



**ADDIS ABABA UNIVERSITY
COLLEGE OF DEVELOPMENT STUDIES
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**IMPACT OF URBANIZATION ON RURAL LIVELIHOODS: EVIDENCE FROM
PERIPHERAL AREAS OF ADAMA CITY, OROMIA REGION, ETHIOPIA**

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**A DISSERTATION SUBMITTED TO THE CENTER FOR RURAL DEVELOPMENT
STUDIES, COLLEGE OF DEVELOPMENT STUDIES PRESENTED IN
FULFILLMENT OF DEVELOPMENT STUDIES (RURAL DEVELOPMENT)**

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**ADDIS ABABA UNIVERSITY SCHOOL OF GRADUATE STUDIES COLLEGE OF
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STATEMENT OF AUTHOR

I, the undersigned, hereby declare that I am the author of the dissertation entitled “Impact of Urbanization on Rural Livelihoods; Evidence from peripheral areas of Adama City, Oromia Region, Ethiopia ". I solemnly declare that this dissertation has not been submitted to any other institution to receive an academic degree, diploma, or certificate, aside from the articles in the dissertation, which were submitted to journals in partial fulfillment of the requirements for the Ph.D. degree at Addis Ababa University. I have appropriately cited and credited all sources used in this work per the generally accepted standards of practice. I am aware that failing to uphold the standards of academic honesty, and integrity and misrepresenting or fabricating any idea, data, fact, or source will be sufficient grounds for the university to take disciplinary action.

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ACRONYMS

ATT	Average treatment effect
CMER	Council of European Municipalities and Regions
CRM	Continuous ratio model
CSA	Central Statistics Agency
DFID	Department for International Development
ECA	Economic Commission for Africa's
EDHS	Ethiopia Demographic and Health Survey
ESS	Ethiopian Statistical Service
ETB	Ethiopian Birr
FAO	Food and Agriculture Organization of the United Nations
FDRE	Federal Democratic Republic of Ethiopia
GDP	Gross Domestic product
GIS	Geographic Information Systems
HHs	House Holds
ILO	International Labour Organization
KII	Key informant interviews
LULC	Land use/land cover change
MUDHCo	Ministry of Urban Development, Housing and Construction
OECD	Organisation of Economic Co-operation and Development
OLI	Operational Land Imager
POM	Proportional logistic model
PPOM	Partial proportional odds model
PSM	Propensity Score Matching
SSA	Sub-Saharan Africa
UN	United Nation
VIF	Variance inflation factor

General Abstract

Urbanization poses significant challenges for public policy in developing countries, particularly in Sub-Saharan Africa, where rapid growth rates have been observed. This study aims to investigate the impact of urbanization on the livelihoods of farm households in the Adama Woreda of Oromia Regional State. The study adopts a pragmatic philosophical approach to examine the socio-economic impacts of urbanization on farm households in the study area, with a focus on practical implications for urban policy in Sub-Saharan Africa. The study utilizes a comparative analysis of two groups of farm households based on their proximity to the urban center. Families residing close to urban areas are categorized as the treated group and are compared to households located far away. A total of 397 households were selected for the study using a multistage sampling technique, with 148 households near the urban center and 249 households situated significantly far from the urban area. Descriptive and inferential data analysis techniques are employed, including the use of Geographic Information System (GIS) and remote sensing tools to extract relevant information on land use and land cover changes in the study area from 1986 to 2022. Furthermore, the study applies ordered logistic regression, multinomial logistic regression, and propensity score matching models to analyze the perceived effects of urbanization on rural farm households near urban areas, the effects of urbanization on their income diversification, and the overall impact on the consumption expenditure of households near urban areas, respectively. The findings reveal significant changes in land use and land cover in the study area over the examined period, with a substantial increase in built-up areas by 4750 hectares and a decrease in agricultural land by 3033 hectares. Urbanization is identified as a key factor contributing to these changes, leading to divergent perceptions among farm households in the study area. While those located further away perceive urbanization positively with mean value of 3.25, households near urban centers hold negative perceptions with mean value 2.47. The ordered logistic regression analyses indicate that distance from the urban center; educational status, family size, and farmland availability significantly influence the perception of urbanization by farm households near urban areas. The finding shows that increasing urbanization by one unit causes a decrease in farming activities by 40%, and farming and non-farm activities increase by 35%. The result also indicated that households with higher-aged and larger family sizes were more likely to diversify their income to unskilled non-farm activities. Furthermore, the research reveals that urbanization limits the income-generation capacity of farming households, necessitating their reliance on less remunerative non-farm income-generating activities. As a result, the average annual consumption expenditure per adult equivalent for rural farm households near urban areas is 2562.55 ETB, indicating a lower expenditure compared to rural households residing far from urban areas. The findings of the study align with dependency theory, indicating an increasing economic reliance of rural households on urban areas, exacerbating disparities and fostering rural dependency. Additionally, these outcomes support the Impoverishment Risks and Reconstruction model of Cernea, which states that smallholder farmers evicted from their farmland are subject to acute poverty. In light of these findings, effective land management policies and a comprehensive understanding of the impacts of urban growth on rural farm households are crucial. Policymakers and stakeholders should prioritize the concerns and perceptions of rural farmers when planning urbanization projects and emphasize the need for policies that mitigate farmland loss while addressing socioeconomic factors affecting farmers in the region. This approach is essential to achieve sustainable food security and poverty reduction.

Keywords: Impact; Multinomial Logistic Regression, Perception, Propensity Score Matching, Rural Livelihoods ,Urbanization

CHAPTER ONE

GENERAL INTRODUCTION

This chapter serves as the dissertation's general introductory section. It presents the background and justification, a concise literature review, a problem statement, research questions, objectives, significance, scope, and limitations of the study. This chapter also encompasses an outline of the methodology applied throughout the dissertation and a summary of the organization of the chapters. It begins with the following section, which discusses the study's context and justification.

1.1 Background and justification

Currently, unprecedented population growth and urbanization put pressure on peri-urban agricultural land (van Vliet, 2019). Continual conversion of agricultural land to buildups comes with different ramifications (Ritchie & Roser, 2018). Reports show that, in mid-November 2022, the global human population reached 8.0 billion and will increase to 9.7 billion in 2050 (Gaigbe-Togbe et al., 2022). Consequently, more than two-thirds of the world's population will be urban residents by 2050. This will mainly happen in less urbanized regions like Africa and Asia (UN-Habitat, 2022). Hence, people who live in urban areas in Africa doubled in the last three decades and are expected to increase in the coming decades as well (Sakketa, 2022). The growth of cities is observed both in the existing urban areas and newly established areas at different rates (Farrell, 2017). Though Ethiopia is the least urbanized in the sub-Saharan Africa region, the urban population was 5 percent of the total population in 1950, increased to 20.4 percent in 2017, and is expected to reach 40 percent by 2037 (ECSA, 2016; MUDHCo, 2016).

Understanding the nature and impact of urbanization on peri-urban smallholder farmers is a topic of considerable debate. As a result, development policies are affecting the urban community and rural households differently (Biłozor & Cieślak, 2021; Sakketa, 2022). Urbanization has been a positive force for economic growth, poverty reduction, human development, and income diversification, this in turn transforms rural livelihood (Sakketa, 2022). Because rural people flee to cities to search for employment opportunities in the manufacturing and services sectors (Dekolo et al., 2015). Besides urbanization moves millions of people from the poverty trap, creating jobs, improving education and healthcare lives in areas with large amounts of public investment, and improving infrastructure and service delivery (Coulibaly & Li, 2020).

Furthermore, urbanization flourishes non-farm employment and facilitates the emergence of small business enterprises, which in turn improves the agricultural sector(Tadesse et al., 2018). Urbanization enhances agricultural commercialization, increasing the marketable surpluses and demand for agricultural inputs thereby increasing rural income(Tadesse et al., 2018). Empirical studies show that urbanization creates a conducive ambient to improve rural livelihood through new economic opportunities (Roy & Thangaraj, 2021).

The academic discourse contends that urbanization does not necessarily correlate with economic growth. Africa has undergone significant urbanization over the last decade, yet it has not observed corresponding economic progress. The process of urbanization often unfolds slowly and without significant growth due to insufficient urban infrastructure, a phenomenon described as urbanization without growth (Gollin et al., 2016). Urbanization increases discrimination, economic inequality, and limited growth spillovers if not well-planned and lacks supportive policies(Sukanya & Tantia, 2023). They also evidenced most SSA countries are making little out of the opportunities that urbanization can provide in transforming rural-urban livelihoods and few countries have successfully translated urbanization into poverty reduction. Even, farm households near urban areas that diversify income sources into the non-farm sector do not transform their livelihood beyond generating income for survival (Binswanger-mkhize et al., 2016; Mezgebo & Shaughnessy, 2014; Tassie Wegedie, 2018). A study in the Philippines indicated that urbanization has converted agricultural land into residential and commercial use, as a result, displaced farmers' economic status is decreased and frustrated working in agriculture(Factura & Cimene, 2022). Thus, a growing urban population and increased income require additional food production(Eghan, 2013) , which puts pressure on the local food distribution system(Frimpong, 2013). If such intensification entails ill-applied external inputs, it can lead to environmental degradation that hampers agricultural productivity and rural health, negatively affecting food security and poverty reduction (Sakketa, 2022).

In Ethiopia, horizontal urban expansion in major cities has incorporated large area of peri-urban land into their territories. Researches in Mekelle and Bishoftu evidenced that about 6000 and 5000 ha of land was incorporated from rural kebeles between 2005 and 2009(Zemenfes & Serbeh-Yiadom, 2014). Similarly, urbanization and industrialization in Dukem Town encroach potential agricultural land owned by farmers whose education levels and skills are low. This is devastating to find stable employment outside the agricultural sector(Dadi, 2016) .

Adama is the second most populous and fastest growing city of the Oromia National Regional State. Adama City administration is the center of the regional government's political, business, and economic activities and the largest urban center in the Oromia region. It is the major city where business activities are underway in the country, next to Addis Ababa. Because of this, the scale and diversity of the infrastructure and economic activities are relatively larger and broader compared to other towns in the region. Several studies (Beckers et al., 2020; Weldearegay et al., 2021 & Factura & Cimene, 2022) in different countries have yet to give clear evidence of urbanization and its effect on smallholder peri-urban farmers. Other research indicates that the impact of urban proximity on rural populations can be discerned by evaluating outcomes in relation to their distance from the nearest city, though this assessment covers a very limited area (OECD/UN ECA/AfDB, 2022). The same source revealed that depending on their size and proximity, different cities have positive or negative spillover effects on rural farm households. Therefore, it is imperative to investigate the impact of urbanization on land use/land cover, income diversification, and the overall welfare of rural farm households in Adama City.

1.2 Concise Review of Related Literature

1.2.1. Introduction

Understanding the unknown or partially known world will use existing theories as a starting point. In light of these, this chapter aims to assess appropriate theories that would enable deeper insights into urbanization and its linkage with rural livelihoods. Therefore, this subsection appraised definitions and basic concepts, a concise theoretical foundation of urbanization, concepts and theoretical foundation of livelihood diversification, urbanization nexus rural livelihoods, empirical literature, urbanization effect on rural farm households in Ethiopia, and the analytical framework of the study.

1.2.1 Definition of basic concepts

1.2.1.1 Urbanization

There is no commonly agreed definition of urbanization and scholars define it differently. However, the commonly used definition of urbanization is the process through which society is transformed from predominantly rural in the economy, culture, and lifestyle to one that is an urban livelihood, which results in high population concentration (Dyson, 2011; Firdaus & Ahmad, 2011). Typically, the physical growth of urban areas can be explained by demographic and economic functions. While a demographic definition of urbanization is limited to factors like population size and density, the economic function refers to the

territorial concentration of productive activities distinctively, industries, and services sectors (Tegenu, 2010). It is, therefore, a growth in the proportion of the population living in urban areas and the further physical expansion of already existing urban centers that resulted in the expansion of urban land users' spatial concentration of people and the point of concentration of productive activities. Thus, urbanization is comprehensively explained as a key feature of economic development where the geographical agglomeration of people, firms, resources, and technology results in lower production costs and higher productivity (Tegenu, 2010; World Bank Group, 2018). In this study, urbanization is defined as the expansion of urban areas into rural areas as a consequence of increased land demand, so urban centers and industrial centers have expanded into periurban areas by acquiring additional land that was previously used for agriculture.

1.2.1.2 Livelihood income diversification

Livelihood income diversification is often defined as the process by which rural households construct an ever more diverse range of activities to survive and improve their standard of living (Weldegebriel & Prowse, 2013). Livelihood income diversification strategies or activities are coping and adaptive strategies, which are reactive and proactive livelihood strategies, respectively. Coping strategies also named survival strategies are short-term responses to shocks or immediate pressures, and adaptive strategies are long-term changes in behavior patterns resulting from stress and shock. Agricultural households diversify their income due to pull factors, which are opportunity-led, or push factors, which are necessity-led for survival (Asmah, 2011). A pull factor is a favorable condition that pushes households to engage in non-farm economic activities. In contrast, a push factor is a harsh condition that causes households to diversify (for survival) due to changes in climate parameters.

Therefore, livelihood income diversification refers to attempts by individuals and households to find new ways to raise incomes and reduce risk, which differ sharply by the degree of freedom of choice (to diversify or not) and the reversibility of the outcome (Gebru et al., 2018; Israr et al., 2014). The diversification strategies include; farm income from own crop production, selling and raising of animals, and cash crop production, while on-farm income includes non-farm rural wage or salary employment, trading, crafts/small industry, services, rents, food and drink processing, and remittances. Off-farm income is a temporary wage or exchange of agricultural labor on other farmers' land and also includes income earned from the sale of natural products such as charcoal, fuel wood, and wild fruits (Weldegebriel & Prowse, 2013).

1.2.1.3 Livelihood income of rural households

Household income is the sum of earnings of all household members from all sources of income during the reference period (Ayana et al., 2022; Vecchi, 2021). Diversification outcomes need to be measured using the impact it conveys on households' income earned from different sources. Farm income is the income generated from crop production, animal production, rents of farm durability, and even the by-products of crops and animals. Income sources from farm and unskilled activities include wages earned from different businesses and other related non-farm activities in the farmer's village or neighboring urban area. However, for quantitative analysis of households' poverty, the most common approach to measure rural household welfare in developing countries like Ethiopia is based on household consumption expenditure rather than income, as it can be a better indicator of lifetime welfare (Eyasu, 2020).

1.2.1.4 Rural households' perception of urbanization

Rural households' livelihood strategies are the most vital factors that affect the perception of urbanization in their hinterlands. Urbanization in surrounding rural areas and households near urban areas attempted to diversify their livelihoods as their farmland has been converted into non-farm activities. Urbanization effects vary depending on the city's size, understanding the perceived effects of urbanization on rural households near and far away from the urban center and its implication for their welfare has paramount significance for urban planners and policymakers. The study links the rural households' perception of urbanization the job creation, food security, maintenance of social relationships, conversion of farmland, income diversification, and agricultural production and productivity (Nguyen et al., 2020). Rural farm households generally perceive urban expansion as a threat to their traditional way of life, with significant psychological, social, and economic ramifications. Even in cases where there are some economic benefits, the broader impacts on their lifestyle, community, and long-term security often overshadow these gains. This complex perception requires careful consideration in urban planning and rural development policies to address the needs and concerns of these communities effectively (Basiago, 1998).

1.2.2 Concepts and theoretical foundation of the research

Urbanization impacts on farm households surrounding urban areas were examined on three distinct but interrelated concepts in the research, notably on their perception, income diversification, and the overall income of the farm households near urban areas. Hence,

important concepts and theories were entertained linking the influence of urbanization on farm households' welfare near urban areas.

1.2.2.1 Concepts and theoretical foundation of urbanization theories

Economic and social theory are among the theories which focus on how urban area is formed. Economic theories strongly argue that urban area is formed by producing surplus marketable agricultural products (Harvey, 1973). Therefore, facilitates the growth of small towns to exchange excess products and to get other services. On the other hand, social theory does not deny economic importance. However, the core element for urban formation is strong human and interpersonal interaction and social and cultural ties, which encourage people to live compactly and concentrate in space (Clark, 2003). For this study, urbanization's effects on farms surrounding urban areas are examined in a comparative empirical literature review guided by the theoretical foundation of urbanization and rural livelihood. The study, however, considers five urbanization-related theoretical perspectives: modernization, urban bias theory, dependency, rural-urban linkage, and Displacement theory, and tries to link the concepts to rural income diversification and their welfare.

Modernization proponents perceive urbanization as a natural and inevitable process (Berliner, 1977). The theory asserts that through this inevitable and irreversible process, traditional or agrarian society has become a modern industrialized nation and improved the way of life in society. He presents the modern methods of production like the use of advanced technology of industry under-developed countries will experience a strengthening in their economies, which will lead them to development. Accordingly, the theory prominently describes the positive impact of urbanization following the development of the urban sector on the livelihood of farm households as it opens a pathway through transforming traditional communities into modern society.

There are also empirical strands supporting the modernization theory of urbanization as sources of modernity and development both in urban and rural areas. Arguably, urbanization is an engine for development that transforms cities through knowledge innovation, contributes to rural poverty reduction, and improves rural living standards (Coulibaly & Li, 2020; Tian et al., 2016). In this case, urbanization is a means of transition from poverty to higher productivity. It is a means to enhance job opportunities and a better quality of life through improved education, health care, improved infrastructure, and services (Coulibaly & Li, 2020). Moreover, urbanization improves the movement of people from rural areas to

urban and access to markets and job opportunities, hence generating higher income in the form of remittance to support their livelihoods(Cali & Menon, 2009; Henderson et al., 2017). From all these perspectives, urbanization has positive implications for societal and national development and must therefore be encouraged.

On the other hand, urban bias theorists, first developed by(Lipton, 1977), do not subscribe to and highly contest the notion of urbanization as a natural process and its positive implications for societal and national development. He contends that rather than a natural process, it is a product of government policies that systematically channel the most valuable national resources to urban areas. This results in pulling rural residents to urban areas, thereby increasing the size of these metropolitan areas (Lipton, 1977). He presented his paper by comparing the data collected from developed and developing countries to conceptualize the rural-urban disparities in developing countries. The theory he developed shifts the emphasis of urbanization from an economic perspective to a political viewpoint. He pointed out both developing and developed countries' government intervention in the market, but the way the two intervened needed to be more consistent.

In developing countries, the government intervenes in the market by imposing a tax on agriculture to subsidize urban livelihoods. At the same time, the governments of the more affluent nations were doing the reverse by intervening in ways that confer subsidies on farmers (Lipton, 1977). Thus, he ascertains that while investments in urban areas and the associated rural-to-urban migration may result in short-term economic growth, this strategy needs to be revised to promote equitable and sustainable development in the long term. Since the government policies favor urban areas at the expense of rural areas, the result cumulated higher poverty incidence and inequalities in rural farm households. He proposed that this development is possible only through investment in agriculture to revise the challenges.

The dependency school pioneered by (Firebaugh, 1979) was similarly concerned with the effect of urbanization on the availability of land and other vital resources for farmers and other rural-based entities. They contend that urbanization tends to dispossess rural dwellers of their land and consequently force them to migrate to cities. The theory indicates that developed countries use developing countries as raw materials suppliers for their factories, resulting in foreign investment in large-scale agricultural production by displacing farmers in rural areas. The displaced farmers then move to urban areas to seek employment at a lower return because of limited experience. Furthermore, dependency theorists contend that rapid

urbanization, such as in sub-Saharan Africa, causes severe distortions in urban labor markets(Bradshaw, 1987).

Generally, Contrary to modernization theory, there has been considerable empirical evidence that the urbanization process is without development(Tegenu, 2010; Voigtländer et al., 2008). For instance, the urban physical growth rate in Ethiopian cities has been faster than the rise in infrastructure and service delivery(Terfa et al., 2019). As a result, the rural areas surrounding cities have institutional insecurity, disorder, under-production of economic growth, and incompatibility with modernity(Coulibaly & Li, 2020; Sargeson, 2013). Thus, non-agricultural activities fail to develop at the same rate as urbanization(Coulibaly & Li, 2020). To be sure, a decrease in the rural population and a corresponding increase in the urban population are not, on their own, sufficient to cause development. Instead, they must be complemented by increased industries and other city activities(Njoh, 2003).

1.2.2.2 Concepts and theoretical foundation of rural-urban Linkage

In contrast to the stated theories, the rural-urban linkage provides a sound theoretical foundation and shows the connection between urbanization and households' income diversification and farmer welfare. The theory gained popularity, particularly between 1980 and 1990. There was authors critics of the stated theories and their contribution to their popularity(Ravazzoli et al., 2018). They proposed that rural and urban areas are linked on a social, political, and environmental level in addition to farm households. Above all, it is important to enhance the flow of commodities, people, money, and information(Dávila, 2002; Tacoli, 2003).

Rural and urban integration has been rare before. Rural development policies and strategies often center solely on agricultural production and productivity, overlooking their effects on urban areas(Shikur, 2020). Even big organizations like the World Bank needed to design synergetic strategies and goals to address common rural and urban income, poverty, food insecurity, and environmental problems. Thus, they designed separate development documents for urban and rural areas, although the ideology was changed later. Proponents of the rural-urban approach boldly argue that an in-depth understanding of the uniqueness and similarity and designing a holistic win-win system is necessary to tackle the prevalence of poverty and low income, food insecurity, and resource degradation of near urban farm households. As a result, the virtuous circle model usually symbolizes the rural-urban linkage to show the positive linkage between them. The central notion of this model is that urban

centers positively contribute to peri-urban farmers through market access to agricultural enhancing inputs and social services like education, health, extension, and credit institutions to produce a marketable surplus and to grow the rural income. Rural people demand, in turn, industrial consumer goods and services, this initiates non-farm income-generating activities and urban income is also boosted(Lanjouw & Lanjouw, 2001). Finally, this will increase farmers' opportunities for non-farm income sources(Webster & Muller, 2002). Hence, to secure this model's full advantage, strong backward and forward sectorial linkages should be in place (Tacoli, 2003).

Much literature implies that the practical application of this model needs to be revised. Due to this, scholars and policymakers argue that rural-urban linkage has positive and negative implications on farmers' income in surrounding urban areas due to urbanization. The advocates of the positive effects of rural-urban linkage justify their concern with evidence. Farmers near urban areas easily sell perishable and non-perishable surplus agricultural produce and get agricultural-enhancing inputs with minimal transport costs(Akkoyunlu, 2015). Likewise, get appropriate and timely information on the price of agricultural outputs and inputs(Tacoli, 2003) and easily access industrial consumption goods while urban people get agricultural products at reasonable prices. Also, changes in urban areas' consumption behavior help peri-urban farmers diversify the produce demanded products(Zeleke & Trutmann, 2006).

The rural-urban linkage is also strengthened by migration. The small land size and landlessness are the pushing factors for young and adult rural people for a better life(Zewdu and Malek, 2011). Remittance generated from migrants reduces rural poverty, and in most cases, helps rural senders adopt agricultural technologies to increase production and productivity, and then increase rural households' welfare(Tiffen, 2006). Particularly, peri-urban farmers are advantaged because they are close to urban and reduce costs related to migration and their close social ties as well as the practice of circular migration to access off-farm jobs and exit poverty than the remote rural farmers(Ravallion & Chen, 2007 ; Christiaensen et al., 2003). In contrast,(Ravallion & Chen, 2007) criticize rural migrants' intensifying urban poverty because of their soft skills and inability to cope with urban life. Similarly, a revised transfer from rural to urban areas affects the livelihoods of the smallholder farmers(Frayne, 2005), and seasonal food insecurity occurs when urban people migrate to their rural relatives. However, rural-urban migration significantly helps young

females increase their income from non-farm jobs and helps widowed women engage in non-farm activities(Krüger, 1998).

Rural–urban linkage negatively impacts farmers near the urban area, which emanates from urbanization. Resources competition and drying of usual income sources of farmers near the urban area create a dispute between the urban and the farmers surrounding it(Zeleke & Trutmann, 2006) . Likewise, chemical substances released from factories and wastes from residential areas contaminate water bodies used for drinking and irrigation(Singh et al., 2022). The government is focusing on industrialization at the expense of smallholder farmers' means of survival; as a result, farming land is fragmented and adversely affects households' food security(Terer, 2019). Others also claimed that causing a change in agricultural practices due to excessive water extraction, intensive irrigation, and intensive use of chemical fertilizer and pesticides results in soil chemical and physical changes and causes displacement of farmers who cannot afford capital-intensive farming. Smallholder farmers do not have adequate land for collateral to take a loan. As a result, the harvested produce is insufficient for home consumption and to meet other industrial consumer goods and services(Tacoli, 2003). Moreover, they faced serious labor completion from non-farm activities(Dávila, 2002). In general, weak rural-urban linkage occurred due to the injudicious distribution of resources, minimal productive assets, and fast urbanization(Scoones, 1998; Tacoli, 2003).

To sum up, rural-urban linkage demands many inputs to function well and to utilize resources effectively. If the linkage is integrated and harnessed, it will positively affect smallholder farmers near urban areas. To this effect, the hypothesis is whether the virtuous circle model works in this study.

1.2.2.3 Concepts and theoretical foundation of displacement

Displacement induced by development projects is poorly understood. When farmers are displaced from their proper areas, the issues of economies, environmental, social, and other related concerns are raised(Vanclay, 2017). Economists try to address economic issues, but they do not explain the social trauma of displacement, which also calls anthropologists and sociologists do. Under this displacement theory, only the Impoverishment Risks and Reestablishment Model (IRR) model were discussed. Chambers, Rowls, Scudder-Colson, and unbalanced growth strategy need to systematically address and show the consequence of involuntarily displaced smallholder farmers.

The Impoverishment Risks and Reconstruction Model mentioned that taking measures that fetter possible risks of displacement and reducing impoverishment is the central focus of development-induced displacement (M. Cernea, 2003). This model identified eight important elements that could happen due to displacement: landlessness, joblessness, homelessness, marginalization, food insecurity, increased mobility, education loss, loss of access to common property resources, and social disintegration. The central concern of this theoretical model is that forced displacement for the sake of development projects marginalizes and impoverishes more people than those in better status. Because they are forced to leave their productive assets, income sources, and livelihood in general (Cernea, 2003). The land is the basis of people's productive system in agrarian society; if it is confiscated and not replaced by steady income-generating employment, it will lead to impoverishments and the interlinked social, political, and economic disturbances and violations. Therefore, this research hypothesized whether the IRR model works for this study.

1.2.2.4 Concepts and theoretical foundation of livelihood diversification

Urbanization forces people to shift their income sources. Farm households reorient their income sources depending on the level of farmland appropriation to sustain their living in the urban and peri-urban labor market. However, the outcome of changes in livelihood strategies might be positive or negative depending on the availability of job opportunities. As natural resource-based livelihoods gradually disappear, peri-urban farmers change their livelihood strategy to cash-based enterprises (Ravazzoli et al., 2018). This leads to the diversification of necessity and the diversification of choice (Ellis, 2000). Diversification of necessity arises from a push factor of fewer opportunities in the socioeconomic situation that forces them to leave their working area. Whereas, diversification of choice comes from pull factors that attract one to another area or activity (Thet, 2014). Therefore, income diversification to the non-farm sector could be crucial for the farm households proximate to urban areas to compensate for income loss due to urbanization, and the diversification should be beyond necessity.

Eventually, urbanization shapes peri-urban farmers to diversify income sources from farming to the non-farm sector (Binswanger-mkhize et al., 2016; Mezgebo & Shaughnessy, 2014; Tassie Wegedie, 2018). Arguably, a household decision to unqualified income sources is more likely for necessity or survival than choice. This ultimately leads to non-remunerative non-farm activities due to a lack of experience in farm households' area, skills, and asset ownership. Such entry barriers to high-return non-farm livelihood income diversification can

cumulate differential livelihood outcomes during to urban livelihood transition(Weldearegay et al., 2021). Therefore, this research hypothesized that urbanization improves the income diversification of proximate farmers.

In conclusion, urbanization is a complex and diversified process, endlessly taking place with different intensities and speeds with different effects in different countries and regions (Biłozor & Cieślak, 2021). On the other hand, a controversy shows no clear and commonly agreed domain of knowledge of urbanization's impact on farm households' income diversification and welfare. So, we can conclude from the review of existing literature that urbanization is a double-edged sword as if well managed, essential for development, and can lift societies by promoting diverse urban environments that stimulate creativity and innovation. Conversely, rapid urbanization without appropriate policy responses challenges livelihoods and threatens the security of life and property of rural farm households surrounding urban areas. Hence, from this reviewed literature the researchers try to examine whether this theory applies or not in the study area.

1.2.2.5 Consumption as a measure of welfare

The preference for using consumption as the primary measure of welfare has been extensively debated by researchers, particularly in the context of developing countries. There is a consensus that consumption, as opposed to income, offers several advantages. It has been posited that consumption more accurately mirrors the quality of life of individuals, as material well-being primarily stems from the direct use of goods and services, rather than merely from income levels (Citro et al., 1995). Similarly, authors contend that consumption is a more accurate indicator of long-term income, as it is less affected by short-term income fluctuations and tends to exhibit greater stability and less volatility than income (Deaton & Zaidi ,2002).

Furthermore, study asserts that in rural farm households, consumption levels are typically smoothed out over different seasons, resulting in greater stability and a more reliable approximation of individuals' actual living standards (Deaton ,1997). Additionally, he highlights that while collecting data on consumption may be time-consuming, the concept of consumption is generally more easily understood than that of income. Therefore, accurately measuring household income, especially for households with self-employed individuals or those working in the informal sector, presents significant challenges. As a result, household-level consumption is often considered a proxy measure of welfare, particularly in rural

settings where farming is the primary occupation and income may be a sensitive topic. In this study, both food and non-food aspects of consumption were considered as contextual frames for examining welfare.

In summary, the preference for using consumption as the most preferred measure of welfare stems from its ability to capture individuals' actual well-being, its greater stability over time, and its relative ease of measurement compared to income. These factors make it particularly relevant in rural settings where farming is predominant and income measurement may be more challenging. By considering various dimensions of consumption, this study aims to provide a comprehensive understanding of welfare in the specific research context.

1.2.3 Empirical literature

1.2.3.1 Review of related empirical literature

By the end of the twenty-first century, more than half of the global population lived in urban areas. High birth rates and in-migration from rural areas (Factura & Cimene, 2022). This growing urbanization brought both improving the livelihoods of rural farm households and progressive economic development on the one hand and negatively affects the lives of some small farmers surrounding urban areas on the other side since the outcomes do not necessarily follow a uniform process(Farrell, 2017).

As a set of the contribution of urbanization on rural farm households, findings of the research illustrate that the agricultural land conversion brought positive impacts for the income and access to assets for the farmers in the villages located at the rural-urban interface(Farah et al., 2022). The author explains that significant land use change led to livelihood transformation from farming to non-farm and mixed livelihood activities of farmers, demonstrating the change in income from different sources due to multiple income-generating strategies adopted by the farmers after a loss of their agricultural land. In the same way, study shows that urbanization tends to increase the landlessness of rural households and reduce their farm income; however, it helps rural households increase their wages and non-farm incomes. As a result, rural households' total income and consumption expenditure tend to increase with urbanization(Farah et al., 2022).

In addition, several pieces of empirical evidence illustrated that urbanization is an engine for development that transforms cities through knowledge innovation, contributes to rural poverty reduction, and improves rural living standards(Coulibaly & Li, 2020; Tian et al., 2016), and hence it is a means of transition from poverty to higher productivity, enhancing

job opportunities and a better quality of life through improved income and welfare(Bruin, 2021; Cali & Menon, 2009; Coulibaly & Li, 2020; Dorosh & Thurlow, 2014; Sharma, 2016; A. B. Youssef et al., 2016). More importantly, urbanization improves the movement of people from rural areas to urban areas, access to markets and job opportunities, and generates higher income in the form of remittance to support their livelihoods back to their home(Cali & Menon, 2009; Henderson et al., 2017). Regarding the correlation of urbanization to rural consumption expenditure, a contemporary study also revealed that urbanization significantly promotes the rural residents' consumption upgrading, yet regional heterogeneity(Le et al., 2023). All these facts underscore that urbanization has positive implications and must, therefore, be encouraged. It also confirmed that most urbanization shifts employment opportunities from rural agriculture to more remunerative urban industrial and non-farm employment opportunities that, in turn, improve the welfare of rural households(Diao et al., 2019; Henderson et al., 2017).

Recent empirical evidence demonstrated that urbanization not only occupies a large amount of farmland spatially but also economically squeezes agricultural production, resulting in farmland marginalization and causing severe threats to food security (Liu et al., 2022). The author explained that one of the direct adverse effects of urbanization on rural households is on agricultural landholding. A large amount of prime agricultural land surrounding urban areas is susceptible to rapid conversion to urban areas, which leads farmers to lose livelihood assets (Muluwork, 2014; Wegedie, 2018). As a result, many local farmers have lost their land rights (ADAM, 2014). The degree of impact that these conversions have on agricultural production and food security is disproportionately large compared to the actual area of land involved (Naab et al., 2013; Shishay, 2011).

Urbanization can lead to more landless or near landless households (Ravallion and Walle ,2008; Satterthwaite *et al.* ,2010). Study shows that clearly stated that urbanization has impacted the livelihoods and quality of life of rural communities that depend on the agricultural sector as their main economic activity (Coulibaly & Li ,2020). The study finding from Philippines revealed that urbanization converts agricultural land into residential or commercial purposes that, in turn, affects farmers' income sources, displaces their livelihoods, decreases their economic status, and brings overall negative motivation for agriculture (Factura & Cimene, 2022).

Other empirical evidence suggests that urbanization through increased demand for agricultural products and a loss of agricultural land put overwhelming pressure on rural people to produce food for the growing number of urban people and, hence, attributed to food problems (Jedwab & Vollrath, 2015). The empirical evidence revealed that agricultural-based livelihoods are closely associated with land and are dependent on the physical environment; however, urbanization adversely alters the use of farmlands in the areas at urban fringes and is a threat to food and income security for smallholders (Farah et al., 2022). In other words, the land use change results in considerable livelihood changes because farmers have shifted to new livelihood activities and changed their primary means of living. Agrarian communities at the urban fringes were primarily affected by urbanization, which led to significant land use changes and livelihood transformations for farmers (Toku *et al.*, 2021). Another study shows that peri-urban farmers' are in continuous eviction from their indigenous land for land re-development, which negatively affects the livelihood of farming communities (Mohammed et al., 2020). According to studies conducted in Pakistan, agricultural activities are continuously declining due to current land use changes at the rural-urban interface. Consequently, farmers' livelihoods in highly urbanized cities of different regions (Farah et al., 2022).

As a result of urbanization in Ethiopia, rural farm households are severely affected by reduced agriculture areas, which has dramatically affected peri-urban farmers who are left with little or no land to cultivate and have become increasingly vulnerable (Ayele & Tarekegn, 2020). They pointed out that the process left farm households near urban areas exposed to adverse shocks of urbanization because significant urbanization-related agricultural land loss has a positive correlation with grain production decrease in which agricultural production is the central of the economy. The land cultivated by Ethiopian smallholder farmers accounts for 95% of the total area under agricultural use, and these farmers are responsible for more than 90% of the agricultural output (Gebresselassie & Bekele, 2012).

Generally, urbanization occupies a large amount of farmland spatially and economically squeezes agricultural production, resulting in farmland marginalization and severe threats to food security. However, how rapid urbanization drives farmland marginalization in surrounding areas and the factors that might play a dominant role in this process still need to be discovered. In addition, the overall effect of urbanization on rural household welfare in developing countries is not well known. Thus, it is imperative to understand better the spatial

and temporal dynamics of urban growth and its impact on small-scale farmer life in surrounding areas.

1.2.3.2 Rural-urban partnership

Territorial relationships have changed profoundly in recent decades (Morgan, 2018; Wiessner et al., 2002). Improvements in communications technology, increasing movements of people and goods, and changes in land use are only some factors reshaping relationships between urban and rural areas. Drawing a clear line between urban and rural territory is becoming increasingly difficult. Cities no longer correspond to the simple notion of clusters of compact settlements with high densities of population and employment that are clearly distinguished from their rural surroundings. Similarly, agriculture is no longer the sole or principal economic activity of rural areas.

Urban and rural areas are increasingly integrated, and this integration covers a complex set of linkages via; population and labor market flows, public services provision, transport network, and environment services(OECD, 2013). Improving these market and non-market connections enhances the development of both urban and rural populations. To this effect, recently, rural-urban partnership has been conceptualized as the mechanism of co-operations that manages these linkages to reach common goals and hence urban-rural relationship (OECD, 2013). Similar sources pointed out that depending on the purposes of the partnership, the actors involved will vary from the public sector or private sector only to a mix of public, private, and other actors.

The concept of rural-urban partnership has distinct features, involving a collaboration with; an awareness of the interdependency of rural and urban areas in a given spaces (functional regions), a membership mix that includes the relevant rural and urban representatives, a framework for action or objectives that represents mutual interests (urban and rural), the initiatives aimed at yielding collective benefits to urban and rural partner and finally an organizational form that is fit for purpose to help realize the partnerships' objectives (Balta & Atik, 2022).

Particularly, a rural-urban partnership has the distinctive characteristic of involving both urban and rural areas directly in the process, which sets it apart from other types of territorial cooperation. The process must include urban and rural stakeholders, such as municipalities and private agents (firms, civil society). Rural-urban partnerships have a common set of objectives that must be managed jointly, integrating urban and rural dimensions on a physical

and/or functional level. The rural-urban partnerships reflect the existence of complementarities between urban and rural areas, which in turn allow territories to coordinate resources and efforts to achieve common objectives that cannot be achieved alone (or at least not as effectively). Generally, urban-rural partnership, like any form of cooperation, is based on shared (Balta & Atik, 2022).

To sum up, it is increasingly difficult to distinguish between rural and urban areas. In today's economy, demographics, and environmental context, people live, work, and consume both in urban and rural areas. Governing these interactions, which cross administrative boundaries and policy domains, is challenging for governments. Interactions between rural and urban areas can improve service provision, increase growth opportunities, and improve quality of life. Therefore, rural-urban partnerships are important tools for better coordinating rural-urban interactions. They can be used to better design and implement policy at the appropriate scale, providing a flexible and inclusive approach that bridges different but interdependent interests. However, rural-urban partnerships face some specific challenges that may hamper their formation, and even policy, when designed without acknowledging the actual integration between urban and rural areas, can be an obstacle for the different actors to work together. Better outcomes can be achieved when policy is tailored at the appropriate scale, reflecting where people live and work and where the relevant socio-economic and environmental processes occur. Rural-urban partnerships are a key solution to achieving better conditions and quality of life both in rural and urban areas.

1.2.3.3 Urbanization nexus rural livelihoods

It is incontestable that as the city becomes more urbanized, its land coverage also expands, attracting investors to require land spaces to establish their businesses. This urbanization trend radiates from the city center going towards an outward direction wherever it is strategically and economically feasible. Along the way, those areas reached within the scope of the expansion are forcibly converted into a new purpose, which could be commercial, industrial, or residential. Land use change in urban peripheries due to urban expansion is considered proof of development (Hegazy & Kaloop, 2015); however, it is a widely expressed concern that expanding cities will come with a substantial loss of farmlands (Francis et al., 2012; Haregeweyn et al., 2012; Zhen et al., 2014).

Scholars explained that the rapid urbanization in Africa is happening without the required structural transformation (Jedwab & Vollrath, 2015; Gollin et al., 2016). The cause is linked

to either unplanned urbanization or poorly managed urban development processes. The result leads to expanding consumption cities financed by surplus from natural resource extraction and agriculture (Jedwab, 2012). If not accompanied by economic transformation, urbanization has frequently led to persistent urban poverty, low real wages in rural areas, and ineffective waste management (Ravallion et al., 2007; Dorosh & Thurlow, 2014). As a result, it has become more difficult to boost productivity and promote greater economic integration between rural and urban areas.

Among the negative effects of urbanization on rural households is agricultural landholding. Empirical evidence suggests that increased urban demand for agricultural products, coupled with the loss of agricultural land, places significant pressure on rural communities to sustain the food needs of a growing urban population, potentially leading to food security issues. (Jedwab & Vollrath, 2015). Unplanned urbanization negatively affects rural livelihoods (UN-HABITAT, 2010; Mandore et al., 2010; Gossop, 2011) as a result of changing land use and cropping patterns, decreasing arable land, increasing unemployment in the farming sector, causing the high price of food commodities, poor quality, and scarcity of water, rural–urban migration and increasing competition between agricultural and residential uses of natural resources (Bah et al., 2003). The process can lead to more landless or near Landless households and impacts the livelihoods and quality of life of rural communities that depend on the agricultural sector as their main economic activity (Ravallion & Walle, 2008; Satterthwaite *et al.*, 2010; Coulibaly & Li, 2020). The process of urbanization and the resultant pressures are anticipated to impact rural communities, particularly through reliance on natural resources and shifts in socio-demographic structures (Bryant, 2004). Urbanization causes the spread of built-up areas (McGee, 2011; Simon et al., 2004), and it results in increasing poverty and environmental degradation in rural areas.

On the other hand, well-managed urbanization positively affects the income and overall livelihoods of rural households, depending on their size and proximity. Rural areas benefit from proximity to cities is essential for the functioning of the rural economy. Cities serve as entry points to more connected and diversified economies for rural areas. They provide markets where agricultural producers can sell their products, and rural households can access services and purchase necessities (OECD/UN ECA/AfDB, 2022). Today, cities and towns offer the greatest commercial opportunities for a region's agricultural producers and act as nodes for food trade and markets. They are transport hubs that provide access to transport networks for goods and people.

