new urban areas on the outskirts of existing town. This has contributed to urban sprawl in Bishoftu town, which is the spread of urban development into less densely populated areas.

4.6. The Effects of Urban Expansion on the Livelihood Peri-Urban Community

Urban expansion is the process of cities and towns growing larger and spreading out into surrounding rural areas. While urban expansion can have some positive effects, such as creating new jobs and businesses, it can also have a number of negative effects, particularly on the livelihoods of people who live in farming communities on the outskirts of cities (Angel et al. 2012). This has been the case in the study area, Bishoftu Town too. A survey was conducted to understand whether or not the expansion of Bishoftu Town has affected the livelihood peri-urban community and if so in what manner and magnitude. The following information shows how the expansion of Bishoftu Town has affected several aspects of the lives of people living in farming communities in Kurkura Denbi and Kajima Kebele, as experienced and assessed by the survey of the respondents.

4.6.1. Land Expropriated due to Urban Expansion

Urban expansion is leading to the loss of land in Kurkura Denbi and Kajima Kebele, which is impacting the livelihoods of farmers in the area. A survey of residents in these two kebeles found that 35% of respondents had lost 1 to 2 hectares of land due to urban expansion, followed by 29% who had lost 0.5 to 1 hectare and 14% who had lost 2 to 3 hectares (Figure 19).

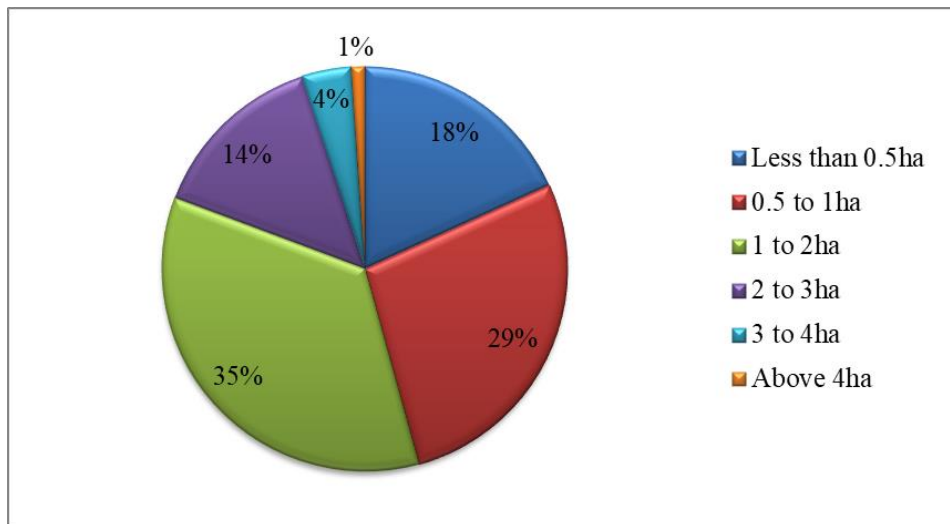


Figure 19: Land lost due to urban expansion

The respondent also requested an explanation of the type of land loss due to urban expansion. Based on the respondent survey, agricultural land was the most commonly lost type of land, accounting for 49%. This was followed by grassland (36%), forest land (11%), and residential land (4%) (Figure 20).

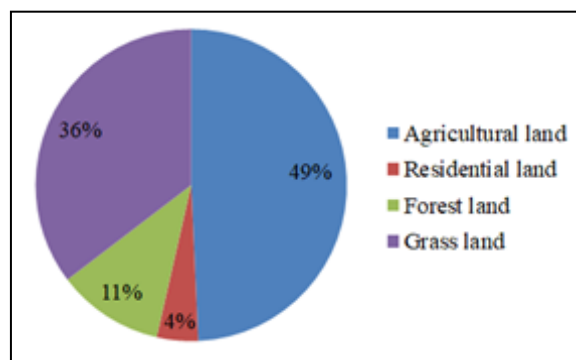


Figure 20: Type of land loss due to urban expansion

According to the information obtained from key informant interviews and focus group discussions, the loss of agricultural land is having a significant impact on the livelihoods of

farmers, as it is reducing their ability to produce food and generate income. A similar study conducted in the Gurage Zone found that urban expansion is also leading to the loss of agricultural land and livelihoods in other parts of Ethiopia (Muluneh, 2003). This is a significant concern, as agriculture is a major source of income and employment for many people in Ethiopia.

One of the key informants revealed that:

"....the loss of agricultural land in Kurkura Denbi and Kajima Kebele has led to a decrease in food production and an increase in food insecurity for the farming community. The loss of agricultural land has also made it difficult for farmers to find new land to farm, as land prices often raise in areas that are experiencing urban expansion." Key Informant Interview, 2023

This quote from a key informant interview in Bishoftu town highlights the negative impacts of urban expansion on the livelihoods of peri-urban farming communities. The loss of agricultural land to urban development can lead to a decrease in food production and an increase in food insecurity, as well as make it difficult for farmers to find new land to farm.