Similarly, the rapid rise of urbanization enables the diversification of rural livelihoods' income activities by bringing new economic opportunities to rural areas (Ørtenblad et al., 2019). Urban areas, particularly small and secondary town development, are increasingly becoming one major source of employment as they offer larger and more efficient labor markets (WB, 2014). The rise in off-farm income (through employment at nearby urban centers or businesses) also increases migration and remittances, improving agricultural productivity. Therefore, the share of rural household income from non-farm sources is growing, mainly due to labor flows, and was sometimes up to 40-50 percent of the average rural household income in Sub-Saharan Africa in the 2000s, with a significant contribution from urban migration (OECD/UN ECA/AfDB, 2022). Urbanization is positively associated with income, and the world is becoming more urbanized. Scholars estimated that the contribution of secondary towns' spillovers to rural poverty reduction was significant during the 1990s, between 13 and 25 percent (Cali and Menon ,2013). Another source also depicted that the overall effect of urbanization is improving household incomes, poverty reduction, and food security (OECD/UN ECA/AfDB, 2022).

To sum up, the relationship between urbanization and rural farm households varies based on development status, geography, socio-economics, and culture and also depends on the size of cities/towns. Even the effect is not similar within a given country or region. Therefore, no concluded results were there regarding urban expansion and its effects on rural farm households. However, most of the recent empirical literature underscored that urbanization, if not well managed, negatively affects the livelihoods of rural farm households in developing countries, particularly sub-Saharan Africa. The justifiable reason explains that there is rapid urbanization in sub-Saharan Africa without economic development taking place in the urban area that, makes different the urbanization of developed countries.

1.2.3.4 Urbanization in Ethiopia

“Most African urban centers trace their origins to colonial times. In colonial settlements, two sides of cities were built: one for Europeans and one for Africans” (Bahiru 2005: 120; Myers 2011:1). This does not mean that Africa does not have its indigenous urban centers. One can claim that the case in Ethiopia is different. Studies shows that Ethiopia is less urbanized although urbanization has a long history in the country (Solomon ,1997; Habtemariam ,1994). Though modern urbanization began in the nineteenth century (Pankhurst, 1985), Ethiopia's level of urbanization in 2019 was only 21.2%. As of 2019, Ethiopia was the second

most populous country in Africa, with 112 million residents with a growth rate of 2.4% (UN, 2019).

However, recently, the restriction of rural land redistribution and migration to mega-projects of irrigation and sugar processing plants dramatically increased urbanization. Reports showed that the proportion of urban residents who migrated from rural to urban increased from 25% in 1996 to 33% in 2013 (MoUDC, 2014) and is expected to reach 47% by 2037 (WB, 2015). The urban areas are growing in Ethiopia; rural people are sometimes displaced, migrate, and become part of peri-urban and urban areas (Hailu, 2016). He also added that the Ethiopian development policies are overwhelmingly a rural bias, which is rhetorically reflected in the development policies but practically urban bias. The author evidenced that rural is the more impoverished than their urban counterpart due to the historical primacy accorded to urban at the expense of rural areas. He concludes that the Ethiopian development policy shows historical bias and current trends that show the dependency of urban on rural for all aspects, particularly the dependency in the economy, political, social, and environmental arenas. Ethiopia's economic dependency on the urban centers is manifested in the flow of goods, labor, and services like heavy, bulky, low-value building materials and other fresh agricultural food (Douglas, 1983 & Hailu, 2016).

Consequently, though the country is at its infant stage, research on urbanization in Ethiopia argues that rather than benefiting, instead, it has resulted in negative consequences on farm households' livelihoods found in urban hinterlands. Urban expansion marginalized the livelihood of the displaced farm community near an urban area (Paulos ,2017). In addition, the city's built-up area expansion is at the expense of the peri-urban environment and leaving the livelihoods of farmers near urban areas at risk (Leulseged et al., 2011). Another study revealed that the transforming power of urbanization and its contemporary challenges and uncertainties among a farming community in town confirmed a continuous change in land ownership resulted in a mismatch of the culture of the farming community with the urban development process in which the government is skeptical (Teshome, 2014). Empirical study showed an extensive agricultural land conversion that has seriously affected the livelihoods of smallholder farmers by reducing farmland size and ownership (Dirriba ,2016). Research has shown that urban expansion has led to the significant loss of agricultural land, primarily through the displacement of farming households into urban areas (Dejene, 2016). This indicates that urbanization in Ethiopia is marginalizing the farm communities, causes

impoverishment risks, makes them vulnerable to environmental pollution, diminishes the indigenous culture of farm households, and causes the conversion of farmland into a built-up area, loss of good tenure assets which results in family breakups and massive premature collapse of their livelihoods near urban areas.

1.2.3.5 Urbanization and peri-urban land tenure administration in Ethiopia

Land ownership in Ethiopia is vested in the state and the public. It is, therefore, impossible to sell or exchange land. Farmers, pastoralists, and semi-pastoralists who engage in agriculture or wish to do so only have land-use rights (Zewdu and Malek, 2011). A large portion of the country's economy is devoted to smallholder subsistence agriculture, on which it depends for its food supply, foreign exchange, labor, and raw materials. However, their land tenure is held a limited real right protected through a land certification system, and cannot be bought or sold but is transferred to eligible heirs as determined by regional land proclamations. In cases when land is expropriated for investment, the land policy grants compensation to the displaced households or individuals (FDRE, 2005, as cited in Mezgebo, 2020). On the other side, Urban land operates on a leasehold system, which can be bought and sold (Alamirew et al., 2015). While land holding rights in peri-urban areas are governed by the rural landholding system with intense pressure to be changed to the urban leasehold system due to the growing demand for land for urban purposes (Ayele & Tarekegn, 2020). Extensive and continuous urban population growth requires large tracts of land from adjacent peri-urban areas for residential and other urban purposes (Adam, 2014). A separate compensation package for farmland and housing has been adopted, i.e., regulation No. 135/2007 (FDRE, 2007). As a result of this proclamation, all regional governments, have the power to enact their regional rural land use laws and establish regional state council institutions to implement the land use proclamation.

Based on this stipulation, the Oromia regional state has enacted its rural land administration and use law named Oromia rural land administration and use proclamation No.130/2007. According to the proclamation, the compensation for farmland is equivalent to ten years' average farm income, whereas compensation for houses consists of local market price and cost of dislocation. Nevertheless, the compensation package overlooks inflation and other property augmentations, adversely affecting farm households dislocated from their lands (Mezgebo, 2020).

The urban land policy taken by the Government of Ethiopia is the urban land lease-holding system. This form of land tenure enables the government to transfer land use rights and benefits from the state to private individuals for investment. In urban areas of Ethiopia, use rights can be transferred to third parties as long as the use right owner fulfills its responsibilities as per the lease contract. In rural Ethiopia, it is only possible to transfer use rights on a contract basis for a limited period except for the family members (Haile, 2022). Under the national law on leaseholding of urban land, the Oromia region has enacted its land leasehold regulation No.1/1995 based on the national urban land lease law (Mailimo, 2016) following the national urban land lease law. Under the Oromia regulation, the land was given out through auction and allotment and avoided inheritance and succession, which had been part of the practice in the region. Despite the urban and rural areas of the region having defined administrative boundaries, there is a continuous expansion of urban territories, formally or informally. Formally, urban governments design expansion plans, then their territory through legislation/regulation. The local council approves the plan, followed by urban expansion by the conversion of farmland of rural people to different built-up areas. As a result, continuous urbanization expropriates the farmland of rural households near the urban area for different investments and public uses.

1.3 Analytical framework

Figure 1 shows how urbanization affects household welfare and income diversification among peri-urban farmers, the analytical framework of the study. The main drivers of this rapid urbanization in different parts of the country, including the study area, are natural growth, rural-to-urban migration, and even the reclassification of rural settlements (Biłozor & Cieślak, 2021).

Before 2018, natural growth was the highest contributor (40%) to the growth of the urban population, followed by rural-urban migration (33%) and the reclassification of rural villages to urban centers (24%) (WB, 2015). Rural-to-urban migration, however, is expected to outpace the natural growth because of limited access to farmland for the increasing youth population, generating landless farm households, which in turn accelerates rural-to-urban migration. The migration to mega-project areas like irrigation, sugar processing plants, and other development expansion areas also contributes to the creation of new urban centers, which increases the proportion of urban residents.

Urban areas also become places where public and private services of higher quality are available and where basic services are often more accessible than in rural areas. Though not at the expected level, people from rural areas are drawn to urban areas because of varied education and employment opportunities, particularly in the past three decades of industry and services sectors. Rural people are also leaving the rural areas due to the lack of rural development that encourages traditional and modern small businesses to improve (Grübler & Fisk, 2013).

As areas become more urbanized, their land coverage also expands. More investors and other business activities are attracted and start coming in, requiring land to establish their businesses. Other infrastructure expansion normally follows while other places start settling and migration occurs more. As a result, urban coverage radiates from the urban center going towards an outward direction wherever it is strategically and economically feasible. Through the process, those areas reached within the scope of the urban expansion are forcibly converted into new purposes, either commercial, industrial, residential, or any other infrastructure development.

In most cases, this process takes place by converting agricultural farmland by affecting farming areas with several small farmers where land is their only source of living. For most of the farmlands near urban areas affected by the urban expansion, farming, and aligned activities are the only kind of livelihood that they know and well experienced, which they have inherited from their ancestors, which is already their way of life. Firmly speaking, the farming activities for smallholder farmers are not just about farming but also about where they grow up and call home (Farah et al., 2021), and they are also where new food production comes into the urban area.

The implication of urbanization on rural farm households near urban areas is divergence. While some see urbanization as strongly benefiting rural areas through increased demand for agricultural goods and services, other highlights negative effects through the loss of livelihoods emanating from displacements and the conversion of agricultural land or alters land use patterns from agricultural to residential or commercial use. Suppose they are involuntarily forced to vacate their residential places due to urbanization. In that case, it leads to more landless or near landless households, which impacts their livelihoods and quality of life since they depend on the agricultural sector as their main economic activity.

As an urban expansion to rural areas, the trend creates competition for resources (fertile agricultural land) for different commercial and urban infrastructure development. As a result, the low-income farmers near urban areas with little access or credit have the hardest time adjusting. They are often forced to diversify their livelihoods to abandon farming altogether, even if they have long-term experiences and are more interested in farming (Brown, 2013). As a result, the income sources of rural farming households near urban areas diversified into non-farm or varied activities via; farming, skilled, farming, and unskilled farming activities, or farming and income transfer payment. These shifts from relatively rewarding agricultural employment to less-paying (unskilled) non-farm employment may have social and economic implications for farm households near urban area.

The effects of urbanization are limited to diversifying farm households' income sources near urban areas and hold great implications for societal integration and cohesion. It results in a demographic transition that is the transition of rural people to an urban area and is the transition from a predominately agricultural population living mostly in relatively small and dispersed rural settlements towards a predominately urban-based population engaged mostly in urban sectors' livelihood activities (McGranahan, 2014). The result leads to new social structuring or social change, social interactions, and relations that imply their livelihoods. Such a new relationship leads the farm households to have a different perception of urbanization that may be positive or negative. The rural farm households thus perceive differently on urbanization, particularly whether or not it increases income diversification, whether the increase in agricultural production/productivity, job creation, ensuring food security, its risk on agricultural land, existing policy, and above all, maintenance of social cohesion, which remains little studied.

Following income diversification from farming to other non-farm activities, a proxy measure of the welfare of household's annual food and non-food consumption impact outcome to check the annual consumption expenditure changes of rural households near urban areas. The decision to diversify to unqualified income sources of farm households near urban areas is more likely for necessity or survival than choice. Accordingly, access to rewarding non-farm activities is restricted due to experiences in farm households' area, skills, and asset ownership, which resulted in low-return activities or unskilled employment. Such entry barriers to high-return non-farm livelihood income diversification can cumulate differential livelihood outcomes during to urban livelihood transition.

Given this complexity, thorough analyses of the causal relationships between urbanization and rural farm households' welfare proximity to the urban area are warranted. In addition, the assessment suggests that the impact of urbanization on the consumption of agricultural products is not homogenous and can vary based on proximity to urban centers and available infrastructure (Henderson et al., 2017).

In summary, the analytical framework captured to investigate the past more than three decades the extent of urban dynamism measured using LULC changes and how the farmers in the surrounding urban area perceived urban expansion and transformation of agricultural land to urban development. Based on the magnitude of agricultural land use changes at urban fringes, understanding how farmers construct their livelihoods and impact on their livelihood specifically, income and consumption expenditure using a comparative picture of the farm households near urban and far away from urban center.

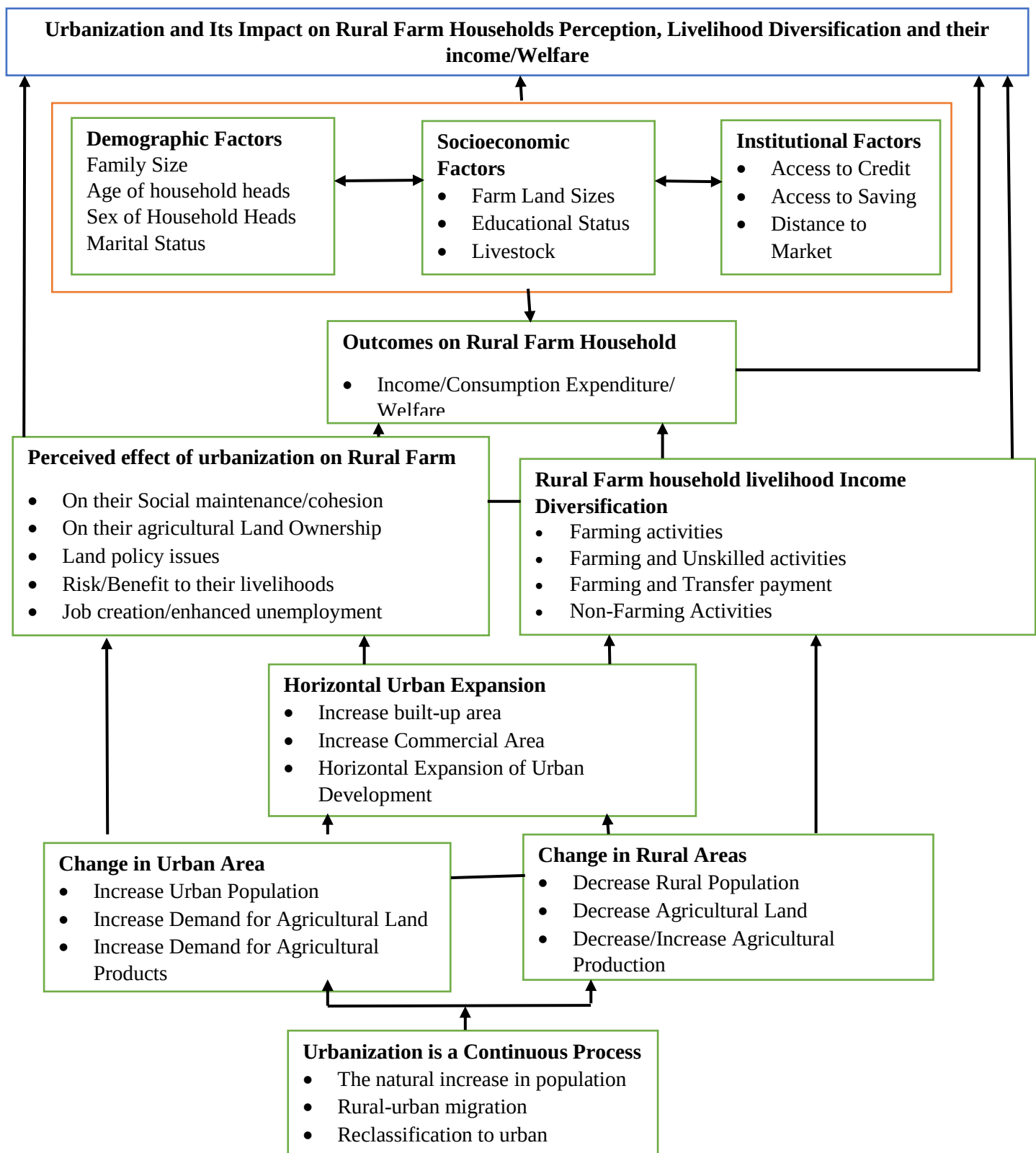


Figure 1: Analytical framewrok of the study

Sources: From literature and author understanding (2022)

1.4 Statement of the research problem

In Africa, horizontal urban expansion has grown rapidly over the years (Montgomery, 2008). As a result, arable land used for crop production shrinks and converts to buildups, and displaces smallholder peri-urban farmers on the outskirts. This creates a burden on rural households who lack sufficient productive assets that enable them to engage in other non-farm activities and acquire additional skills other than farming (Mezgebo, 2014). Due to the poor performance of the industrial sector in most sub-Saharan Africa (SSA) is not exceptional in Ethiopia, extra labor coming from rural areas is not utilized (ILO, 2009; Oqubay, 2019; Paper, 2020). Therefore, urbanization is becoming one of the challenges facing African economies, particularly smallholder farmers who produce most of the food. Rapid urban expansion reduces agricultural land, displaces farmers from farming land, and increases out-migration which emaciates the livelihood of peri-urban smallholder farmers (Williams et al., 2021).

Ethiopia is characterized by high population density with fast urbanization (MUDHCo, 2016). It has a weak manufacturing sector that contributes only 6.9% to the GDP (MPD, 2019), with a marginal role in job creation and a limited effect on stimulating domestic linkages (Oqubay, 2019). The sector is dominated by small firms and unable to utilize additional labor from the farming community. Though the current regional planning attention is creating mutual benefits for rural and urban areas, practically it has defects.

Oromia regional state is among the victims of the ongoing urbanization in Ethiopia, where the majority of the factories and processing plants are found as a result, residential areas are unprecedentedly increasing due to its proximity to Addis Ababa City. Study revealed that from 1992-2019 urbanization consumed 38.45% of the natural land cover (Terfa et al., 2020). They also added that all towns under the study experienced accelerated growth in the built-up area, scattered urban spatial growth along the outskirts, and irregular patterns of built-up density. Moreover, From 2004 to 2013, more than 840 hectares of prime agricultural lands in Dukem and Gelan of Oromia were converted to industrial uses (Dadi, 2016).

The study was conducted in Adama which is, one of the fastest-growing cities in the Oromia regional state. The population of the city is predicted to triple from 253,000 to over 954,000 inhabitants and grow in the area more than fivefold by 2040 (Easton-Calabria et al., 2020).

There is no commonly agreed empirical evidence that addressed urbanization and its impacts on rural farm households near the urban area by linking the effects with the conversion of farmland to other development activities, effects on income diversification, and changes in income and consumption expenditure. There are studies on the impact of urbanization on rural livelihoods, income diversification, and overall effects on income or consumption expenditure in different areas in Ethiopia (Gebregziabher et al., 2014; Mezgebo, 2014). However, no existing study result indicates the combined effects of land use change from agriculture to urban development, its pressure on the livelihood strategies, and overall income and consumption expenditure of farm households in the study area. Similarly, the study explained that urbanization enhances social interaction among urban and rural people, bridging cultural and knowledge gaps and enhancing social cohesion. However, more empirical evidence is needed in detailed study results regarding the perceived effects of rural farm households on rapid urban expansion. In general, literature evidenced that there are no uniform effects of urbanization on rural livelihoods across countries and even within a community (Sakketa, 2022) that require detailed investigation.

Methodologically, most urbanization impact studies compared the displaced households' livelihoods and income changes with the non-displaced found in the same area by neglecting its impact on households found at different distances from urban centers and engaged in farming activities. Studies shows that

A substantial portion of rural households now reside in close proximity to urban centers. Studies shows that 50% of rural households are situated within 14 kilometers of a city, 90% live within 47 kilometers and less than 1.5% of the rural population is located more than 100 kilometers from the nearest city(OECD/UN ECA/AfDB, 2022). This trend highlights the proximity of rural populations to urban areas. Therefore, urbanization impact on rural people's from proximity to cities become clear if outcomes are measured against distances to the closest city (OECD/UN ECA/AfDB, 2022). Hence, the study envisioned portraying a comparative picture of the perceived effects of urbanization by farm households, its effects on income diversification, and its impact on income and consumption expenditure changes in two contrasting categories of households from the urban center of Adama City. The method is essential to observe whether there is any difference in the rate of land use land cover changes and impacts on livelihood change depending upon the distance between the two constructed groups of households comparing households near the urban area to the households found far away from the urban center. Understanding the trends of agricultural

land conversion in the study area and how people construct their livelihoods in the milieu of agricultural land use changes at urban fringes is crucial for formulating strategies for the well-being of the farming households in the study area and overall in the region.

1.5 Research question of the study

Under this enlightened assumption, the present study is designed to investigate the most profound question linked to urbanization and its impact on rural farm households near the urban area of Adama City;

1. What is the dynamism of urbanization and its effects on land use/land cover change in Adama City?
2. What did population trends look like with urbanization in Adama City in the past 30-plus years?
3. How do the rural farm households in Adama rural Woreda perceive urbanization's effects on their livelihoods?
4. What are the determinat socioeconomic factors affecting percepton differences among rural farm households based on their distances from urban center?
5. Which alternative livelihood strategies are adopted by farming households in rural Adama Woreda, Ethiopia?
6. What are the livelihood outcomes on income/consumption expenditure of farming households near urban areas resulting from transformed livelihood strategies?

1.6 Objectives of the study

The general objective of this study is to investigate urbanization and its effect on rural farm households' income diversification, and welfare in the peripheral area of Adama City. Whereas specific objectives are to;

- ✓ Investigate the land use /land cover dynamics of Adama City with the changing population.
- ✓ Examine rural households' perception of urbanization and its implication on their livelihood in the Adama rural Woreda
- ✓ Analyze the effect of urbanization on income diversification of farming households in Adama Woreda, Ethiopia
- ✓ Explore the impact of urbanization on rural farm household welfare in the Adama rural Woreda

1.7 Significance of the study

The study holds significant importance at regional, national, and global levels due to several key factors. Firstly, while numerous studies have focused on examining the impact of urbanization on rural farm households using a single theory, this study takes a significant step forward by employing a combination of theories. By integrating multiple theoretical perspectives, the study enhances researchers and policy makers understanding of the complex relationship between urbanization and rural livelihoods. This approach contributes to the advancement of the discipline and paves the way for future research employing more sophisticated econometric techniques.

Secondly, the study employs a comprehensive methodology to investigate the impact of urbanization on rural livelihoods, specifically comparing the effects of proximity to an urban center versus more distant rural areas. In doing so, distance is considered a critical indicator, a rarely practiced methodological approach in measuring the influence of urbanization on rural farm households near urban areas. By employing this innovative technique, the study provides valuable insights into the specific dynamics and challenges faced by rural communities close to urban centers.

Furthermore, the impacts of urbanization extend beyond purely economic factors and encompass environmental, social, and political dimensions. This study recognizes the wide-ranging implications of urbanization and seeks to assess its effects on various aspects such as farmers' perceptions, income diversification, and overall welfare in peripheral urban areas. By shedding light on these dimensions, the study contributes to the existing knowledge base in the field, particularly in the study area where such investigations are scarce. The findings of this study can be utilized by the Ministry of Urban Planning and the Ministry of Agriculture to inform the formulation of effective urban expansion strategies and promote the efficient utilization of peri-urban agricultural land.

Lastly, given the availability of theoretical and empirical literature in this particular area of inquiry, this study serves as an important entry point for future research endeavors. The study generates new insights and provides a foundation for further studies, as well as additional reference materials, enabling researchers and policymakers to expand their understanding of the complicated interplay between urbanization and rural farm households.

In summary, this study holds significant significance by advancing the existing literature through the integration of multiple theories, employing an innovative methodological

approach, examining the multifaceted impacts of urbanization, and serving as a catalyst for future research. Its findings have practical implications for urban planning and agricultural policies, contributing to the sustainable development and well-being of rural communities in peri-urban areas.

1.8 Scope of the study

This study presents a comprehensive analysis of the impacts of horizontal urban expansion on the livelihoods of smallholder farmers in the peripheral areas of Adama City, located in the Oromia Region of Ethiopia. Employing a cross-sectional research design, the study focuses on the geographical area encompassing Adama City and its adjacent rural Woreda. The primary objective is to investigate how urban expansion influences income diversification and the welfare of rural farm households, particularly contrasting those situated near the urban center with those further afield.

Theoretically, the study integrates various frameworks to elucidate the socio-economic impacts of urbanization on rural communities. Drawing on modernization theory, urban bias theory, dependency theory, rural-urban linkage, and theories of development-induced displacement, the research aligns these perspectives with livelihood frameworks to provide a multidimensional understanding of urbanization effects. Spatially, the investigation centers on the transition zones around Adama City. These areas are crucial as they represent the interface where urban and rural characteristics blend and mutually influence one another, reflecting the complex dynamics of urban encroachment into rural territories. From a temporal perspective, the study spans a significant period, examining changes from 1986 to 2022. This includes analyzing trends in land use and land cover (LULC) changes and population dynamics within this timeframe, providing a historical context to current observations.

Methodologically, the study utilizes a quantitative approach with a statistically determined sample size and employs a simple random sampling technique. It explores various factors such as changes in land use, perceptions of urbanization, income diversification, and shifts in welfare among smallholder farms. Notably, this research contrasts the economic and welfare outcomes of households proximate to and distant from urban centers, thereby highlighting the differential impacts of urban expansion.

While the study focuses on the urban periphery of Adama City, its findings offer insights that can be generalized to similar urban contexts within the Oromia regional state. However, it is

important to note that the study does not delve into separate comparisons of rural and urban land policies, the direct environmental impacts of urbanization, or the specific experiences of displaced non-farming households.

In summary, this study uniquely contributes to the existing body of research by focusing on under-explored geographical areas and offering new insights into the effects of urbanization on rural livelihoods near urban centers. Its findings are pivotal for understanding urbanization dynamics and underscore the need for further research into related areas such as land policy, environmental consequences, and the experiences of displaced households.

1.9 Limitations of the study

This study needs to address the following issues. Urbanization is a pressing issue across the Oromia region because the region is the top victim of such urban horizontal expansion compared to other regions; however, the study was limited to Adama city and the surrounding rural kebeles. The reason is the financial constraints for the researchers to study at the regional and national levels. Secondly, the lack of baseline data forces the researcher to use cross-sectional data. However, if data were not a constraint, the study could reflect the picture of households' income diversification and welfare before and after taking baseline data. Lastly, the data were mainly derived from quantitative data because the study's objective was to make a clear comparison between the nearby urban center and far away from the urban center, taking the distance between the two groups as a measurement indicator. However, the limitations mentioned above did not affect the quality of this study.

1.10 Research methodology

1.10.1 Physical description of the study area

Adama is part of the East Shewa Zone of the Oromia Regional State, Ethiopian. which is 100 kilometers southeast of Addis Ababa, at latitude of 8° 33' N and 39° 16' E longitude. The city is located southeast of Addis Ababa along the main highway leading to Djibouti. It is found in the Ethiopian Great Rift Valley, on flat terrain characteristics and surrounded by mountains and ridged topography.

Adama has a total area of 871.18 km². The area is situated within the Great Ethiopian Rift Valley and has an altitude range from 1415 to 2505 meters above sea level. The Adama meteorological station's long-term rainfall data from 1989 to 2016 indicates an average yearly rainfall of 844.20 mm and a maximum monthly average rainfall of 259.8 mm in July. June, July, August, and September get the most rainfall similar to the majority of other parts of the

country. While January, October, November, and December are the dry months. The warmest month on average is May, while the coldest month is July. The driest month overall is December (Belete, 2017).

The livelihood of the people mainly depends on subsistence agriculture, and petty trading, daily labor, and other livelihood activities are secondary sources of income for the woreda. The locals' crops are Teff, wheat, barley, maize, and sorghum. The harvesting season is between October and December when the rain is deficient. According to data from the Ethiopian Statistical Service (ESS) in July 2022, the total population of Adama Woreda was 234,986, of which male accounts for 118,403 and 116,583 women counterpart. Currently, woreda has 37 rural kebeles.

The growth of regional cities in Ethiopia has been faster than that of Addis Ababa, the capital city (UN-HABITAT, 2017). As a result, Adama is the second most populous and fastest-growing city of the Oromia Regional State. According to data gathered from Ethiopian CSA, the urban expansion rate has reached 4.6%, whereas the urban population growth rate of the city is estimated at 5.4% (Edition & The, 2020) which is greater than the national and Oromia (3.8%), despite the urban share of Ethiopia's population is below the SSA average of 37 percent.

According to Ethiopia Statistical Services July 2021, the total population of Adama City was 435,222, of which males account for 212,991 and 222,231 women. Adama City is the center of the regional government's political, business, and economic activities and the largest urban center in the Oromia region. It is the principal city where business activities are underway in the country, next to Addis Ababa. Because of this, the scale and diversity of the infrastructure and economic activities are relatively larger and broader compared to other towns in the region.

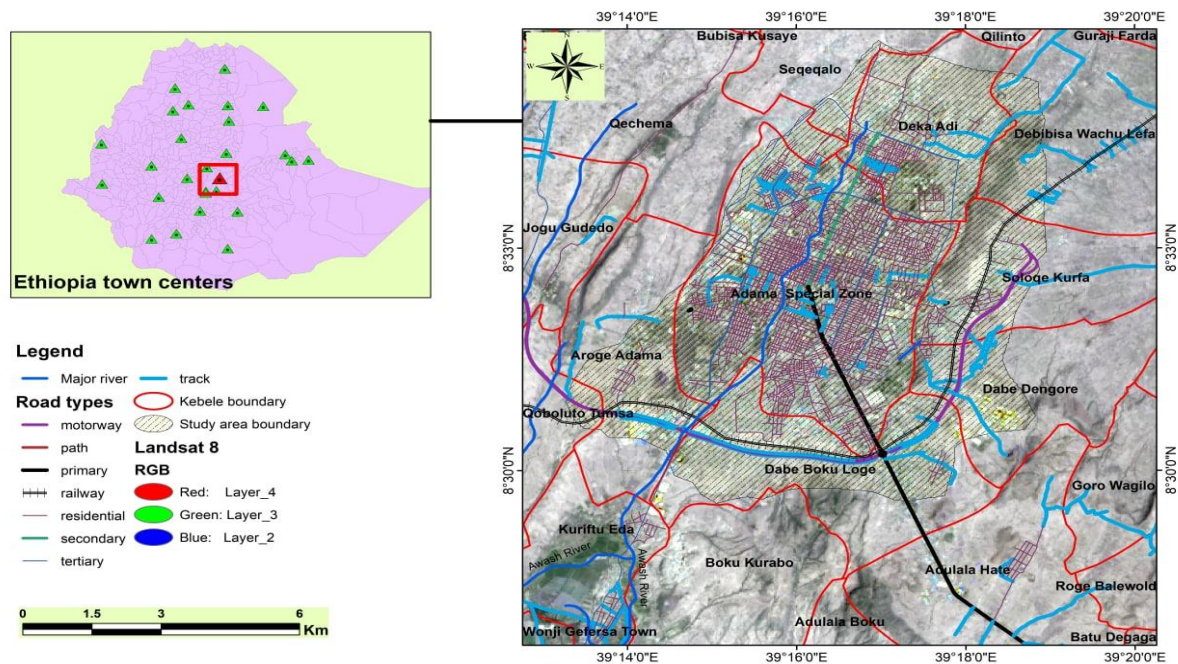


Figure 2: Location map of the study area, Adama City & woreda, Oromia Region

Source: Constructed by the author based on the raw data from Ethiopia Geo-Spatial instit (2022)

The availability of non-farm and off-farm employment opportunities is higher (OBPDC, 2018). Moreover, the town has rapidly expanded into the adjacent Adama rural Woreda. Recently, four rural kebeles have been included in the city administrative boundary by the (White & Sabarwal, 2014) impacts rural smallholders near urban areas, therefore, need to be better understood through considering urban dynamics, trends and overall effects on the welfare of rural farm households taking Adama city and its surrounding areas as a case study.

1.10.2 Methodological philosophy

A research paradigm inherently reflects the researcher's beliefs about the world he lives in and wants to live in (Kivunja & Kuyini, 2017). The authors stated that it constitutes the abstract beliefs and principles that shape how a researcher sees the world and how s/he interprets and acts within it. It is the lens through which a researcher looks at the world. They substantiated that the research paradigm is the conceptual lens through which the researcher examines the methodological aspects of their research project to determine the research methods used and how the data will be analyzed. However, (Guba & Lincoln ,1994), leaders in the field, concluded that a paradigm is a basic set of beliefs or worldviews that guides research action or an investigation. In one way or another, there is a recurring argument in the study as to whether there is only one reality or several realities (Guba, 1990).

In positivistic theory, a single reality can be measured objectively, the hypothesis can be tested and validated, and knowledge is independent of human interaction (Guba; Lincoln & YS, 1994). Likewise, Creswell (2009) asserted that positivist philosophy yields accurate predictions and generalizations because it undergoes random sampling and empirical testing.

Positivists assume that reality is objective and measurable using properties independent of the researcher and his or her instruments; in other words, knowledge is objective and quantifiable (Sönmez, 2013). He stated that positivists use scientific methods and systematize the knowledge generation process through quantification. Thus, it increases precision in describing parameters and the relationship among them. Positivism involves uncovering truth and presenting it empirically (Sönmez, 2013).

The study is related to quantitative methods, like experimental and non-experimental. Wherein questions and hypotheses are posited in advance in a propositional way and are subjected to an empirical test for verification under conditions that are carefully controlled (manipulated) so that the results are not influenced (Guba & Lincoln, 1994). This approach aims to study the fundamental relationship between consistent variables in time and context. An essential part of it is to deal with researchers' control and manipulation of conditions independently to determine the events according to their interests. In non-experimental approaches, especially in correlational studies, the researcher would refrain from manipulating the independent variable.

Constructivist contends that various realities may be measured in a subjective and internally constructed knowledge with the person under investigation and cannot be measured objectively. In addition, there is no way to reach a reality separate from our minds, and there is no outside reference against which to compare claims of truth. The constructionist approach focuses on the process and the meaning associated with it. The data are produced using key informant interviews, in-depth interviews, focus group discussions, and transect observations. Furthermore, findings are not extrapolated to a sizable population (Frowe, 2001). Pragmatism was the outcome when the two techniques needed to address a particular study issue adequately. The research philosophy constructs the methods and the next question after the philosophy is decided. In this regard, the qualitative paradigm's worldview is not masked and epitomized by the quantitative paradigm (Guba & Lincoln, 1989). Therefore, the study can be hypothesized, tested, and validated objectively and subjectively interpreted to construct knowledge. Hence, a pragmatism view was applied in the research.

1.10.3 Research design

1.10.3.1 Quasi-experimental research design

The study employed a quasi-experimental research design. A quasi-experimental design is appropriate to evaluate the impact of an intervention on outcome variables controlling for all other factors that might influence the outcome and, hence, used for comparison purposes (White & Sabarwal, 2014). Given the absence of base line data on the impact assessment of urbanization, the changes in rural farm households' livelihood outcomes like income and consumption expenditure near urban areas are compared and contrasted with that of the farm households' livelihood outcomes found far away from the urban influence to determine the urbanization impact.

The other most important quasi-experimental research design for this study is it uses non-randomized assignment of subjects to treatment conditions (Creswell, 2009). As a result, it does not require the random assignment of individual cases to comparison groups. The assignment of the two groups is not random for both rural households found near or far away from the urban area due to the self-selection to decide in the groups. Hence, this design allows the researcher to randomly select samples from the population. Generally, the application of quasi-experimental research requires identifying and clearly defining the following important variables.

Treatment vs control group: Quasi-experimental research consists of two comparable groups; a treatment and a control group. In this study, the population of the study is stratified into two comparable groups; households selected from near urban centers and others selected far away from urban areas to analyze the impact of urbanization comparing the income difference of the two. Therefore, households found near urban areas were considered to be the treatment group, and those found far away from urban areas were the control group. The control group consisted of households located at an average distance of 27 kilometers from the urban center, while the treatment group comprised households at an average distance of 9 kilometers.

Dependent vs Independent Variables: The components of rural livelihood such as livelihoods perception of urbanization, rural households' income diversification, and the overall impact of urbanization on income/welfare were dependent variables for the study, and other determinate factors used as explanatory variables are considered independent variables. The independent variables are sex of households, age, educational status, dependency ratio,

access to credit service, savings, family sizes, marriage, land holding sizes distance from the urban center, and remittances.

1.10.4 Research approach

1.10.4.1 Mixed research approach

The integration of quantitative and qualitative (mixed approach) aspects of social research has gained much popularity in recent years. As a result, the ongoing debates on the relationship between qualitative and quantitative research approaches have shifted from a philosophical point of view toward more pragmatic approaches to utilizing mixed methods in studies across different social sciences (Niglas, 2009). Both quantitative and qualitative data were collected to explore and support statistical findings. It is used to collect data about farm households' perceptions of urbanization, income diversification, and farm households' welfare variables. A quantitative approach measured demographic, socioeconomic, income diversification, and welfare-related data. By contrast, qualitative instruments can assess people's understanding, perceptions, and feelings about urban expansion. To gain a deep understanding of this cross-sectional study, both quantitative and qualitative data were used to address the issue under investigation.

Although there are various types of mixed-method design, embedded design will be selected for this study. This is the mixed research design which combines the collection and analysis of both quantitative and qualitative data within a design of traditional quantitative research approach or qualitative approach when emphasis or priority is given to either quantitative or qualitative data (Creswell & Plano Clark, 2011). In this study, therefore, the qualitative strands will be embedded in the quantitative strand which is a survey design. The purpose of using an embedded mixed method design is to corroborate, confirm, or cross-validate the quantitative results and qualitative findings of the study (triangulation) and complement the findings of the research using the two approaches. Thus, both the qualitative and quantitative strands of the research will be mixed and integrated into the design, collection, analysis, and interpretation stage of the research.

1.10.5 Sources and types of data

Data sources are important to triangulate the quantitative validity and the trustworthiness of qualitative strands of the research (Creswell, 2009). Therefore, the important data was collected from different sources based on primary and secondary sources. The types of data which was generated through the various data collection instruments from these sources were

both quantitative and qualitative primary data. Quantitative data was collected using a survey questionnaire and the qualitative data was gleaned using key-informant interviews, and observation. Regarding the nature of the data, it was both retrospective collected using GIS and cross-sectional at one point in time.

Secondary sources of data were collected from the government policy documents, reports, and livelihood research reports from the research journals, GIS, books and magazines, policy guidelines, and discussion papers of various higher institutions, libraries, websites, etc. Besides, data on population size and land use (1986, 1996, 2006, 2016, and 2022) of Adama city was collected from Geo-Spatial Information Institutes of Ethiopia at the national level to analyze urbanization in the study area.

1.10.6 Sampling techniques and sample size determination

A multi-stage sampling technique was applied. Adama City was purposively selected, referring to its rapid urban expansion demographically and spatially only towards the prime agricultural land in the region. Besides, the area is where private sectors and government bodies demand more land for additional development and business activities every year. Compared to other parts of Oromia, the area was where urban expansion currently encroaches on fertile agricultural land necessary for crop production.

The study's population and unit of analysis are farm households in the peri-urban of Adama *Woreda*, where their livelihood depends on agriculture and has common boundaries with Adama City. Hence, two rural kebeles near the town and two rural kebeles far away from Adama City were selected using simple random sampling. Therefore, the four rural kebeles were classified into two based on their distance to Adama City to analyze urbanization's effect and associated impact on rural farm households near an urban area. Lastly, a simple random sampling technique was used to select a representative from the two groups.

The sample size determination formula developed by Kothari (2004) was used to estimate the sample size of the finite population and presented as follows;

$$n = \frac{Z^2 \cdot p \cdot q \cdot N}{e^2 (N - 1) + Z^2 \cdot p \cdot q}$$

Where p represents proportion agreeing and q equals 1- p. Z indicates the value of the standard variate at a given confidence level, n is the desired sample size, e is the desired margin of error with N showing the total population. Of the four sampled kebeles (2,515) household heads, 333 samples and 20 % additional for contingency and data quality were

used. Therefore, a total of 397 rural household heads were selected proportionally depending on the sizes of household heads using simple random sampling techniques. Accordingly, the sample size used the 148 farm households near the urban area as a treatment group of farm household heads, and the remaining 249 households far from the urban area as the control group.

Table 1.1 Distribution of the population and sample households across the study kebeles

Respondent type	Ave. Dist from urban Center	Kebeles’	Population Size	Sampled HHs	Additional 19.2%	Total Sampled HHs
Treatment	9km	Boku	438	58	12	70
		Adulala	498	66	12	78
Control	27km	Goro	695	92	17	109
		Roge	884	117	23	140
Total		4	2,515	333	64	397

Source: own computation, 2022

1.10.7 Techniques of data collection

Following the objectives of the study, quantitative and qualitative data were gathered. Primary quantitative data were collected using a structured survey questionnaire through a personal interview. In structured survey questionnaires, responses are limited to answers to predetermined questions, while in the case of interviews, the interviewer is present with the subject. Therefore, there is an opportunity to collect nonverbal data and clarify the meaning of questions if the subjects need help understanding (Lehto et al., 2020). Likewise, primary qualitative data was generated from key-informant interviews and participant observations. Secondary data were collected from published and unpublished documents, articles, and websites, particularly demographic, socioeconomic, and climate data.

Structured survey questionnaire: The questionnaire was developed in English and interviewed in Afaan Oromo. Ten enumerators were recruited and underwent training to facilitate data collection. They were assigned to work in collaboration with two development agents, each overseeing activities in four sampled kebeles. Additionally, two supervisors from the woreda agricultural offices were appointed to oversee the entire data collection process. A pilot test was conducted on 50 households to check whether the interviewees well understood the questionnaire. A structured questionnaire is crucial to avoid variations in the respondents' understanding of the question. Consequently, data on demographic characteristics, socioeconomic status, income diversification, and welfare of rural farm households were collected between October and December 2021.