This quote is supported by a number of studies on the impact of urban expansion on peri-urban farming communities. For example, a study by Choithani et al. (2021) found that urban expansion can lead to a decrease in agricultural land, a loss of biodiversity, and a decrease in the incomes of peri-urban farmers. Another study by Girma et al. (2023) found that urban expansion is a major driver of displacement for peri-urban farmers in Dukem town, Ethiopia.

The findings on land expropriated due to urban expansion in the above paragraphs are consistent with the findings of the land use detection matrix. Figure 21 below clearly shows how much land has been converted to urban built-up areas over different time periods.

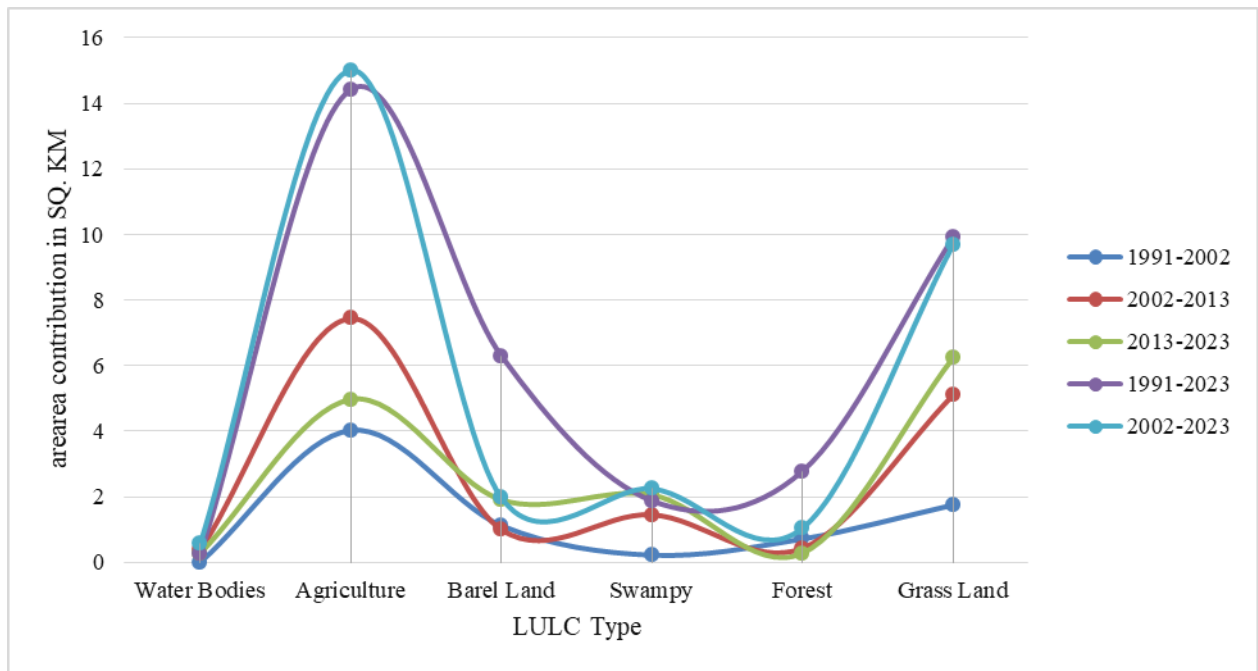


Figure 21: The amount of area contribution for the growth of Urban built up with different time dimensions

The analysis of the figure above shows that a significant amount of agricultural land was converted to urban built-up area between 2002 and 2023. This indicates that agricultural land was expropriated for urban expansion during this period. This finding is consistent with the results of the household survey, which showed that many households had lost their agricultural land to urban expansion. Based on the land use land cover detection matrix and the household survey study, it can be concluded that agricultural land is being converted to urban land at a rapid pace in Bishoftu city. This is a significant concern, as agricultural land is essential for food production and security and the findings highlight the need for careful urban planning in Bishoftu city.

The main purpose of expropriating land from farmers in Kurkura Denbi and Kajima Kebele was for residential development (45.7%), followed by industrial (27.9%), commercial (14.3%), road construction (8.6%), and social infrastructure (3.6%) (Figure 22). This is consistent with the major reasons for urban expansion in Ethiopia, which include the expansion of government offices, new transportation lines and communication infrastructure, schools, hospitals, modern businesses, and new industries owned by foreign investors. Farmers reported that during the expropriation process, they were only left with a small plot

of land for private housing. This is a common concern among peri-urban communities that are affected by urban expansion.

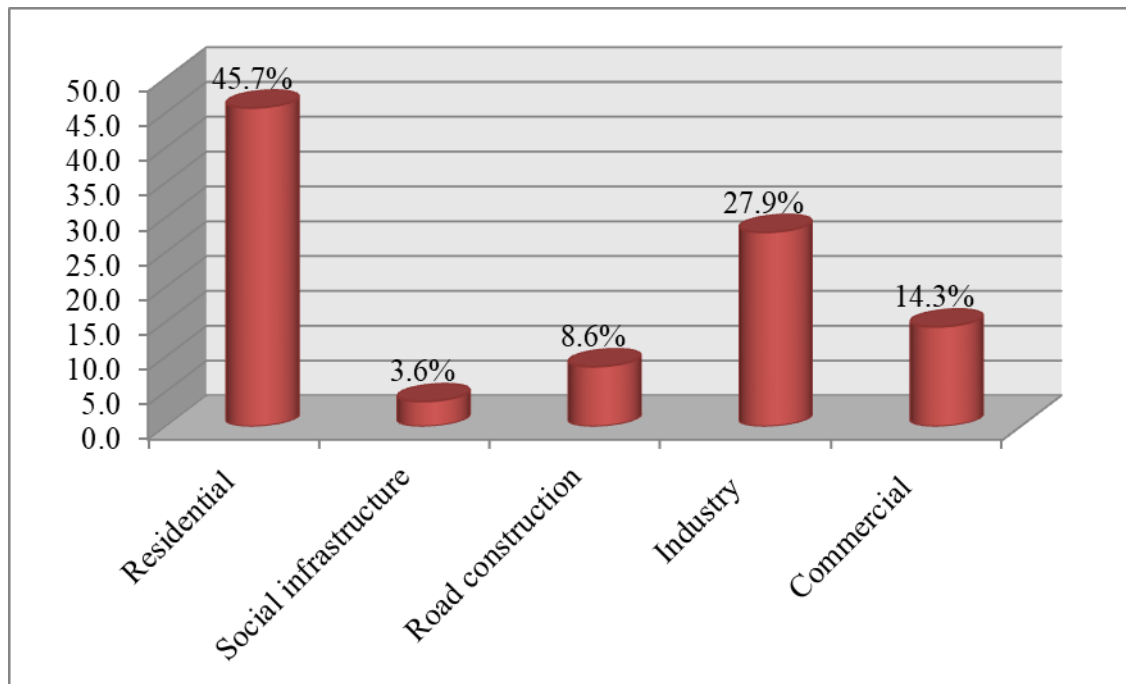


Figure 22: Purpose of expropriating land from farmers

4.6.2. Compensation for Expropriated Land

All of the respondents who were forced to leave their land due to urban expansion received some form of compensation. The vast majority of this compensation was in the form of money (95.4%), with a smaller percentage being in the form of housing plots (27.1%). A very small percentage of respondents received other types of compensation, such as land elsewhere (Figure 23).

This is a positive finding, as it means that people who have been displaced by urban expansion are not being left completely empty-handed. However, it is important to note that monetary compensation may not be enough to cover the full cost of losing one's land. For example, farmers who lose their land may no longer have a source of income, and people who lose their homes may have to move to less desirable areas. It is also important to note that the type of compensation that is offered may not be appropriate for everyone. For example, some people may prefer to receive land elsewhere rather than money, but this option may not be available in all cases.

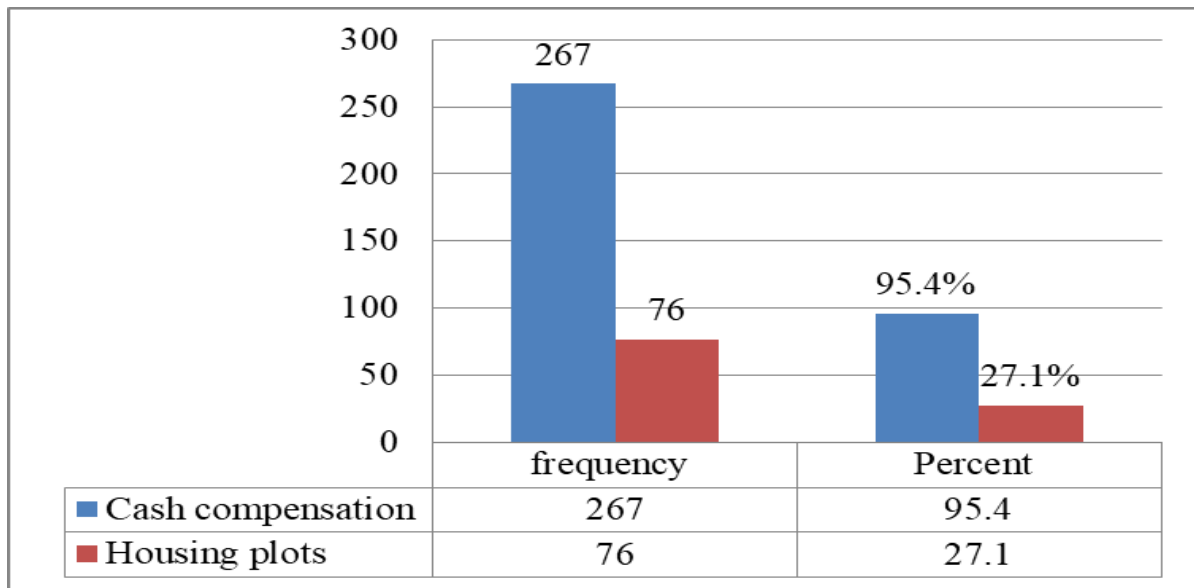


Figure 23: Kinds of compensation paid

The fact that all of the respondents in this study received compensation for their land is a positive development, but it is important to ensure that the compensation is fair and meets the needs of the people who have been displaced. Unfortunately, 91% of the sampled farming households were unsatisfied with the compensation they received and viewed it as unfair (Figure 24). This is a common concern among peri-urban communities that are affected by urban expansion. Urban expansion can lead to the loss of agricultural land and livelihoods, and it is important to ensure that people who are displaced are compensated fairly.