Interviews: In addition to the survey questionnaire, qualitative interviews were conducted to generate additional information not addressed by the questionnaire and to support the quantitative data. This crucial informant was conducted out of the sampled households to generate diversified and enriched quantitative data. Participants were purposively selected. This method effectively investigates the participant's natural life experiences, vivid picture, and livelihood. Critical informant interview helps to understand the lived experience of participants explicitly. Key-informants participants from the community were selected with a rich and deep understanding of the issue; kebele Administrative management, religious leaders, civil servants in kebeles, woreda office of Agriculture experts, woreda land administrator officer, and experts of Adama municipal. In general, a total of 12 respondents were taken. Data related to rural households' perception of urban expansion, income diversification of farm households, and their annual income and expenditure per adult equivalency were generated from key informants.

Observation: This helps to capture candidate data by observing the actual setup of the environment and activities of the community. It is essential to raise questions during the critical informant interview and focus group discussion. Because observation is not only a tool for data collection, it also helps formulate questions to understand better the situation being studied.

1.10.8 Data analysis method

Descriptive statistics, inferential statistics, and econometric models were used to analyze the data. Stata version 13 was used to analyze and manage quantity. Using U.S Geological survey (USGS) data, Landsat Thematic Mapper (TM), Landsat Enhanced Thematic Mapper Plus (ETH+), and operational Land Imager (OLI) data between the years 1986- 2022 was extracted using GIS and remote sensing tools to assess the LULC of Adama City. In addition to the descriptive method of data analysis, Ordered logistic regression was used to analyze the perceived features of urbanization by farm households near and far away from the urban area of Adama City. Similarly, the multinomial and propensity score matching model of econometric analysis was used to assess the income diversification and its impact on their welfare respectively. Likewise, qualitative data was analyzed, contextualized, transcribed, and triangulated into quantitative data. The detailed descriptive and econometric models are discussed in respective chapters.

1.10.9 Reliability, validity, and ethical considerations of the study

The study considers the issues of reliability, validity, and research ethics. Reliability concerns the extent to which an experiment, test, or measure yields the same result on repeated trials (Carmines & Zeller, 1979, p. 11). He also pointed out that any measurement always contains a certain amount of error, and the goal of error-free measurement is never attained in any area of scientific investigation. Instead, the degree of error varies. It might be large or small. Therefore, to attain reliability of the study, participants were asked their convenient time to give the interview. Participants were informed of the purpose of the study to avoid false responses, reducing the number of interviewees per day, and the researcher documented responses curiously. Besides, Cornbrach's alpha test was conducted, and the same procedure was applied from inception to the final stage of the data collection period.

Validity shows how accurately a method measures what is planned to be measured in the actual investigation or how accurate the measure is. The result addresses whether the collected data reflects the reality under investigation. The questionnaire was pre-tested, and the researcher supervised the enumerator regularly to overcome the validity problems. Applying research ethics is essential to protect the participants' dignity, rights, and welfare. To this effect, a letter was collected from the woreda administrator and dispatched to respective kebele leaders. Then, the leaders share the information with the community and get informed to support the researcher. Finally, the researcher guarantees that their data is transferred to third parties with their willingness. An anonymous name was provided to individuals not interested in giving their names for security purposes.

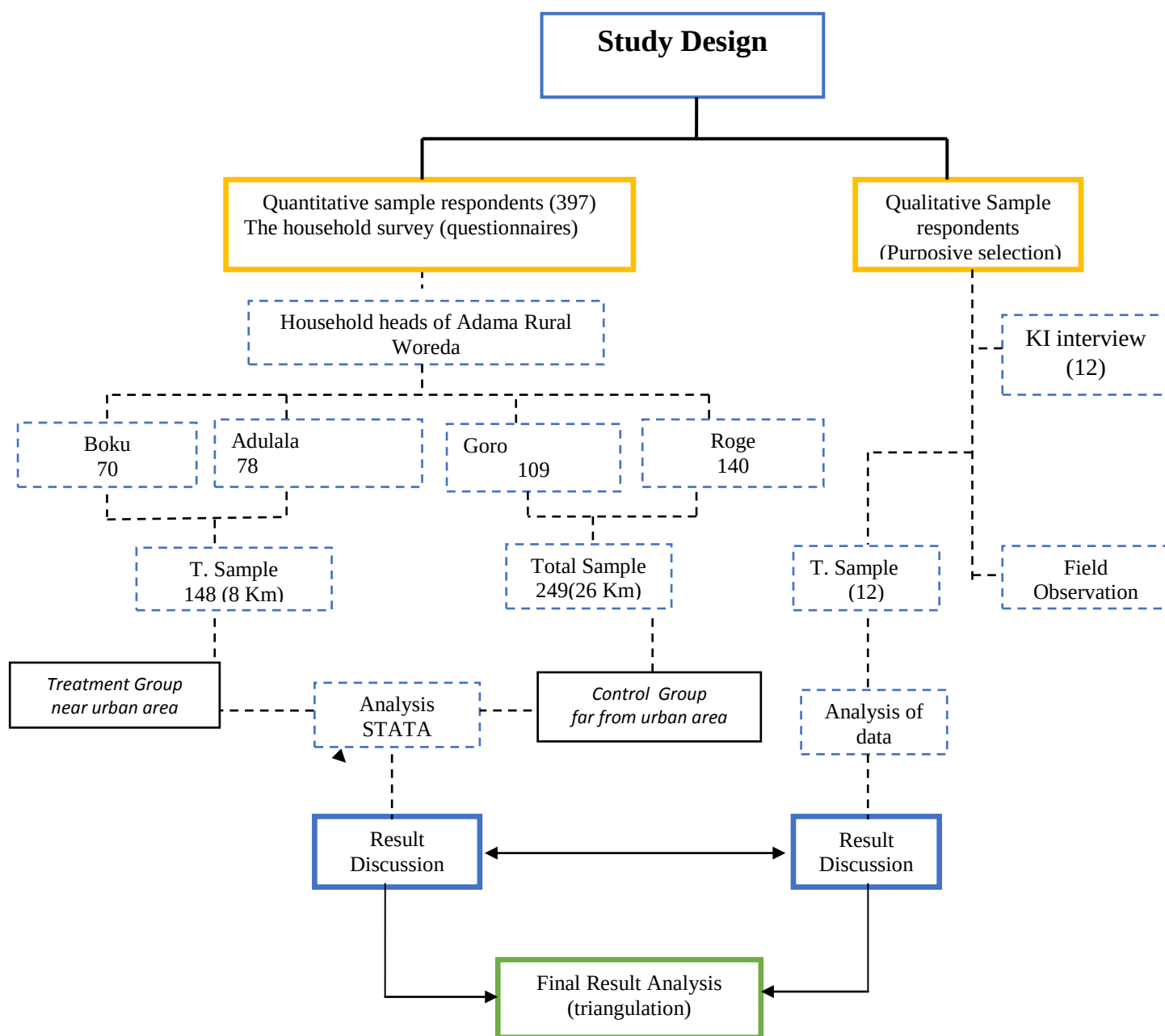


Figure 3: Summary of the study design

Source: Own drawing (2022)

1.11 Structure of the dissertation

This dissertation comprises six chapters. A brief of the study background, concised theortetical and emperical literature review,problem statement, research questions and objectives, significance, scope, and limitations of the study are covered in the first chapter, which serves as the dissertation's general introduction. This chapter reviewed the conceptual and empirical literature on the study under investigation. The literature establishes a connection between the four essays in this study and the philosophical assumption that directs the study in general. The general methodology for all the objectives included in the study (*i.e.* research design, population, sampling procedure, sample size, data sources and methods and tools of data collection, techniques of data analysis, theoretical and analytical frameworks of the study, objectives and data matrix, data presentation, data quality assurance, and ethical issues considered throughout the study are described in this chapter. The literature and the theoretical foundations and model basis for the subjects this dissertation addresses were analyzed, summarized, and illustrated in the form of an analytical framework in a way that demonstrates the knowledge gaps that this study aims to fill. The analytical framework also demonstrates the conceptual connections between the articles in this dissertation and their foci. The methodology section of each study presents the specifics of the research design, data sources and methods of collection, sampling procedure, sample size determination, data collection tools, econometric specifications, and data analysis procedures. They are described alongside the methods, procedures, and rationales for their use.

The dissertation's main body is covered in chapters two through five. The background, statement of the problem, objective, methods, findings and discussion, and conclusion, as well as any recommendations or policy implications, are all included in each chapter. Accordingly, the second chapter presents the first research objective of examining the land use /land cover dynamics of Adama City with the changing population. The third chapter presents the second research objective of investigating rural households' perception of urbanization and its implication on their livelihood in the Adama rural Woreda. The third research objective analyzes the effect of urbanization on the income diversification of farming households in the study area, which is presented in the fourth chapter. The fourth research objective, which explores the impact of urbanization on rural farm household welfare in the Adama rural Woreda, is presented in chapter five. The sixth and last chapter presents the synthesis of the study. By synthesis, conclusions from chapters, general

recommendations and/or implications and limitations of the study, and suggestions for further studies are presented. Objectives indicated in the study are also synthesized and discussed given the main thesis of the study and with the basic tenets of the theories and/or models used.

The writing styles of the empirical chapters followed the journal's specific guidelines in which each article was published and/or submitted. Lastly, the articles were organized into the dissertation using the same formatting and citation styles. The first paper of the dissertation is presented in the upcoming chapter.

CHAPTER TWO: Article 1

The dynamics of Urbanization and its effects on land use/land cover change: A case study of Adama City and Adama Rural Woreda, Ethiopia

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Abstract

Rapid urbanization in cities presents both opportunities and challenges for national development. One significant aspect affected by this process is the change in land use and land cover, which has implications for agricultural land and the livelihoods of rural farm households. This study focuses on investigating the dynamics of urbanization and its impact on land use/land cover change in Adama City, located in the Oromia Regional State, over thirty-five years. To conduct this analysis, various datasets from the U.S. Geological Survey (USGS), including Landsat Thematic Mapper (TM), Landsat Enhanced Thematic Mapper Plus (ETH+), and Operational Land Imager (OLI), were utilized. Geographic Information System (GIS) and remote sensing tools were employed to extract relevant information from these datasets for the years 1986 to 2022. The findings reveal that built-up areas and agricultural land exhibit the most significant changes over the examined period. However, these changes occur in opposite directions. The built-up area has experienced a substantial increase of 60% from 1986 to 2022, while agricultural land has decreased by 40% during the same timeframe. These results underscore the need for policies that promote appropriate land management and a well-planned urbanization process and ensuring sustainable urban development remains crucial. Furthermore, it is vital to enhance understanding of the spatial and temporal dynamics of urban growth and its impacts on farm households residing near urban areas. The findings emphasize the importance of effective land management policies and a comprehensive understanding of the impacts of urban growth on rural farm households. By addressing these issues, sustainable food security and poverty reduction objectives can be better achieved.

Keywords: Agricultural Land; Built-up area; Farm households; Landsat images; Urbanization

2.1. Introduction

There is empirical evidence that more than 50% of the world's population resides in urban areas currently. Accordingly, by 2050, the number will surpass 65 percent of which 90 percent of this growth will be from Asia and Africa (Terfa et al., 2019). This rapid population growth in urban areas combined with the search for development resulted in rapid urban expansion to the rural hinterland. Social researchers, urban planners, and geographers are now becoming alarmed about this unprecedented urban expansion triggered by a variety of factors, among them the demographics, economies, and spatial trends of cities, that might have either favorable or adverse effects (Cali & Menon, 2013; Gashu & Gebre-Egziabher, 2018; SATI et al., 2017; Terfa et al., 2019). Mallupattu and Reddy (2013) noted that normal and human-instigated natural changes are of concern today due to the deterioration of a condition and human wellbeing in urban settings. Its speed, scale, and global connectedness turn the urban habitat, particularly in mega cities and large agglomerations, into both a space of risk and a space of opportunity.

The horizontal expansion of the urban area to its hinterlands has social, economic, and political development effects that lead to urban concentration and growth of large cities, changes in land use, and transformation from rural to metropolitan pattern of organization and government, which is still not adequately documented (WEGEDIE, 2018). This topic has become a central component in strategies for managing resources particularly land the very crucial asset of farm households. Hence, a better understanding of urbanization is necessary to be aware of the mechanism of LULC change and the driving forces for such changes. Moreover, it is thought that analyzing the relationship between population expansion, land use conversions, and environmental effects requires a thorough understanding of land cover analysis and land use transformation, which are primarily related to population growth (Khan et al., 2014). Natural population growth, rural-urban movement, and the reclassification of areas from rural to urban areas are among the many causes that contribute to the increase in the urban portion of the overall population, or urbanization (Buhaug & Urdal, 2013 as cited in Khan et al., 2014). The process takes place due to the intensification of human activities including marketization and industrialization (Khan et al., 2014).

Several studies were carried out to support the argument that fast urbanization as a result of human-induced changes in land use/land cover is occurring in emerging countries (Gashu & Gebre-Egziabher, 2018; SATI et al., 2017; Sharma, 2016b; Terfa et al., 2019). It is a frequent

pattern that as cities get bigger and more populous, agricultural land is turned into built-up regions and other non-farm economic activities which in turn results in urban land area increase, changing both the land use and the land cover.

Currently, Ethiopia is the second most populous country in Africa next to Nigeria in size of its population ranking 12th among the world countries (world meter, 2022). Over the past three decades, the country has been experiencing a rapid urbanization process coupled with tremendous population growth (MUDHo, 2017; CSA, 2017). Every day, the majority of Ethiopia's cities are growing more urbanized, and changes in land cover brought on by people are changing how land is used in urban areas. According to what is seen in many emerging nations, the country's increasing restrictions as a result of its rapid urbanization processes are unplanned and unmanaged, leading to sporadic urban growth, the loss of farmland, and environmental deterioration (Terfa et al., 2019). The primary driver behind urban growth-related constraints is the disparity between urban physical growth rates and the expansion of infrastructure and service delivery in the majority of the cities in the nation (MUDHo, 2014).

The city of Adama, the research area has become the main hot spot to face the problem of urban dynamics. Due to its unchecked rapid growth pattern, the city is also not free of urbanization issues. Significant environmental degradation, shifting green spaces, and other land uses like residential, industrial, and commercial constructions have all been made possible by urban expansion in Adama City (Sinha et al., 2016). Similar sources quantified the urban growth of Adama using Landsat images from 1984 to 2015 and reported that the built-up area of the city increased. Similarly, another author, pointed out that urban expansion in Adama has been almost in every direction from the initial urban center towards the east, northeast, and southeast of the city (Terfa et al., 2019). The studies revealed that the pattern, direction of LULC changes, and methodology used were heterogeneous from time to time even within similar cities. While some studies on Adama City concentrated on urban expansion and its pattern of land use and land cover changes, population growth, the main driver of urban expansion, and their combined impact on rural farm households near the study area were still scant. Urban areas are expanding as a result of the increasing population, however, the rate of expansion depends on several other related factors (Khan et al., 2014). The authors also pointed out that resource consumption and population growth induce changes in land use and land cover changes. In this instance, a significant portion of agricultural land was converted into built-up areas or other urban land uses, complicating the livelihoods of farm households outside of urban areas.

Due to all these reasons, Adama is one of the fastest growing cities of the Oromia national regional state currently housing several industries, institutions, commercial areas, and residential areas that attract nations, nationalities, and peoples of Ethiopia from the country. Therefore, Adama City is the top to represent the fastest urbanization processes coupled with a demographic shift that characterizes the existing development of the cities in the region and the country as well. Hence, to figure out the growing urban expansion ratio of prior and recent urban areas, this study will look at the population growth trends together with land use land cover change in Adama City during the past more than thirty years.

Therefore, this study aimed to quantify the dynamism, trends, extent, and spatiotemporal variability of the LULC transition of Adama City in the period from 1986 to 2022. The LULC in the period was also assessed and compared against the population growth rate and its implications. The findings of this study could contribute information for city planners to have solid environmental protection strategies, sustainable land, and other resource management that resulted in improving the livelihoods of the farming community surrounding urban areas. In addition, it also be useful in that can offer some baseline data for future research and growth plans in the area.

2.2. Materials and method

2.2.1. Remote sensing data

Cloud-free Landsat Thematic Mapper (TM) and Landsat 8 (OLI) images were used. Imagery from Landsat was acquired between December 2021 to February 2022 of 1986,1996,2006,2016 and 2022, respectively. This was to reduce the impact of cloudiness and seasonal variation and to enhance the accuracy of the classified imagery USGS and Global Land Cover Facility websites provided the Landsat images (path 168, row 54). Individual pixels were used as validation units. Training sites (pixels) were identified with high-resolution images from Google Earth to generate the reflectance signature of each land cover type. The thumb rule of Congalton (2001) was selected for each LULC class of at least 50 samples (pixels). A stratified random sampling method was used to collect sample reference points from individual strata. This method is important because it increases sample size in groups that occupy a limited area to minimize standard errors in class-specific accuracy estimates (Olofsson et al., 2014). The number of samples was selected for each mapping class by assigning equal sample sizes to all strata. This procedure is important for estimating the user's accuracy and overestimating the producer's overall accuracy (Olofsson

et al., 2012). Reference data for the 2022 accuracy assessment map were acquired at various locations in the city. Generally, each classified image was assessed using the post-classification function of ERDAS imagine 2014 by identifying 300 reference pixels from 1500 collected reference pixels.

The error matrix and kappa coefficient were used to assess image classification accuracy (Congalton, 2001; Rwanga and Ndambuki, 2017; Morales-Barquero *et al.*, 2019). The accuracy measures derived from the error matrices were computed as described in. The producer's accuracy is determined by dividing the overall number of pixels obtained from the sample reference data into the total number of pixels within a category. User accuracy is determined by dividing correctly identified sample units in the error matrix by the number of sample reference data. The accuracy was also determined by dividing the number of sample units correctly identified by the total number of sample units in the error matrix. Finally, kappa analysis (K) is the measure of agreement based on the arithmetic change between the actual agreement in the error matrix and the chance agreement indicated by the row and column totals (Congalton, 1991).

$$\text{Kappa Coefficient}(K) = \frac{N \sum_{i=1}^r x_{ii} - \sum_{i=1}^r (x_i - X_{x+i})}{N^2 - \sum_{i=1}^r (x_{ii} - X_{x+i})}$$

where; r is the number of rows and columns in the error matrix, N , N is the total number of observations (pixels) X_{ii} is observation in row i , and column i $x_i +$ is a marginal total of row i and $x + i$ is a marginal total of column i . A coefficient of Kappa equal to 1 indicates perfect agreement while if it is close to zero it means the agreement is no better than expected.

2.3. Result and discussion

2.3.1. Trends of population size of Adama City between 1986 and 2022

The last Ethiopia national population and housing surveys were conducted in 1994 and 2007, and the possible projection was made for 2022. The Adama City population was 115,693 in 1986 and become 328,137 in 2022. The population in Adama City increased from 115,693 (1986) to 328,137 (2022), implying that the population has nearly tripled (2.84) in the past 36 years.

Table 2. 1 The population size of Adama City between 1986 and 2022

Year	1986	1996	2006	2016	2022
Growth rate (%)	3.18	3.17	2.77	2.71	2.50
Population	115,693	161,437	214,318	281,850	328,137

Source: World Bank, 2022 & CSA, 2022

The trends of the population growth rate also show that although the total numbers of population increased from year to year, however, the growth rate was declining according to the report of the World Bank (2022). Analyzing the annual rate of population growth between the four survey periods (1986 – 1996, 1996 – 2006, 2006 – 2016, and 2016 – 2022) revealed changes of 3.18, 3.17, 2.77, 2.71, and 2.50 percent respectively with an average rate of 14.33 for the whole study, from 1986 to 2022. An increase in population has implications for land resources as the need to produce food and the demand for settlement and fuel wood increase in response to growing population needs. Accordingly, high population pressure can be considered as the driver of land use/land cover change.

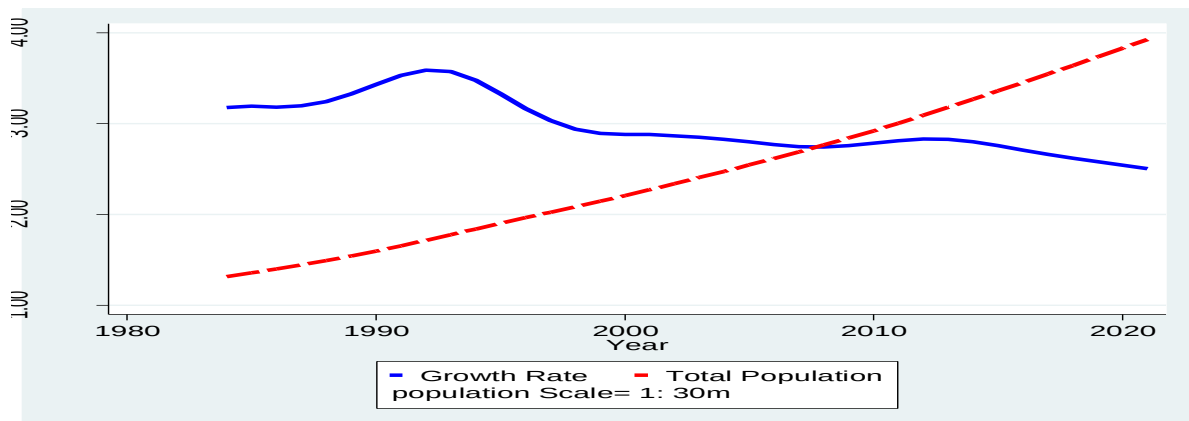


Figure 4: Population size and growth rate trends

Source: Own Computation (2022)

2.3.2. Classification accuracy assessment

A confusion matrix was used to conduct accuracy assessments for the identified LULC categories for the years 1986, 1996, 2006, 2016, and 2022. The stratified random sample approach yielded overall classification accuracy of 87.33, 88.33, 86.67, 86, and 89 percent for the years 1986, 1996, 2006, 2016, and 2022 respectively (Table 2.2). We can infer that there is a respectable level of agreement between the categorized image and the reality it reflects because the numbers are over the cut point of the typical overall classification accuracy

criterion of 85 percent (Congalton & Green, 2009) with no class less than 70 percent. With mathematical precision, the confusion matrix calculated the overall accuracy, producer, and user accuracy, and kappa statistics with no class less than 70 percent (Thomlinson et al., 1999). Accordingly, the kappa statistic for the LU/LC maps for the years 1986, 1996, 2006, 2016, and 2022 was 0.8858, 0.8949, 0.8802, 0.8745, and 0.9112, respectively, indicating a high degree of agreement between the classified images and the referenced data. The outcomes revealed a high degree of agreement for each of the categorized photos (Lea & Curtis 2010). This method of image processing was discovered to be successful in generating compatible data of LU/LC alterations.

Furthermore, Table 2.2 reports the accuracy of the various groups of the six classifications. According to a user accuracy result, the built-up area had the highest class accuracy in 1986 (94 percent), while three other classifications forestland, grassland, and shrub and woodland had the lowest class accuracy of 84 percent. In 1996, user accuracy ranged from the lowest accuracy of 82 percent for grassland to correctly classified 94 percent for shrub and woodland; in 2006, it ranged from 82 percent for grassland to 94 percent for the built-up area. In 2016, the maximum class accuracy for forestland was 92 percent, while the minimum for agricultural land was 80 percent. In 2022, the maximum class accuracy for bare land was 94 percent, while the minimum was 84 percent (Forest and grassland). According to producer accuracy results, the built-up area was correctly categorized for the years 1986, 1996, and 2022 with accuracy rates of 94, 94, and 93.75 percent, respectively. Similarly, forestland was relatively accurately categorized for the years 1986, 1996, 2006, and 2022 with accuracy rates of 91.30, 92, 90.20, and 91.30 percent, respectively.

Table 2. 2 Accuracy assessments for 1986, 1996, 2006, 2016, and 2022 classified images

Classified Data	1986		1996		2006	
	Producer Accuracy	User Accuracy	Producer Accuracy	User Accuracy	Producer Accuracy	User Accuracy
Agricultural land	84.62%	88%	82%	84%	88%	84%
Bare land	78.95%	90%	85%	88%	82%	92%
Built-up area	94.00%	94%	94%	92%	87%	94%
Forest land	91.30%	84%	92%	90%	89%	84%
Grass land	84.00%	84%	84%	82%	89%	82%
Shrub & woodland	93.33%	84%	94%	94%	86%	84%
Overall Accuracy	87.33%		88.33%		86.67%	
Kappa	0.8858		0.8949		0.8802	
Classified Data	2016			2022		
	Producer Accuracy	User Accuracy		Producer Accuracy	User Accuracy	
Agricultural land	86.96%	80.0%		82.14%	92.00%	
Bare land	77.36%	82.0%		88.68%	94.00%	
Built-up area	84.62%	88.0%		93.75%	93.75%	
Forest land	90.20%	92.0%		91.30%	84.00%	
Grassland	84.62%	88.0%		91.30%	84.00%	
Shrub & woodland	93.48%	86.0%		91.84%	90.00%	
Overall Accuracy	86%			89%		
Kappa	0.8745			0.9112		

Source: Own computation (2022)

2.3.3. LULC change for the period 1986 – 2022

The six LULC classes via; agricultural land, built-up area, grassland, bare land, forestland, and shrub & woodland were identified for the years 1986 to 2022, and the area for each LULC class has been presented. The Adama City LULC has recorded significant changes in pattern, structure, and extent. Table 2.3 shows the proportion of each LULC class that made a transition from one class to another for each of the study years. The change tendency of the main LULC class in Adama City from 1986 to 2022 is revealed below.

In the period between 1986 and 2022, the built-up area shows an increase, while agricultural land shows a decline. During the period 1986-2022, built-up area are among the changes attributed to gains, whereas, agricultural land are among the changes attributed to losses. Agricultural land and built-up areas are among the primary land use and land cover types depicted on the maps of the relevant period. Agricultural land and built-up areas account for

the largest proportion of land use and land cover across all groups, as stated. As a percentage of the total area of Adama city, agricultural land and built-up areas make up 1,631 ha (21.37%) and 5,022 ha (65.81%), respectively, while forest, bare, grass, and shrub land make up 497 ha (6.51%), 12 ha (0.16%), 181 ha (2.37%), and 288 ha (3.77%), respectively. This indicated that in 2022, agricultural land and built-up area together accounted for 87.18 percent of the city's total area, indicating that a large portion of the town was built-up. The rise of residential and other infrastructures, as well as settlers' occupation of public lands, may be contributing factors to the increase in the built-up area (Mariye et al., 2022). The results are in line with those of ((Miheretu & Yimer, 2017), who examined the growth of urban built-up regions in the Gelana sub-watershed over 50 years (1964–2014). Similarly, the increase in crops and populated regions may be to blame for the loss of shrub land (Mariye et al., 2022). The results of this study are also in line with those of (Angessa et al., 2019), who examined the reduction of shrub land at a rate of 1.3 percent per year. Similarly, Bekele et al. (2019) found that between 1986 and 2000, shrub lands decreased by 27 percent in the central rift valley of Ethiopia.

Agricultural land accounted for 61.12 percent of the total area in 1986, but by 2022, that percentage had dropped to 21.37 percent. In 1996, 2006, and 2016, it had coverage of 54.14, 48.48, and 34.83 percent, respectively (Table 2.3). Contrarily to this, Built-up areas rose dramatically between 1986 and 2022; their overall areas were 5.93, 21.43, 28.39, 44.23, and 65.81 percent in 1986, 1996, 2006, and 2022, respectively. Additionally, bare land and forestland experienced less change dynamics than agricultural and built-up areas. For example, between 1986 and 2022, forestland increased from 2.97 to 6.51 percent, while the percentage of bare land varied between 0.16, 3.05, 0.35, 0.34, and 0.16 percent. In 1986, shrub and grassland were the dominant LULCs, accounting for 21.05 and 8.77 percent, respectively, of the total area.

For the next three periods (1996, 2006, and 2016), agricultural land and built-up areas were the primary LULC. The amount of agricultural land decreased as the amount of built-up area increased during the years 1986, 1996, 2006, and 2016 to 2022. The built-up area exhibited the largest growth from 1986 to 2022, whereas agricultural land drastically shrank over the period. Up until 2016, there was a steady rise in forestland, but by 2022, it was decreasing.

According to the study, Adama city has been rapidly urbanizing for more than three decades (Figure 2). The majority of Adama's urban development occurred there between 1986 and

1996 and from 1996 to 2006, however, since 2006, it has expanded in all directions. The city's east, northeast, and southeast had quick and occasional urban land expansion between 2006 and 2016, which caused rapid and sporadic urban land expansion in all directions, but particularly accelerated in the east and south between 2016 and 2022. Almost every direction from the original urban center has seen growth in Adama as a whole. Additionally, the biggest changes occurred in the built-up and agricultural regions, with the built-up area expanding at the expense of the agricultural, shrub, and woodland sectors (Figure 2.2).

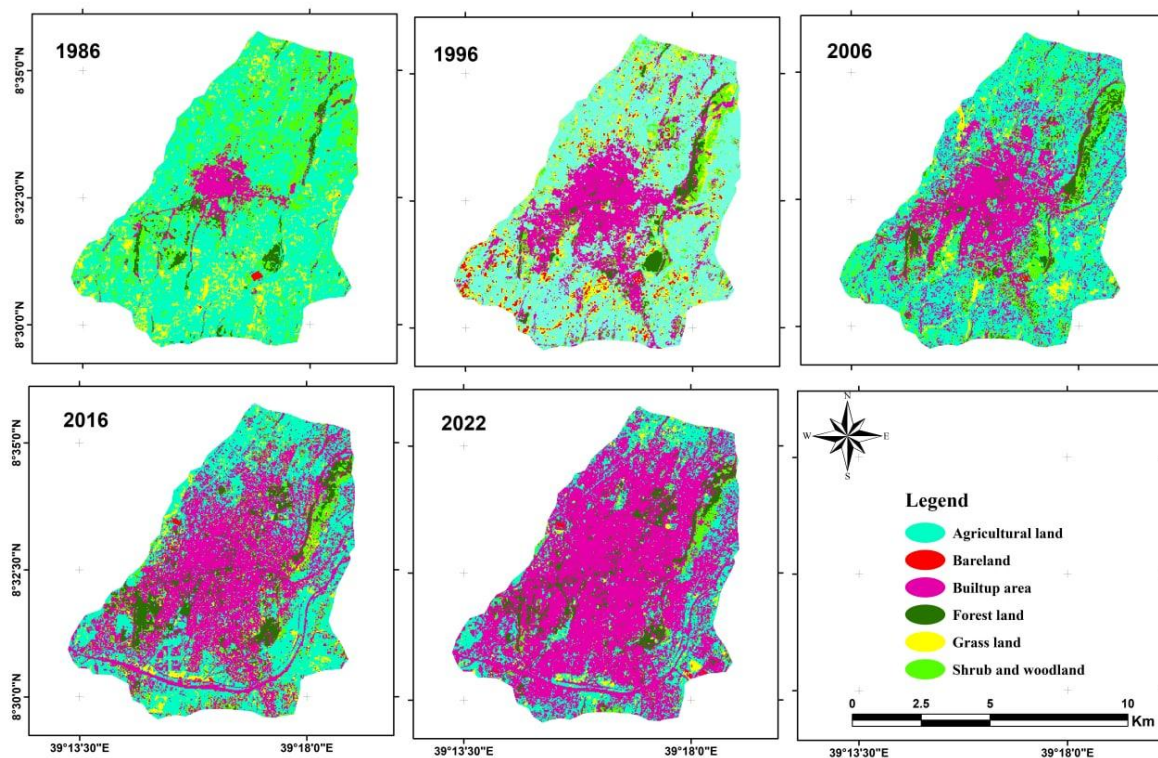


Figure 5: Classified Land -use/cover map of Adama City(1986-2022)

Source: constructed by the author based on raw data from Ethiopia Geospatial inst (2022)

Table 2.3 Temporal and annual rate of change between 1986–1996, 1996-2006, 2006-2016, and 2016-2022

Major LULC Class	Area in (Sqkm)				
	Area Sqkm (1986)	Area Sqkm (1996)	Area Sqkm (2006)	Area Sqkm (2016)	Area Sqkm (2022)
Agricultural land	46.64	41.32	36.99	26.58	16.31
Bare land	0.12	2.33	0.28	0.26	0.12
Built-up area	4.52	16.36	21.67	33.75	50.22
Forest land	2.27	2.49	3.99	5.61	4.97
Grass land	6.69	7.58	3.17	3.11	1.81
Shrub & woodland	16.06	6.23	10.22	7	2.88

Major LULC Class	Area (%)				
	Area Sqkm (1986)	Area Sqkm (1996)	Area Sqkm (2006)	Area Sqkm (2016)	Area Sqkm (2022)
Agricultural land	61.12	54.14	48.48	34.83	21.37
Bare land	0.16	3.05	0.36	0.34	0.16
Built-up area	5.93	21.43	28.39	44.23	65.81
Forest land	2.97	3.26	5.23	7.35	6.51
Grass land	8.77	9.94	4.15	4.08	2.37
Shrub & woodland	21.05	8.17	13.39	9.17	3.77

Source: Own computed land Use land change between 1986 and 2022

As seen in Figure 2.3, both classes, agricultural land, and built-up area, underwent substantial changes between 1986 and 2022, with the first class declining and the other increasing. The analysis for the period of 1986 – 2022 revealed that built – up area increased by 59.88 percent (5.93 – 65.81), whereas, the agricultural land classification decreased by 39.75 percent (61.12 – 21.37).

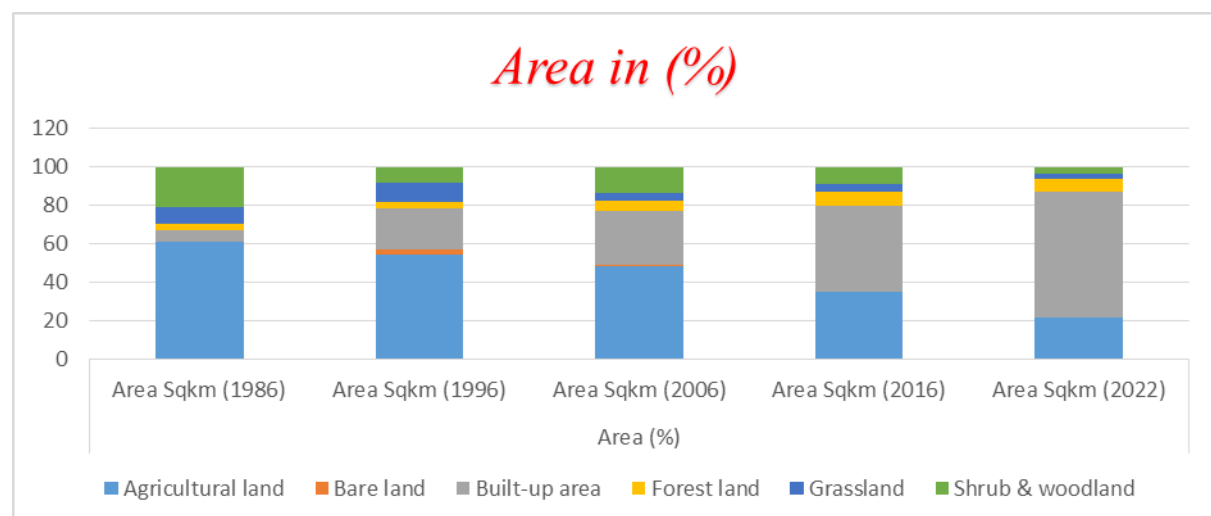


Figure 6: Land Use Land cover change between 1986 & 2022

Source: Own computed data of 1986 - 2022

2.3.4. Rate of LULC change

The built-up area expanded by 11.83 square kilometers between 1986 and 1996 and then by 5.31 (1996–2006), 12.08 (2006–2016), and 16.47 (2016–2022) square kilometers for the next three periods. Between 1986 and 2022, the built-up area grew by 45.70 square kilometers, or 4570 hectares, at an average annual rate of 127 hectares. The built-up area rose by 1.66 percent annually in terms of percentage over 36 years. This demonstrates how the strain of urbanization caused Adama city to develop in multiple directions. On the other hand, agricultural land has been losing land at an annual rate of 84 hectares for the entire period. From 1986 to 1996, the percentage declined to 6.98 percent in 2000, 5.67 percent from 1996 to 2006, 13.65 percent from 2006 to 2016, and 13.46 percent in 2022. The two main LULC classes that experienced a significant change were agricultural land and built-up areas. During the specified period, agricultural land was reduced by 30.33 km², losing 39.75 percent of its original holding, while the built-up area increased by 45.70 km², increasing by 59.88 percent between 1986 and 2022. In comparison to its initial covering, agricultural land shows a 1.1 percent yearly decline, while the built-up areas show a 1.66 percent annual growth.

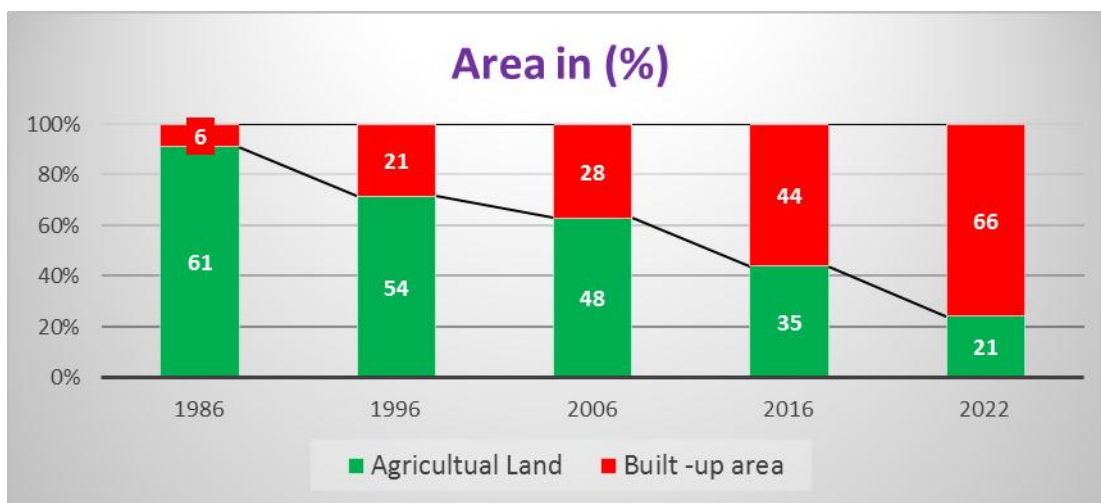


Figure 7: Land Use Land cover change between 1986 & 2022

Source: Own computed data of 1986 - 2022

Both the amount of agricultural land and the built-up area changed significantly over the last two periods. For the first period from 1986 to 1996, bare land and grassland increased by 2.90 and 1.17 percent, respectively, for the other LULC groups. For the following periods, both grassland and barren ground exhibited a decreasing pace. Except for the most recent era, which runs from 2016 to 2022, forestland indicates an increasing rate; the largest change in

forestland was 2.12% (162 ha) (2006-2016). Forestland rose by 3.54 percent overall during the 1986–2022 period, at an annual increment rate of 0.10 percent (Table 2.4).

Table 2. 4 Rate of LULC alteration from the time (1986–2022) in Adama City

Major LULC Class	Area in (Sqkm)				Overall Change 1986-2022	
	1986-1996	1996-2006	2006-2016	2016-2022	Total change (SqKm)	Rate of Change (SqKm)
Agricultural land	-5.32	-4.32	-10.41	-10.27	-30.33	-0.84
Bare land	2.21	-2.06	-0.02	-0.14	0.00	0.00
Built-up area	11.83	5.31	12.08	16.47	45.70	1.27
Forest land	0.22	1.50	1.62	-0.64	2.70	0.08
Grass land	0.89	-4.42	-0.06	-1.3	-4.88	-0.14
Shrub & woodland	-9.83	3.99	-3.22	-4.12	-13.18	-0.37
Major LULC Class	Area (%)				Overall Change 1986-2022	
	1986-1996	1996-2006	2006-2016	2016-2022	Total change (%)	Rate of Change (%)
Agricultural land	-6.98	-5.67	-13.65	-13.46	-39.75	-1.10
Bare land	2.90	-2.69	-0.02	-0.18	0.00	0.00
Built-up area	15.51	6.96	15.84	21.58	59.88	1.66
Forest land	0.29	1.96	2.12	-0.84	3.54	0.10
Grass land	1.17	-5.79	-0.08	-1.70	-6.40	-0.18
Shrub & woodland	-12.88	5.22	-4.22	-5.40	-17.27	-0.48

Source: Own computation, 2022

2.3.5. Implication of LULC Transition on Rural Farm Households near Adama Urban Area

Following direct pressures exerted on agricultural land, studies have shown that there were significant land use and land cover changes due to urbanization in Ethiopia ((Motuma Shiferaw Regasa, 2021; Tilahun et al., 2022). Among other changes, occurring due to urbanization, the conversion of farmland into built-up areas and other infrastructure expansion are the major key factors challenging food security, rural farm households' livelihood, and sustainable development (Damtew et al., 2022).

Ethiopia is a country where the majority of its population resides in a rural area with their livelihoods depending on agriculture and aligned activities that determine their well-being. Therefore, urbanization takes agricultural land and explicitly or implicitly disturbs the food production system by consuming fertile land, particularly in countries where the population size is high and the landholding size is small (Seto & Ramankutty, 2016).