Based on the information obtained from the key informant interview and focus group discussion, one of the main reasons for the dissatisfaction with the compensation is that it is not enough to sustain the livelihoods of the displaced farmers. Many farmers rely on their land for their income, and when they lose their land, they also lose their income. The compensation that they receive is often not enough to replace their lost income, which leaves them struggling to support themselves and their families. Another reason for the dissatisfaction with the compensation is that it does not take into account the full range of costs that farmers incur when they are displaced. For example, based on the key informant interview farmers may have to pay for new land, new agricultural equipment, and new housing. The compensation that they receive may not be enough to cover all of these costs.

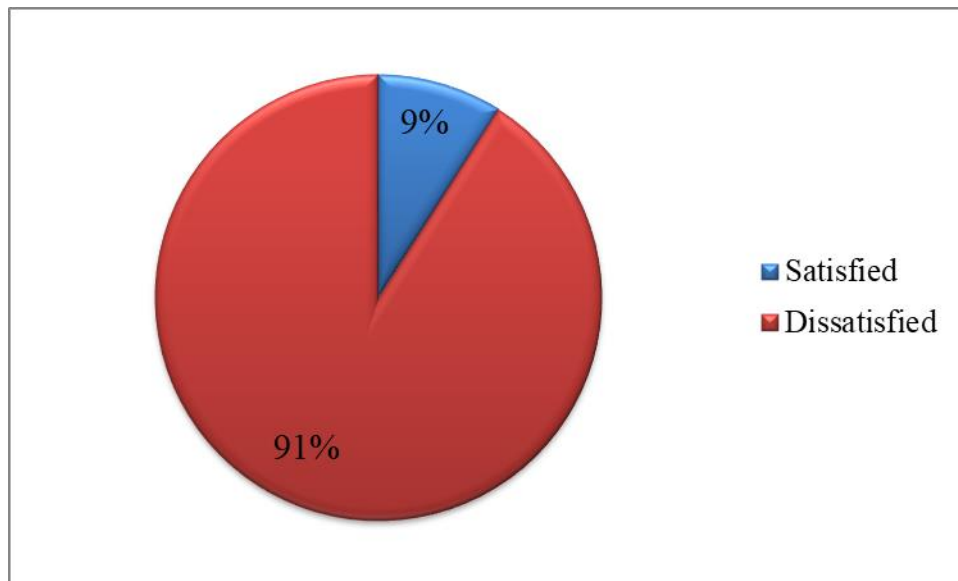


Figure 24: Satisfaction condition towards a paid compensation

With regards to dissatisfaction of the compensation paid one of the key informants revealed that:

“....before urban expansion, I had 5.5 hectares of farmland and grazing land. But now, I have only 2.5 hectares. I was compensated for the three hectares, but the compensation was based on the cost of production over ten years, and it was paid out in different installments. This has had a negative impact on my business, as I do not have enough farmland to work on or enough money to invest in creating jobs for my family. I was unable to educate my children at first, as it cost too much for school uniforms, exercise books, and stationery. Later, I tried to invest in a small shop, but I was not successful. I also tried to fatten up oxen to sell during big holidays, but this is not enough to support my family.” key informant interview, 2023

This quote highlights the negative impacts of urban expansion on peri-urban farming communities. Urban expansion often leads to the expropriation of land from farmers for development purposes. This can have a devastating impact on farmers' livelihoods, as they lose their land and their source of income. In the case of the key informant in this quote, the loss of land has made it difficult for him to provide for his family. He has been unable to educate his children or invest in other businesses. This is a common experience for farmers

who are affected by urban expansion. Urban expansion is a complex process, and there is no easy solution to the challenges that it poses for peri-urban farming communities.

4.6.3. Impact of urban expansion on income of the peri-urban community

The income of peri-urban communities before and after land expropriation can vary depending on a number of factors, including the type of land expropriated, the amount of compensation paid, and the availability of alternative livelihoods (Dires et.al. 2021). Figure 25 and 26 below shows the average annual income of peri-urban communities before and after land expropriation.