As indicated in (Table 2.3 & 2.4) in the study area, in the last thirty-plus years, extended land was converted into urban built-ups confirming that agricultural land of farm households near Adama city trespassed to urban built-ups continuously increased by 3033 Hectares.

Increasing natural population growth and rural-urban migration are the possible forces that increase agricultural land conversion to residential and other development purposes. The cumulated result of agricultural land conversion is forced displacement of the farm households near urban areas that marginalizes and impoverishes more rural farm households compared to those who are in better status. Because they are forced to leave their productive assets, income sources, and their livelihood in general (Cernea, 1999, 2003, 2006). For instance, a study conducted in Bahir Dar, Ethiopia, showed that rural households near the urban area were expropriated from their agricultural land and lost their permanent trees, which are important sources of cash, firewood, and construction materials, and declined livestock population (Haregeweyn et al., 2012). They stated that the overall decrease in livestock population size is attributed to the feed shortage resulting from shrinkage of the land holding size following urbanization.

This implies that during the urbanization of rural farm households surrounding urban areas, to urban livelihood transition is foreseeable due to the expropriation of their farmland. Hence, farm households might reorient their income sources to sustain their living in the urban and peri-urban labor market. The outcome of changes in livelihood activities from farming to non-farm and unskilled livelihood activities might be negative depending on the demand for the labor market in the area and the asset as well as the skill and experience they have in the area.

2.3.6 Conclusion

Urbanization is an ongoing and irreversible process driven by natural population growth, rural-urban migration, and urban reallocation. Consequently, these changes will have socio-economic implications, particularly in the surrounding urban areas. The study has successfully quantified the rate, process, and drivers of land use/land cover change (LULC) in Adama City from 1986 to 2022. The findings reveal significant changes in the main LULC classes within the city. Specifically, built-up areas and agricultural land have experienced the highest rates of change. The built-up area has witnessed a gain of nearly 60% during the period, while agricultural land has suffered a loss of approximately 40% within the same timeframe. The conversion of farmland into urban built-up areas has had a profound impact on the livelihood activities of farm households residing near the urban area. They have been compelled to shift away from farming and adopt unskilled labor and income transfer-based lifestyles, which have implications for their income and overall welfare. This trend also raises

concerns about potential food insecurity and social unrest among farm households in the surrounding urban areas.

Therefore, it is imperative to implement policies that ensure appropriate land management and a well-planned urbanization process. Such policies should aim to mitigate the negative consequences of land use changes and urban expansion. Additionally, there is a pressing need for a better understanding of the spatial and temporal dynamics of urban growth and its impacts on farm households living close to urban areas. This understanding will serve as a foundation for promoting stable livelihoods and addressing the challenges arising from urbanization. By focusing on appropriate land management and understanding the impacts of urban growth on farm households, it is possible to achieve sustainable development, ensure food security, and promote social stability in the surrounding urban areas.

CHAPTER THREE: Article 2

Perceived Effects of Urbanization on Rural Farm Households in Adama Woreda, Ethiopia

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Abstract

Urban expansion is a global phenomenon that often yields positive and negative consequences. In Ethiopia, the rapid growth of urban areas has increased pressure on rural farmlands. The study aims to assess the variations in perceived effects of urbanization on rural farm households based on their proximity to urban areas and identify the socioeconomic factors that influence these variations. Specifically, the study compares the perceptions of rural farm households near the urban center with those residing further away. A multistage sampling technique was employed to select 397 households for the study, with 148 households located near the urban center and 249 situated significantly further from the urban area. The ordered logistic regression model was utilized to analyze the perceived effects of urbanization and the factors contributing to the variation of viewpoints. The results revealed a significant difference between farm households near urban areas regarding their perception of urbanization. Farm households located far away from urban centers perceived positive effects of urbanization on various aspects, including increased income diversification, agricultural production, creation of job opportunities, and community relationships, with an average mean value of 3.25. On the other hand, farm households near urban areas perceived these effects negatively, with an average mean value of 2.47. Furthermore, the ordered logistic regression analysis results indicated that the distance from the urban center, educational status of households, family sizes, and farmland significantly impact the perception of urbanization among farm households near urban centers. Therefore, when planning urbanization projects, policymakers and stakeholders must consider the concerns and perceptions of rural farmers.

Keywords: urbanization; households; perception; ordered logistic regression; Ethiopia

3.1. Introduction

Urbanization is when a more significant proportion of a country's population resides in urban areas than rural regions. Factors contributing to this phenomenon include migrating working-age individuals from rural to urban areas and natural population growth in metropolitan areas (Sharma, 2016; SATI et al., 2017; Tassie W, 2018; Diao et al., 2019). In mid-November 2022, reports indicated that the global human population reached 8.0 billion and is projected to increase to 9.7 billion by 2050. Statistical projections suggest that by 2050, there will be a notable trend of significant population concentration in urban areas, particularly Asia and Africa (Coulibaly & Li, 2020). In Africa, the urban population has doubled over the past three decades and is expected to continue growing in the coming decades (Sakketa, 2022). Traditionally known as an agrarian nation, Ethiopia is experiencing rapid urbanization. Despite having the lowest urbanization rate, it is projected to reach 60% urbanization by 2040, maintaining an average growth rate of 3.5% (Desa, 2014; Tassie Wegedie, 2018).

Urbanization has significant implications for rural farm households, encompassing economic, social, and cultural aspects (Faborode, n.d.; FAO, 2022; Feng et al., 2019; Thongyou et al., 2014). The multifaceted consequences experienced by rural farm households lead to various perspectives on the impact of urbanization (Fitawok et al., 2023; SATI et al., 2017). Rural households perceive it as an opportunity for economic growth and enhanced services, while some consider it a potential threat to their land, environment, and traditional way of life (Bonye et al., 2020).

Rural farm households recognize urbanization as an opportunity for economic growth that transforms cities through knowledge innovation and enhances rural living standards (Tian et al., 2016; Coulibaly & Li, 2020). With the influx of urban dwellers, there is a growing demand for agricultural products, creating potential markets for farmers to sell their produce at higher prices (Warsaw et al., 2021). Urban expansion improves rural infrastructure, facilitating better transportation, healthcare, and education, improving overall quality of life and productivity (Talema & Nigusie, 2023). It diversifies economies, fostering non-agricultural sectors like tourism and manufacturing, reducing dependence on agriculture (W. Dadi et al., 2022; Satterthwaite et al., 2010). These findings confirm that urbanization serves as a pathway from poverty to increased productivity by providing expanded job opportunities and improved quality of life (Coulibaly & Li, 2020; Bruin, 2021; Calì & Menon, 2013; Sharma, 2016; Youssef et al., 2016; Dorosh & Schmidt, 2010).

On the other hand, the expansion of cities encroaches upon agricultural zones, resulting in land fragmentation and a reduction in farming land available for rural communities. Consequently, rural farm households perceive urbanization negatively as it leads to involuntary acquisition and displacement from their farmland. This displacement not only separates them from their land but also creates institutional insecurity and disorder and hampers economic growth in the rural areas surrounding cities (Coulibaly & Li, 2020; Sargeson, 2013). Furthermore, the clash between traditional farming practices and new technologies introduced by urbanization threatens the environment and livelihoods of rural farmers who rely on sustainable farming methods (FAO, 2022). The loss of cultural identity and knowledge is also a consequence of urbanization. Despite significant urban development and the shift from inner urban enclaves to the periphery, farming remains a crucial source of livelihood for households in peri-urban areas (Abdulai et al., 2022). Research in Tigray, Ethiopia, highlights how urban expansion adversely affects peri-urban farmers' economic performance (Mezgebo, 2014; Weldearegay et al., 2021). Studies in Addis Ababa, emphasize that despite compensation, displaced farming households have limited income opportunities, engaging in low-income activities for survival rather than long-term improvement (Leulseged et al., 2012).

Therefore, based on various theoretical and empirical foundations, rural farm households hold diverse perspectives regarding urban expansion in their vicinity. Urbanization is a complex phenomenon that can have both positive and negative impacts. Well-managed urbanization promotes diversity, fosters creativity and innovation, and improves societies. In this particular scenario, farm households in rural areas perceive urban expansion towards their farmlands positively. Conversely, rapid urbanization without appropriate policy responses poses livelihood challenges and threatens the security of life and property. Uncontrolled, fast-growing urban areas in the hinterland have the potential to consume more land belonging to rural households and transform agricultural land for other development purposes. It is widely recognized that farming in peripheral urban areas is a sector that attracts various stakeholders who compete to fulfill their economic and social interests (Mohammed et al., 2020).

Ethiopia is characterized by a high population density and rapid urbanization (MUDHCo, 2016). The rate of urban physical growth in cities has outpaced the development of infrastructure and service delivery (MUDHCo, 2014). The manufacturing sector in Ethiopia

is weak, contributing only 6.9% to the GDP (MPD, 2019), and has a limited impact on job creation and domestic linkages (Oqubay, 2019). Small firms, unable to absorb additional labor from the farming community, predominantly comprise this sector. Major cities have expanded horizontally, incorporating significant peri-urban land into their territories. In Mekelle and Bishoftu, researchers found that approximately 6,000 and 5,000 hectares of land were included in rural kebeles between 2005 and 2009 (Zemenfes & Serbeh-Yiadom, 2014). Similarly, the urbanization and industrialization of Dukem Town have encroached upon potential agricultural land owned by farmers with low education and skills. The trends pose a significant challenge in finding stable employment opportunities outside the farm sector (D. Dadi, 2016).

Adama is the second most populous and fastest-growing city in the Oromia National Regional State. The city's administration is the hub for the regional government's political, business, and economic affairs, making it the most significant urban center in the Oromia region. Adama is a central commercial hub in the country, second only to Addis Ababa. Consequently, the city boasts a more extensive and diverse range of infrastructure and economic activities compared to other towns in the region.

Several studies (Beckers et al., 2020; Weldearegay et al., 2021; Factura & Cimene, 2022) conducted in different countries have yet to provide clear evidence of the impact of urbanization on smallholder peri-urban farmers. Similarly, various studies have shown in Adama City (Bulti & Abebe, 2020; Ermias et al., 2020; Shalo, 2016). However, there needs to be more research on the perceived effects of urbanization on rural farm households. Consequently, there needs to be a significant gap in the current research landscape regarding the implications of Adama City's rapid growth on the perceptions of surrounding rural farm households. Specifically, the differences in perceptions among farm households near urban areas and those residing farther away have yet to be adequately explored. This research aims to address this gap through comparative analysis, seeking to determine whether the perceived effects of urbanization on rural farm households differ between these two groups. Furthermore, there is a need for increased attention to identify the factors contributing to variations in perception among rural farm households. The study seeks to fill this gap by understanding the changing nature of urbanization's effects over time.

By addressing the existing gaps, this study aims to provide valuable insights that can contribute to informed decision-making and policy development in the context of urbanization and its impact on rural farm households. The study enhances a comprehensive understanding of the consequences of urbanization, enabling well-informed decision-making and the development of strategies that promote mutual benefits for both urban and rural populations. Moreover, the study findings are highly relevant for policymakers and stakeholders, urging them to incorporate the concerns and perspectives of rural farm households into the planning and implementation of urbanization projects.

3.2. Materials and methods

3.2.1. Description of the study area

Adama Woreda, located in the East Shewa Zone of Oromia, Ethiopia, and Adama City, the capital of the Woreda, is 100 kilometers southeast of Addis Ababa, the nation's capital. The coordinates for Adama are 8° 14' 0" to 8° 43' 0"N and 39° 6' 0" to 39° 25' 0"E. The total area of Adama is 871.18 km². The region is situated within the Great Ethiopian Rift Valley and has an altitude range of 1415 to 2505 meters above sea level. Adama Woreda experiences an average annual rainfall of 844.20 mm, with a maximum monthly average of 259.8 mm in July. Like other parts of the country, June, July, August, and September receive the most rainfall, while January, October, November, and December are the dry months. On average, May is the warmest month, while July is the coldest (Belete, 2017).

The primary economic activities in Adama rural Woreda are subsistence agriculture and petty trade. Locally grown crops such as teff, wheat, barley, maize, and sorghum are harvested between October and December when the weather is dry. Adama Woreda comprises 37 rural kebeles and had a population of 235,986 as of July 2022, with 118,403 males and 116,583 females (ESS, 2022).

Adama, the second most populous and fastest growing city in the Oromia Regional State, is along the central railway route to Djibouti. It is the largest urban center in the Oromia region, providing numerous employment opportunities beyond traditional farming. Adama City is located within the Ethiopian Great Rift Valley, surrounded by mountains and rugged terrain. According to the Ethiopia Statistical Services, the total population of Adama city in July

2021 was 435,222, with males accounting for 49% (212,991) and females accounting for 51% (222,231). This demographic distribution reflects a balanced Sexratio within the city. Adama City is the regional government's political, business, and economic hub and is the most significant urban center in the Oromia region. It boasts a thriving economy with diverse industries and economic sectors. Major industries and sectors in Adama City include manufacturing, agriculture and agro-processing, construction and building materials, trade and commerce, services, energy, education, and training. Next to Addis Ababa is the primary city where significant business activities take place in the country. As a result, the scale and diversity of infrastructure and economic activities in Adama City are relatively more extensive than other towns in the region. These industries and economic activities collectively contribute to the growth and prosperity of Adama City, establishing it as a dynamic center for business, employment, and economic opportunities.

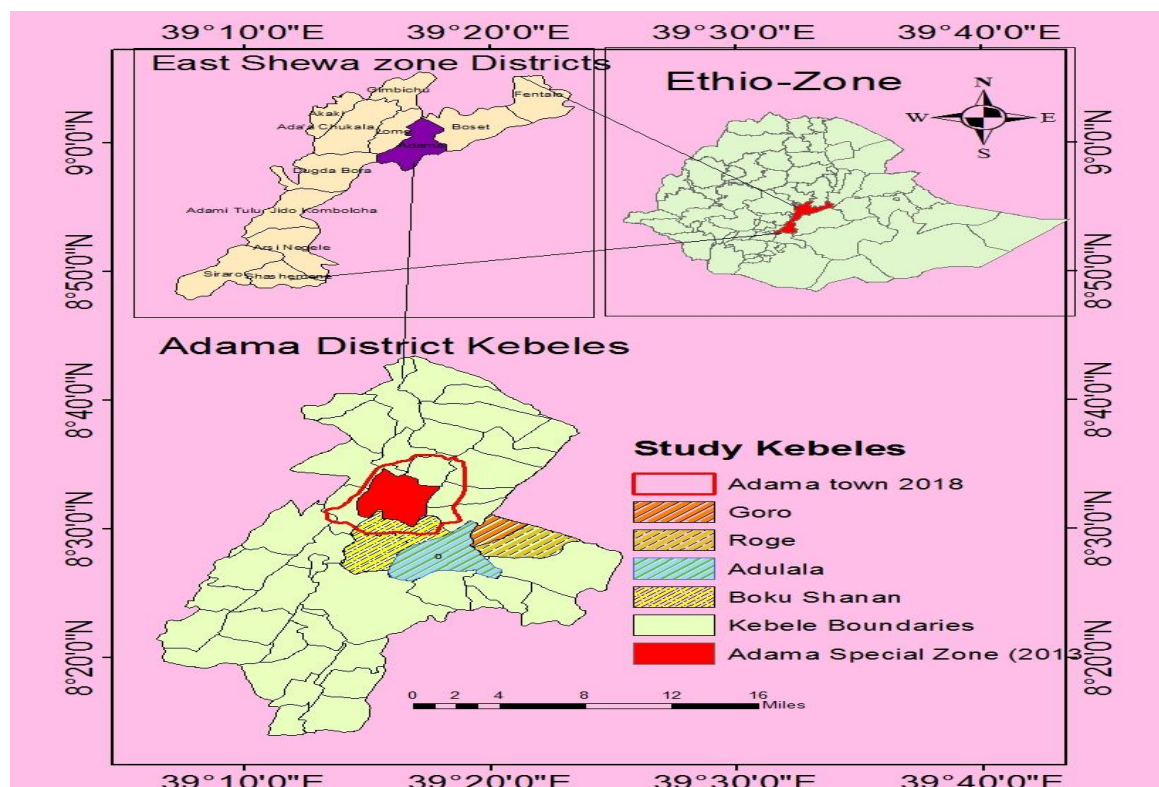


Figure 8: Location map of the study area, Adama City & Woreda, Oromia Region

Source: Constructed by the author based on the raw data from Ethiopia Geo-Spatial instit (2022)

The availability of employment opportunities outside of agriculture and in non-agricultural sectors has significantly increased, as reported by OBPDC in 2018. Furthermore, the city has rapidly expanded into the adjoining Adama rural Woreda. This expansion is evident in incorporating four rural kebeles (local administrative units) into the city's administrative

boundaries. These kebeles, namely Malka Adama, Dhaka Adii, Boku Shanan, and Daabee Sologee, have been included in the city's growth plan. The process of urbanization has had an impact on small-scale farmers residing in rural areas near the city. To better understand these effects, it is necessary to thoroughly examine the urban dynamics, trends, and overall consequences on the well-being of rural farming households. In this regard, Adama City and its surrounding areas serve as a case study to enhance our comprehension of the situation.

3.2.2. Research design

The study used a cross-sectional survey design to collect participant data at a specific time. We chose a cross-sectional design for its inherent advantage in assessing the present study. The choice of this design demonstrates a consideration of efficiency, contemporaneity, and the ability to explore multiple aspects of the subject matter simultaneously. The design contributes to the robustness and relevance of the research findings (Cullinane & Wang, 2006; Goczek et al., 2021; Setia, 2016). The cross-sectional design allows for the simultaneous examination of multiple characteristics within a relatively short period. This efficiency in data collection is critical when studying perceptions of households, which may change over time. It provides a snapshot of the current state. The cross-sectional design enables researchers to assess current issues, offering a contemporary perspective on the investigated subject. The design is valuable when the aim is to capture the most recent and pertinent information related to the research focus.

Conducting a cross-sectional study can often be more resource-efficient than longitudinal designs, requiring continuous data collection over an extended period. The design can be particularly advantageous in terms of cost and logistical considerations. Cross-sectional designs allow for concurrent investigation of various characteristics within the sampled population. The design contributes to a more comprehensive understanding of the diverse aspects that may influence the phenomenon under study. This versatility makes cross-sectional designs applicable to various research objectives, whether exploring attitudes, behaviors, or practices. This design allows researchers to capture a broad spectrum of information in a snapshot, facilitating a comprehensive analysis. Depending on the research question and objectives, researchers may choose the cross-sectional design over others, such as longitudinal or experimental designs, for this study.

A descriptive and explanatory concurrent mixed research design was employed to analyze the gathered data. This methodology integrates quantitative and qualitative data to comprehend the study topic comprehensively. Quantitative data pertains to numerical information that can be statistically analyzed, whereas qualitative data encompasses non-numerical information such as interviews, observations, or open-ended survey responses. By incorporating both data types, researchers can acquire a more profound understanding of the phenomenon under investigation.

3.2.3. Sampling size determination and collection approaches

The study used diverse and relevant sources to collect qualitative and quantitative data. Three hundred ninety-seven survey questionnaires were distributed to farm households in the Adama Woreda, aimed explicitly at gathering quantitative data on the perceived effects of urbanization on these households. Before distributing the questionnaires, the Woreda head office issued a consent letter to ensure compliance with ethical considerations.

According to the Ethiopian Central Statistical Services, the rural kebeles, the lower administrative units in the Adama Woreda, were categorized based on their proximity to the urban center. This spatial proximity to urban areas has significant implications for the overall livelihoods of rural farm households, as evidenced by previous studies (W. Dadi et al., 2022; Hussain et al., 2021; Jamshed et al., 2020; Sharma, 2016; Zhang et al., 2022). Proximity to urban areas can influence various aspects of life for these households, including economic opportunities, access to services, and cultural and lifestyle changes. Therefore, understanding these differences is crucial for development practitioners in designing targeted interventions that address the specific needs and challenges associated with varying degrees of urban proximity in rural areas.

The researcher employed a multistage sampling method to select the sample, considering rural kebeles in the Adama rural Woreda near and far from the urban center. The researchers chose Adama City due to significant urbanization trends in the region and the potential for new construction and business opportunities in the city. Compared to other cities in Oromia, this area experiences the highest degree of urban expansion, threatening fertile agricultural land vital for crop production.

Farm households in the peri-urban area of Adama were selected as the sample and analytical unit for this study. These households rely primarily on agriculture for their income and are located near the boundaries of Adama city. Two rural kebeles near the city and two far from Adama City were chosen using a simple random sampling method. These two categories are selected based on the similarity of agro-climatic and socioeconomic conditions. It is worth noting that Adama City has experienced rapid expansion in the southeast, surpassing other directions. This expansion, coupled with increased agricultural production in that area and the recent implementation of agricultural initiative (summer irrigated wheat production) takes place, justifies the selection of rural kebeles from the southeast as a solid foundation for the research focus.

Furthermore, the study focuses on two groups of rural kebeles in the peri-urban area of Adama Woreda, emphasizing those whose primary source of income is agriculture. The selection of rural kebeles that represent the interaction between urban and rural dynamics is crucial, and those located near Adama City are considered suitable due to their shared boundaries. By including farm households from this peri-urban area, the study aims to capture the direct influence of urbanization on the perception of rural farm households.

To comprehensively analyze the perceived effects of urbanization on rural farm households in the peri-urban area, the study selected two rural kebeles near the town and two rural kebeles located further away (Hussain et al., 2021). The remote rural areas were chosen for their anticipated lesser impact of urbanization. By comparing the perceived effects of urbanization on these distinct groups, the study aimed to draw meaningful conclusions. The four rural kebeles were selected using a simple random sampling technique (Acharya et al., 2013; Levy & Lemeshow, 2012). This method ensured that each kebele within the selected groups had an equal chance of being included in the study, thereby minimizing bias and enhancing the generalizability of the findings to larger rural farm households near urban areas. Finally, the study employed a simple random sampling technique to select the study participants from the two groups, ensuring that each household within the selected kebeles had an equal opportunity to be included. This approach enhanced the fairness of the process and strengthened the validity of the collected and analyzed data.

The study's sample size was estimated using the Kothari (2004) formula, an established methodology, considering proportional representation, confidence level, and margin of error accounting for the total population (Gupta et al., 2004; Loru, 2020; Schreuder & Gregoire,

2001). Accordingly, the sample size estimation of Kothari's (2004) formula is reported as follows;

$$n = \frac{Z^2 \cdot p \cdot q \cdot N}{e^2 (N - 1) + Z^2 \cdot p \cdot q}$$

Where p represents the proportion of individuals agreeing, and q is equal to 1 - p. Z represents the value of the standard variate at a specific confidence level, n indicates the desired sample size, e represents the expected margin of error, and N represents the total population.

Of the total sampled kebeles (2,515) household heads, using the Kothari (2004) formula, 333 samples and 20 % additional for contingency and data quality were used. Therefore, using simple random sampling techniques, 397 rural household heads were selected proportionally depending on their sizes. Accordingly, the sample size used 249 households far from the urban area as the control group and the remaining 148 farm households near the urban area as a treatment group of farm household heads.

Five-point Likert scale items were constructed and attached to a scale ranging from strongly disagree to strongly agree, with the mid-point being neutral and upbeat and negative scores from 1 to 5. The five-point Likert scale is a commonly used technique in survey research for measuring perceptions, satisfaction, and attitudes (Coelho & Esteves, 2007; Olaniyi, 2019). The five-point Likert scale is essential for perception, satisfaction, and attitude analysis due to its ease of use, ability to generate quantifiable responses, flexibility, and suitability for comparative and statistical analyses. Its widespread application in research across various disciplines underscores its reliability and effectiveness in capturing and analyzing meaningful human experiences and opinions. Simple, clear, and direct sentences make each item meaningful, engaging, and exciting for respondents so that the mean score across all items was analyzed for each respondent. Finally, the perception was regressed to the hypothesized explanatory variables.

Key informant interviews (KII) were conducted with diverse stakeholders and tailored to the composition of each platform. Apart from kebeles level administrators, Development Agents, Religious Leaders, Teachers, and other experienced farm household heads were also interviewed. The KII encompassed Woreda and zonal-level agricultural and land management offices, municipal-level administration offices, and other relevant regional stakeholders. Hence, information was gathered through 12 key informant interviews

conducted in the research area. Data related to rural households' perception of urban expansion, specifically on their agricultural production, agricultural land, food security, and social cohesion, were generated from key informants.

After collecting all the necessary data, we analyze the selected variables using quantitative and qualitative methods. The findings are presented using descriptive statistics and narrative accounts. In the case of qualitative data analysis, the process begins with acquainting oneself with the data, followed by initial coding to create concise labels that capture the key features. These codes are then organized into potential themes reviewed, defined, and named. A thematic map is also created to depict the themes' relationships visually. Based on this, an analysis is conducted by composing a narrative that describes and illustrates each theme, ensuring consistency with the original data. An ordered logistic regression analysis is utilized to identify the factors influencing households' perceived effects of urbanization on their welfare. Furthermore, qualitative data obtained through Key Informant Interviews (KII) is presented and interpreted to complement the quantitative findings.

3.2.4. Model specification

The study employed ordinal logistic regression to assess the perception of rural farm households regarding urbanization in the study area. This model is appropriate when the dependent variable is qualitative, falls into multiple ordered categories, and requires analysis (Williams, 2008; Lelisho et al., Yogi, and Tareke, 2022). Various models exist within ordinal logistic regression, including the proportional odds model (POM), partial proportional odds model (PPOM), and continuous ratio model (CRM). The proportional odds model was the most commonly utilized (Das & Rahman, 2011; Citko et al., 2012). However, the continuation ratio model is employed under certain circumstances (McCullagh, 1980). The interpretation of rural farm households' perception of urbanization under the proportional odds model appears more rational and understandable. In cases where proportionality is violated, the partial proportional odds model (PPOM) may be a preferable alternative (Ananth & Kleinbaum, 1997; Long & Freese, 2005). Additionally, the choice between POM and PPOM was evaluated using the likelihood ratio test and AIC, providing a comprehensive assessment of the statistical models.

Therefore, the study outcome perception of rural households on urbanization satisfies this condition. By exponentiating the odd proportional ratio, the odds of being at or below the given category can be determined, and the factor associated with a higher probability of being

in each category can be identified, increasing the power of the estimated regression coefficients (Gujarati, 2004; Long & Freese, 2006). The goal of the cumulative odds ratio is to simultaneously consider the effect of a set of independent variables across those possible consecutive cumulative splits to the data. Assume an independent observation with p predictor variables; the response variable falls into K categories (1, 2..., k), where the k categories are ordinal.

Let Y denote the response variable; the cumulative distribution of Y is;

$$F_j(x_i) = P_r(Y \leq j | X_i = x_{i1}, \dots, X_{ip}); j = 1, 2, \dots, (k - 1) \dots \dots \dots (1)$$

The cumulative odds model predicts the odds of being at or below a particular category.

Because they are K possible ordinal outcomes, the model makes capital $k - 1$ prediction, each corresponding to the accumulation of probability across successive categories.

Suppose we let $\pi(Y \leq j | x_1, x_2, \dots, x_p) = \pi_j(x)$ represent the probability that the response falls in a category less than or equal to the j^{th} category ($j = 1, 2, \dots, K - 1$), then we have a collection of cumulative probabilities for each case. The final category has a cumulative probability of 1, 0.

Logistic regression is employed to estimate cumulative probabilities logistically, often known as cumulative logits;

$$\ln(Y'_j) = \ln \left(\frac{\pi_j(x)}{1 - \pi_j(x)} \right) = \alpha_j + (\beta_1 X_1 + \beta_2 X_2 + \dots \beta_p X_p) \dots \dots \dots (2)$$

The cumulative logit associated with being at or below a particular category j can be exponentiated to arrive at the estimated cumulative odds and then used to find the estimated cumulative probability associated with being at or below category j . Hence, the regression equation for the proportional odds model is given as follows;

$$L_j(x_i) = \log \left(\frac{F_j(x_i)}{1 - F_j(x_i)} \right) = \beta_{0j} + \beta_{1j} x_{i1} + \beta_{2j} x_{i2} + \dots + \beta_{pj} x_{pi} \dots \dots \dots (3).$$

Where;

$j = 1, 2, \dots, k$ Catagories

$x_{i1}, \dots, x_{pi}$.are the values of the p predictor variables for the i^{th} observation.

β_0 is the intercept or constant and $\beta_1, \dots, \beta_p$ is the coefficient

Finally, the proportional log-odds model was checked for suitability, goodness of fit, and robustness. The only difference is their intercepts or the cutoff points). Parallel regression lines were obtained for the various levels. The drawbacks of the proportional log-odds model

are that it is essential to test this assumption using both the informal test of constant β coefficient and the formal test of parallel regression lines explicitly (Gujarati, 2004).

3.2.5. Informal test of constant β coefficient

Since we have J categories of ordered responses, we can compute $j-1$ binary logit regressions on the odds of being in a higher vs. lower category of Y . If Y_i is the ordered outcome, the log – odds of a response greater than j vs. less than j is;

$$\ln \left(\frac{Pr(Y_i > j)}{Pr(Y_i \leq j)} \right) = \alpha_j - \beta_j X, \quad j = 1, 2, 3, \dots, j-1 \dots \dots \dots (4)$$

The quantity used is to estimate separate binary logit models for $j-1$ response variables. So, in all, we will have $j-1$ estimates of β_j . Therefore, the assumption of parallel regressions means:

$$\beta_1 = \beta_2 = \dots = \beta_{j-1} = \beta \dots \dots \dots (5)$$

To evaluate the variation in the regression, we analyzed the coefficients. If the regression lines were dissimilar, it would indicate rejection of the hypothesis of parallel regressions. Testing the assumption of parallel regression lines is crucial, and this is achieved by employing the formal test of the parallel regression lines model developed by Long and Freese (2006) (27), known as the Brant test. However, it is worth noting that violating these assumptions may or may not significantly impact the results of the ordered logistic regression model, as the practical implications of such violations are generally minimal (Long & Freese, 2006; Brown, 2016). The parallel test assumption is presented in the subsequent Table 9. The ordinal logistic regression model is employed to elucidate the variables that determine how each individual perceives urbanization.

Furthermore, it significantly impacts the multifunctional farming activities of rural farm households. To assess the perception of rural areas, the model utilized various estimation questions related to perception. These questions consider both the negative and positive effects. Specifically, they explore the implications of urbanization on household food security, income diversification, and non-farming job opportunities. The current policy matters significantly impact rural land, agricultural production, and productivity. The results were converted into mean values by aggregating them on the Likert scale. These mean values measure perception, with five independent variables encompassing socioeconomic and demographic factors.

3.2.6. Study Variables and Measurements

In the context of our ordered logistic regression model for analyzing perceptions, significant emphasis was placed on defining the dependent and independent variables. The subsequent tables systematically explain the hypothesized associations among these variables (Table 3.1). The dependent variable (DV) under investigation in this study pertains to the perception of urbanization among rural farm households, measured on a five-point scale. Within this scale, responses range from strongly disagree to agree strongly, indicating varying degrees of disagreement or agreement with urbanization and reflecting negative or positive perceptions, respectively. The neutral category represents an undecided stance between the two extremes. Table 3.1 provides detailed information on the various socioeconomic and institutional factors considered independent variables. Consequently, the perception of urbanization's effects within households is treated as an ordinal response variable derived from a categorical variable. This approach allows for a comprehensive exploration of the impact of urbanization on rural farm households.

Table 3. 1: Variables used in the model and measurements

Variables	Description of variables	sign(+/-)
PERCEPTION(DV)	Perception of rural farm households on urbanization, categorical: 1 Strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, and 5 –strongly agree	+/-
GROUP	Categories of sample rural kebeles based on Distance: 1- Far from urban center, 2 – near urban center	+
AGE	Age of HHs in years continuous variables	+
SEX	Categorical variable: 1 – male, 2 - female	+
MARGE	Marital Status of HHs Categorical: 1 – single, 2 – married, 3 – divorced, 4 - widowed	+
FSIZE	The family size of HHs in number is a continuous variable.	-
LHA	HH income diversification is categorical: 1 – farm only, 2 – farm & unskilled, 3 – farm and skilled, 4 – farm & transfer payment	-
EDU	The educational status of HHs is categorical: 1 – illiterate and 2 - literate.	+
DEPRATIO	The dependency ratio in number is a continuous variable.	-
TLU	Tropical livestock units in number are continuous variables.	-
LANDSIZE	The land size of households in (hect) is a continuous variable.	-
DISTANCE	The average distance of HHs in km from the urban center is a continuous variable.	+

Sources: Field Survey 2022 and Review of empirical studies

3.3. Results and Discussion

The study sought to examine the perceptions of rural farm households in the peripheral urban area of Adama City regarding urbanization and identify the factors contributing to the perception variations between the two groups. A combination of descriptive and inferential data analysis methods was employed to investigate the factors influencing the diverse perceptions of rural farm households in the rural kebeles found in the peripheral urban area of Adama City.

3.3.1. Descriptive Analysis

In Table 3.2, the respondents exhibited significant heterogeneity in their demographic and socioeconomic characteristics, leading to divergent perspectives on expanding urban areas into surrounding hinterlands. The rural kebeles were categorized into two groups, the control and treatment groups, based on their proximity to the urban center. This categorization was presented as a categorical independent variable in Table 3.2. Subsequently, 63% of the household heads belonged to the control group, indicating they resided relatively far from the urban center. Conversely, the remaining 37% were classified as the treatment group, representing those who lived closer to the urban center.

Males constituted 86 percent of the rural sample households, while females comprised 14%. The marital status of the household heads was predominantly married, accounting for 92% of the households surveyed. 65% of the household heads had no formal education and were considered illiterate, while the remaining 35% were literate. These findings emphasize the need for targeted initiatives to improve access to adult education in rural areas of the Oromia region.

Regarding income diversification, a significant majority of the respondents (61.5%) primarily engaged in farming activities, albeit with varying sizes of farmland. Approximately 38% of the household heads pursued a combination of farming and other income sources, including unskilled or skilled labor and transfers from others. Despite a decrease in farming activities compared to non-farm activities, many respondents still relied on farming as their primary source of livelihood. Despite urban expansion and farmland conversion, farming remains an important source of employment, income diversification, and food security.

Table 3.2: Summary of Categorical independent variables

Independent Variables		Frequency	Per cent
Group of Kebeles	Control	249	62.7
	Treatment	148	37.3
HHs Sex	Male	341	85.9
	Female	56	14.10
HHs Marital Status	Single	9	2.3
	Married	365	91.9
	Divorced	8	2.0
	Widowed	15	3.8
HHs Income diversification	Farm only	244	61.5
	Farm and Unskilled	107	27.0
	Farm and Skilled	8	2.0
	Farm and Transfer income	38	9.6
Educational Status	Illiterate	257	64.7
	Literate	140	35.3

Sources: Field survey (2022)

Table 3.3 presents the findings regarding the average family size of rural farm households in the control group, located far from the urban center, and the treatment group, which is closest to the urban center. The findings show that the average family size in the control group was 3.97, compared to 5 in the treatment group. The larger family sizes observed in urban proximities can be attributed to better access to healthcare infrastructure, which likely contributes to lower child mortality rates. In rural households, the average age of the head of household was also 45.2 years. The average age of household heads in the control group was 43.04 years, while it was 48.7 years in households near the urban center.

The study analyzed the dependency ratio, which measures the percentage of family members who are not in the labor force (including children aged 0 to 14 and elderly individuals over 64) relative to those who are. The average dependency ratio among the households surveyed was determined to be 0.75. More specifically, the control group had a dependency ratio of 0.736, while the treatment group exhibited a slightly higher ratio of 0.785. According to these findings, larger families and higher dependency ratios correlate with higher household poverty levels (Bersisa & Heshmati, 2016; Kebede & Sharma, 2014; Anteneh M, 2020).

In order to analyze the disparity between the two groups, it was essential to consider how far rural kebeles are from urban centers. In this context, the average distance of rural kebeles far from the urban center was 27 kilometers. In comparison, the closest rural kebeles had an average distance of 9 kilometers. The corresponding standard deviations were 5.714 and 4.1065, respectively. These findings emphasize the significant distances that separated the two groups, which played a vital role in estimating the socioeconomic disparities contributing to the divergence in perceptions of urbanization between them (Sharma, 2016).

Table 3.3: Summary of Continuous Independent Variables

Continuous Variables	Group G	N	Mean	Std. Deviation
Age of HH Head in Years	Control	249	43.04	8.804
	Treatment	148	48.67	10.624
Educational Status of HH Head	Control	249	1.27	0.444
	Treatment	148	1.49	0.502
Family Size of HH Head	Control	249	3.97	1.167
	Treatment	148	4.60	1.689
Adult Equivalent of Family Size	Control	249	3.382	0.882
	Treatment	148	3.780	1.053
Dependency ratio of HHs	Control	249	0.736	0.377
	Treatment	148	0.785	0.357
Tropical Livestock Units	Control	249	4.927	4.804
	Treatment	148	0.469	2.005
Land Size of HHs	Control	249	1.056	0.221
	Treatment	148	0.539	0.217
The average distance from the urban	Control	249	26.992	5.714

center	Treatment	148	8.946	4.065
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Sources: Field survey (2022)

3.3.2. Perceived Effects of Urbanization by Rural Farm Households

The study examining urbanization's impact on perception-related factors is presented in Table 3.4. For the positive perception variables, household heads in the control group consistently rated them highly, with mean scores ranging from 3.02 to 3.46 on a scale of 1 to 5. The top three positive statements, ranked in descending order, were: urbanization creates job opportunities, maintains community relationships, and increases agricultural production. Household heads living near urban areas were evaluated using four variables, yielding mean scores ranging from 2.24 to 2.99. In contrast to households residing farther from urban areas, those nearby displayed comparatively lower mean scores. The variables that received higher rankings from this group were: urbanization helps maintain community ties, contributes to income diversification, and leads to job creation. The results suggest that the perception of urbanization differed between the two groups. Household heads living far from urban areas had more positive perceptions across all four variables, whereas those living near urban areas expressed relatively less significant views. The results highlight the differing perspectives on the effects of urbanization, particularly regarding job opportunities, community relationships, income diversification, and agricultural production. However, only one of the four variables (urbanization maintains community relationships) obtained a score above 50% for farm households near urban area.

The variables associated with the positive impacts of urbanization received mean scores below the midpoint (2.5) on a 5-point scale for households residing near urban areas. There were significant differences in the overall mean results regarding the positive effects of urbanization between households far from urban areas and those nearby, with mean scores of 3.2560 and 2.4764, respectively. These results suggest notable variations in the average scores reflecting the positive impacts of urbanization between households situated at a significant distance from urban areas and those nearby. Specifically, households distant from urban centers had a higher mean score of 3.2560, indicating a more favorable perception of the positive effects of urbanization. On the other hand, households near urban areas had a comparatively lower mean score of 2.4764, signifying a less optimistic outlook on these positive effects. Households near urban areas believed that uncontrolled urban expansion hinders their ability to improve their livelihoods and overall well-being. The result implies

that they view unplanned urban growth as a potential obstacle to their economic and social progress, affecting their quality of life.

Regarding the negative perception variables related to the impact of urbanization, households located at a significant distance from urban areas and those nearby recorded mean scores of 3.2430 and 3.1689, respectively. These mean scores exceed the midpoint of 2.5, indicating that both groups perceived unfavorable effects of urbanization. The results suggest that households, whether far from or near urban areas, held a significantly negative perception of urbanization about the selected variables, such as its risks, the decline of agricultural land, the cause of food insecurity, environmental effects, and government policies on urbanization. Both farm household classifications recognize urbanization's detrimental impact on agricultural production. This impact arises from converting agricultural land into urban built-up areas, primarily driven by natural population growth and rural-urban migration. This transformation leads to the displacement of farm households near Adama City, resulting in their marginalization and impoverishment as they are forced to abandon productive assets and sources of income. A study also highlights similar consequences, indicating that rural households near urban areas experience the expropriation of agricultural land, the loss of permanent trees, and a decline in livestock population, all linked to reduced landholding sizes following urbanization (Haregeweyn et al., 2012). Thus, the study revealed that agriculture remains important for peri-urban farm households. These findings align with the emphasis by Nguyen et al. (2020) on farm households, including those near urban areas, recognizing the pivotal role of agriculture in employment, food security, and fostering collaborative relationships. Given the critical need to preserve the positive effects of urbanization on farm households, it is imperative to implement targeted policy interventions to mitigate the adverse effects.

Table 3.4: Distribution of Control and treatment groups' responses according to their perceived effects of urbanization

Perception Statement	Distance Based Categories				t	df	Sig.
Positive	Controls		Treatment				
	Mean	Rank	Mean	Rank			
Urbanization increases income diversification RHS	3.02	4 th	2.41	2 nd	6.195	395	.000
Urbanization increases agricultural production	3.16	3 rd	2.24	4 th	9.081	395	.000
Urbanization creates job opportunities	3.46	1 st	2.26	3 rd	11.188	395	.000
Urbanization maintains community relationship	3.37	2 nd	2.99	1 st	3.540	395	.000
Mean	3.2560		2.4764		10.070	395	.000
Negative	Mean	Rank	Mean	Rank			
Urbanization is a risk for rural farming HHs.	2.90	5 th	3.39	2 nd	-4.463	395	.000
Rural HHs are not benefiting from Urbanization	2.90	5 th	3.11	4 th	-1.616	395	.107
Urbanization pollutes the rural environment	3.45	2 nd	3.07	5 th	1.207	395	.228

Urbanization declines HH farmland	3.28	4 th	3.13	3 rd	1.207	395	.228
Urbanization causes HH food insecurity	3.32	3 rd	2.91	6 th	3.443	395	.001
Gov't policy gap on urbanization	3.60	1 st	3.41	1 st	1.355	395	.176
Mean	3.2430		3.1689		.741	395	.459

Sources: Field Survey 2022

3.4 Inferential statistical results

The Chi-square analysis presented in Table 3.5 uncovers significant associations between the perception of rural farm households regarding the impact of urbanization and various variables, including rural kebeles, educational status, marital status, and livelihood activities of household heads. However, no significant association was observed with the sex of household heads. This analysis demonstrates a statistically significant correlation between these variables, indicating that the relationship is unlikely to result from chance alone and instead suggests a meaningful and potentially causal connection. These findings provide valuable insights into the interplay between the covariate variables and perceptions or outcomes of the phenomenon being investigated.

Table 3. 5: Frequency distribution table of the respondents' profile

Variables	Categories	Total N(%)	Summary of all Perception					P-Value
			Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Group	Control	249(63)	8(3.2)	20(8)	88(35.3)	131(52.6)	2(0.8)	0.000
	Treatment	148(37)	36(24.3)	17(11.5)	32(21.6)	55(37.2)	8(5.4)	
SEX	Male	341(86)	35(10.3)	34(10.0)	102(29.9)	164(41.1)	6(1.8)	0.062
	Female	56(14)	9(16.1)	3(5.4)	18(32.1)	22(39.3)	4(7.1)	
MARAGE	Single	9(2.2)	1(11.1)	1(11.1)	3(33.3)	4(44.4)	0(0.0)	0.015
	Married	365(92)	43(11.8)	35(9.6)	112(30.7)	168(46.0)	7(1.9)	
	Divorced	8(2.0)	0(0.0)	0(0.0)	2(25.0)	6(75.0)	0(0.0)	
	Widowed	15(3.8)	0(0.0)	1(6.7)	3(20.0)	8(53.3)	3(20.0)	
Educational Status	Illiterate	257(65)	15(5.8)	14(5.4)	91(35.4)	131(51.0)	6(2.3)	0.000
	Literate	140(35)	29(20.7)	23(16.4)	29(20.7)	55(39.3)	4(2.9)	
LHA	Farm	244(61)	19(7.8)	23(9.4)	90(36.9)	109(44.7)	3(1.2)	0.006
	Farm & unskilled	106(27)	18(17.0)	10(9.4)	18(17.0)	55(51.9)	5(4.7)	
	Farm & skilled	8(2.0)	1(12.5)	2(25.0)	0(0.0)	5(62.5)	0(0.0)	
	Farm & transfer	39(10)	6(15.4)	2(5.1)	12(30.8)	17(43.6)	2(5.1)	

The P-value was calculated by chi-square.

Sources: Field Survey 2022

Table 3.6 presents the correlation between the perceptions of rural farm households regarding urbanization and other continuous variables. The summary of perceptions about continuous

variables such as family size, landholding size, and average distance of households to the urban center demonstrates a strong association between the dependent variable (perception) and the continuous variables. This strong association indicates a significant relationship whereby variations influence differences in perceptions among rural farm households in these continuous variables. Such a robust association underscores the importance of these continuous variables in shaping the understanding of perceptions regarding urbanization.

Table 3. 6: The mean distribution table of respondents' profile on the selected continuous variables

Variables	Mean(Sd)	Summary of all Perception					Total
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
FSIZE	Mean(Sd)	4.95(1.82)	4.75(1.77)	4.29(1.33)	3.82(1.10)	4.80(1.98)	397
LANDSIZE	Mean(Sd)	0.78(0.20)	0.85(0.31)	0.93(0.34)	0.85(0.34)	0.57(0.29)	397
DISTANCE	Mean(Sd)	15.65(7.17)	20.89(8.85)	24.06(10.56)	19.30(9.80)	10.40(9.65)	397

Sources: Field Survey 2022

Table 3.7 presents the findings of the ordered logistic regression analysis. The relationship between the variables was examined through both univariate and bivariate analyses. The results indicate that five socioeconomic variables demonstrate a significant association. These variables include groupings between households, educational status of household heads, land size, family size, and distance from the urban center. Specifically, the univariate analysis reveals that land size, family size, and distance of household heads are statistically significant. In the bivariate analysis, the two groups of households and household head educational status show a statistically significant association. These results suggest that the selected factors influence the perception of rural farm households regarding urbanization in their surroundings. However, factors such as sex, age, marital status, dependency ratio, and livelihood activities of farm households do not show statistical significance. Therefore, excluding the insignificant variables and proceeding with an ordinal logistic regression analysis using the variables that have statistical significance is recommended.

Table 3. 7: Ordered logistic regression

Mean dependent var	3.204	SD dependent var	1.033
Pseudo r-squared	0.123	Number of obs	397
Chi-square	124.739	Prob > chi2	0.000
Akaike crit. (AIC)	905.262	Bayesian crit. (BIC)	941.118

PERCEPTION	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval	Sig
GROUP	-4.358	.516	-8.44	0	-5.37	-3.346	***
EDU	-.589	.218	-2.70	.007	-1.016	-.162	***
FSIZE	-.149	.073	-2.05	.041	-.292	-.006	**
LANDSIZE	-1.402	.488	-2.87	.004	-2.358	-.446	***
DISTANCE	-.157	.022	-6.99	0	-.201	-.113	***

Constant	-14.358	1.272	.b	.b	-16.85	-11.866	
Constant	-13.463	1.246	.b	.b	-15.906	-11.02	
Constant	-11.692	1.197	.b	.b	-14.039	-9.345	
Constant	-7.505	1.147	.b	.b	-9.753	-5.257	
*** $p < .01$, ** $p < .05$, * $p < .1$							

Sources: Field Survey 2022

3.4.1 Ordered Logistic Regression Model Result

Before analyzing the results of the ordered logistic regression on the selected variables, it is crucial to verify the satisfaction of three key assumptions: the categorical nature of the dependent variables, adherence to the proportional odds model, and the absence of significant multicollinearity, indicating minimal correlation among the independent variables. In this context, the first assumption is met, as rural farm households' perception of urbanization is categorical and evaluated on a five-point scale ranging from strongly disagree to agree strongly.

Five socioeconomic variables were chosen due to their strong correlation with this variable (see Table 3.7). Evaluating multicollinearity, which refers to the interrelationships among the independent variables, is a prerequisite for conducting ordered logistic regression. Tolerance and the variance inflation factor (VIF) are used to assess multicollinearity. Tolerance represents the variability in a particular independent variable that the other independent variables do not explain. On the other hand, VIF is calculated as the reciprocal of the tolerance value (F. et al., 2014), providing an alternative measure of multicollinearity. Hair et al. (2014) suggested a cutoff VIF value of 10, indicating that a tolerance value below 0.1 or a VIF value above ten would indicate severe multicollinearity, thus violating the assumption of the regression model. The tolerance and VIF values indicate tolerance values above 0.1 and VIF values below 5. The analysis confirms the absence of multicollinearity concerns among the independent variables.

Table 3. 8: Multicollinearity Test.

VARIABLES	VIF	1/VIF
GROUP	4.88	0.204778
DISTANCE	4.68	0.213516
LANDSIZE	2.73	0.365766
SIZE	1.14	0.874018
EDU	1.08	0.928366
	Mean VIF 2.90	

Sources: Field Survey 2022

3.4.2. Result of Proportional Odd Model (POM)

The covariates, which include categories of rural kebeles (groups), educational status, family size, landholding size, and average distance of households from the urban center, showed statistical significance at a 5% significance level through the multivariable Proportional Odds Model (POM). This highlights their essential role as critical determinants in the analysis of rural households' perceptions regarding the impacts of urbanization. On the other hand, factors such as gender, age, dependency ratio, and other socioeconomic variables of household heads did not demonstrate a statistically significant impact.

Goodness-of-fit statistics are used to assess the adequacy of the model in describing the data. In terms of model fitting information, a significant model indicates a significant improvement in fit compared to the null model. In the present model, the Chi-Square is 124.739 with a P-value of 0.000, indicating a well-fitting model. Conversely, a significance value below 0.05 in the goodness-of-fit statistic suggests a poor fit. In this case, the chi-square value of 861.942 with a p-value of 1.00 indicates that the model adequately fits the data ($p > 0.05$). Generally, a goodness-of-fit test measures how well the observed data aligns with the assumed model. The Model Summary presents the Pseudo R-Square, where pseudo indicates that it does not precisely explain the variation but is an approximate measure of variation in the criterion variable. In this instance, the Nagelkerke Pseudo R-Square of 0.292 signifies a 29.2% improvement in outcome prediction compared to the null model based on the provided predictors.

One of the main assumptions of the proportional odds model for ordered logistic regression is that the effects of the predictors on the odds of falling into a higher versus lower category on the dependent variable are the same across categories. The insignificant test result suggests that the assumption of proportional odds is met, meaning the effects of the independent variables on the cumulative probability of falling into a higher category do not vary across categories on the same dependent variable.

Table 3. 9: Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	873.739			
General	730.813	142.926	15	.000

Sources: Field Survey 2022

In Table 3.9, a significant test statistic indicates a violation of the parallel regression assumption ($p = 0.000$). Given this violation, it is essential to thoroughly reassess the data using a more comprehensive Partial Proportional Odds Model (PPOM) analysis. The PPOM can estimate less constrained models than the parallel lines models estimated by Ologit, which often face assumption violations. GOLOGIT2, the default setting in STATA, produces results similar to a series of Binary Logistic Regression (BLR) models and can be interpreted similarly. Both techniques involve incorporating a more significant number of parameters compared to POM, which presents a fundamental challenge. These approaches remove the parallel line requirement for all variables, even if only a subset violates the assumption (Williams, 2006). Consequently, the study utilized the AUTOFIT option with GOLOGIT2 to implement the Partial Proportional Odds Model (PPOM). This allowed for the relaxation of the parallel line constraint exclusively for variables where the assumption was not justified while maintaining the parallel line constraint for variables that adhered to the assumption (Lelisho et al., 2022; Williams, 2006).

The results reveal a chi-square statistic of $\chi^2(6) = 8.69$ with a p -value = 0.1919 for two variables: The land size of households and the average distances of rural households from urban centers. This non-significant test statistic suggests that the final model does not violate these specific variables' proportional odds or parallel lines assumption. However, for the kebele categories (p -value = 0.00002), EDU (p -value = 0.00153), and FSIZE (p -value = 0.00768), the parallel lines assumption was violated. The proportional odds constraint is released for all variables, regardless of whether the assumption is violated by only one or a few of them (Williams, 2008). The interpretations of the effects of the constrained variables (categories of rural kebeles, educational status, family sizes, land size, and average distance of rural households from urban centers) remain broadly consistent with those in the earlier logit model. The variations from the previous model primarily involve degree (Long & Freese, 2005; Williams, 2008). The result implies that categories of kebeles, educational status, and family size of household heads influence the perception of rural farm households regarding urbanization in their hinterlands. However, the most significant factors influencing their perception are land size and the average distance of household heads from urban centers. Accordingly, as shown in Table 3.7, the findings reveal that all variables included in the model achieved statistical significance with a p -value less than 5%.

Table 3. 10: The Generalized Linear Model Estimates using Perception Status as a response with five ordered categories

Parameter		B	Std. Error	Hypothesis Test			Exp(B)	95% Confidence Interval for Exp (B)	
				Wald Chi2	df	Sig.		Lower	Upper
Threshold	[PERCEPTION=1]	-3.680	.6634	30.771	1	.000	.025	.007	.093
	[PERCEPTION=2]	-2.779	.6523	18.149	1	.000	.062	.017	.223
	[PERCEPTION=3]	-.993	.6395	2.408	1	.121	.371	.106	1.298
	PERCEPTION =4]	3.192	.6942	21.149	1	.000	24.345	6.245	94.905
[GROUP=1]		4.331	.5072	72.917	1	.000	76.026	28.134	205.444
[GROUP=2]		0 ^a	.	.	.	.	1	.	.
[EDU=1]		.473	.2222	4.535	1	.033	1.605	1.038	2.482
[EDU=2]		0 ^a	.	.	.	.	1	.	.
SIZE		-.178	.0751	5.626	1	.018	.837	.722	.970
LANDSIZE		-1.447	.4869	8.832	1	.003	.235	.091	.611
DISTANCE		-.147	.0232	40.233	1	.000	.863	.825	.903

Sources: Field Survey 2022

The estimate presented in Table 3.10 illustrates the probability of a case surpassing a certain category on the dependent variable. The sign of the variables' coefficients is interpreted within linear regression. Positive coefficients suggest that higher explanatory variable values increase the likelihood of the respondent belonging to a higher category of Y rather than a lower one. On the other hand, negative coefficients indicate that higher explanatory variable values raise the probability of being in the lower category (Long & Freese, 2005; Williams, 2006, 2008). When analyzing the odds ratio, a value greater than 1 indicates that respondents have a higher agreement level than the reference lower category. Conversely, if the odds ratio is less than 1, respondents have a lower level of agreement on the issues relative to the reference category. An odds ratio of 1 implies that subjects in that category express the same level of agreement as the reference category.

The analysis examined the impact of proximity to urban centers on the perceptions of farm households, classified by rural kebeles. Two distinct groups of kebeles were identified: the control group consisted of households far from urban centers, while the treatment group comprised households near urban centers. The findings revealed significant differences between the two groups. Specifically, the coefficient and odds ratio for the control group were 4.331 and 76.026, respectively. This indicates that the control group, which includes

households situated at a considerable distance from urban centers, tends to have a more positive perception of urbanization's effects than those living nearby.

Moreover, the odds ratio suggests that households far from urban areas are 76.026 times more likely to view the benefits of urbanization in their surroundings than households near urban areas. The results suggest that farm households near urban areas are more likely to express dissatisfaction with the urbanization taking place in their vicinity. The findings also reveal diverse perceptions among rural farm households regarding the impact of urbanization on their well-being. Notably, households far from urban areas are more inclined to view urbanization positively, while those nearby tend to have a more pronounced negative perspective.

The analysis examined the correlation between the educational status of household heads and their perspectives on urbanization. The variable was divided into illiterate and literate households based on the years of schooling. Significant differences were found between the two groups, as indicated by the coefficient and odds ratio for illiterate households, which were 0.473 and 1.605, respectively. This indicates that illiterate households were 1.605 times more likely to fall into a higher perception category, expressly agreeing or strongly agreeing with urbanization, than literate households. The findings suggest that illiterate farm households are more likely to view urbanization as having positive effects on their well-being than educated farm households. As a result, the perspectives of rural farm households on urban expansion and its impact on their welfare vary based on their level of education.

The study examined the impact of family size, treated as a continuous variable, on households' perceptions of urbanization within the study area. The findings indicated a significant influence of family size on households' perceptions. As family size increases, the negative coefficient (-0.178) and odds ratio less than 1 (0.837) suggest a higher likelihood of households with larger family sizes falling into a lower perception category (disagree or strongly disagree) regarding the effects of urbanization. The result suggests that rural households with larger family sizes tend to view urbanization negatively in their surroundings. Furthermore, the descriptive analysis revealed that households near urban areas, with a mean family size of 4.6 and a standard deviation of 1.167, had a higher average than those located farther away (mean 3.97, SD 1.689). Thus, households with larger family sizes near urban areas demonstrated a more negative impact of urban expansion than those situated significantly from the urban center.

The results of the multivariable ordinal logistic regression analysis, presented in Table 3.7, demonstrate that the size of households' land significantly impacts their perception of the effects of urbanization, with a significance level of 5%. As the landholding size of rural households increases, the negative coefficient (-1.447) and odds ratio less than 1 (0.235) indicate a higher likelihood of falling into a lower perception category (disagree or strongly disagree) regarding the effects of urbanization. Consequently, households with smaller farmland sizes were more likely to agree positively with urbanization's effects than those with relatively more extensive farmland. This highlights the variation in the perception of urbanization effects among households based on the size of their farmland.

The study unveiled a significant correlation between households' proximity to the urban center and their perceptions of urbanization. In rural households, as the distance increases, the negative coefficient (-.147) and odds ratio less than 1 (.863) signify a higher probability of being categorized as having a lower perception (disagree or strongly disagree) regarding the impact of urbanization. These findings emphasize the diversity in farm households' perceptions of urbanization, which are influenced by their proximity to the urban center.

3.5 Discussions

The findings section presents crucial discoveries regarding the perspectives of rural households on urbanization. Notably, rural households located farther away generally hold a favorable view of urbanization, in contrast to those near urban areas. This observation is consistent with established theories in urban and rural sociology and spatial assimilation (Gifford, 2014; Massey & Denton, 1985; Parsons, 1991). According to the perspective of Environmental Psychology, which emphasizes the impact of physical surroundings on individuals' perceptions (Gifford, 2014; Parsons, 1991), the positive outlook of rural households situated at a distance can be attributed to factors such as a cleaner environment, reduced congestion, and a calmer atmosphere compared to those in immediate urban proximity. Therefore, distance strikes a harmonious balance between the benefits of urbanization and the preservation of rural attributes.

The study's findings are consistent with spatial assimilation theory (Massey & Denton, 1985). According to this theory, individuals and households far from urban centers may view urbanization positively as they adapt to urban lifestyles while retaining some rural characteristics. The advantages of urbanization, such as economic opportunities and

improved infrastructure, may outweigh potential drawbacks, resulting in an overall positive perception. Similarly, the findings align with the peripheral model of urbanization (Kentor, 1981). This theory emphasizes the growth of urban areas on the outskirts, where rural and urban elements coexist. Rural households in these peripheral zones may regard urbanization positively since it brings economic opportunities and improved services without compromising essential aspects of rural life (Kühn, 2015; Qi et al., 2004). Although these theories offer possible explanations, it is essential to acknowledge that individual perceptions can be intricate and multifaceted. Other factors, such as cultural values, economic opportunities, and community dynamics, may also contribute to the observed positive perception of urbanization among rural households far from urban areas.

Another critical finding indicates a negative perception of urbanization among rural households as the educational status of household heads increases, particularly when compared to illiterate household heads. Economic and sociocultural theories support this finding. According to economic disparities theory, as education levels rise, individuals become more aware of the economic disparities between urban and rural areas (Rodríguez-Pose & Hardy, 2015). This awareness could lead to a negative perception, especially if they perceive limited economic opportunities or unequal distribution of resources in urban areas. Similarly, sociocultural theories suggest that as education levels increase, rural individuals may become more aware of the potential loss of cultural identity associated with urbanization (Stephens et al., 2012). This awareness may contribute to a negative perception of urbanization as it threatens traditional values and ways of life.

However, this concept also diverges with modernization and development theory. These theories argue that higher levels of education should result in a more positive perception of urbanization. This viewpoint suggests that educated individuals are more likely to view urbanization as a sign of progress and advancement, offering improved opportunities for education, healthcare, and employment (Holsinger, 1987). Several empirical pieces of evidence support the ideas presented in modernization and development theories (Demissie & Belaineh, 2013; Iqbal et al., 2020). These studies concluded that farmers with higher levels of education are more inclined to pursue non-farm self-employment and formal wage labor to diversify income.

Moreover, a correlation has been identified between family size and the perception of urbanization, with larger family sizes associated with a more unfavorable viewpoint (Headey

& Hodge, 2009). This inverse relationship between family size and perception is consistent with existing literature that suggests larger families may hold negative perceptions of urbanization due to potential disruptions in traditional rural lifestyles. This finding is supported by previous empirical evidence, which indicates that larger household sizes are associated with lower levels of family well-being, even when alternative livelihood strategies such as non-farm self-employment and formal wage labor are available (Tiberti & Mezgebo, 2020; WEGEDIE, 2018).

Similarly, there is a correlation between increasing landholding sizes and a negative perception of urbanization. This finding aligns with the theory of economic dependence on agriculture (Vlasek, 1979), which suggests that households with more considerable farmland perceive urbanization negatively because they rely on agriculture for their economic livelihood. These households may be concerned that urbanization will result in the loss of agricultural land, which would directly impact their income and overall well-being. This finding is consistent with previous studies (Aouri et al., 2014; Mezgebo, 2020; Factura & Cimene, 2022). These empirical studies emphasize that urbanization often involves the conversion of nearby rural land to accommodate the expansion of urban centers. Aouri et al. (2014) specifically highlight that the loss of agricultural land is one of the adverse effects of urbanization on rural households, potentially leading to an increase in landless or near-landless households.

A combination of similarities and disparities emerges upon comparing these findings with existing literature. Studies that validate the positive outlook on urbanization among rural households situated at a distance coincide with the idea that spatial proximity can positively influence perceptions of urban development by reducing congestion and environmental impact. In contrast, the finding of a negative perception linked to higher educational attainment diverges from specific literature, suggesting that increased education levels may foster a more positive understanding of the benefits of urbanization. The inverse correlation between family size and perception aligns with the literature proposing that larger families might view urbanization negatively due to potential disruptions in traditional rural lifestyles. Furthermore, the adverse perception linked to expanding landholding sizes echoes studies emphasizing concerns about the potential impact of urbanization on agricultural practices and land use.

3.6 Conclusion

The study aimed to investigate whether there are differences in the perceived effects of urbanization on rural farm households based on their proximity to urban areas. Additionally, the study aimed to identify socioeconomic factors contributing to variations in perception among rural farm households. The results indicate distinct variations in perceptions of urbanization between households near urban areas and those further away. Rural farm households located further from urban centers generally perceive urbanization positively, attributing it to increased income diversification, improved agricultural production, job creation, and strengthened community relationships. On the other hand, farm households near urban areas tend to have a negative perception, with an average mean value lower than that of households located further away. Key determining factors contributing to these differing views include distance from the urban center, educational status of households, family sizes, land holding sizes, and categories of rural kebeles based on their distance.

3.7 Recommendations

Based on the findings, the subsequent recommendations can be categorized into three groups: Implications for Development Practitioners, Implications for Research, and Implications for Policy.

Implications for Development Practitioners: Development practitioners should formulate interventions considering the diverse perceptions of urbanization among rural farm households, contingent upon their proximity to urban centers. Customizing programs and initiatives to address households' specific concerns and preferences in different locations can enhance their effectiveness. Recognizing the influence of educational status on perceptions, development practitioners should implement targeted educational campaigns to disseminate accurate information about the benefits and challenges of urbanization. This can contribute to a more informed understanding among rural communities and potentially mitigate negative perceptions of higher education. In addition, development initiatives should prioritize community engagement and participatory approaches, involving residents in decision-making processes related to urbanization. This inclusive strategy can foster a sense of ownership, address specific needs, and build trust between practitioners and rural farm households.

Implications for Research: Researchers could employ various study designs to track changes in perceptions, thereby gaining a more comprehensive understanding of the evolving nature of attitudes toward urbanization. This would provide valuable insights into the factors influencing shifts in perspectives within rural communities. Further research could explore similar studies in different geographic contexts or cultural settings to determine the generalizability of the findings. Comparative analyses contribute to a broader understanding of how regional and cultural factors influence perceptions of urbanization. Moreover, researchers should adopt interdisciplinary approaches, integrating perspectives from sociology, environmental psychology, and urban planning to comprehensively analyze the complex interplay of factors shaping rural farm households' perceptions of urbanization.

Implications for Policy: Policymakers should consider spatially targeted policies that consider rural farm households' unique needs and concerns based on their proximity to urban areas. This approach ensures that interventions are tailored to communities' specific challenges in different geographical contexts. Policy initiatives should include education and awareness programs that address misconceptions and highlight the positive aspects of urbanization. Emphasizing the potential benefits, such as improved infrastructure and economic opportunities, can contribute to a more positive overall perception. Lastly, land-use planning policies should be inclusive and considerate of the concerns associated with increasing landholding sizes. Balancing urban development with preserving agricultural practices and rural qualities requires comprehensive and collaborative land-use planning strategies.

CHAPTER FOUR: Article 3
Urbanization and Its Effects on Income Diversification of Farming Households
in Adama Woreda, Ethiopia

Abstract:

Urbanization remains a public policy challenge in developing countries, particularly in Sub-Saharan Africa, where fast growth rates have been observed. This study aims to investigate the effect of urbanization on the income diversification of farm households in the Adama Woreda of the Oromia Regional State. We used data collected using structured questionnaires and KII from two groups of farm households based on their distance from the urban center . Families residing close to urban areas are categorized as treated and those found at further distance is considered as control group. The study employed both descriptive and inferential data analysis. Multinomial logistic regression analysis revealed that farming households in urban areas diversify their income to farm and unskilled non-farm activities more than rural households far away from urban centers. The finding shows that increasing urbanization by one unit causes a decrease in farming activities by 40%, and farming and non-farm activities increase by 35%. The result also indicated that households with higher-aged and larger family sizes were more likely to diversify their income to unskilled non-farm activities. The result proved that urbanization limits farming households' capacity to generate revenue from agriculture and pushes them to diversify their income. Governments should therefore design robust strategies and facilitate the provision of agricultural technologies. The regional state and small financial enterprises should also assist displaced households in expanding their income-generating activities.

Keywords: Income Diversification; Marginal effect; Multinomial logistic regression; Oromia Region; Urbanization;

4.1. Introduction

Agriculture has been the economic backbone and principal activity of most rural households in Ethiopia. However, recently swift urbanization is coming with enormous ramifications for farm households in major cities of Ethiopia (Terfa et al., 2019). Different theories describe the effects of urbanization on smallholder farmers' livelihoods differently. For instance, modernization theory prominently describes the positive impact of urbanization on the livelihood of farm households as it opens a pathway through transforming traditional communities into modern society (Berliner, 1977).

On the other hand, proponents of urban bias and dependency theory claim that urbanization weakens the livelihood of smallholder farmers. Urban bias theorists critically criticize government policies that favor metropolitan areas that motivate migration from rural areas and economic performance increases for a short period; however, after a time, the economy goes bankrupt (Lipton, 1977). So, they assert that equitable development is possible only through aiding agriculture. Similarly, dependency theorists argue that foreign investors compete for land with farm households, decreasing farmers' landholding, and migration to urban areas remains indispensable (Ledogar, 1975). Consequently, job opportunity decreases, and economic development emaciates (Timberlake & Kentor, 1983). This controversy shows that there is no clear and commonly agreed domain of knowledge on urbanization's impact on farm households' income diversification.

It should also be noted that urbanization is an irreversible and inherent global phenomenon in human development. Similarly to the theoretical viewpoint, there are no commonly agreed on empirical strands of urbanization on peri-urban households' livelihood strategies and income diversification. It is crystal clear that urbanization incorporates peri-urban farmland and limits farming households' access to farmland and natural resource-based livelihood. As a result, farm households revise their livelihood strategies and diversify their income sources. Emperical studies evidenced that urbanization improves rural-urban linkage through consumption linkages, remittances, upward pressure on agricultural wages, and the generation of rural non-farm employment rather than merely trespassing rural areas into urban areas(Cali & Menon ,2013).

Similarly, Other studies also assured that urban expansion had an unprecedented role in transforming the economy of nations as it accounted for 50-80% of the Gross Domestic Product (GDP) of nations (Alaci ,2010). It spurs the economic growth of peri-urban farmers by facilitating access to markets, education, employment opportunities, technology, and health services (Abass et al., 2013; Aberra& King, 2005; Ashong et al., 2004). Urbanization increases the non-farm income of rural households, especially those living close to cities(Arouri et al. ,2014). As firms are concentrated in cities, they attract not only urban workers but also nearby rural workers. As a result, urbanization increases the wages of rural workers.

Studies conducted in Kenya and Malaysia showed that it creates decent jobs for those previously working as farmers and laborers in farming (Samat et al., 2014; Thuo, 2013). They also add that it provides a better working environment for formal work like small-scale business and construction where such activities were absent. Consequently, their income was increased, and their livelihoods were improved. Another study in Kenya showed that farmers had improved their income sources, mainly when low agricultural produce prices were (Tacoli, 2002). Besides, it helped to decrease vulnerability to seasonal drought and shocks and normalized income variation unless it varies seasonally. It benefited by renting houses to compensate for the reduction of food grains from their farmland (Thou, 2010). Accordingly, all these extensive domains of studies advocate its role in transforming and improving the national economy and the community's well-being.

Conversely, researchers have noted that urban expansion leads to the reduction of green open spaces, the disappearance of landscapes, and heightened environmental degradation (Arouri et al., 2014). Urbanization changes land use and cropping patterns, decreasing fertile agricultural land. Therefore, increasing unemployment in farm sectors causes higher prices of food, poor quality, scarcity of water, rural-urban migration, and increasing competition between agricultural and residential uses of natural resources (Bah et al., 2003). The reduction in farmland sizes has cumulated in a reduction in the number of farm households engaged in farming and increased their livelihood strategies and income diversification in a peripheral urban area. For instance, a study conducted in Ghana evidenced that farming communities decreased from 89.3% to 40%, whereas non-farming increased from 10.7% to 60% between 1986 and 2007 (Abass et al., 2013). Another study in Kenya also revealed that the number of farmers decreased from 90% in 1970 to 49%. The income generated from

agriculture declined due to the reduced economic value of agriculture and decreased the number of households engaged in farming as a full-time economic (Mandore et al., 2010).

Consequently, a study conducted in Tigray, Ethiopia, by Mezgebo (2014) and (Weldearegay et al., 2021) reveals that urban expansion diminishes the economic performance of smallholder peri-urban farmers. Another study in Addis Ababa also evidenced that regardless of compensation, dispossessed farming households have low-income-generating opportunities (Leulseged et al., 2012). Another study in Addis Ababa underscored that dislocated farmers were engaged in low-income-generating activities like selling local beverages and water (Abdissa, 2005). He adds that this economic opportunity was for survival rather than a choice of economic activity to improve and change their lives permanently.

Both theoretical and empirical reviews of the literature have long-established that in the course of rural-urban livelihood transitions, farm households might reorient their income diversification to secure their families' livelihoods in the peri-urban. The outcome of such a livelihood transition can be positive or negative. Negative livelihood adaptation likely occurs when the household shifts from relatively rewarding agricultural employment (e.g., producing cash crops) to less-paying (unskilled) non-farm employment that results in social and economic costs (Ellis, 2000; Mezgebo & Shaughnessy, 2014). Therefore, urbanization is a double-edged sword; if well managed, essential for development and can lift societies by promoting diverse urban environments. It stimulates creativity and innovation to diversify their livelihood strategies and improve their well-being. Conversely, rapid urbanization challenges livelihoods and threatens the security of life and property of farm households surrounding urban areas. It consumes more of the rural households' farmland, and transforming agricultural land into other development activities as farmland in peripheral urban areas is a potential sector where many stakeholders compete to satisfy their fundamental economic and social interests (Mohammed, Kosa, and Juhar, 2020).

Oromia region farm households are a top victim of urbanization in Ethiopia. The region is where most factories and processing plants are found, and residential areas are unprecedentedly increasing due to their proximity to the capital city of Ethiopia. Every year – peri-urban smallholder farmers are displaced. So far, studies (Abdissa, 2005; Bekele, 2010; Mengistu, 2016; Mezgebo, 2014; Terfa et al., 2019; Weldearegay et al., 2021) have been conducted in different parts of Ethiopia. However, no single cross-national study has tested

the hypotheses advanced by the three theories via; the theory of modernization, dependency theory, and the rural-urban linkage; instead, they tested either of the theories. In addition, various empirical studies in different countries conducted so far did not give clear evidence of urbanization's effect on smallholder peri-urban farmers in Ethiopia. Therefore, this study in Adama City and the surrounding Woreda was conducted in Oromia to address the effect of urbanization on income diversification among farm households close to urban areas and far away from urban areas. In addition, the study explores factors that affect the income diversification of farm households in the study area.

4.2. Material and Method

Land is a priceless resource for farm households in Ethiopia. In recent years urbanization has been increasing at an alarming rate in rural areas integrating peri-urban farmland into urban areas that make households landless or possess small landholdings. Both quantitative and qualitative data were employed to investigate the effect of urbanization and differences in income diversification of farm households between proximate and rural farm households in the peripheral area of Adama city. We used data collected from two groups of farm households based on their distance from the urban center of the same Woreda and adjacent kebeles with comparable agro-climatic and socioeconomic circumstances. The average distance of households in the control group was 26.992km, and that of the treatment group was 8.946km.

Data were gathered mainly from primary sources using a cross-sectional design to simultaneously estimate the outcome and farm households' engagement; the study also employed inferential statistics (chi-square test, T-test, and ANOVA) for data analysis. Multinomial logistic regression was used to analyze the determining factors that affect the income diversification of households. The data for the study was collected from four samples of rural kebeles in the Adama Woreda, in which two were proximate to the Adama City Administration and the remaining two were nearly far from the city administration to compare their difference. Three hundred ninety-seven rural households were selected using a simple random sampling technique from the total sampled kebeles. 140, 109, 78, and 70 households from Roge, Goro, Adulala, and Boku of rural kebeles were sampled, respectively.

Multinomial logistic regression was used to analyze urbanization's effect on farm households' income diversification. The model is applicable when the outcome variable is a discrete and unordered category. Therefore, the probability of association in other categories is compared

to the probability of association in the reference category. Income diversification is the dependent variable and is categorized into three via household heads' major activities: farming, farming and unskilled non-farm income, and farming and transfer income activities. Therefore, demographic, socioeconomic, and institutional factors that affect the outcome variable are defined precisely.

Let Y_i be a random variable that indicates the individual i 's choice, then the probability of choice j in the multinomial logit model is given as follows (Greene, 2003; Maddala, 1993).

$$\Pr = (Y_i = j) = \frac{e^{\beta_j X_i}}{\sum_{k=0}^n e^{\beta_k X_i}} \dots\dots\dots(1)$$

Where j indexes the choice, X is a vector of individual characteristics; i index the individuals, index the independent variables, e indicate the natural base of logarithms, and β a vector of unknown parameters. The model provides a set of probabilities for the $j+1$ choice of a decision-maker with characteristics X_i . However, the model in equation (1) above is indeterminate and needs to be normalized by assuming $\beta = 0$. The reason is that probabilities sum to 1, so only j parameter vectors are needed to determine the $j+1$ probability. Therefore, the probabilities are:

$$\Pr(Y_i = j | X_i) = \frac{e^{\beta_j X_i}}{1 + \sum_{k=0}^j e^{\beta_k X_i}} \text{ for } j = 1, 2, 3 \dots\dots\dots(2)$$

The magnitude of the coefficient estimates of the independent variables in the multinomial choice models describes the relative probability of a choice to a base choice. However, this gives limited information; only their signs and significance level are relevant (Kropko, 2007). On the other hand, the influence of an independent variable on the choice decision can be assessed by the size of its marginal effect. The marginal effect measures the instantaneous effect that a change in a particular explanatory variable has on the predicted probability of the dependent variable. The larger the marginal effect, the more significant the impact of an independent variable on the probability of an individual choosing an income diversification alternative in response to a change in the independent variable (Ntembe, 2009). They are differentiating (2) to determine the marginal effects of the repressors on the probabilities.

$$\delta_j = \frac{\partial P_j}{\partial X_i} = P_j \left[\beta_j - \sum_{k=0}^j P_k \beta_k \right] = P_j \left[\beta_j - \bar{\beta} \right] \dots\dots\dots(3)$$

Table 4.1 Dependent and independent variables used in the multinomial logistic regression

Variables	Description of variables	Expect sign
INDCV (DV)	Income diversification categorical variable	
SEX	Sex of HH head (binary) 1 = Male, 0 = Female	+
AGE	Age of HH. Head in years (Continuous)	-+
EDU	Educational Status of HH. head in the year (binary) 1= literate 0 = illiterate,	+
SIZE	Family size of HH in number (discrete)	+
MIRAGE	Marital status of HH head (categorical) 1= married, 0 = Others,	+
LSIZE	Land size in hectares (continuous)	-
TLU	Tropical livestock unit in number (continuous)	+
ACCREDIT	Access to credit habit of HH head (binary) 1= yes, 0 = no,	+
SAVE	Access to Saving habit of HH heads (binary) 1= yes, 0 = no,	+
MKTDIST	Distance to market in kilometers (continuous)	-
REMITTANCE	Access to remittance of HH head (binary) 1= yes, 2= no,	+
TREATMENT	Categories of Kebele based on distance from the urban center (binary) 1= treated, 0 =control,	-
EXPEND	Annual consumption expenditure of HH head in birr (Continuous)	+

5. Sources: Field Survey 2022 and review of empirical studies

5.1. Results and Discussion

5.1.1. Descriptive results

Table 4.2 shows the descriptive statistics on the sampled farmers of continuous data. It revealed that the average total family size of the households was 4.3, which is less than the national average family size of 4.6 (Ethiopia Demographic and Health Survey [EDHS], 2016). Similarly, since age was measured in years, the average years of the household heads were 45.2 years. The average total household land holding size was 1.2. Distance to the Adama city market from the household residence is a critical determinant factor in measuring urbanization effects on rural livelihoods. Hence, the average distance from a residence to the nearest urban market is 20.3 km.

Distance to the urban center from average sample kebeles of household heads was essential in analyzing the difference between the two groups. To this effect, the average kebeles far from the urban center (Control) was 26.992 km, and that of the nearest kebele was 8.946 km, with their standard deviation of 5.714 and 4.065, respectively. The average annual consumption

expenditure per adult equivalence of the households in the study area was 7015, with st. Dev 2606.9.

Table 4.2 Summary Statistics for Continuous Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
Age of Households in years	397	45.2	9.9	25	71
Family Size in number	397	4.3	1.2	3	7
Land Holding Size in hectares	397	1.2	0.6	0.2	2.8
Distance to market in km	397	20.3	10.2	2	37
Annual Consumption Exp in birr	397	7015.8	2606.9	735.8	18788.7

Sources: Compiled from own field survey data (2021)

The income sources of rural farming households are diversified via the farm, farm, and unskilled livelihood activities and farm and transfer payment. Farm income is the income generated from crop production, animal production, rents of farm durability, and even the by-products of crops and animals. Income sources from farm and unskilled activities include all incomes from wages earned from different businesses and other related non-farm activities in the farmer's village or neighboring urban area.

However, for quantitative analysis of households' poverty, the most common approach to measure rural household welfare in developing countries like Ethiopia is based on household consumption expenditure rather than income, as it can be a better indicator of lifetime welfare than income (Eyasu, 2020). He pointed out that using the consumption expenditure of households is relatively stable, and households may be more able or willing to recall what they have spent than what they earned. Hence, for this study, household consumption expenditure per adult equivalency was used to compare the welfare of the two groups. The consumption expenditure includes both food and non-food-related expenditure in the year. Food expenditures are purchased and provided from products such as cereals, vegetables, fruits, and others, whereas non-food-related expenditures via health, education, and other durable and non-durable expenditures in the year.

As shown in Table 4.3, the t-test distribution of the mean consumption expenditure of households was 7016 birr per year. The analysis indicates that households' mean consumption expenditure proxy to urban areas is 5,207 birrs and lower than that of families in distant areas by 8,092 birrs. The result indicates that urbanization not only changes livelihood strategies

and income diversification activities but also affects the income and overall welfare of farm households near the urban area in the study sites.

Table 4. 3 T-test distribution of Consumption expenditure per adult equivalence between groups

Explanatory variable	Obs	Mean value			P-value	Mean value			p-value
		Male	Female	Combined		Control	Treated	Combined	
Ann.Con. Exp in birr	397	7000	7113	7016	0. 7638	8092	5207	7016	0.000***

Sources: Compiled from own field survey data (2021)

The basis of the classification depends on the effective livelihood strategies of households. Accordingly, the primary income for most of the households at the Woreda level comes from farming, followed by farm and unskilled non-farm income activities (Table 4.4). Like other parts of Ethiopia, it is clear that the farm households in this Woreda predominantly engaged in farm activities to sustain food and non-food necessities. The reason is low marketable skills to compete in fewer non-farm activities requiring a skilled workforce. Both female and male-headed farm households' livelihood depends on subsistence agriculture. Besides, many female and male farm households are engaged in unskilled non-farm income-generating activities. Though the quantities of farm households are low, farm households still generate income from a combination of farm and transfer income activities. In general, no statistically significant association was found between the sex of farm households and income diversification activities in the study area.

Since peri-urban smallholder farmers mainly depend on agriculture, the result showed a similar output. More than 80% of the control groups who are apart from the urban areas sustain their livelihood from agriculture. While most treated groups are close to urban settings, their livelihood is mainly driven by farm and unskilled income-generating activities. However, a few controlled and treated households are getting income from farm and transfer income activities. The overall chi-square test result showed a significant statistical correlation in income diversification at $p < 0.01$ between the control and treated groups.

Table 4. 4 Chi-square test results on distribution of household income diversification by sex and treatment

Livelihood diversification	Sex			P-value	Treatment			P-value
	Female	Male	Total		Control	treated	Total	
Farm activities	32(13.1%)	212(86.9%)	244(100%)		202(82.8%)	42(17.2%)	244(100%)	0.000***
Farm & unskilled activities	21(18.3%)	94 (87.6%)	107(100%)	0.218	35(30.4%)	80(69.6%)	115(100%)	
Farm & transfer activities	3(7.9%)	35(92.11%)	38 (100%)		12(31.6%)	26(68.4%)	38(100%)	
Total			397(100%)		249(100%)	148(100%)	397(100%)	

*** indicates a 1% significant level

Source: Compiled from own field survey data (2021)

5.2. Determinants of income diversification of farm households

Initially, Multicollinearity and heteroscedasticity tests were conducted. The result showed that there is no multicollinearity and heteroscedasticity problem. Moreover, the overall model is statistically significant at $P < 0.01$. Therefore, the model is robust. Income diversification increases smallholder farmers' agricultural productivity and production by investing in agricultural technologies. However, in most agrarian countries, income diversification is a coping strategy where poor farmers are forced to migrate in search of wages to compensate for crop wilt (Samson et al., 2010). Table 4.5, the multinomial logistic regression result shows that the household head's age increases the likelihood of households participating in farm and unskilled income activities relative to the farm activities. The result implies that household of higher ages more strongly participates in farm and unskilled income activities than participating in the farm only farm and transfer income activities as means of income sources. The result might be the continuous shrinking of farmland size resulting from urbanization, forcing older people to participate in lower-wage activities like local brewing and petty trading and renting their land. The result agreed with ((Adem et al., 2018). He evidenced that older people are less productive in farming because farm activities are labor-intensive. Perversely this finding contradicts (Demissie & Belaineh, 2013; Mezgebo, 2014). They stated that employers prefer younger workers over older workers regarding non-farm activities. Thus, older households engage in farming activities. Hence, younger households rely on non/off-farm employment to support their livelihoods, while the older ones concentrate on farming instead of non/off-farm activities.