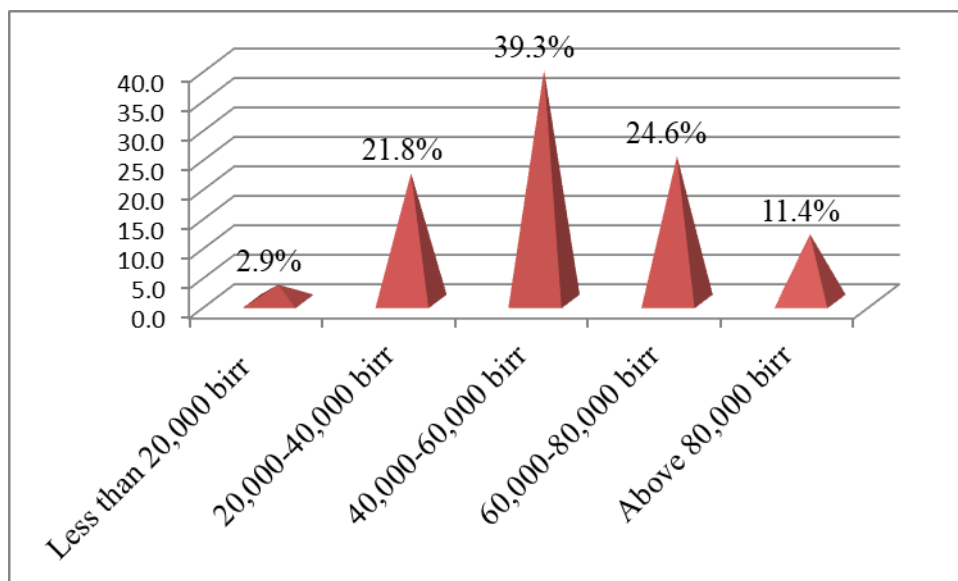


Figure 25: Annual incomes before land expropriation

Figure 25 shows the income distribution of households in a peri-urban community before urban expansion and expropriation of their land. The figure shows that 2.9% of households earned less than 20,000 birr per year, 21.8% of households earned 20,000-40,000 birr per year, 39.3% of households earned 40,000-60,000 birr per year, 24.6% of households earned 60,000-80,000 birr per year, and 11% of households earned more than 80,000 birr per year. This means that the majority of households in the community earned less than 60,000 birr per year before urban expansion and expropriation of their land. This suggests that the community was relatively low-income.

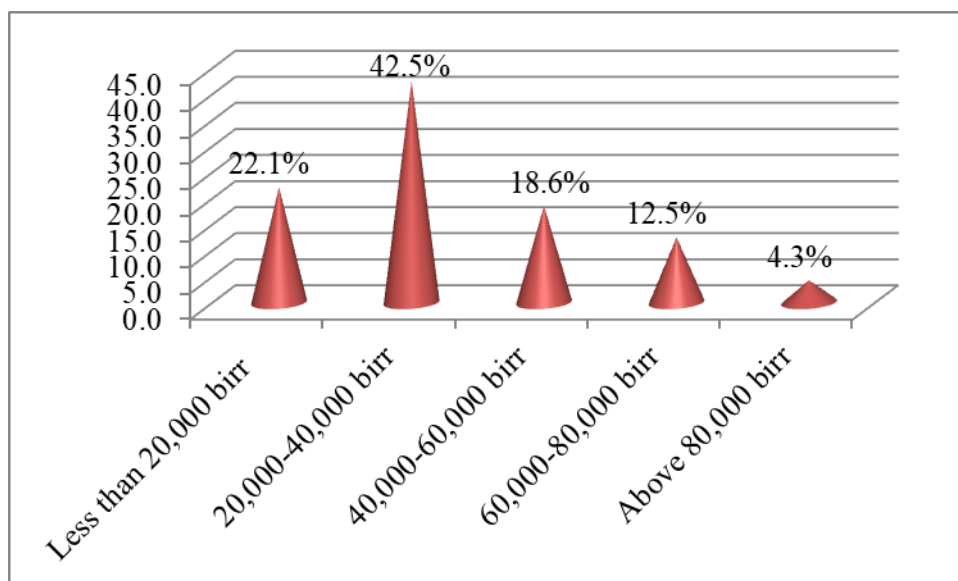


Figure 26: Annual incomes after land expropriation

Figure 26 shows that after urban expansion and expropriation of their land, 22.1% of peri-urban households in Bishoftu Town, Ethiopia, earn an average annual income of less than 20,000 Ethiopian birr (ETB), 42.5% earn 20,000-40,000 ETB, 18.6% earn 40,000-60,000 ETB, 12.5% earn 60,000-80,000 ETB, and 4.3% earn above 80,000 ETB. This is a significant decrease from the pre-expropriation period, when only 2.9% of households earned less than 20,000 ETB, 21.8% earned 20,000-40,000 ETB, 39.3% earned 40,000-60,000 ETB, 24.6% earned 60,000-80,000 ETB, and 11.4% earned above 80,000 ETB (Figure 25).

These findings are consistent with other studies on the impact of urban expansion on the income of peri-urban communities. For example, a study by the Food and Agriculture Organization of the United Nations (FAO) found that urban expansion in Africa is leading to a decrease in agricultural land and a loss of income for peri-urban farmers. The study also found that urban expansion is making it difficult for farmers to find new land to farm, as land prices often raise in areas that are experiencing urban expansion.

Another study, conducted by the World Bank, found that urban expansion in developing countries is leading to a number of negative impacts on the livelihoods of peri-urban farming communities, including land expropriation, loss of income, and loss of assets. The study also found that urban expansion can lead to the displacement of people from their homes and communities, making it difficult for them to access the social infrastructure that they need.

According to Figure 27, 96% of peri-urban community members relied on agricultural jobs, such as crop production, livestock rearing, and forestry, for their income before land expropriation, while 4% relied on non-agricultural jobs. This means that the vast majority of residents were engaged in agricultural activities that require large amounts of land, which has since been converted to urban land use. This is a significant concern, as it means that many peri-urban community members have lost their livelihoods due to urban expansion.

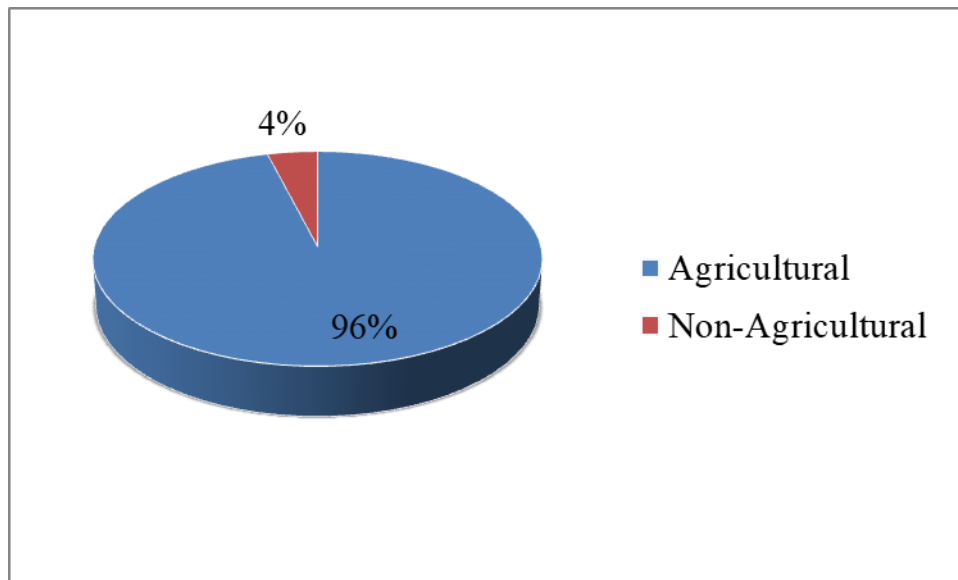


Figure 27: Mean of income of households before urban expansion

Agricultural jobs are often the primary source of income for peri-urban communities, and the loss of agricultural land can make it difficult for people to find new jobs or sources of income. Reviewed literature also stated that the main livelihood strategies at the urban periphery are farming practices focused on those who have access to land inside and outside of urban boundaries, but basically generate income from it.

Figure 28 shows that 69% of respondents were dependent on non-agricultural activities after land expropriation, while 31% of respondents were dependent on agricultural activities. This means that after losing their land to expropriation, the majority of respondents (69%) had to switch to non-agricultural activities to make a living. This is because they were unable to find new land to farm, and they did not have the skills or resources to transition to a new livelihood in agriculture. The remaining 31% of respondents were able to continue working

in agriculture after land expropriation. This is because they were able to find new land to farm, and because they have remaining land that was not expropriated.

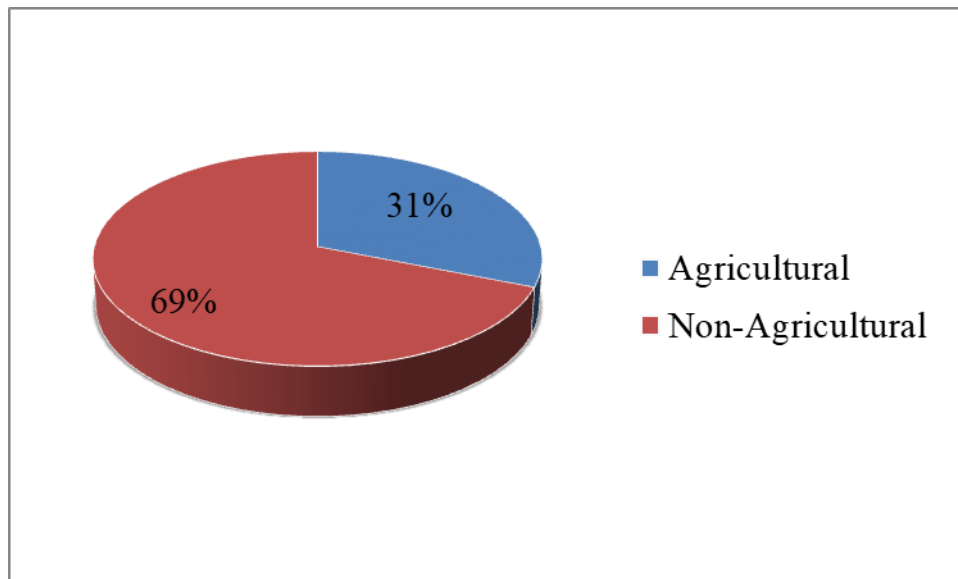


Figure 28: Mean of income of households after urban expansion

Information provided from the key informant interview and focus group discussion revealed that urban expansion is leading to a decrease in farming job opportunities and making it difficult for farmers to supplement their income. One respondent, who works as a security guard and cultivates crops on his remaining land, expressed concern about his future livelihood as urban expansion continues. This is a common concern among peri-urban farmers in the study area and other developing countries. As cities expand, they encroach on agricultural land, reducing the amount of land available for farming and making it difficult for farmers to make a living. This can lead to poverty, food insecurity, and other social problems.