Surprisingly, farm households being close and away from urban settings significantly impacts choosing income diversification. Compared to the base outcome variable, treated groups are likelier to engage in farm, unskilled, and transfer income activities. Therefore, households close to urban settings are more likely to engage in farm and unskilled income and farm and transfer income activities than diversifying their income into only farm income activities. Since the treated group are close to urban centers, the probability of access to non-farm activities is better than their counterpart control group. Hence, urbanization increases households' income by diversifying their livelihood activities from farm to non-farm to increase their income and consumption expenditure (Calì & Menon, 2013; A. Ben Youssef et al., 2016). In addition, this finding is in line with (Etea et al., 2019). They stated that peri-urban households diversify their income strategies more than households in rural areas. Consumption expenditure has significant effects on farm households deciding income diversification. The result shows that less consumption expenditure increases the probability of households diversifying their livelihood strategies into the farm and transferring income activities relative to the base outcome of farm activities. Therefore, households near urban areas diversify their income activities from farm to farm and transfer income activities to increase their annual consumption expenditure rather than being employed in farm and unskilled income activities. The result is in line with (Kokeb & Molla, 2014). They pointed out that remittance and other transfer income substantially reduce the level, depth, and severity of poverty among remittance recipient households.

Table 4. 5 The result of multinomial logistic regression is arranged based on table 4.1.

Multinomial logistic regression		Number of obs = 397		
		LR chi2(26) = 139.21		
		Prob > chi2 = 0.0000		
Log-likelihood = -280.8116		Pseudo R2 = 0.1986		
Farm activities	(Base outcome)			
Variables	Farming and Unskilled income activities		Farming and Transfer income activities	
	RR.	Std. err	RR.	Std. err
SEX of HH. head	0.834	0.348	2.301	1.816
AGE of HH. head	1.034**	0.016	1.033	0.024
EDU of HH. head	1.231	0.385	1.345	0.592
FSIZE HH. of head	0.867	0.138	1.228	0.267
LSIZE HH. f head	0.670	0.459	0.786	0.795
MRAGE HH. of head	0.637	0.345	0.472	0.394
TLU	0.901	0.074	0.911	0.121
CREDIT of HH head	0.767	0.349	1.271	1.040
SAVE of HH head	1.173	0.375	1.761	0.816
MKTDISTANCE	0.993	0.032	0.957	0.048
REMITANCE of HH head	0.679	0.293	1.742	1.244
TREATMENT	7.111***	4.66	8.207**	8.102
EXPENDITURE of HH head	1,000	0,000	1.000**	0.000
_cons	0.348	0.579	0.001***	0.003

***, **, and * indicates $P < 0.01$, $P < 0.05$, and $P < 0.1$ significant level, respectively.

Source: Compiled from own field survey data (2021)

5.3. Result of marginal effects of multinomial logistic regression estimation

The marginal effect measures outcome variables or dependent variables, which we will analyze the relationship with independent variables. Age of household is an essential demographic characteristic that can affect positively or negatively household income diversification. A unit increase in the age of the household head decreases the probability of households' income diversification to farming by 0.5%. It -increases the likelihood of households' income diversification to farming and unskilled income activities by 0.4%, keeping other variables constant. Farming is labor-intensive and demands a young person to effectively manage agronomic practices and livestock rearing. However, comparatively unskilled non-farm activities can be easily managed by elders. This result is in line with (Ibrahim et al., 2010). They evidenced that larger households with older adults have small limited access to income-generating activities.

The marginal multinomial logistic regression estimation (Table 4.6) showed that a unit increase in the number of households in the treated group decreased the probability of households diversifying their income to farm activities by 32%, keeping other factors constant. Households in the treated group are close to urban settings, so owing to urbanization, the government takes part of their farming land for development purposes, and the farming community remains with a small landholding. This limits farming households from generating income from farm activities. Instead, they diversify their income sources to non-farm activities. Contrarily, a unit increase in the number of under-treated households increased the likelihood of households being in the category of farm and unskilled income activities by 24. %, holding other variables constant. This result agreed with (Lay et al., 2008). They explained that the decreasing landholding of farming households is the main driving force behind to rise of non-farm activities in Sub-Saharan Africa.

The marginal multinomial logistic regression shows urbanization decreased household annual consumption expenditure by 0.0021 percent, keeping other variables constant. Rural subsistence farmers' consumption and production patterns change due to urban expansion. Having limited farmland due to urbanization decreases the farming activities of households and affects their annual consumption expenditures. Families diversify their income-generating activities from farming to non-farming activities because of the decreasing annual consumption expenditure. Thus, a unit decrease in annual consumption expenditure of

households near urban areas increased their income diversification to farming and transfer income activities by .0012%, holding other factors constant. Households near urban areas are declining in their full-time farming activities due to rapidly shrinking farmland for built-up and other development purposes. The process is fueled by rural-urban migration associated with remittance flows back to the rural place of origin based on their earnings (Calì & Menon, 2013). However, diversifying into low-productivity and low-return non-farm activities. The result agreed with (N. Mandere et al., 2010). As farmland declined in peri-urban areas, households engaged in low-income productive activities.

Table 4. 6 Marginal multinomial logistic regression estimation

Variables	Farming activities		Farming & unskilled income activities		Farming & transfer income activities	
	Dy/dx	Std. Err.	Dy/dx	Std. Err.	Dy/dx	Std. Err.
SEX of HH. head	-.0111465	.0675473	-.061994	.0658143	.0731406	.0602537
AGE of HH. head	-.0054557**	.0023989	.0041653*	.0024017	.0012904	.0017103
EDU HH head	-.037588	.047756	.0222024	.0474111	.0153856	.0325931
FSIZE HH. head	.0092555	.0241429	-.0310843	.0236434	.0218288	.0159203
LSIZE HH head	.0590708	.1039782	-.055506	.1062699	-.0035647	.0766126
MRAGEHH. head	.0859229	.0842168	-.0440223	.0825453	-.0419006	.0621696
TLU HH. head	.0165502	.0124516	-.0132153	.0132182	-.0033349	.0103236
ACREDIT HH. head	.0231186	.0720388	-.0524433	.0726162	.0293247	.0627469
ASAVE HH. head	-.0424692	.0485688	.00383	.0490464	.0386391	.0348747
MKTDISTAN HH head	.0026993	.0048574	.0004911	.005121	-.0031903	.0038398
REMITANCE HH. head	.0253133	.0693941	-.0843545	.0638875	.0590412	.0522925
TREATMENT	-.3269389***	.0935897	.2364736**	.1004413	.0904653	.0747071
EXPENDITURE	-.0000208*	.000012	1.74e-06	.0000123	.000019**	8.06e-06

***, **, and * indicates $P < 0.01$, $P < 0.05$, and $P < 0.1$ significant level, respectively.

Source: Compiled from own field survey data (2021)

4.6 Conclusion

The study examined the effect of urbanization on income diversification of farming households' decisions near urban areas. The study result shows that urbanization has a statistically significant effect on the income diversification decision of farming households. The finding proved that farming households near urban areas diversify their income to farming and unskilled non-farm activities more than households far from urban centers. The result also indicated that households with aged, low annual consumption expenditure, and living close to urban areas were more likely to diversify their income to farming and unskilled non-farm activities, farm and transfer income activities than participating only in farming. However, their diversification to non-farm activities adversely affects their income,

shifting from relatively rewarding farm activities and better income to less-paying unskilled non-farm activities.

Therefore, the result of the study disproves modernization theories, where households proximate to urban areas are better off than those far from urban centers. Conversely, the result converges with dependency theory as displaced labor from farming due to urbanization migrates to urban areas to participate in unskilled and low-paying activities. Therefore, the government should design deliverable strategies to improve the livelihood of farming households near urban areas. The strategies should strengthen urban agriculture and facilitate mechanisms to enable farmers to get agricultural technologies that increase agricultural productivity. Moreover, micro and small enterprises should work hand in hand with the farmers who lost part of their farmland for development purposes to create job opportunities. Lastly, the Oromia Regional State should apply additional efforts to create a favorable working environment for displaced households to generate income from non-farm activities.

CHAPTER FIVE: Article 4
Impact of Urbanization on the Welfare of Farm Households: Evidence from Adama
Rural Woreda in Oromia Regional State, Ethiopia

Abstract

Urbanization is a widespread phenomenon with varying causes, patterns, and effects across countries. However, existing studies have overlooked the specific impact of urbanization on households near urban areas by failing to compare them with households in more distant regions. This study examines the impact of urbanization on rural household welfare in the Adama Rural Woreda of the Oromia Region, Ethiopia. A multi-stage sampling technique was employed, selecting a sample of 397 households from two distinct categories. Of these households, 148 were located near the urban center, while 249 were far away. The study utilized descriptive and inferential data analysis methods and employed the propensity score matching technique to investigate the impact on farm households. Data was collected through questionnaires to gather cross-sectional information, supplemented by qualitative insights from Key Informant Interviews. The findings revealed that households near urban areas had a significantly lower mean annual consumer expenditure of 5,207 ETB compared to 8,092 ETB spent by families in distant areas. The results from propensity score matching further indicated that households near urban centers experienced lower annual consumption expenditures than those located further away. These results highlight the influence of urbanization on the welfare of rural farming households near urban areas. To address the negative effects of urbanization on these households, city administrations, and regional governments need to prioritize the development and implementation of alternative livelihood support strategies. Additionally, the study emphasizes the necessity of implementing policies that mitigate farmland loss while considering the socioeconomic factors impacting farmers in the region.

Keywords: urbanization; rural households; impact; propensity score matching; welfare

5.1. Introduction

The world has witnessed an unprecedented trend of urbanization, with developing countries experiencing the highest growth rates (Abay et al., 2020; Kundu & Pandey, 2020). The world's population is expected to experience significant changes within the next thirty years, with 60-70% of its habitants living in urban areas (Alam, 2018; Ekpenyong, 2015; Holdaway, 2015; Majeed & Tauqir, 2020). In Ethiopia, urbanization is rapidly increasing and transforming fertile agricultural land owned by smallholder farmers (Ayele & Tarekegn, 2020; J. Chen, 2007; Mekuria, 2018; Setia, 2016). This increases pressure on farm production and competition for fertile land for development and profoundly impacts peri-urban farmland and farmers' livelihoods (Dekolo et al., 2015b; Mahtta et al., 2022). Agriculture is a crucial sector in Ethiopia, employing 79% of the population and contributing 34.1% to the country's GDP, accounting for 34.1% of foreign currency earnings (Diriba, 2018; Shimelis, 2021). Smallholder farmers, who utilize 90% of the land for food production, are responsible for producing 85% of all crops, as reported by the (Diriba, 2020; FAO, 2022). Inadequate investment in Sub-Saharan Africa has resulted in low industries with extra obligations originating from the rural sector (Gollin et al., 2016).

Contrarily, studies evidenced that urbanization positively affects the welfare of households (Abay et al., 2020; Cali & Menon, 2009; Reiss, 2011). Urbanization enhances the transition from agriculture to more lucrative industrial and non-farm jobs and boosts rural households' consumption expenditures by increasing investments in farming technologies and creating market opportunities for agricultural products (Diao et al., 2019; Haggblade et al., 2010). It paves the way for market linkage through increasing demand for high-value farming products and non-farm employment, earning higher income to support rural livelihood (Vandecasteele et al., 2018). Studies show that urbanization positively correlates with higher per-capita income (Dao, 2023; Dorosh & Thurlow, 2014; Narayan, 2014) and motivates farmers to modify their agricultural production parallel to urban growth to earn a higher return (Kuusaana & Eledi, 2015; Naab et al., 2013.; Vandecasteele et al., 2018). It fosters a favorable environment for non-farm income, total income, and consumption expenditures of rural households (Arouri et al., 2014; Rumulika, 2019). Innovation in social media and internet use provides peri-urban farmers with access to information, market opportunities, networking, capacity building, and financial services (Anum et al., 2022; Atoma et al., 2018; Chowdhury & Odame, 2013; Odongo, 2014). These benefits empower

farmers to overcome the adverse effects of urbanization on their livelihoods. By leveraging these digital tools, peri-urban farmers can optimize their farming practices, connect directly with consumers, collaborate with peers, enhance their skills, and access financial resources, ultimately ensuring sustainable and resilient livelihoods (Diehl, 2020).

Contradictory viewpoints exist concerning the impact of urbanization on farm households, with some asserting positive effects while others highlight negative consequences (Coulibaly & Li, 2020; Sakketa, 2022). The significant negative impact of urbanization on peri-urban farmers is the reduction in landholding farming (Satterthwaite et al., 2010; Weldearegay et al., 2021). As cities expand, agricultural land in peri-urban areas is often converted for non-agricultural purposes such as residential or commercial development (Alamneh et al., 2023; Rustiadi et al., 2015; Skog & Steinnes, 2016).

In developing countries, urbanization reduces the amount of land accessible for agricultural purposes, constraining farmers' capacity to engage in crop cultivation or livestock rearing and environmental degradation, decreases available incomes and labour productivity, and brings negative motivation for agriculture (Olumba et al., 2021; Reardon, n.d.). Studies in the Philippines revealed that urbanization converts agricultural land into residential or commercial purposes that, in turn, affects farmers' income sources, displaces their livelihoods, and decreases their economic status (Factura & Cimene, 2022). The sewerage and polluted water flow from urban areas affect food production and nutritional quality, influencing farm households' consumption behavior (Alam, 2018; Ekpenyong, 2015; Holdaway, 2015; Majeed & Tauqir, 2020). The interactions between tourism, urbanization, and natural resource exploitation significantly impact the environmental sustainability and welfare of households on the outskirts of urban areas (Balsalobre-Lorente et al., 2023).

Studies have shown that urbanization has decreased the asset valuation of the surrounding residences and the loss of agricultural land (Hussain et al., 2021; Jiang et al., 2018; Zhang et al., 2022). Urban villages negatively influence the value of neighboring assets, such as flats; however, the impact was most significant on residential units that were closer to these villages than on those that were farther away compared to other homes located far away. The result reveals that the neighborhood of urban villages harmed a home's selling value, indicating the adverse effects of urbanization on the surrounding residences.

In Ethiopia, land is a public resource, and the government appropriates land for speculation purposes with possible financial compensation, compromising land discourse for farming and

resulting in a differential impact on the welfare of subsistence farmers (Gemedat et al., 2020, 2020; Wubneh, 2018). As a result, farm households close to urban areas are less likely to move out of poverty than farm households apart from urban areas (Bigsten & Shimeles, 2008; M. Cernea, 2003; Gebregziabher et al., 2014). Urban expansion negatively affects the consumption expenditure of dispossessed farm households and asset ownership (Mezgebo, 2015; Muluwork, 2014; Woldegebriel & Girma, 2023). A multidimensional poverty index analysis of poverty in Tigray highlighted that urban development positively affects the poverty of smallholder peri-urban farmers (Weldearegay et al., 2021).

Ethiopian rural farmers face significant challenges due to urbanization and the decline in their yield, which is linked to agricultural land loss (Ayele & Tarekegn, 2020; Dibaba, 2023; W. Li et al., 2019; Weldearegay et al., 2021). As urban areas continue to expand, it significantly impacts peri-urban farmers. They have been facing a substantial decrease in available land for cultivation, and in some cases, they have lost their land altogether. The process has made farmers more vulnerable than ever (Ayele & Tarekegn, 2020). The land cultivated by Ethiopian smallholder farmers accounts for 95% of the total area under agricultural use, and the farmers are responsible for more than 90% of the farm output (Debela et al., 2020; B. Tadesse et al., 2021; Wondimagegnhu et al., 2019).

Urbanization has had a significant impact on rural farm households in Ethiopia. This multidimensional impact includes challenges related to land availability, poverty dynamics, consumption patterns, and environmental sustainability. While many studies have been conducted on this topic, there is still a need for more studies in the Oromia region to explore the relationship between urbanization and rural farm households. There is also a lack of investigation into the impact of urbanization on the welfare of rural households in rural areas and towns within Oromia. Thus, the study aims to examine the effects of urbanization on rural farm households in Oromia, Ethiopia, based on their distance from the urban center.

5.2. Review of literature

Urban expansion and its effects on rural farm households near urban areas have been the subject of various theoretical explanations. There are theoretical viewpoints that explain urbanization and its effects on rural farm livelihoods. However, this process is complex and diverse, occurring with varying intensities and impacts in different countries (Bilozor & Cieślak, 2021). This study builds upon (Barnes, 2001) theoretical foundation, which proposed three theories to explain urban expansion. The first theory, known as population growth

theory, suggests that an increase in the urban population through natural growth or rural-to-urban migration leads to the outward expansion of cities, encroaching upon surrounding areas(Doan & Oduro, 2012; Ford, 1999; Khan et al., 2014; Mostert, 2018). The second theory, economic growth theory, highlights that expanding the income base, including per capita income and employment rates, creates a demand for new housing and infrastructure amenities(Beauregard, 1994; Harvey, 1973; Kessides, 1993). As economic growth advances, it frequently leads to the displacement of farmers from their land due to establishing new industries on the outskirts of urban areas(Stürck et al., 2018; Sullivan, n.d.).

The third theory focuses on government development policies, particularly the implementation of restrictive land policies to facilitate urban development (Agunbiade et al., 2012; Bengston et al., 2004; Fekade, 2000). The policy poses a significant threat to agricultural communities' livelihoods in developing countries' urban fringes (N. M. Mandere et al., 2010; Thuo, 2013). The development policy perspective suggests that variations in the regulation of development and land use strategies can have significant economic and social implications for farm households near urban areas (Stanny et al., 2021). The differences in the policies may hinder agricultural communities' economic and social well-being (Barnes, 2001). In addition, the absence of proper planning policies and the failure to enforce existing policies contribute to uncontrolled urban expansion, disrupting established zoning structures for residential, commercial, industrial, institutional, and other land uses(Alemineh, 2018; Mohamed et al., 2020). The practices cause a significant threat to agricultural communities' livelihoods in developing countries in urban peripheral areas (Rajadurai, 2020; Strech, 2023).

The study also considers(M. Cernea, 2003) the Impoverishment Risks and Reconstruction (IRR) Model) as its theoretical framework. The model outlines eight key factors that can result from displacement caused by development projects(M. M. Cernea, 2006; Koch-Weser & Guggenheim, 2021; Wet, 2006): landlessness, joblessness, homelessness, marginalization, food insecurity, increased mobility, education loss, loss of access to common property resources, and social disintegration. Although development projects are seen favorably in the comprehensive development paradigm, they have destroyed the environment, uprooted and impoverished people who depended on the land, and fostered social and economic inequality that serves the interests of a small elite (Fernando, 2010; Fynn Bruey, 2019; Rajan, 2018). The central concern of this theoretical model is that forced displacement for development projects disproportionately marginalizes and impoverishes individuals already in vulnerable situations. Under pressure, they are obliged to surrender their valuable possessions, sources

of income, and overall means of sustaining their livelihoods(M. Cernea, 2003). Furthermore, the land is the foundation of people's productive systems in agricultural societies(Jama & Pizarro, 2008; Lepofsky & Kahn, 2011; Walters et al., 2016). Without sufficient replacement through stable income-generating employment opportunities, confiscating these assets will result in impoverishment and interconnected social, political, and economic disruptions and infringements (M. Cernea, 2003; M. M. Cernea & Schmidt-Soltan, 2006; Saxena, 2008).

Empirical strands support the urbanization impact on rural farm households' welfare near urban areas in developing countries, with the impact extending beyond the absolute quantity of land involved, significantly affecting agricultural production and food security(Ziem Bonye et al., 2021). Arguably, urbanization in Sub-Saharan countries needs to be supplemented with appropriate and adequate investment in infrastructure and industrialization to utilize the already evicted productive labour from the displaced rural farming households (Gollin et al., 2016). Notably, urbanization not only occupies vast spatial areas of farmland but also exerts economic pressures that diminish agricultural production, ultimately leading to the marginalization of farmland and posing significant threats to food security (Ayele & Tarekegn, 2020; Huang & Du, 2019). The areas surrounding urban areas, known for their fertile and productive agricultural land, are increasingly susceptible to swift conversion into urban areas. This rapid transformation, in turn, results in farmers losing their vital assets for livelihood (WEGEDIE, 2018). Consequently, numerous local farmers lose land rights(Coulibaly & Li, 2020).

Empirical literature ascertains that urbanization significantly affects the well-being of rural farm households residing near urban areas in developing countries(Darrouzet-Nardi & Masters, 2015; Navarro et al., 2020; Satterthwaite et al., 2010). Urbanization not only encroaches upon extensive farmland but also exerts economic pressures that diminish agricultural production, thereby marginalizing farmland and posing substantial threats to food security (Y. Li et al., 2023; Liu et al., 2022; Sun et al., 2023). The fertile and productive agricultural land surrounding urban regions is increasingly susceptible to swift conversion into metropolitan areas, resulting in farmers losing their vital assets for sustaining their livelihoods (Momanyi, 2021; WEGEDIE, 2018). The process brings numerous challenges, including the loss of income opportunities and heightened vulnerability for rural farm households near urban areas(Ayele & Tarekegn, 2020; Azadi et al., 2018; Mekuria, 2018). Hence, sub-Saharan countries must invest more adequately in infrastructure and industrialization to effectively utilize the labour force displaced from rural farming

households due to urbanization (Djurfeldt & Jirström, n.d.; Gollin et al., 2016; Gutu Sakketa, 2023).

Urbanization increases demand for agricultural products, resulting in the loss of agricultural land. The trend puts overwhelming pressure on rural communities to produce food for the growing urban population, contributing to food-related challenges (Gollin et al., 2016). Agricultural-based livelihoods are closely tied to land and rely on the physical environment (Berchoux et al., 2023; Georgis, 2010; Kumasi et al., 2019). However, it negatively impacts the use of farmlands in areas on the outskirts of cities, posing a threat to small-scale farmers' food and income security (Farah et al., 2022). On the other hand, various studies indicate that while urbanization can result in increased landlessness among rural households and decreased agricultural income, it also tends to boost wages and non-farm income opportunities (Mezgebo, 2014, 2015). Consequently, the overall income and consumption expenditure of rural households generally see an increase due to urbanization (M. Arouri et al., 2014; Pandey et al., 2020; Zhong et al., 2021).

Food, energy, water, and environmental security are essential to human survival and socioeconomic development (Kattelus et al., 2014; Rustiadi et al., 2015). However, the safety of these critical resources is threatened due to growing demand. Beyond the widespread implications on public health, Coronavirus disease (COVID-19) has raised additional challenges for critical resource security, particularly for urban populations, as they mainly outsource their demands from rural areas outside their physical boundaries (Abbas et al., 2023; Balsalobre-Lorente et al., 2023; Mitra et al., 2021). In developing countries, where there is poor health infrastructure coupled with a low level of education and a high incidence of poverty, the pandemic would result in increased unemployment, decreased income for daily labour, increased food insecurity, depletion of saving and relief measures, and disrupted the marketing system (Abbas et al., 2023).

In Ethiopia and other African countries, the pandemic significantly affected and forced households to cease their livelihood activities such as daily labor, small business trade, livestock trading, income from remittance, and labor migration (Asegie et al., 2022; Maredia et al., 2022). The pandemic has resulted in crisis management challenges and international concerns related to health issues (Bishop et al., 2022; Choudhuri et al., 2022.). Different actors' cooperation, commitment, and responsible approaches are needed to correct the problems, which should guide their actions to seek common interests that can fix them

(Abbas et al., 2023). Rural-urban collaboration is the mechanism of cooperation that manages these linkages to reach common goals (Mitra et al., 2021). To this effect, recently, rural-urban collaboration has been conceptualized as the mechanism of cooperation that operates these linkages to reach common goals and, hence, urban-rural relationships.

The COVID-19 pandemic caused significant economic disruption, affecting the entire population's lives, livelihoods, and well-being (Asegie et al., 2022). However, the degree and severity of its effects vary among groups and sectors. The pandemic has adversely affected Travel and tourism, a decline in the productivity and production of the services industry (Abbas et al., 2023). Besides, Social media and internet use have enabled peri-urban farmers to access information on pandemics, market opportunities, networking, capacity building, and financial services (Anum et al., 2022; Atoma et al., 2018; Chowdhury & Odame, 2013; Odongo, 2014). Hence, households quickly adapted to the pandemic shock with the support of significant fiscal and monetary policy measures.

5.3. Analytical framework

The study's analytical framework in Figure 5.1 below draws upon the existing literature regarding urbanization and its effects on rural farm households close to urban areas. The study area is experiencing rapid urbanization due to natural population growth, rural-to-urban migration, economic growth, government development policies, restrictive land policies, and the reclassification of rural settlements (Biłozor & Cieślak, 2021). The natural population growth in both rural and urban due to improved health facilities lead to population growth, increasing the demand for resources and services in the outskirts of urban areas. Urbanization is often driven by rural-urban migration as individuals and families move from rural areas to urban centers for better economic opportunities, education, healthcare, and improved living standards. This factor contributes to the growth of the urban regions and places pressure on rural farm households near urban areas.

Economic growth tends when economic activities shift from primarily agricultural-based activities to manufacturing and more services sectors contributes to urbanization and the subsequent decrease in agricultural land near urban manufacturing and services sector increase, the demand for land for factories, warehouse, and commercial and residential area spaces increases, resulting in the conversion of agricultural into urban areas. Government policies and development initiatives often lead to the displacement of farms near urban areas. Land acquisition for urban infrastructure projects, special economic zones, or housing

developments can force rural farm households to relinquish their land and livelihoods. The loss of productive agricultural land and other socioeconomic and institutional factors can result in reduced incomes and increased vulnerability to poverty in farm households near urban areas. It may also disrupt traditional farming practices and agricultural activities, reducing household income and limiting their capacity to invest in education, healthcare, and other essential needs. The process can perpetuate a cycle of poverty and inequality. Therefore, by employing this analytical framework, policymakers, researchers, and stakeholders can better understand the complex dynamics of urbanization and its consequences on rural farm households near urban areas in developing countries. This understanding can inform the design of effective policies and interventions to mitigate the negative impacts and promote sustainable and inclusive development.

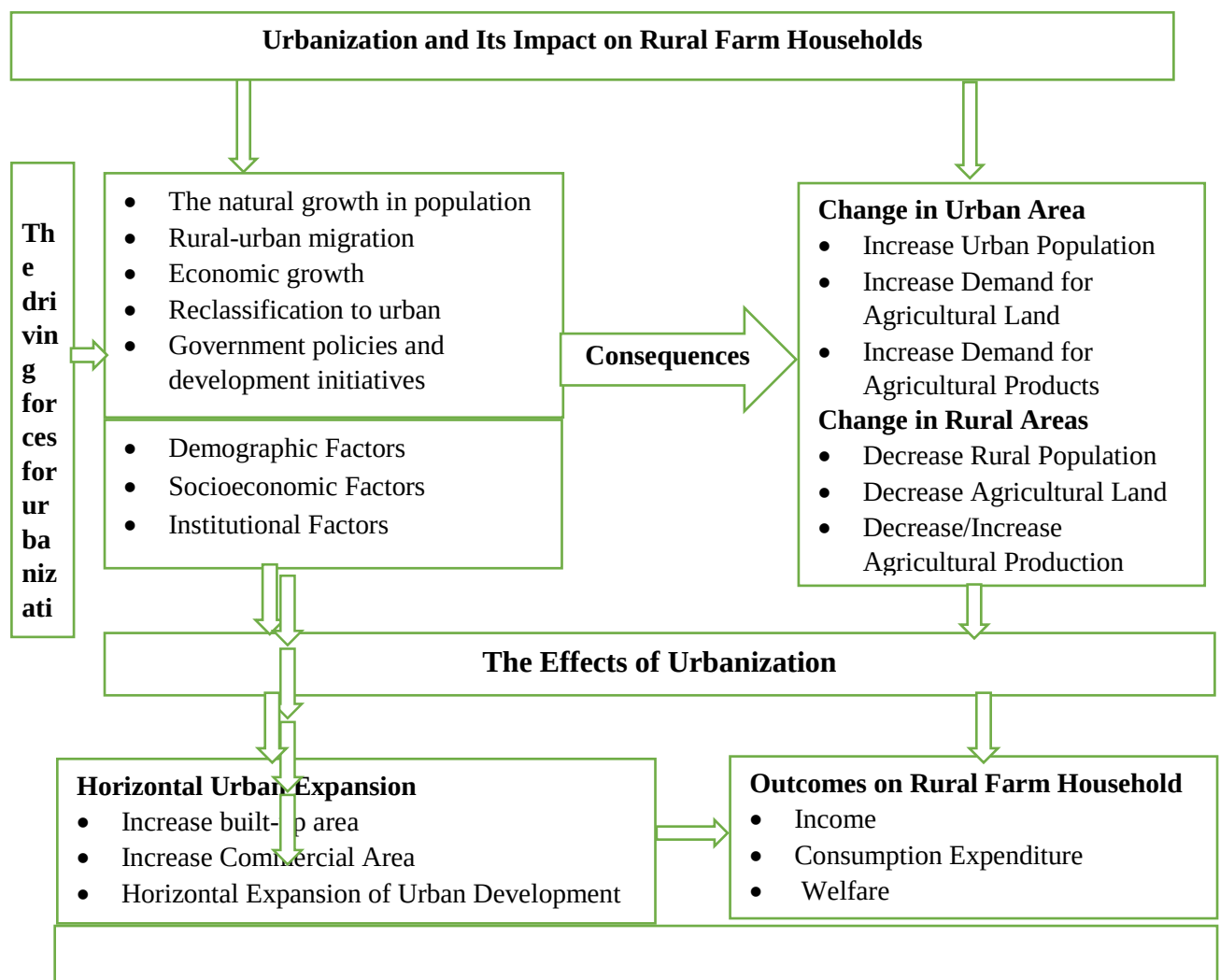


Figure 9: Analytical framewrok of the study

5.4. Material and methods

5.4.1. Description of the study area

Adama Woreda, in the East Shewa Zone of Oromia, Ethiopia, and Adama City, the capital of Woreda, lies 100 kilometers southeast of Addis Ababa, the nation's capital, at latitudes $8^{\circ} 14' 0''$ and $8^{\circ} 43' 0''$ N, and $39^{\circ} 6' 0''$ and $39^{\circ} 25' 0''$ E. Adama has a total area of 871.18 km². The area is situated within the Great Ethiopian Rift Valley and has an altitude range of 1415 to 2505 meters above sea level. Adama Woreda has an average yearly rainfall of 844.20 mm and a maximum monthly average rainfall of 259.8 mm in July. June, July, August, and September get the most rain, similar to most other parts of the country. While January, October, November, and December are the dry months. The warmest month, on average, is May, while the coldest month is July (Belete, 2017). Adama rural Woreda's main economic activities are subsistence agriculture and petty trade. Teff, wheat, barley, maize, and sorghum are locally grown and harvested between October and December when the weather is dry. It has 37 rural kebeles and a population of 235,986 in July 2022, of which 118,403 were males and 116,583 were females(ESS,2022).

Adama, the second most populous and fastest growing city of the Oromia Regional State, is located along the central railway leading to Djibouti. It is the largest urban center in the Oromia region and has more non-farm and off-farm employment opportunities. Adama City is situated in the Ethiopian Great Rift Valley, surrounded by towering mountains and rugged terrain, strikingly contrasting its flat surroundings.

According to Ethiopia Statistical Services, in July 2021, the total population of Adama City was 435,222, of which males account for 212,991(49%) and 222,231 women (51%). Adama City is the center of the regional government's political, business, and economic activities and the largest urban center in the Oromia region. It is the principal city where business activities are underway in the country, next to Addis Ababa. Because of this, the scale and diversity of the infrastructure and economic activities are relatively larger and broader compared to other towns in the region.

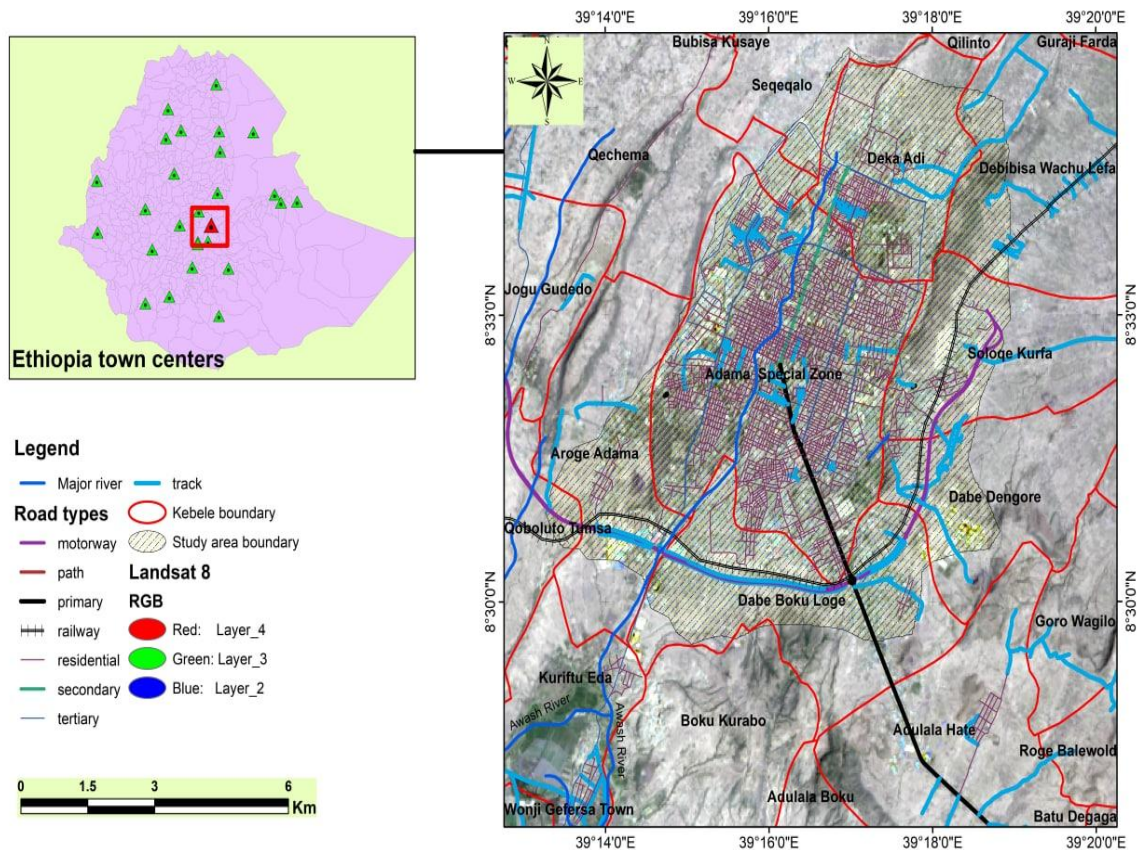


Figure 10: Location map of the study area, Adama City & Woreda, Oromia Region

Source: Constructed by the author based on the raw data from Ethiopia Geo-Spatial instit (2022)

There is a higher availability of non-farm and off-farm employment opportunities. Moreover, the city has rapidly expanded into the adjacent Adama rural Woreda. Recently, four rural kebeles have been included in the city administrative boundary by the preceding Adama structure plan via Malka Adama, Dhaka Adii, Boku Shanan, and Daabee Soloqee. Therefore, it needs to be better understood by considering urban dynamics, trends, and overall effects on the welfare of rural farm households, taking Adama City and its surrounding areas as a case study.

5.5. Research design

This study used a cross-sectional survey design to collect participant data at a specific time. The cross-sectional design offers the benefit of assessing current attitudes or practices, allowing researchers to examine multiple characteristics simultaneously and gather information within a relatively short timeframe (Setia, 2016). It used a descriptive and explanatory concurrent mixed research design to analyze the data. The researchers used quantitative and qualitative data to analyze the cross-sectional study.

5.5.1. Sampling methods and sample size determination

Using a multi-stage sampling method, the researcher considered Adama rural Woreda targeted kebeles near and far from the urban center. The researchers chose Adama City based on the region's significant urbanization trends and potential for new construction and business opportunities following Adama City. Compared to other regions in Oromia, the area experiences the highest degree of urban expansion, threatening fertile agricultural land crucial for crop production.

Farm households in the Adama peri-urban area comprise the study's sample and analytical unit, where agriculture is their primary income source and shares boundaries with Adama city. Therefore, two rural kebeles near the city and two rural kebeles far away from Adama City were selected using simple random sampling. The study focused on two groups of kebeles in Adama Woreda's peri-urban area, emphasizing those whose primary income source is agriculture.

Selecting kebeles representing the interaction between urban and rural dynamics was crucial, which were considered suitable as they share boundaries with Adama City. By including farm households from this peri-urban area, the study can capture the direct influence of urbanization on agricultural practices and livelihoods of homes in the area.

To ensure a thorough analysis of the impacts of urbanization on rural farm households in the peri-urban area, two rural kebeles near the town and two rural kebeles faraway were selected (Hussain et al., 2021). These distant rural areas are expected to have less pronounced effects of urbanization. The study can assess and compare the impacts of urbanization on these two distinct groups. A simple random sampling technique was used for selecting the four rural kebeles (Acharya et al., 2013; Levy & Lemeshow, 2012). It ensures each kebele within the chosen groups has an equal chance of being included in the study. This approach minimizes bias and increases the findings' generalizability to larger rural farm households near urban areas. Lastly, employing a simple random sampling technique to select the study participants from the two groups ensures that each household within the selected kebeles has an equal opportunity to be included. The technique enhances the fairness and validity of the collected and analyzed data.

The study's sample size was estimated using the (Kothari, 2004) formula, an established methodology, considering proportional representation, confidence level, and margin of error accounting for the total population (Gupta et al., 2004; Loru, 2020; Schreuder & Gregoire,

2001). Accordingly, the sample size estimation of the (Kothari, 2004) formula is reported as follows;

$$n = \frac{Z^2 \cdot p \cdot q \cdot N}{e^2 (N - 1) + Z^2 \cdot p \cdot q}$$

Where p represents the proportion of individuals agreeing, and q is equal to 1 - p. Z represents the value of the standard variate at a specific confidence level, n indicates the desired sample size, e represents the expected margin of error, and N represents the total population.

Using (Kothari, 2004), 333 households from 2,515 households in the four sampled kebeles were selected. The formula represents a substantial portion of the population under study, enabling a comprehensive understanding of the research objectives. The study aims to capture the diversity and variability within the population by including a significant number of households, resulting in more reliable and generalizable findings. An additional 20% of the sample size (64 household heads) was considered for a contingency measure. The technique accounts for potential non-response, dropouts, or other unforeseen factors affecting data collection.

Moreover, this additional sample size helps ensure that the desired sample size (397 rural household heads) is achieved even if there are unavoidable issues during the data collection process. This sample size allows for adequate population representation, accounts for potential contingencies and data quality, and employs multi-stage random sampling techniques to enhance the validity and representativeness of the sample. The technique contributes to the overall robustness and reliability of the study's findings.

Data was gathered from 397 farm households in the same Woreda and neighboring rural kebeles with similar agro-climatic and socioeconomic conditions. The control group consisted of households located at an average distance of 27 kilometers from the urban center, while the treatment group comprised households at an average distance of 9 kilometers. Of the 397 selected household heads, 249 were from households far from the urban area, serving as the control group, while 148 were from households near the urban area.

The decision to have more control group participants than the treatment group in our impact analysis is based on several justifications. We used propensity score matching to create a balanced comparison between the treatment and control groups, and a larger control group provided greater statistical precision and reduced the variability in the estimated treatment

effects. By including a larger control group, we increase the pool of potential matches for each participant in the treatment group, thereby enhancing the quality of the matching process and reducing bias (Austin, 2010; Caliendo & Kopeinig, 2008). It allows for a more robust analysis by providing a larger sample size for estimating the counterfactual outcomes. This increased precision improves the reliability and validity of the impact analysis results.

A larger control group helps ensure the findings' generalizability (Tipton, 2022.) and improves the balance of the study. Moreover, a diverse and representative control group increases the external validity of the estimated treatment effects. In summary, the decision to have a more significant number of participants in the control group compared to the treatment group in our impact analysis using propensity score matching is argued by the need for improved balance, increased statistical precision, enhanced generalizability, and a comprehensive assessment of the intervention's impact (Austin, 2010; Caliendo & Kopeinig, 2008; Tipton, 2022.).

5.5.2. Data collection techniques

The study collected quantitative and qualitative data through personal interviews using a structured questionnaire. The data covered various aspects such as household heads' demographics, socioeconomic status, income, consumption expenditure, and welfare. The questionnaire was initially developed in English and later translated into Afaan Oromo. Four enumerators were recruited and trained to collect data. Before the data was collected, a pilot test was conducted with 50 households to ensure that the interviewee understood the questionnaire well. A structured questionnaire is essential to ensure that respondents' comprehension of the questions is accurate. Data on various aspects such as household heads' demographics, socioeconomic status, income, consumption expenditure, and welfare, were gathered.

Qualitative interviews were conducted with individuals outside the sampled households to complement the quantitative data and provide a vivid picture of the participants' natural life experiences. Key informants from the community were chosen based on their extensive understanding of the issue. These key informants included kebele administrative management, religious leaders, civil servants in kebeles, experts from the woreda office of Agriculture, the woreda land administrator officer, and experts from the Adama municipal. In total, 12 respondents were included in the qualitative interviews. Questions were raised during the interviews and observations with the key informants to capture firsthand data by

observing the environment and community activities. Observation was not only used as a data collection tool but also helped in formulating questions to gain a better understanding of the situation being studied.

5.5.3. Data analysis method

Data was analyzed using various methods, including descriptive statistics, inferential statistics using econometric and models. Qualitative data was also analyzed by transcribing, contextualizing, and triangulating it with quantitative data.

5.6. Model specification

The main objective of this study was to analyze how urbanization affects the consumption expenditure of rural households living near urban areas compared to those living farther away. The impact was evaluated using Propensity Score Matching (PSM), which has the advantage of not making assumptions about any specific functional or distributional form in the impact estimation (Essama-Nssah, 2006; Jimenez-Soto & Brown, 2012). PSM helps control selection bias, reduces the dimensionality of any matching problem, and deals with observable confounding factors to produce unbiased estimates (Essama-Nssah, 2006; Jimenez-Soto & Brown, 2012; M. Li, 2013).

Propensity Score Matching (PSM) uses a continuous outcome variable, and the regression used household expenditure per adult equivalent as a dependent variable (Abdul-Wahab, 2022; Y. Chen, 2022; Olwande & Smale, 2014). Households were categorized into treated and control groups depending on the distance of farm households from the urban area (Cunguara & Darnhofer, 2011; Tibesigwa & Visser, 2016; Weldearegay et al., 2021). However, the main problem in evaluating any intervention is obtaining a good result of the counterfactual effects (Baum et al., 2013). The author argues that if all information relevant to participation and outcome variables is observable to the researcher, the propensity score produces suitable matches to estimate the impact of an observation. The observed treatment variable, which represents the rural households nearest to an urban area (C_i) denoted by (C_i) , can take the values of 0 or 1, where $C_i = 1$ for rural households nearest to an urban area and $C_i = 0$ for rural households far away from urban area.

The treatment status is correlated to the rural households nearest to an urban area (C_i) as follows:

$$C_i = 1 \text{ if } C_i > 0, \quad 0 \text{ otherwise } \dots \dots \dots (1)$$

The development intervention issues of the study under consideration are advised to be evaluated by comparing the results that would have been seen had the program impacted households close to the urban area but had little or no impact on the households far away from the urban fringe. Following (Heckman et al., 1997), let Y_{i1} denote the potential outcome for unit i if the unit receives treatment, and let Y_{i0} indicate the likely outcome for unit i in the control group. The treatment effect for observation i is defined by:

$$Ti = Y_{i1} - Y_{i0} \dots \dots \dots (2)$$

Where Ti denotes the treatment effect for a given household (i), the fundamental problem of evaluating an individual treatment effect arises because one can never observe both the treatment effect and the counterfactual outcome for the same household, either Y_{i1} or Y_{i0} , can be observed. Hence, Y_{i1} and Y_{i0} can never be seen concurrently (i) for the same household. The fence results in a missing data issue, the evaluation problem's crux (Smith & Todd, 2005). The unobservable component in equation 2, be it Y_{i1} or Y_{i0} , is called *the* counterfactual outcome. Therefore, one has to concentrate on sample averages for the impact on a treatment group (Abebaw et al., 2010; Randazzo & Piracha, 2019; Wordofa et al., 2021).

Measuring impact as the difference in mean outcome between all rural households near an urban area and rural households far away from the urban area may give a biased impact estimation. Therefore, since there will never be an opportunity to estimate individual treatment effects in Equation 1 directly, one has to concentrate on sample averages for the impact on a treatment group.

When the two groups are drawn from the same population, and the treatment assignment is independent of all baseline variables, the expected value of the Average treatment effect (ATT) is explained in a random program assignment. Accordingly, it is defined as the difference between expected outcome values with and without treatment for those who participated in the program (Heckman et al., 1999). It is given as follows:

$$\Delta YATT = ATT(\Delta Y/X; Z = 1) = E(y_1 - y_0 / Z = 1) = E(y_1 / Z = 1) - E(\frac{y_0}{Z} = 1) = \dots 1) \dots \dots (3)$$

$YATT$ denotes that rural farm households are more likely to diversify their livelihood strategies and well-being if they live near urban areas. Z – is an indicator variable showing whether a rural household (i) received treatment or not (i.e. (Zi being equal to 1 if the household is near an urban area and 0 otherwise): X – Denotes a vector of the control variable.

Data on program beneficiaries identify the mean outcome in the treated state ($Y_1/X, Z = 1$). The mean outcome in the untreated state $E(Y_0/X, Z = 1)$ is not observed, so a proper substitute must be chosen to estimate ATT.

Since the assignment of the households to the nearby urban area and far away from an urban area is not random (i.e., due to household self-selection to a nearby urban area), the estimation of the effect of urbanization using equation 3 may be biased due to the existence of confounding factors. In non-experimental research like this, estimating the mean impact of treatment on the treated by computing the difference between mean values of the outcome variable for the treatment and control groups gives rise to a biased estimation of treatment impact. An impact evaluation uses a suitable non-experimental method in a setting like this (Rosenbaum & Rubin, 1983). Using PSM to reduce the bias in the treatment effect estimation with observational data set proposed. PSM, therefore, is the most appealing approach to estimate the impact of urbanization on diversifying livelihood strategies and income/expenditure of rural households using distance as a measure of the indicator.

5.6.1. Selection of covariates

There are recommendations for including or excluding covariates in the propensity score matching. (Grilli & Rampichini, 2011.) have suggested that only variables that simultaneously influence the treatment status and outcome variables should be included in the propensity score matching. Given that unconfoundedness requires the outcome variable to be independent of treatment conditional on the propensity score, only variables not affected by treatment should be included in the model. Variables should be fixed over time or measured before participation to confirm this fact.

5.6.2. Estimation of propensity score

While the propensity scores are unknown, the assignment mechanism is non-random; an essential first step is to estimate them as far as the primary objective is to obtain the estimate of the propensity score. This study uses the probit model to compute the propensity score for rural households near the urban area and the other found at a far distance rather than on the estimates of the accurate propensity score as accurately as possible. Each observation (household unit i) in the data will have a propensity score variable between 0 and 1. The probit model on the selected covariates will estimate the propensity score of rural households near urban areas. Hence, the propensity score will be calculated using the formula given;

$$P(Z_i) = \text{Prob}\left(C_i = \frac{1}{Z_i}\right) \dots \dots \dots (4)$$

Where $P(Z_i)$ is the propensity score of households, C_i and i represent the status of the household ($C_i = 1$ for households near urban areas and $C_i = 0$ for households far away from urban influences). Z is the covariates included in the model, and i is the number of households in the sample. Therefore, the propensity score, $P(Z_i)$, will be estimated by the probit model, representing rural households near urban areas (1 = yes and 0 = No) on the selected covariates.

5.6.3. Matching estimator (algorithm)

Several matching techniques have been suggested in the literature to estimate the ATT. An excellent matching estimator only allows a few original observations (Caliendo & Kopeinig, 2005). It should yield statistically equal covariates simultaneously for households in the treatment and control groups.

Common Support Assumption: A further requirement besides independence is expected to support. It rules out the phenomenon of perfect predictability of D given X :

$$0 < P(D = 1 | X) < 1$$

The common support assumption ensures that persons with the same X values have a positive probability of being both participants and non-participants (Heckman et al., 1999).

Estimation strategies involve estimating treatment effects on the treated (ATT), urbanization's average impact on consumption expenditure for rural households near the urban area, and rural homes far from the urban area. As (Becker & Ichino, 2002) states, the ATT is urbanization's average impact on consumption expenditure.

$$ATT = E\{Y_{1i}^k - Y_{0i}^k | C_i = 1\} = E[E\{Y_{1i}^k - Y_{0i}^k | C_i = 1, P(Z_i)\}] \\ E[E\{Y_{1i}^k | C_i = 1, P(Z_i)\} - E\{Y_{0i}^k | C_i = 0, P(Z_i)\} | C_i = 1] \dots \dots \dots (5)$$

Where ATT is the impact of urbanization on consumption expenditure, Y_1 and Y_0 are the outcome variables of interest for the households near the urban area and the rural households far from the urban area. i denotes the number of households in the sample (n). K refers to the livelihood outcomes under study (diversifying livelihood strategies and expenditure status of the rural households).

Estimation strategies involve estimating treatment effects on the treated (ATT), urbanization's average impact on consumption expenditure for rural households near the urban area, and rural households far from the urban area.

5.7. Result and discussion

5.7.1. Impact assessment

Propensity score matching (PSM) analysis was used to examine the difference in annual food and non-food consumption between households headed by males and females, as households located near urban areas (treated group) and those situated farther away (control group); a pre-test was employed for this analysis (Abebaw et al., 2010; Koloma & Alia, 2014; Wordofa et al., 2021).

Table 5.1 indicates no statistically significant differences in annual food consumption between households headed by males and females. However, there is a statistically significant difference between the treated and control groups at a significance level of $p < 0.01$. This finding can be attributed to the inability of the modern sectors to absorb the surplus labour from rural areas. Additionally, rural households need more productive assets and alternative skills beyond agriculture to engage in non-farm activities or be employed in industrial sectors (Igwe, 2013; Komikouma et al., 2021; Mezgebo, 2014). Consequently, this demonstrates that the expansion of urban areas hampers the annual consumption expenditure of farming households.

There are evident variations in various socio-economic factors between the control group and the treatment group. The control group spent more on non-food items, which exhibited a statistically significant difference between the two groups. This finding suggests that farming households not allocating a portion of their expenditure tend to spend more on non-food goods (Bongole, 2016). Consequently, the control households enjoy a more stable livelihood than the treated households. Furthermore, the study demonstrated a statistically significant difference in mean expenditure between the groups, with the treated group spending less on durable goods, health, and education. The inferential statistics revealed a substantial disparity in the mean average between the two groups. Hence, urbanization reduces displaced farmers' expenditure on non-food goods, durable goods, health, and education (Ayele & Tarekegn, 2020; Mezgebo, 2014; Weldearegay et al., 2021).

Table 5.1 Annual expenditure distribution of households

Explanatory variable	Obse	Mean value			P-value	Mean value			p-value
		Male	Female	Combined		Control	Treated	Combined	
Average Annual Exp	397	7000	7113	7016	0.7638	8092	5207	7016	0.000***
Expenditure on non-food goods	397	-	-	-	-	501	236	402	0.0051***
Expenditure on durable goods	397	-	-	-	-	1187	2639	1728	0.0000***
Expenditure on health	397	-	-	-	-	1222	553	973	0.0002***
Expenditure on education	397	-	-	-	-	2450	1095	1945	0.0000***

Source: Compiled from own survey (2021)

As stated earlier, the dependent variable used to assess the impact of urbanization on farming households was the annual household consumption expenditure. To avoid bias in estimating the impact of urbanization on farming households, variables that were not directly influenced by the treatment effect were chosen. This selection was made to ensure that essential variables were not excluded while avoiding an excessive number of variables. According to (Heckman et al., 1997), too many variables can lead to biased impact estimation results (Marchenko & Genton, 2012; Tucker, 2011). Although various demographic and socio-economic factors influence consumption expenditure, variables that affect the decision to participate and the outcome variables were selected. These variables include the sex of the household head, age, educational status, dependency ratio, access to credit, and savings status of the household were selected. The probit analysis of (equation 4) result presented in Table 5.2 indicates that, except for the dependency ratio, all of these variables have a statistically significant effect on the annual consumption expenditure of the households.

Table 5. 2 Psmatch2 probit regression estimation result

Log-likelihood = -199.97983	LR chi2(6) = 124.42	Pseudo R2 = 0.2373
Number of obs = 397	Prob > chi2 = 0.0000	
Variables	Coef.	Std. Err.
Sex of household head	0.523**	0.211
Age of household head	0.0412***	0.008
Educational status of household head	0.999***	0.163
Dependency ratio	-0.068	0.195
Access to credit	0.434*	0.242
Saving status of households	-1.032***	0.153
_cons	-3.469	0.800

Source: Compiled from own survey (2021)

To create a homogeneous group, variables with statistically significant associations or mean differences must be transformed into statistically non-significant or mean differences. The selected variables were determined based on the percentage of mean bias and value. The objective is to match participants based on common characteristics to estimate the impact accurately. Thus, repeated tests were conducted to determine which variables should be included, satisfying the propensity score matching (PSM) assumptions. Table 4 displays the selected variables based on the percentage of mean bias and β value.

The mean bias and β value should be below certain thresholds after matching. Specifically, the mean bias should be less than 5%, and β should be less than 25% (Caliendo & Kopeinig, 2005). In this study, two continuous variables and four categorical variables were chosen: the sex of the household head, age of the household head, dependency ratio, and access to credit, household saving status, and educational status of the household head.

Before matching, a t-test, and a chi-square test were conducted to determine if there were any mean differences or statistical disparities between the treated and control groups for the selected variables (Olmos & Govindasamy, 2015). Two continuous and two categorical variables exhibited statistically significant differences between the treated and control groups.

Table 5. 3 Statistical summary of t-test distribution

Explanatory variables	Mean values			P-values
	control	treated	Combined	
Age of household head	43.04	48.67	45.14	0.0000***
Dependency ratio	0.74	0.78	0.75	0.0001**

***p<0.01; **p<0.05; *p<0.1; Standard errors in parenthesis

Source: Computed from own survey data (2021)

Unlike the continuous variables, only two categorical variables have a statistically significant relationship between the control and treated groups (Table 5.4).

Table 5. 4 Statistical summary of the chi-square distribution

Explanatory variables	Categories	Sample Percentage	Control %	Treated %	Chi-Square
Access to credit	No	307 (90.0)	213 (88.7)	94 (93.1)	0.224
	Yes	34 (10.0)	27 (11.3)	7 (6.9)	
Sex	Female	96 (28.1)	28 (27.7)	68 (28.3)	0.909
	Male	245 (71.9)	73 (72.3)	172 (71.7)	
The educational status	Literate	140 (35.3)	67 (26.9)	73 (49.3)	0.000***
	Illiterate	254 (64.7)	182 (73.1)	75 (50.7)	
Access to Saving	No	192 (48.6)	159 (63.9)	33 (22.3)	0.000***
	Yes	205 (51.6)	90 (36.1)	115 (77.7)	

***p<0.01; **p<0.05; *p<0.1; Standard errors in parenthesis

Source: Computed from own survey data (2021)

5.7.2. Testing the balance of propensity score and covariates

Balancing was successfully achieved after conducting rigorous matching tests. Before matching, the bias percentage ranged from 4.6% to 92.2%. After matching, the bias percentage was significantly reduced to a range of 0.8% to 7.7%. This reduction in bias indicates that the matching process effectively balanced the selected variables, bringing them closer to the critical level cutoff point of 25% (Peel & Makepeace, 2012; Shipman et al., 2017), as shown in Table 5.5.

Before matching, the variables such as the age of the household head, dependency ratio, household head's educational status, and household saving status exhibited statistically significant differences between the treated and control groups. After matching, no statistically significant correlations were found between the treated and control groups for the variables. This outcome suggests that the matching process successfully homogenized the households, making them comparable and suitable for further analysis.

Table 5. 5 Propensity score and covariate matching

variables		Mean				P> t
		Treated	Control	% bias	% reduction bias	
Sex	U	1.16	1.13	9.5	.	0.353
	M	1.16	1.18	-6.8	28.3	0.586
Age	U	48.67	43.04	57.7	.	0.000
	M	48.40	47.92	4.9	91.6	0.702
Edu. status	U	1.49	1.27	47.3	.	0.000
	M	1.48	1.49	-2.2	95.4	0.861
Dependency ratio	U	0.79	0.74	13.4	.	0.201
	M	0.78	0.81	-7.7	42.5	0.546
Access to credit	U	1.91	1.89	4.6		0.662
	M	1.90	1.88	6.8	-49.5	0.570
Access to Saving	U	1.22	1.64	-92.2		0.000
	M	1.23	1.22	0.8	99.2	0.944

Source: Computed from own survey data (2021)

5.7.3. Matching treated and control groups

The mean propensity score of households is 0.373, with a minimum and maximum score of 0.007 and 0.954, respectively. The treated and control groups' mean scores are 0.554 and 0.266, respectively. The minimum and maximum scores of the treated and control groups were between 0.024-0.954 and 0.007-0.910, respectively. The joint support region lies between 0.024 and 0.910, according to minima and maxima criteria (Table 5.6).

Table 5. 6 Distribution of estimated propensity scores

Groups	Obs	Mean	Std. dev.	Min	Max
Treated	148	0.554	0.231	0.024	0.954
Control	249	0.266	0.207	0.007	0.910
Total HH	397	0.373	0.257	0.007	0.954

Source: Computed from own survey data (2021)

Graphically, the score is presented in Figure 5.3. The score is higher in treated on support than untreated on support.

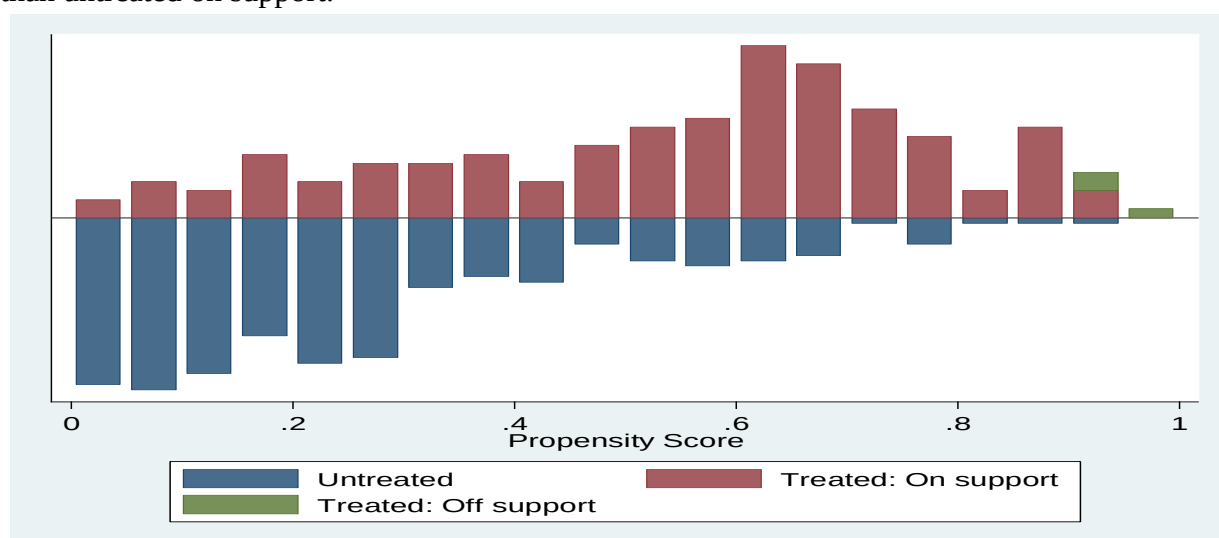


Figure 11: Distribution of propensity score

Source: Computed from own survey data (2021)

5.7.4. Matching algorithm

After matching, both groups of households had a comparable distribution of variables, as seen by the reasonably low pseudo-R2 and statistical insignificance. Therefore, the matching process satisfies the criteria and balances the characteristics of the study area's treatment and control group of households. According to (Caliendo & Kopeinig, 2005), no one matching procedure predominates and is relevant in all data gathered to estimate impact. Three matching algorithms, namely, neighbor, caliper, and kernel matching, were used at various levels for this study. The result showed that the treated households had lower annual consumption expenditure than the control households (Table 5.7). The output implies a reverse correlation between urbanization and household yearly consumption expenditure of smallholder peri-urban farmers. Moreover, in most developing countries, higher consumption expenditure is related to better wealth accumulation as it is correlated with poverty reduction and food security (Ali et al., 2018).

Table 5. 7 Estimated results of different matching algorithms

Matching type	Pseudo-R ²	β	Mean- bias	Matched sample size	ATT	T-value
Neighbor matching						
Neighbor(1)	0.005	15.8	5.0	145	-2562.5	-6.73***
Neighbor(2)	0.003	12.0	4.9	145	-2542.3	-6.81***
Neighbor(3)	0.003	13.1	4.9	145	-2584.4	-7.45***
Neighbor(4)	0.005	16.1	6.2	145	-2439.0	-7.28***
Neighbor(5)	0.007	19.7	7.9	145	-2590.3	-7.71***
Caliper matching						
0.01	0.005	16.8	4.7	130	-2552.5	-6.88***
0.05	0.005	15.8	5.0	145	-2562.5	-6.73***
0.1	0.003	15.8	5.0	145	-2562.5	-6.73***
Kernel matching						
Bandwidth of 0.01	0.008	20.7	7.5	130	-2448.4	-7.01***
Bandwidth of 0.05	0.003	12.2	4.7	145	-2534.6	-7.99***
Bandwidth of 0.1	0.003	13.6	4.9	145	-2553.5	-8.31***

*** indicates statistically significant at 1%,

Source: Compiled from own survey data (2021)

Table 5. 8 Estimated value of ATT

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
TOTALHHEXPYR_A	Unmatched	5206.42	8091.23	-2884.81	228.76	-12.61
	ATT	5267.50	7830.04	-2562.55	380.98	-6.73

Source: Compiled from own survey data (2021)

The Average Treatment Effect on the Treated (ATT) metric quantifies the average disparity in yearly consumption expenditure per adult equivalent between two distinct groups, while accounting for a pre-treatment covariate. This investigation specifically concentrates on rural farm households proximate to urban centers, compared with households situated at a considerable distance from urban areas (considered as the control group). The study's results reveal that the average annual consumption expenditure per adult equivalent for rural farm households near urban areas is 2562.55 Ethiopian Birr (ETB), indicating a lower expenditure compared to their counterparts in the control group residing far from urban areas. This implies that rural farm households in close proximity to urban regions exhibit reduced consumption levels in contrast to those situated farther away. To enhance the reliability of the derived outcomes, the research employs diverse matching algorithms, including Nearest Neighbor, Caliper matching, and Kernel matching. Kernel estimator with Bandwidth of 0.1 as per the Rubin (2006) criteria for the overall balance to be sufficiently choicen. The algorithm serve to mitigate selection bias, ensuring the robustness and consistency of the estimated results. The consistent findings across these various matching methods further affirm the conclusion that the annual consumption expenditure per adult equivalent and overall welfare

of rural farm households near urban areas consistently lag behind when compared with those households residing at a distance from urban areas.

5.8. Discussion

Based on (equation 5), the result of the study in Table 9 aligns with previous research in Ethiopia (Alemineh, 2018; Gebeyehu et al., 2022; Mezgebo, 2015). (Mezgebo, 2015)'s study demonstrated that farm households located near urban areas experienced a decrease in their physical asset holdings, such as land and livestock. This decrease in assets resulted in a decline in the consumption expenditure of rural households over a year. Similarly, (Gebeyehu et al., 2022) indicated that farm households displaced due to urban expansion experienced a significant reduction in their consumption expenditure per adult equivalent, and the combined asset index of these displaced households decreased due to the urban-induced expansion. The study findings also correspond with (Alemineh, 2018), which revealed that evicted farmers faced a substantial annual income reduction compared to their counterfactuals. The decrease in income further underscored the negative impact of evictions on farmers' financial well-being. The study results align with previous research in Ethiopia, which indicates that farm households located near urban areas, displaced by urban expansion, or subject to evictions experience a decline in their consumption expenditure and overall welfare outcomes.

A study in sub-Saharan Africa by (Gollin et al., 2016) revealed that urbanization in countries within the region needs to be accompanied by sufficient investment in infrastructure and industrialization, which could effectively utilize the labour force from displaced rural farming households. Lack of investment stems from inadequate policy design and implementation by the government, which primarily benefits a small segment of the population. These policies are often based on flawed studies and fail to align with on-the-ground conditions. Urbanization exacerbates welfare inequality within communities near urban areas (Abay et al., 2020). Recent empirical strands in the Philippines have demonstrated that urbanization leads to converting agricultural land for residential and commercial purposes. This transformation, in turn, adversely impacts farmers' income sources, displaces farmers' livelihood, diminishes their economic standing, and undermines the overall motivation for agricultural activities (Factura & Cimene, 2022). Besides, the result of the study aligns with (M. Cernea, 2003) Impoverishment Risks and Reconstruction framework, which asserts that when small-scale farmers are compelled to leave their land, they experience significant levels

of poverty. However, sustainable development objectives encompass attaining food security, eliminating hunger, and promoting sustainable agriculture by 2030.

Some studies contradict the results of this study, stating that urbanization can lead to increased landlessness among rural households and reduced farm income but has facilitated higher wages and non-farm incomes, resulting in an overall increase in rural households' total income and consumption expenditure (El et al., 2014). Authors explain that urbanization significantly shifts the livelihoods of farming communities by creating non-farm employment opportunities that are more financially rewarding than agriculture (Diao et al., 2019). Urbanization improves forward market linkage by increasing the demand for agricultural outputs and non-farm employment (Vandecasteele et al., 2018). Additionally, urbanization helps farmers diversify their sources of income, leading to higher income levels and supporting rural livelihoods (Dorosh & Thurlow, 2014).

Furthermore, studies conducted by (Swain & Teufel, 2017) demonstrate that urbanization positively impacts the welfare of rural households by improving access to and investment in agricultural technologies. The result, in turn, increases agricultural productivity even with limited farming land. Urbanization also motivates rural households to align their agricultural production with urban areas' needs and food preferences, enabling them to generate higher income (Vandecasteele et al., 2018). In summary, while the present study suggests adverse outcomes of urbanization on rural households, other research highlights the positive effects of urbanization, such as increased non-farm employment opportunities, higher income levels, improved market linkages, and enhanced agricultural productivity. According to (Le et al., 2023), urbanization encourages rural residents to improve their consumption habits, but the impact varies significantly across regions, indicating regional heterogeneity in its effects.

In Ethiopia, urban expansion predominantly occurs in the larger cities, which have limited capacity to transform the livelihoods of rural areas. The process is due to rural individuals' need for more skills, financial resources, and educational levels, making it difficult to compete with urban dwellers. (Christiansen & Kanbur, 2017) indicated that small towns play a more significant role in reducing rural poverty and improving welfare than large cities. The development of small towns provides a favorable environment for rural households, offering non-farm employment opportunities and income prospects with minimal competition (De Brauw & Mueller, 2012).

The COVID-19 pandemic has had a profound impact on the economy. It has detrimentally affected the lives, livelihoods, and overall well-being of individuals in developing nations with fragile healthcare infrastructure, limited education, and high poverty rates (Asegie et al., 2022; Kakaei et al., 2022; Padmaja et al., 2022). However, the extent and severity of these consequences vary depending on different groups and industries (Ghanbari Movahed et al., 2022). The pandemic has increased unemployment, reduced income from daily labor, heightened food insecurity, drained savings and relief funds, and disrupted the marketing systems. Furthermore, the travel and tourism sectors have experienced various consequences resulting in decreased output and productivity in the services industry (Abbas et al., 2023).

The pandemic in Ethiopia and other African countries caused households to cease livelihood activities such as daily work, small-scale trade, selling livestock, receiving remittances, and engaging in labor migration (Asegie et al., 2022; Maredia et al., 2022). As a result of these limitations on household activities, opportunities to utilize services decreased, and increase their purchases of products (Bishop et al., 2022). The effect led to a profound impact on hotel, tourism, and hospitality businesses.

The consumption recovery was significantly more potent than anticipated during the pandemic because fiscal and monetary policy actions helped consumers quickly adjust to the pandemic shock. This path requires various actors' cooperation, dedication, and responsible approaches. These traits should direct their actions as they look for shared interests that can address the issues noted in the 2030 Agenda of new economic, social, and environmental strategies (Bishop et al., 2022). Positive measures like the media's role in raising awareness of social exclusion and consumption modeling, as well as new business initiatives that lessen the adverse effects on employees' health, can better combat the virus' effects on household income and consumption expenditure (Abbas et al., 2023; Balsalobre-Lorente et al., 2023; Maredia et al., 2022; Mayhew & Anand, 2020; Zhou et al., 2022).

The global consumption recovery from the pandemic surpassed earlier expectations due to significant fiscal and monetary policy measures. However, this recovery path is complex and requires various stakeholders' collaboration, dedication, and responsible actions. These qualities should guide their efforts as they seek common interests to address the issues outlined in the 2030 Agenda, which focuses on new economic, social, and environmental strategies (Bishop et al., 2022). Positive initiatives and the media's role in raising awareness of social exclusion and promoting responsible consumption, as well as new business ventures

that mitigate the adverse effects on employees' health and productivity using corporate social responsibilities initiatives, can effectively alleviate the impact of the virus on household income and spending (Abbas et al., 2023; Balsalobre-Lorente et al., 2023; Maredia et al., 2022; Mayhew & Anand, 2020; Zhou et al., 2022).

The study found that despite the significant impact of COVID-19 on households' income and consumption expenditure near urban areas, interview data collected from key informants shows no significant effects of the pandemic on their consumption expenditure. The result suggests that the negative impact on consumption expenditure and overall welfare in households near urban areas can be attributed solely to urbanization rather than the additional influence of the pandemic.

5.9. Conclusion

The study examined the impact of urbanization on the annual consumption expenditure of rural farm households near the Adama City Administration. Specifically, the study reveals that farm households near urban areas experience lower yearly average consumption expenditure per adult equivalent than those in more distant areas. This reduction in consumption expenditure is attributed to converting farmland to non-agricultural development activities and the subsequent need for farm households to diversify their livelihoods. The gradual expansion of urban land coverage diminishes the availability of agricultural land for farm households near urban areas, thereby negatively influencing their livelihoods and overall welfare. Given that farming serves as the primary economic activity for these households, it is crucial to acknowledge and evaluate the existing conditions of both urban areas and neighboring rural settings before initiating the urbanization process. This proactive approach is necessary to preserve mutual benefits for urban and rural communities.

5.10. Recommendations

Based on the study's findings, the following recommendations can be categorized into three parts: Implications for Development Practitioners, Implications for Research, and Implications for Policy.

5.10.1. Implications for Development Practitioners:

- a. City administrations and regional governments should prioritize land use planning that balances urban expansion with agricultural land preservation. This can involve designating protected agricultural zones or implementing regulations to limit the conversion of farmland for non-agricultural purposes. Development practitioners

should play a key role in implementing and enforcing these measures to safeguard farmland for rural farm households.

- b. The regional government should implement programs to support rural farm households near urban areas. These programs can include providing access to credit, improved agricultural techniques, and modern farming equipment to enhance productivity and efficiency. Development practitioners should facilitate the implementation of these programs to maximize the income-generating potential of rural farm households despite limited farmland availability.

5.10.2. Implications for Research:

- a. Further research is needed to explore and identify specific alternative income-generating activities suitable for rural farm households near urban areas. This research can focus on agro-tourism, rural industries, or value-added agricultural products that can help offset the negative impact of diminishing farmland on income and consumption expenditure.
- b. Research should investigate the effectiveness of farmer cooperatives and associations in enhancing the marketing and bargaining power of rural farm households near urban areas. This can provide insights into how collective action can help overcome challenges related to diminishing farmland and secure land tenure rights and fair prices for produce.

5.10.3. Implications for Policy:

- a. Policy interventions should be designed to encourage rural farm households near urban areas to diversify their income sources beyond traditional farming. The process can be achieved by providing training and resources to develop alternative income-generating activities. Policymakers should create an enabling environment and provide the necessary support for successfully implementing these initiatives.
- b. Policies should promote the formation and strengthening of farmer cooperatives and associations. The trend can help rural farm households near urban areas access markets, negotiate for their land tenure rights, and secure fair prices for their produce. Policy frameworks should be developed to facilitate the establishment and functioning of these collective organizations.

In summary, development practitioners should prioritize land use planning, implement support programs, and promote diversification and collective action among rural farm households near urban areas. Further research is needed to explore alternative income-generating activities and assess the effectiveness of collective marketing strategies. Policymakers should design and implement policies that encourage diversification and support the formation of farmer cooperatives and associations.

CHAPTER SIX: SYNTHESIS

6.1. Introduction

In this chapter, Convergences and divergences between observations and theories, overarching conclusions are derived from the preceding chapters, encompassing general recommendations and avenues for future research. The initial section revisits the research objectives outlined in the introduction chapter, offering a comprehensive overview of the findings and general conclusions stemming from each objective. Subsequently, the synthesis examines the interconnectedness of the study objectives, aligning them with the primary theses of the research and the underlying assumptions of the employed theories or models. This synthesis is deeply rooted in the analytical framework established in Chapter One. Transitioning to the second segment of the chapter, broad recommendations are presented for policies and practices aimed at securing rural livelihoods near urban areas not only within the study area but also in broader contexts. Finally, the chapter concludes by addressing the study's limitations and proposing potential avenues for future research.

6.2. Convergences and divergences between observations and theories

Articulating the intersections and disparities between empirical observations and established theories is imperative. It is essential to explain both the points of convergence and divergence among theories and observation. Convergences serve as indications of the effectiveness of the current understanding on the subject, while divergences pose challenges to existing theories and contribute diverse perspectives. The discussions in preceding chapters have revealed the application of various theoretical frameworks to address distinct research questions. The overarching framework revolves around the complex interplay of urbanization and its impact on rural livelihoods. Consequently, the primary research objectives aim to explore how the theoretical insights derived from this study can augment existing theories. Additionally, the inquiry seeks to identify parallels in knowledge between previous research and the ongoing investigation.

It has been generally argued that a multiplicity of economic, social and cultural factors were responsible for variation of perception of rural farm households on urbanization effects in Ethiopia. However, it is necessary to investigate whether there are differences in the perceived effects of urbanization on rural farm households based on their proximity to urban areas. Additionally, the study aimed to identify socioeconomic factors contributing to variations in perception among rural farm households. The analysis results in chapter three

makes the perception distinction between the groups of households on urbanization based on distance from urban center. This observation aligns with established theories in urban and rural sociology, as well as spatial assimilation (Gifford, 2014; Massey & Denton, 1985; Parsons, 1991). From the perspective of Environmental Psychology, which underscores the impact of physical surroundings on individuals' perceptions (Gifford, 2014; Parsons, 1991), the optimistic outlook of rural households situated at a distance can be attributed to factors such as a cleaner environment, reduced congestion, and a more tranquil atmosphere compared to those in immediate urban proximity. Likewise, the spatial assimilation theory (Massey & Denton, 1985) reveals that individuals and households residing far from urban centers may view urbanization positively as they adapt to urban lifestyles while retaining some rural characteristics. The benefits of urbanization, such as economic opportunities and improved infrastructure, may outweigh potential drawbacks, resulting in an overall positive perception.

On the other side, divergent results based on the growth poles theory introduced by (F. Perroux ,1955). He highlights that urban-led growth can create dynamic economic hubs or growth poles, with positive effects radiating into nearby rural areas. The theory emphasizes concentrating development efforts on urban centers to stimulate economic activities, generate jobs, and benefit both urban and rural regions.

In the fourth chapter of this study was conducted to assess the impact of urbanization on the income diversification decisions of farming households located in proximity to urban areas. The results indicate a significant influence of urbanization on the decisions of farming households to diversify their income sources. The findings have several points of convergence and divergence with different theoretical and empirical underpinnings. The decision-making process for income diversification is observed to be influenced by both 'necessity' (push factors) and 'choice' (pull factors) according to existing literature (Ellis, 2000; Barrett et al., 2001).

Households with relatively higher levels of skill and experience near urban areas are found to diversify their livelihood activities from farming to non-farming activities by choice. In contrast, households with lower skills and less experience near urban areas tend to engage in non-farm activities primarily as a response to necessity (push factors), induced by human activities linked to urbanization (Degefa Tolossa, 2005). Consequently, the findings align with the concept of diversification induced by necessity (Ellis, 2000), suggesting that farming

households near urban areas diversify their income towards both farming and unskilled non-farm activities more than households located further away from urban centers, attributing this trend to the impact of urbanization.

The shift of a significant proportion of farming households near urban areas towards a combination of farming and unskilled farm activities is deemed crucial in the context of rapid urbanization and the subsequent reduction in available agricultural lands is also in line with modernization theory (Berliner, 1977). The theory suggests that urbanization is associated with a shift away from traditional agricultural activities towards more diversified income sources. The result also in line with urban biased theory (Lipton, 1977) suggesting that urban areas have a positive impact on economic activities and income diversification. However, it is noteworthy that their diversification towards non-farm activities has an adverse effect on their income. This shift represents a transition from relatively lucrative farm activities with higher income potential to less remunerative unskilled non-farm activities (Mezgebo & Shaughnessy, 2014). It is observed that farming households near urban areas possess more expertise in traditional farming compared to skilled non-farm activities, which generally offer lower monetary returns.

In the fifth chapter of this study, the study was conducted to assess the impact of urbanization on rural households' annual consumption, considering their proximity to the urban center. The findings revealed a noteworthy disparity, with households near urban areas exhibiting a significantly lower mean annual consumer expenditure compared to those residing in more distant areas. This outcome aligns with the theoretical framework of the Impoverishment Risks and Reconstruction Model proposed by (M. Cernea in 2003). The model focuses on the potential marginalization and impoverishment of individuals already in vulnerable situations due to forced displacement for development projects. Despite development projects being endorsed within the comprehensive development paradigm, they have been associated with environmental destruction, displacement of communities dependent on the land, and the perpetuation of social and economic inequality, favoring a small elite (Fernando, 2010; Fynn Bruey, 2019; Rajan, 2018). In the context of this study, the observed lower mean annual consumer expenditures near urban areas indicate a heightened risk of impoverishment for certain segments of the rural population as a consequence of the urbanization process. The concept of reconstruction becomes relevant, suggesting the need for policies or interventions to address and alleviate the adverse impacts on rural welfare induced by urbanization.

As economic growth progresses, a common consequence is the displacement of farmers from their land, often attributed to the establishment of new industries on the outskirts of urban areas (Stürck et al., 2018). However, the study's results diverge from the expectations set by population and economic growth theories, as outlined by (Barnes in 2001). Traditional perspectives within these theories posit that urbanization correlates with increased economic opportunities and improved living standards. The identified lower welfare near urban areas challenges these expectations, implying that urbanization alone may not ensure positive outcomes for rural households. This incongruity underscores the complexity of the relationship between urbanization, economic growth, and the well-being of rural populations.

In summary, the responses to the research findings within the framework of various theories underscore a combination of converging and diverging aspects in the relationship between urbanization and rural household livelihoods within the study area. It is apparent that certain theories do not entirely capture the nuanced realities of the households at the study sites, revealing that those in close proximity to urban areas encounter distinct challenges influenced by diverse factors. Consequently, their strategies for livelihood adaptation and activities to sustain welfare exhibit variations contingent upon the specific contextual factors. Moreover, the identified disparities underscore the need for further investigation to elucidate the precise mechanisms and dynamics at play. A deeper exploration is imperative to unveil the intricate impacts of urbanization on rural communities. This nuanced understanding will contribute to the development of targeted interventions and policies that can address the diverse challenges faced by households in the evolving landscape shaped by urbanization.

6.3. General conclusions

The study examined the impact of urbanization on rural livelihoods near urban areas using four interrelated issues. First, it examined the dynamics of urbanization and its effects on land use/land cover change including the population trends in the past 35 years of Adama City to the surrounding rural kebeles. Through a comprehensive case study spanning multiple years, the research aims to discern the evolving patterns of urbanization and its effects on land use and land cover change in Adama City and the surrounding area. The second objective builds upon the insights gained from the first by examining the perceived effects of urbanization on rural farm households and the socioeconomic factors contributes for perception variations . Both objectives are interconnected through the common thread of land use changes. The third objective examined urbanization and Its Effects on the Income Diversification of Farming

Households in the study area. The fourth objective summarizes the cumulative results of all three objectives by exploring the impact of urbanization on the overall consumption expenditure of rural households near urban areas compared with those found in distant areas. Chapter One describes and discusses the background, a concise overview of the literature, the problem statement, the objectives, the methodology, and other elements of the dissertation. Consequently, detailed conclusions were deduced for each specific objective as follows.

Chapter two presents an analysis of the dynamics of urbanization and its effects on land use/land cover change including the population trends in the past 35 years of Adama City to the surrounding rural kebeles. This chapter enables us to comprehend better whether urbanization takes place or not and its significant impact on the productive agricultural land of rural farm households near Adama city. The study confirms that there is a significant change in the main LULC classes within the city. Specifically, built-up areas and agricultural land have experienced the highest rates of change. The built-up area has witnessed a gain of nearly 60% during the period, while agricultural land has suffered a loss of approximately 40% within the same timeframe. The conversion of farmland into urban built-up areas has had a profound impact on the livelihood activities of farm households residing near the urban area. They have been compelled to shift away from farming and adopt unskilled labor and income transfer-based lifestyles, which affect their income and overall welfare. This trend also raises concerns about potential food insecurity and social unrest among farm households in the surrounding urban areas.

Chapter three focuses on the rural farm households perceived effects of urbanization in the study area. Altered land use patterns influence rural farmers' views on urbanization, eliciting diverse perceptions. The results revealed a significant difference between farm households near urban areas on their perception of urbanization. Rural farmers near urban areas perceive urbanization negatively, while farm households far away from urban areas view urbanization positively. While farm households far away from urban centers perceived positive effects of urbanization on increased income diversification, agricultural production, creation of job opportunities, and community relationships with an average mean value of 3.25, those farm households near urban areas perceived negatively with an average mean value of 2.47. In addition, the ordered logistic regression result also revealed that distance from the urban center, educational status of households, family sizes, and farmlands significantly affect their perception of urbanization by farm households near urban centers. This implies that rural farm households near urban areas thought urbanization negatively compared to those found

far away from urban center. Based on our findings, we suggest policymakers and stakeholders must consider rural farmers' concerns and perceptions when planning urbanization projects.