4.6.4. Impact on Social Capital

Urban expansion can have a significant impact on social relationships. When people are displaced from their homes and communities, they may lose touch with their friends and neighbors. This can be especially difficult for older people and people who have strong cultural ties to their community. Urban expansion can also lead to a decline in cultural practices. When people are scattered across a large urban area, it can be difficult to organize

and participate in community events and activities. This can lead to a loss of cultural identity and a sense of belonging.

Based on the household survey, 87% of the respondents identified that their social assets have been affected by urban expansion and that they accept the impact of the expansion. They have changed their lifestyle due to urban expansion. The study also found that only 13% of respondents said that their social relationships had not been affected by urban expansion. This suggests that the vast majority of people in the community are being affected by urban expansion in some way.

The findings of this study are consistent with other research on the social impacts of urban expansion. Studies have shown that urban expansion can lead to social isolation, loneliness, and a decrease in social cohesion.

4.6.5. Urban Expansion and Accessibility of Basic Services

Urban centres generally have better facilities than rural areas, but the quality and accessibility of these services can vary depending on location and socioeconomic factors. While urban expansion can have negative consequences on farmland by displacing farmers, it can also bring new services to towns and surrounding communities. Accordingly, the Kurkura Denbi and Kajima kebeles was access to the following services since the town expansion.

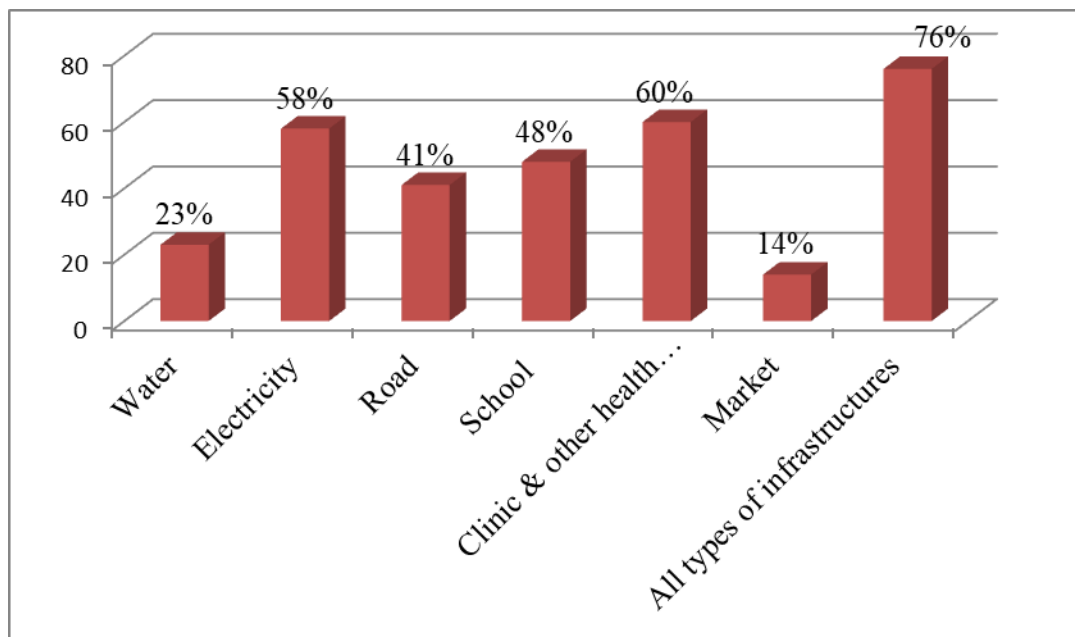


Figure 29 Accessibility of basic services due urban expansion

The findings of the study presented in Figure 29 suggest that urban expansion has a positive impact on peripheral farming communities in terms of physical capital, which is measured in terms of infrastructure in the study area. This finding is supported by a number of studies on the impact of urban expansion on peri-urban communities.

For example, a study by the Food and Agriculture Organization of the United Nations (FAO) (2018) found that urban expansion has led to improvements in infrastructure in peri-urban areas. The study found that urban expansion has led to the construction of new roads, bridges, and other infrastructure projects that can improve access to markets, schools, and other essential services for peri-urban communities. Another study, conducted by the World Bank (2012), found that urban expansion has led to increased investment in infrastructure in peri-urban areas. The study found that private investors are often willing to invest in infrastructure in peri-urban areas in order to support the development of new businesses and industries.

Beka's (2016) study of farmers displaced by urban expansion in Sululta town, Ethiopia, found that they had access to improved social facilities and infrastructure, such as water supply, electricity, telecommunications, health, schools, banking services, leisure services, and paved roads. However, Tamirat's (2016) study of farmers displaced by urban expansion in Jima city, Ethiopia, found that they did not have access to basic infrastructure and services, such as water, electricity, roads, and telephone services.

In the case of Kurkura Denbi and Kajima kebeles, the positive impact of urban expansion on physical capital is evident in the construction of new roads, bridges, and other infrastructure projects. These projects have improved access to markets, schools, and other essential services for peri-urban communities.

Overall, the findings of the study and the literature suggest that urban expansion can have a positive impact on peripheral farming communities in terms of physical capital. However, it is important to note that the impact of urban expansion on peri-urban communities can vary depending on a number of factors, such as the way that urban expansion is managed and the availability of resources to support peri-urban communities.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1. Conclusion

This study has assessed the impact of urban expansion on the livelihoods of peri-urban communities in Bishoftu town, Ethiopia. The study used a mixed-methods approach, combining quantitative and qualitative data collection methods. The quantitative data was collected from a survey of 280 peri-urban communities, while the qualitative data was collected from focus group discussions and key informant interviews. GIS and remote sensing were used to analyse the phenomena of agricultural land transformation into urban land use.

The study found that the land use and land cover (LULC) of Bishoftu Town has changed dramatically over the past 32 years. Built-up area has increased rapidly from 7.9 square kilometers to 43.3 square kilometers, while the remaining area was covered by other LULC classes. This was the year in which the most significant LULC change occurred. Agricultural land declined sharply to 64.7 square kilometers (34.1%), while built-up areas increased by 22% compared to 2013, when they covered 14.7 square kilometres. Other LULC classes declined dramatically and were converted to built-up areas over the 30-year period. The change matrix shows that built-up areas expanded at the expense of grasslands (9.9 km²), forest land (2.8 km²), bare land (6.34 km²), swampy (1.9 km²) and farm land (14.4 km²). This indicates that the increase in urban built-up areas came mainly from the conversion of farmlands, grasslands, and forest during 1991–2023.

The study found that the main factors contributing to urban expansion in Bishoftu town are population growth, infrastructure accessibility, topography of the town, proximity to Addis Ababa, and land speculation. The study also found that reclassification of former rural settlements into new urban settlements contributes to urban expansion by providing new land for urban development and leading to the development of new urban areas on the outskirts of the town.

Urban expansion in Bishoftu Town is leading to the loss of agricultural land and livelihoods for peri-urban farming communities. The main reason for this is that agricultural land is being expropriated for urban development. Farmers who are displaced by urban expansion often receive compensation, but this compensation is often not enough to sustain their livelihoods.

The study found that the vast majority of farmers who lost their land to urban expansion were unsatisfied with the compensation they received. This is because the compensation is often not enough to replace their lost income or cover the full range of costs that they incur when they are displaced.

The study found that urban expansion in Bishoftu Town, Ethiopia, has had a negative impact on the income of peri-urban communities. After land expropriation, the majority of respondents (69%) had to switch to non-agricultural activities to make a living. This is because they were unable to find new land to farm, and they did not have the skills or resources to transition to a new livelihood in agriculture.

The study also found that urban expansion has had a significant impact on the social capital of peri-urban communities. When people are displaced from their homes and communities, they may lose touch with their friends and neighbours. This can be especially difficult for older people and people who have strong cultural ties to their community. Urban expansion has also lead to a decline in cultural practices.

5.2. Recommendation

Based on the following recommendations are made to mitigate the negative impacts of urban expansion on peri-urban communities in Bishoftu town:

- Develop and implement comprehensive land use plans that take into account the needs of peri-urban communities. Land use plans should identify and protect agricultural land, and ensure that peri-urban communities have access to basic infrastructure and services.
- Promote sustainable urban expansion practices, such as limiting urban sprawl and promoting infill development. This will help to reduce the amount of agricultural land that is lost to urban development.
- Provide fair compensation to peri-urban farmers who lose their land to urban expansion. Compensation should be sufficient to allow farmers to purchase new land and continue their livelihoods.
- Invest in social programs and initiatives that help to build and maintain social capital in peri-urban communities. This could include programs that promote community participation in decision-making, and programs that support cultural and social activities.
- Promote the development of affordable housing in urban areas. This could help to reduce the demand for land in peri-urban areas.

5.3. Contribution and Further Research

This study contributes to the existing body of knowledge on urban expansion and its impact on peri-urban communities in several ways. First, it provides a comprehensive assessment of the impact of urban expansion on the livelihoods of peri-urban communities in Bishoftu town, Ethiopia. Second, it identifies the main factors contributing to urban expansion in Bishoftu town. Third, it highlights the negative impacts of urban expansion on the income and social capital of

peri-urban communities. However, similar research needs to be conducted in the future, focusing on comparative studies of urban expansion and peri-urban livelihoods in different contexts. This could include studies that compare different cities within the same country, or studies that compare different countries. Comparative studies can help to identify the common factors that drive urban expansion and the impacts that urban expansion has on peri-urban communities. Additionally, research on the intersection of urban expansion and other social and environmental challenges is needed. For example, research could be conducted on the intersection of urban expansion and climate change, or the intersection of urban expansion and inequality. Research on these intersections can help to develop more holistic and effective solutions to the challenges posed by urban expansion. Finally, it is also important to conduct research on the effectiveness of different interventions to mitigate the negative impacts of urban expansion on peri-urban communities, as well as the role of different stakeholders in addressing the challenges posed by urban expansion.

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