Chapter four analyses the urbanization and its effects on income diversification of farming households in the study area. Responding to shifting perceptions, farmers adapt to urbanization-induced changes by diversifying their livelihood activities. Multinomial logistic regression analysis revealed that farming households in urban areas diversify their income to farm and unskilled non-farm activities more than rural households far away from urban centers. The finding of the study shows that increasing urbanization by one unit causes a decrease in farming activities by 40%, and farming and non-farm activities increase by 35%. The result also indicated that households with higher-aged and larger family sizes were more likely to diversify their income to unskilled non-farm activities. The result proved that urbanization limits farming households' capacity to generate revenue from agriculture and pushes them to diversify their income. Governments should therefore design robust strategies and facilitate the provision of agricultural technologies. The regional state and small financial enterprises should also assist displaced households in expanding their income-generating activities.

Chapter five examines the impact of urbanization on the welfare of farm households' evidence from Adama city surrounding rural kebeles found at differences distance from the city center. The annual average per adult equivalent expenditures were taken as the proxy measure of welfare; food and non-food consumptions were the indexes considered for measuring the consumption expenditures. The findings show that households near urban areas had a significantly lower mean annual consumer expenditure of 5,207 ETB compared to 8,092 ETB spent by families in distant areas. The results from propensity score matching further indicated that households near urban centers experienced lower annual consumption expenditures than those located further away. These results highlight the influence of urbanization on the welfare of rural farming households near urban areas. To address the negative effects of urbanization on these households, city administrations, and regional governments need to prioritize the development and implementation of alternative livelihood support strategies. Additionally, the study emphasizes the necessity of implementing policies that mitigate farmland loss while considering the socioeconomic factors impacting farmers in the region.

To sum up, the studies on the impacts of urbanization on rural livelihoods evidenced from peripheral areas of Adama city on land use land cover change to measure agricultural land consumed by urbanization, its perceived effects on farm households near urban areas, the effects on income diversification of farming households responding to shifting perceptions urbanization-induced changes by diversifying their livelihood activities and the overall impact on the adult equivalent annual consumption expenditure of rural households provides a complete picture of the analysis of urbanization effects on rural livelihoods at micro-level.

Urbanization in developing countries triggers an augmented demand for agricultural land, precipitating changes in land use and land cover, particularly impacting areas proximate to urban centers. Altered land use patterns influence rural farmers' views on urbanization, eliciting diverse perceptions. These range from negative sentiments, fueled by the loss of agricultural land, to positive outlooks driven by perceived economic opportunities linked to urban development. Responding to shifting perceptions, farmers adapt to urbanization-induced changes by diversifying their livelihood activities. This strategic diversification becomes an adaptive response, mitigating the negative consequences of reduced agricultural land while leveraging potential opportunities associated with urban development. These in turn consolidates the outcomes by examining the overall impact of urbanization on the consumption expenditure of rural households. In doing all these, an extensive comparative examination is carried out, systematically comparing households near urban areas with those situated at a distance. This approach facilitates a thorough comprehension of the collective repercussions of urbanization on the overall well-being of rural communities. Therefore, the study shows a linkage among the effects of agricultural land conversion to other development activities on the perception, income diversification and overall welfare of farm households near urban area.

The analysis showed that urbanization affects negatively the welfare of farming households near urban so that the findings of this study confirmed the thesis underpinning of our study. This outcome agrees with the Impoverishment Risks and Reconstruction model of Cernea. He stated that smallholder farmers evicted from their farmland are subject to acute poverty. Therefore, sustainable development aims to end hunger, achieve food security, and promote sustainable agriculture by 2030. Governmental policies should gear towards reducing the ramification of urbanization on smallholder near urban area as most of the food production comes from the farmers in developing countries. Above and beyond, land management

system particularly agricultural management, investment in small and medium enterprises to utilize the extra labour from the rural areas and improve the households' welfare is crucial.

To the investigators knowledge, the impact of urbanization on rural livelihoods is the first study, at least in the study, which attempts to show the interconnectedness among conversion of agricultural land to non-farm activities, perception of farmers on the conversion of farm land, their adaptive strategies by diversifying their livelihood activities and the impact on their welfare. By doing so, it adds to the continuity thread of conceptualizing, theorizing and measuring urbanization impact on rural farm households' livelihoods in developing countries particularly in the sub-Saharan Africa in general.

In addition, though there is a controversy on whether urbanization have negative or positive effects on the livelihoods of rural farm households at different areas, the study result associated with different basic models used in the study like Impoverishment Risks and Reconstruction model of Cernea, The model state that land is the basis of people's productive system in agrarian society; if it is confiscated and not replaced by steady income-generating employment, it will lead to impoverishments and the interlinked social, political, and economic disturbances and violations. The study also congruent with dependency theory that urbanization tends to dispossess rural dwellers of their land and consequently force them to migrate to cities. The displaced farmers then move to urban areas to seek employment at a lower return because of limited experience that in turn causes severe distortions in their livelihoods.

Methodologically, first, the results of the studies related to the impact evaluation highlight the importance of evaluating the impact of urbanization on rural livelihoods near urban area using rigorous methods such as PSM. It shows how the PSM contributes to the more precise estimation of treatment response. In other words, the rigorous procedures followed in the model, could remain as a lesson on how to balance the distribution of observable and unobservable characteristics of the treatment and comparison groups, and reduce the potential for bias in conducting a more robust comparison between the two groups on the issues of impact of urbanization on rural farm livelihoods. Most urbanization impact studies compared the displaced households' livelihoods and income changes with the non-displaced found in the same area by neglecting its impact on households found at different distances from urban centers and engaged in farming activities. Hence, the study portrayed a comparative picture of the perceived effects of urbanization by farm households, its effects on income diversification, and overall impact on consumption expenditure changes on two distance

based categories of households from the urban center of Adama City. As a result, this distance based categories of (treatment and control) group also remains a lesson for other comparable studies to be done on the relationship between households welfare found near urban areas comparing with found at distances.

Since this study indicates the connections between interrelated concepts of urbanization and rural livelihoods near urban area, it would assist policy-makers and practitioners in guiding impact of urban expansion on rural livelihoods of farm households. By and large, from such analysis, a valuable lesson would be learned on how to enhance the welfare of farm households found near urban area which has been an overarching aim of many rural development programs in Ethiopia in general and in the study area in particular.

6.4. General recommendations

The research findings have led to the following recommendations. Details of the recommendations and/or policy implications are set in each objective of the study; the subsequent can be viewed as the general recommendations:

1. This study focuses on the impact of urbanization on rural farming households' livelihoods in general. The land use land cover has changed dramatically, with the majority of land being converted to build-ups. Rapid urbanization shrinks verdant agricultural land for development purposes, with little economic impact on smallholder farming near urban area, resulting in widespread livelihood deterioration. As a result, city administrations and regional government Bureau of both rural and urban land management should prioritize land use planning that balances urban expansion with agricultural land preservation. This can involve designating protected agricultural zones or implementing regulations to limit the conversion of farmland for non-agricultural purposes. Development practitioners should play a key role in implementing and enforcing these measures to safeguard farmland for rural farm households. Furthermore, urban planning insitutute at regional level should have a better understanding of the spatial and temporal dynamics of urban growth, as well as the effects on farm households living near urban areas, and prioritized to build a stable livelihood and economic development.
2. The findings of the research on the perceived effects of urbanization on farm households near urban area point to negative consequences. As a result, city administration and regional government urban planning institutes and land mamangment bureau should consider rural farmers' concerns, opinions and

perceptions when planning urbanization projects. Cooperative agency at regional level should investigate the effectiveness of farmer cooperatives and associations in enhancing the bargaining power of rural farm households near urban areas. This can provide insights into how collective action can help overcome challenges related to diminishing farmland and secure land tenure rights.

3. The finding of the study shows that increasing urbanization causes a decrease in farming activities and limits farming households' capacity to generate income from agriculture and pushes them to diversify their income to non-farming activities where their skill and experience in the area is minimal. As a result, city administration, regional government training institutes and other development practitioners should designed to encourage rural farm households near urban areas to diversify their income sources beyond traditional farming. The process can be achieved by providing training programs and resources to develop alternative income-generating activities. These programs can include providing access to credit, improved agricultural techniques, and modern farming equipment to enhance productivity and efficiency on their limited land.
4. Majority of farming households near urban areas face life-threatening livelihood outcomes. They are transitioning from economic independence to economic dependency. As a result, the city administration and Regional government should develop different manufacturing and other package to utilize the extra labor flow caused by urbanization to contribute to economic growth and reap the benefits of urbanization. In addition, the Regional State should also establish a responsible and agile office to follow up on related issues and put additional efforts into creating a favorable working environment for rural households near urban area to generate income from non-farm activities.
5. Further research is needed to explore and identify specific alternative income-generating activities suitable for rural farm households near urban areas. This research can focus on agro-tourism, rural industries, or value-added agricultural products that can help offset the negative impact of diminishing farmland on income and consumption expenditure
6. Agricultural experts at the kebele, woreda, and regional levels are now willing to hear and respond to the issues raised by respondents. As a result, social institutions and strategies should prioritize reducing the impact of urbanization on smallholder found

near urban, as smallholder farmers produce the majority of food in developing countries.

7. To help balance rising land demand with the loss of agricultural land, which has a significant impact on the livelihoods of farm households near cities, and with adequate compensation for forced eviction, encroachment, and conversion of farmlands into nonfarm development and physical infrastructure, city planners' land management knowledge and skills must be improved. As a result, the government and other relevant organizations should proceed with caution and make the necessary changes to spatial and urban planning. Above and beyond that, investment in small and medium-sized businesses is required to utilize extra labor from rural areas and improve the welfare of evicted households.

6.5. Limitations of the study and implications for future research

While this study has important theoretical and practical implications, it is essential to acknowledge its limitations. The study did not consider the impact of urbanization on various characteristics such as agronomic factors, socio-economic settings, weather conditions, spatial arrangements, agricultural inputs, and other physical and intangible assets. Including these factors in future research would enrich our understanding of the impact of urbanization on farm households. The presence of this limitation indicates that there is still more research to be done on this topic.

1. Further research is needed to investigate the diverse effects of urbanization on farm households based on the mentioned specific characteristics. The impact of urbanization may vary significantly depending on factors such as institutional arrangements, socio-economic status, and demographic characteristics. Exploring these factors is essential to understand the differential impacts of urbanization fully.
2. Investigating the factors influencing urbanization and its relationship with consumption patterns is also essential. The approach can help identify farm households' key traits or actions associated with welfare outcomes in the face of urbanization.
3. The relationship between urbanization and rural farm households varies based on development status, geography, socio-economics, cultural factors and the size of cities/towns. Even the effect is not similar within a given country or region. As a result, conducting similar studies in multiple locations over time can help validate the results and provide more conclusive recommendations.

4. Impact assessment would be better if base data is available. Unfortunately lack of data and financial resources forces the researcher to use cross-sectional data. Therefore, researchers who want to study in this area will be better to use longitudinal data by alignment with a combination of poverty measurements.

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Appendices

Appendix A: Questionnaire

Ph.D. Dissertation Research Project

on

The Impact of Urbanization on Rural Livelihood in Oromia Region with Special Reference to Adama City Administration and its Peripheral Rural Woreda

Interview Schedule for Sample Respondents

Dear Sir/Madam

Dear respondent, my name is WakitoleDadi. I am a PhD student at Addis Ababa University in the college of development studies center for rural development. Currently I am doing a research to investigate the impact of urbanization on rural livelihood in Oromia region with special reference to Adama City Administration and its peripheral rural Woreda. Dear respondent, you have been selected randomly from the households in sample rural kebele. The study will help the policy makers to evaluate and redesign appropriate policy important for rural - urban linkage in the country. The responses you give are valuable and will be held in utmost confidentiality and will be used only for the analysis of this research. You will not be identified by name in any case. If you accept to participate in this research, you will be doing so voluntarily and there will not be any monetary returns. You are also free to refuse to respond to any questions you do not feel comfortable answering or to withdraw from the research all together. A copy of the results will be sent to you upon request. This questionnaire will take about an hour of your time to respond to the questions.

Thank you in advance for your cooperation

Part I. General Information

1.1. Woreda name: _____

1.2. Name of the kebele/PA: _____

1.3. Name of the enumerator: _____

1.4. Enumerator signature: _____

1.5. Interview date: _____

Part II. Respondents Socio – Personal and Demographic Conditions

2. Sex, age , educational status ,Family sizes of household head

2.1.	2.2.	2.3.	2.4.	2.5.	2.6.	2.7.	2.8.
House hold head ID	Sex of Household 1. Male 2. Female	Marital Status of Household 1. Single 2. Married 3. Divorced 4. Widowed	Age in Year _____	Educational Status 1. Illiterate(Skip 2.8) 2. Literate	If literate, maximum grade level attained in years_____	Family size of household_____ Male___Female_	Place of birth 1. Rural 2. Urban Others (specify)

2.9. Religion of household head: 1. Orthodox 2. Catholic 3. Protestant 4. Muslim 5. Waqefana 6. Others

2.10. Occupation of Household head: 1. Farmer 2. Trader 3. Daily Laborer 4. Government Employee 7. private sector

2.11. Social Responsibility of household head: 1. Ordinary Member 2. Community Leader 3. Religious leader 4. Political leader 5. others

Part III. More detail Education Related Information of Households

3. Detail access to education and respondents perception on education services

3.1.	3.2.	3.3	3.4	3.5.	3.6		
In your perception, what is the level of access to education? 1. Very poor 2. Poor 3. Medium 4. High 5. Very high	In the last month, was there any family member absent from the school for more than a week? 1. Yes 2. No	If Yes, what is the main reason for being absent 1. Sickness 2. Death in family 3. Had to work 4. Others	What was your total school expenditure in the past 12 months in birr?_____ (Except food and clothing)	Which of the following are applicable? 1. Too far away/Transportation problems 2. Lack of Teachers 3. Low education quality 4. Poor school mgt quality 5. Poor school facilities/ Students Overcrowded 6. Lack of safety and security/violence, drugs)	Do you owned your family in Primary school(1-4) Primary school (5-8) Secondary School (9-10) Preparatory School (11-12) College/University	No	Distance (km)

Part IV. General Health Services Information of household head

- 4.1. Is there any disable person in your household members? 1. Yes 2. No
- 4.2. Have you or your family members received medical assistance /consulted from health institution? 1. Yes 2. No (skip to 4.4)
- 4.3. Where did you or other your family members receive medical assistance primarily?
1. Hospital 2. Health Center 3. Health post
4. Clinics 5. Pharmacy
- 4.4. If your answer for 4.2 is No, what was the main reason? 1. Lack of money 2. Do not believe in medication 3. Too far 4. Low quality of health profession
- 4.5. How could you rate the quality level of health services in your surrounding?
1. Very high 2. High 3. Moderate 4. Poor 5. Very poor
- 4.6. What is the amount of expenditure of the household for health in the last 12 months in birr? _____

4.7.			4.8.	
The nearest available Health Services in your surrounding	No	Distance (km)	Which of the following are applicable to you regarding health services (multiple answers)	
Hospital			1. Unhygienic facilities	1. Yes 2. No
Health center			2. Treatment unsuccessful	1. Yes 2. No
Health post			3. No appliances/bed, machinery	1. Yes 2. No
Clinics			4. Long waiting time/waitlist	1. Yes 2. No
Pharmacy			5. No drugs/medicines available	1. Yes 2. No
Others(specify)			6. Insufficient number of professionals	1. Yes 2. No
			7. Too expensive	1. Yes 2. No
			8. Low quality of drugs	1. Yes 2. No
			9. Too far	1. Yes 2. No

Part V. Housing and other durable and non-durable goods of household

- 5.1. For how long you have been in this area? _____
- 5.2. How did you get the house you are living in? 1. Own 2. Inherited
3. Rented 4. Free of rent 5. Others
- 5.3. How many rooms do the house you live in? _____
- 5.4. From which the wall material is constructed? 1. Wood and mud
2. Stone and mud 3. Stone and cement 4. Blocket & cement
5. Mud Blocket and Cement 6. bricks and cement 7. Steel (lamera)
8. Cargo container 9. Parquet or polished wood 10. Chip wood
- 5.5. What is the roof made of? 1. Corrugated iron sheet 2. Concrete/Cement 3. Thatch
4. Wood and mud 5. Bamboo/reed 6. Plastic & Thatch
- 5.6. What is the floor made of? 1. Mud/dung 2. Bamboo /reed 3. Wood
4. Brick tiles 5. Parquet /polished wood 6. Cement screed(Lishoo)
- 5.7. What is the ceiling of your house made of? 1. no ceiling 2. Cloths
3. Chip wood 4. Gypsum board 5. Others

5.8.	5.9	5.10	5.11.	5.12.
What type of kitchen does the household use? 1. No kitchen 2. A room used inside the housing unit 3. A room used outside the housing unit 4. A room used for modern kitchen inside the housing unit 5. A room used for modern kitchen outside the housing unit	What is the primary type of oven (Mitad) used for baking injera/bread? 1. Traditional mitad (Oven) removable 2. Traditional mitad (not removable) 3. Improved energy saving mitad 4. Electric mitad	What type of toilet facilities does the household use? 1. Pit latrine private ventilated 2. Pit latrine private not ventilated 3. Pit latrine shared ventilated 4. Pit latrine shared- not ventilated 5. Field /forest	What type of bathing facilities does the household use? 1. A room reserved for bathing (private) 2. A room reserved for bathing (shared) 3. No fixed place for bathing	What type of solid waste disposal facilities does the household use? 1. Waste disposable vehicle 2. Waste disposal Container 3. Throw away 4. Use as fertilizer 5. Burning the waste 6. Collected by municipality

5.13.	5.14.	5.15.	5.16.
What is the main source of drinking water of your household members? 1. Tap inside the house 2. Private tap in the compound 3. Water from kiosks/retailer 4. Protected well /spring (private) 5. Protected well / spring (shared) 6. Unprotected well /lake/ pound River or spring	Distance from house to water source (km/Single trip)	What mechanism your household is using to purify water before drinking? 1. No habit 2. Boiling 3. Chemicals 4. Other	What is the main source of light for your household members? 1. Electricity Meter- Private 2. Electricity Meter- Shared 3. Electricity From Generator 4. Solar Energy 5. Biogas 6. Lantern (fanos) 7. Local Kerosene Lamp (Kuraz) 8. Candle/Wax 9. Fire Wood

Please specify which of the following durable goods you have and estimate their current market price (value)

5.17.			5.18.	5.19.	5.20.	5.21.
Which one of the following do you have ?	Yes (√)	No (X)	If yes, how many do you have?	How did you obtain it? purchased Gift others	What is its current market value? in Birr	How is its ownership? Joint household Joint with outsider Individual
Television						
Dish						
DVD						
Radio						
Tape recorder						
Bicycle						
Motor cycle/Bajaj						
Motor Vehicle						
Beds						
Chairs						
Tables						
Sofa set						
Bife						
Buta Gas						
Electric Mitadi						

Jewelry/Gold in gram						
Jewelry/silver in gram						
Mobile phones						
Water pumping generator						

Part VI. Household head perception on urbanization

- 6 For you what is/are the benefits of urbanization? 1 Improved infrastructure 2. Improved social amenities 3. Improved security
4. Goods & services 5. All
- 7 How could you rate the advantages of urbanization for your livelihood activities?
1. Very high 2. High 3. Medium 4. Low 5 very low
- 8 Being rural resident for a long period in the area, how could you rate the livelihood of your family compared to that of urban life?
1. Better 2.No Change 3. Worse
- 9 How is the size of land you own has it changed? 1. changed 2. No change
- 10 Urbanization is a risk for rural livelihoods 1. St.Disagree 2. Disagree 3. Neutral
4. Agree 5. St. agree
- 11 Urbanization is an opportunity to improve your livelihoods 1. St.Disagree
2. Disagree 3. Neutral 4. Agree 5. St. agree
- 12 Urbanization is a threat for the conversion of farm land to other purpose
1. St.Disagree 2. Disagree 3. Neutral 4. Agree 5. St. agree

No	Descriptions on Perception of urbanization	Response rate				
		strongly disagree	Disagree	Neutral	Agree	Strongly Agree
6.8.	Your family member is not benefiting from urbanization					
6.9.	Urbanization has potential contribution for your agriculture production					
6.10.	Urbanization has potential contribution to creates more job opportunities for you or your family					
6.11.	Urbanization affect your households negatively by polluting environment like farm land ,water, air,...etc					
6.12.	Rapid expansion of urbanization is a risk for your family members					
6.13.	Your farm land decline/lost because of urbanization and affect the your livelihood					
6.14.	Your farm land decline/lost due to urbanization and resulted in food insecurity of your family					
6.15.	Your farmland decline/ lost because of urbanization and threat for your future agricultural activities					
6.16.	Soil fertility status of your farmland is negatively affected due to urbanization					
6.17.	Most land occupied due to urbanization fertile land and resulted in reducing production/productivity					
6.18.	The impact of urbanization on your livelihood is not well considered by government policy					

6.19. Least any other benefits /advantages of being urban residents :_____

6.20. List any other drawback of being urban residents :__

Part VII. Changing Agricultural Land Use Pattern of Households

7.1.	7.2.	7.3.	7.4.	7.5.	7.6
Do you have your own land? 1. Yes 2. No (skip to 8.1.)	specify the land ownership of household head 1. Own 2. Inherited 3. Rented /leased 4. Share Cropping 5. land redistribution (gov't)	What is the household head land holding size in hectare? _____	Identify your land sizes based on the following land categories in hectare 1. Cultivated land 2. Grazing land 3. Forest land 4. Own irrigable land 5. Built-up area 6. Fallow land	What was the trend of landholding sizes /households head during the last two or more decades? 1. Increasing 2. Decreasing 3. No change 4. I don't know	If decreasing, what do you think the reason? 1. Continuous land redistribution among family members 2. urban expansion 3. Population growth 4. others

7.7.	7.8.	7.9.	7.10.	7.11.	7.12.	7.13.
What is the general topography of your land? 1. Plain 2. Steep 3. Hilly	What type of agriculture did you have? 1. Crop 2. Livestock 3. Both 4. others	If "1", what is the primary aim or target of the household in producing crop? 1. For Household Consumption 2. For Sale/ Market 3. Both 4. Others	How many times do you usually harvest temporary crop per year? 1. once 2. twice 3. three times 4. four & above	What specific problems do you have in crop production? 1. Input supply 2. input cost 3. land fragmentation to family members 4. Continuous change of agricultural land to builtup area	If "b" what is your household primary aim or target to hold animal husbandry? 1. For Household Consumption 2. For Sale/ Market 3. Both 4. Doesn't Produce	What specific problems do you have in raising livestock? 1. Grazing 2. Diseases 3. Lack of Water 4. Theft 5. Poor breed 6. others

Part VIII: Social Capital

8.1.	8.2.	8.3.	8.4.	8.5.	8.6.	8.7.	6.1.
Are you a member of any association? 1. Yes 2. No	If your answer for Qu.No.1 is “yes” in which social association you are a member? 1. Idir 2. Iqub 3. Mahiber 4. Senbete 5. Professional	What benefits you are getting from the associations? 1. Labor 2. Food 3. Credit 4. Access to services 5. Equipments/tools 6. Child care 7. Guarding the house 8. Information for a job	In what way you participated in these associations? 1. Labor 2. Cash 3. Both 4. Others(specify)	How many days do you received labor from others in the last 12 months? _____days	How many days do you gave labor to others in the last 12 months? _____days	How many birr did you provide in the last 12 months to others? _____Bir rr	How many birr did you get from others in the last 12 months? _____Birr

Part IX. Livelihood Activities of Households

9.1.	9.2.	9.3.	9.4.	9.5.	9.6.	9.7.
What is your major livelihood activity in the last 12 months? (multiple answer is Possible) 1. Farm self employed 2. Self-employed in non-farm 3. Salary 4. Agricultural wage 5. Non-agricultural wage 6. Mixed (both)	If your answer is 'b' in which types of non – farm activities did you engaged? 1. Trade/Business 2. Wage /salary employment 3. mixed	Why did you engage in those non-farm activities? 1. To supplement farm income 2. As a major mode of livelihood 3. Lack of farm land 4. Inherited from family 5. urbanization	What do you think the advantage of participating in non-farm activities besides agriculture? 1. It helps not to sell crops 2. It helps not to sell livestock 3. The sources of employment	In which types of major non-farm activities did you participate (select more than one)? 1. Handcraft 2. trade 3. sale of food & drink 4. employed in formal sector 5. employed in informal sector	What is/are the main sources of your startup capital for the non-farm activities? 1. Agricultural income 2. Self-employment 3. Wage/Salary income 4. Remittances 5. Sale of assets 6. Bank/cooperative loan 7. Family or friends 8. Private money lenders 9. Micro finance institut	If you participate in trade, in which types of petty trading activities you are currently participate (select more than one)? 1. Selling of food 2. Selling of drinking 3. Fuel wood selling 4. Wood selling 5. Retailer

9.8.	9.9.	9.10.	9.11.	9.12.	9.13.
How long does the potential market for activity take for round trip (Km.)?	How do you transport your activities to market places? 1. Pack animals 2. Hired labor 3. Carried by family 4. Car transport	Who are your potential customers for the activity? 1. Local Farmers 2. Local Merchants 3. Urban residents	What are the potential problems you usually face in the activity? 1. Poor transport facility 2. lack of pack animals 3. lack of skill 4. Access to Market 5. lack of initial capital	At what time do you undertake the activity? 1. All the time 2. After/before farming 3. Off season	What are the challenges that you faced to engage in non-farm activities? 1. Lack of skill 2. lack of job opportunity in the area 3. Problem of finance to start up 4. Old age to participate 5. lack of labor intensive manufacturing

9.14.	9.15.	9.16.	9.17.	9.18.	9.19.	9.20.
Why did you engage in those Salary/Wage-employment activities? 1. To supplement farm income 2. As a major mode of livelihood	Where are you employed? 1. In this PA 2. In other PAs 3. Neighboring woreda	How long does the activity take for round trip (Km)? _____	How do you use for transport? 1. Pack animals 2. On foot 3. Car transport 4. Others	Who is your employer? 1. Local Farmers 2. Private sector 3. Government 4. Others	What are the potential problems you usually face in this occupation? 1. Low payment 2. Job insecurity 3. Unavailability of work 4. Others	Do these activities complete with farming in terms of time? 1. Yes 2. No

9.21. What is your total income from the wage employment per month in birr _____

9.22.			9.23.	9.24.
Identify Livelihood Activities that Household Participates on (multiple answer is Possible)	1. Yes	2. No	Why did you engage in those Wage-employment activities? 1. To supplement farm income 2. As a major mode of livelihood 3. Lack of farm land 4. Inherited from family 5. urbanization	Income per month in Birr
1. construction				
2. community soil and water conservation works				
3. carpentry				
4. masonry				
5. cementing				
6. Cattle tending				
7. Daily laborer				
8. Guarding				
9. Farming				
10. Safety net				
11. Office work				
12. Others				
13. Total income from wage				

Part X: Income Sources of Households

10.1. What are the major sources of your household income in the past year? a. Crop production b. livestock raising c. both (If your answer for the Question 10.1 is “a & c” fill the following tables and if only “b” skip to Q. 10.7)

10.2. Crop Production and Related Activities of Households heads				10.3. Yield in kg/yr	10.4. 1. For consumption 2. For Sale	10.5. Current market Price/kg	10.6. Income in birr/year
10.2.1. Cereals	Yes	No					
	Yes		No				
10.2.1.1. Teff							
10.2.1.2. Barely							
10.2.1.3. Wheat							
10.2.1.4. Hanfets							
10.2.1.5. Sorghum							
10.2.1.6. Maize							
10.2.2. Pulses							
10.2.2.1. Lentil							
10.2.2.2. Cow pea							
10.2.2.3. Chick pea							
10.2.2.4. Horse Bean							
10.2.2.5. Others							
10.2.3. Vegetables							
10.2.3.1. Onion							
10.2.3.2. Garlic							
10.2.3.3. Tomato							
10.2.3.4. Potato							
10.2.4. Fruits							
10.2.4.1. Banana							
10.2.4.2. Oranges							
10.2.4.3. Papaya							
10.2.4.4. Apple							
10.2.4.5. Others							

10.7. Do you have livestock and/or Beehives? a. Yes (complete question below) b) No (skip to Qst 10.1.)

Categories	Livestock types and production	Yes	No (skip)	Number per unit	1. For consumption	Market Price/animal
Large ruminant (Cattle)	Bulls					
	Oxen	☐				
	Cows	☐				
	Steers/Heifers	☐				
	Calves male/female	☐				
Small ruminants	Sheep Rams/Ewes/Lambs	☐				
	Goats he/she/kids	☐				
Equines	Horses	☐				
	Mules	☐				
	Donkey	☐				
	Camels he/she/kids	☐				
	Pigs Boar/sow/piglets	☐				
Poultry	Chicken cocks/Broilets	☐				
	Chicken Hens/layers	☐				
	Pullets/Docs	☐				
Milk, Egg and honey production	Milk production day / cow in liters	☐				
	Milk production day/ camel in liters	☐				
	Egg production day/hen / clutch	☐				
Beehives Production	Traditional beehives	☐				
	Modern beehives	☐				
	Traditional production/ beehives in kg/yrs	☐				
	Modern production/ beehives in kg/yrs	☐				

Part XI: Household incomes from other non-farming

11.1. Credit and Saving

11.1.1. Over the past 12 months, did you borrow on credit both in cash and kind? 1. Yes 2. No (skip to Q 11.6)

11.1.2. For what purpose did you borrow money or in kind? 1. Business Expansion 2. Business Startup 3. Farm equipments/inputs 4. Wedding 5. Food Purchase 6. House purchase 7. Land purchase/rent 8. Other ceremonial expense 9. Asset purchase

11.1.3. From which institution you borrowed the money 1. Relative's 2. Grocery 3. Friends 4. Employer 5. Religious institution 6. MCSI 7. Bank 8. Informal lender

11.1.4. Has the loan been paid? 1. Yes 2. Not yet

11.1.5. If you paid or paying the loan, what is/are the sources? 1. Business profit 2. Selling asset 3. Borrowing

4. Land sale/rent 5. House sale 6. Selling asset

11.1.6. If your answer for question number (11.1.1 is no), what is /are the reason? 1. Collateral problems 2. No purpose to borrow 3. No source to borrow 4. Other(specify)

11.1.7. Do you have a saving practice either in cash or kind? 1. Yes 2. No

11.1.8. If “yes “for what purpose you are saving? 1. Household expense 2. Invest in business 3. Medical expense

4. School fee 5. Buy/build house 6. Insurance

11.1.9. How much money currently you are sa ving in birr _

11.1.10. How did you save your money? 1. Equib 2. Bank 3. Microfinance institution 4. Home 5. Friend 6. Others

11.1.11. Is/are there family members / relatives send money back to you or any other organization that sends money to you currently?

1. Yes 2. No

11.1.12. If your answer for Q 11.1.12 is “yes” , specify the amount in birr _

11.1.13. If your answer for Q 10.1.12 is yes, from where the money sent back to you?

1. Surrounding urban area 2. Abroad 3. Rural area 4. Others

11.1.14. What is your major income generating activities 1. Manufacturing 2. Food and drinking 3. Trade

4. Provide Services 5. Employee in privates sectors 6. Government employee 7. Agriculture

8. Retirement 9. Daily laborer 10. Remittances (transfer

11. assistance and begging

11.1.15. Where is the place of your work to sustain your livelihood activities? 1. Residential House 2. In shop 3. Road side 4. Mobile 5. Rural Area

11.1.16. How much is your monthly income from agriculture in 2020/2021 crop harvest season? 1. < 500 2. 501 – 1000 3. 1001 -1500 4. 1501 – 2000 5. > 2001

11.1.17. What are the means of agricultural production of the households? 1. Family labor

2. Share cropping to others 3. Labor from relatives 4. employing labor

11.1.18. What is your total monthly income estimate in birr? 1. < 1000 2. 1001 – 2000

3. 2001 -3000 4. 3001 – 4000 5. 4001 – 5000

6. 5001 – 6000 7. 6001 – 7000 8. 7001 and above

11.1.19. How could you estimate the changes on the livelihoods of your households in the past five years?

1. Improved 2. No change 3. Decreased

11.1.20. If your answer for question 1.1.19 is improved, what are the driving forces (multiple answers)?

1. Salary improved 2. Equip

3. Remittance 4. Business improved 5. Additional jobs/works

6. Improved yield/product price

11.1.21. If the answer for question Q 11.1.19 is no change or decreased, specify the reasons

1. Sickness 2. Death of the bread winner 3. Divorce

4. Loss/lack of job Inflation 6. Loss of their land for urban expansion 7. Lack of business profit/market

8. Asset sold/confiscated & inflation

Part XII: Sources of Expenditures

12.1.		12.2.	12.3.	12.4.	12.5.	12.6.	12.7.	12.8.
Over the past one month, identify the material you purchased	No	How much did you pay in ? Birr	Over the past 12 months, did you purchase or pay for any item? 1. Yes 2. No (skip to 12.6.)	No	How much did you pay in ? birr	How many meals, including breakfast are taken on average per day in your household? <i>Adults (5 yrs & above number)</i> <i>Children(6-59 months)</i>	How many varieties of foods are consumed by the household per week in the last 12 months? Number	In the last 12 months, have you been with a situation where you did not have enough food to eat in your household? 1. Yes 2. No
Matches			Clothes/shoes/fabric for MEN					
Batteries			Clothes/shoes/fabric for women					
Candles (tua'af), incense			Clothes/shoes/fabric for boys					
Laundry soap /OMO			Clothes/shoes/fabric for girls					
Hand soap			Kitchen equipment					
Other personal goods (sendel,)			Linens (sheets, towels, blankets)					
Charcoal			Furniture					
Firewood			Lamp/torch					
Kerosene			Ceremonial expenses					
Cigarettes, tobacco,			Contributions to IDDIR					
Transport			Donations to the church					
Total			Taxes and levies					

Monthly Expenditure to services

12.9.	12.10.	12.11.		
In which months of the last 12 months did you experience this incident?	What is the number of children who sent to relatives due to shortage of food?	Service	Own meter (birr)	Rented (birr)
		Water		
		Electricity		
		Estimated rent of own house		
		Rented house		
		Fixed phone		
		Mobile phone		

NB: Value of freely obtained goods & services must be estimated at market price

Part XIII: *Shocks*

No	Shocks	13.1.	13.2.	13.3.	13.4
		Was your household affected negatively by this shock? 1. Yes 2. No	Rank the three most Significant shocks you experienced 1. Most Severe 2. Second Most Severe 3. Third Most Severe	What did your household do in response to the [SHOCK]? List up to 3 answers by order of importance	During the last 5 years, how many times did [SHOCK] occur? List the years
1	Death of household member				
2	Sickness /death of household member				
3	Loss of non-farm jobs				
4	Drought				
5	Flood				
6	Heavy rains preventing work				
7	Crop damage due to frost/insects				
9	Price rise of food items				
10	Increase in price of inputs (seed, fertilizer)				
11	Sickness, great loss/death of livestock				
12	Loss of asset due to Fire				
13	Theft/Robbery & other violence				
14	Involuntary loss of house/land				
15	Displacement (due to gov't projects)				
16	Water interruption				
17	Electric interruption				
18	Intra-household conflict				
19	Inter-household conflict				
20	Eviction from rented house				
21	Complete loss of income				
22	Food shortage/insecurity				
23	Expropriation of rural agr. land				

Thank You

Appendix B: Interview guide for the program beneficiary farmers

Dear Sir/Madam,

I am a Ph.D. student at Addis Ababa University, College of Development Studies, Center for Rural Development Studies. This interview aims to collect data to examine how have impacted the livelihoods smallholder farmers near urban area of Adama City. It is particularly designed to look into the Impacts of urbanization on rural livelihood in Oromia region, Evidence from Adama City and surrounding rural kebele. The data you provide for this study will only be used to partially meet the requirements for a Ph.D. in Rural Development Studies from the Addis Ababa University Center for Rural Development. Researchers, policymakers, and other stakeholders who are inquiring about the significance of urbanization impacts on rural livelihoods and who want to engage in comparable interventions on farm households may find the data you provide in this research to be valuable. Otherwise, data has no administrative use and/or should not be used to make decisions that could in any way have an impact on your private life. I kindly request that you keep your responses modest and honest. Please feel free to pause me at any point during your responses to the following questions if you require more clarification.

I appreciate the useful information you will be providing for me in advance!

Questions

1. What do you understand by the term urbanization?
2. What benefits do you expect from being in an urban area?
3. What are the disadvantages you expect being urbanization in your area?
4. Have you experienced any urbanization?
5. What benefits can you say are as a result of your surroundings being an urban area?
6. How has urbanization affected your farmland areas?
7. How has urbanization affected the conservation areas like forestland /grassland/water land ...in your surroundings?
8. What are the basic sources of income now? Is there any change in the pattern of sources of income in the past ten years?
9. What positive changes can you attribute to urbanization?
10. What are the negative impacts of urbanization on the physical environment?
11. What are the positive impacts of urbanization on the socio-economic lives in your surrounding community?

12. In your own opinion is urbanization good or bad for your livelihood? Explain your answer.
13. What is your suggestion to policymakers about urbanization and the livelihood of rural communities?
14. Do you think that is there any disparity in income and consumption levels in rural and urban in your surroundings? If so, to what extent?
15. Are the inequalities in income distribution decreasing or increasing in rural and urban areas of your surroundings?
16. Is there any difference between the levels and pattern of consumption expenditure between rural & urban households by occupational groups?
17. What is the magnitude of poverty measures in rural and urban areas? Is it similar for different occupational groups?
18. Does income increase with the level of the education of head in rural and urban areas?
19. What are the negative impacts of urbanization on the physical environment?
20. What is your source of livelihood?
21. What was the main source of livelihood before ten years and after the area became urbanized?

Appendix C: Observation checklist

1. Trends in the physical growth of the town
2. Identifying growth directions of the town and the highly affected urban fringe kebeles
3. Identifying natural resources affected by the town expansion
4. The Change in the livelihood of the rural households/farmers

Appendix D: Ordered Logistic Regression Analysis

Mean DV	3.204	SD DV	1.033
Pseudo r-squared	0.123	Number of Obs	397
Chi-square	124.739	Prob > chi2	0.000
Akaike crit. (AIC)	905.262	Bayesian crit. (BIC)	941.118

PERCEPTIO N	Odds Ratio.	St.Err.	t-value	p-value	[95% Conf	Interval	Sig
GROUP	0.013	0.007	-8.44	0.000	0.005	0.035	***
EDU	0.555	0.121	-2.70	0.007	0.362	0.851	***
FSIZE	0.861	0.063	-2.05	0.041	0.747	0.994	**
LANDSIZE	0.246	0.120	-2.87	0.004	0.095	0.640	***
DISTANCE	0.855	0.019	-6.99	0.000	0.818	0.893	***
Constant	-14.358	1.272			-16.85	-11.866	
Constant	-13.463	1.246			-15.906	-11.02	
Constant	-11.692	1.197			-14.039	-9.345	
Constant	-7.505	1.147			-9.753	-5.257	
*** $p < .01$, ** $p < .05$, * $p < .1$							

Ordered Logistic Regression

Determinant Factors		Total	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	p- value
Categories of Kebele	Control	249	8(3.2)	20(8.0)	88(35.3)	131(52.6)	2(0.8)	0.00
	Treatment	148	36(24.3)	17(11.5)	32(21.6)	55(37.2)	8(5.4)	0
Educational Status of HH	Illiterate	257	15(5.8)	14(5.4)	91(35.4)	131(51.0)	6(2.3)	0.00
	Literate	140	29(20.7)	23(16.4)	29(20.7)	55(39.3)	4(2.9)	0
Categorical Land Size(HK)	< 0.25	23	1(4.3)	1(4.3)	8(34.8)	12(52.2)	1(4.3)	0.00
	0.251 -	55	3(5.5)	4(7.3)	15(27.3)	29(52.7)	4(7.3)	
	0.50	164	35(21.3)	19(11.6)	29(17.7)	77(47.0)	4(2.4)	
	0.51 - 1.00 > 1.01	155	5(3.2)	13(8.4)	68(43.9)	68(43.9)	1(0.6)	
Categorical Family Size	< 2	23	0(0.0)	4(17.4)	6(26.1)	12(52.2)	1(4.3)	0.00
	3 - 4	234	21(9.0)	14(6.0)	67(28.6)	129(55.1)	3(1.3)	
	> 5	140	23(16.4)	19(13.6)	47(33.6)	45(32.1)	6(4.3)	
Categories of Distance	< 10km	88	12(13.6)	2(2.3)	22(25.0)	44(50.0)	8(9.1)	0.00
	11 - 15km	55	19(34.5)	15(27.3)	10(18.2)	11(20.0)	0(0.0)	
	16 - 20km	44	6(13.6)	3(6.8)	5(11.4)	30(68.2)	0(0.0)	
	21 - 25km	68	0(0.0)	4(5.9)	8(11.8)	55(80.9)	1(1.5)	
	> 26km	142	7(4.9)	13(9.2)	75(52.8)	46(32.4)	1(0.7)	

Sources: Own survey 2021

Ordered Logistic Regression							
DV1	Urbanization maintain community relationship()						
	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
GROUP	-4.731	.54	-8.76	0	-5.79	-3.672	***
EDU	-.598	.224	-2.67	.008	-1.037	-.159	***
FSIZE	-.169	.074	-2.29	.022	-.314	-.024	**
LANDSIZE	-1.961	.504	-3.89	0	-2.949	-.974	***
DISTANCE	-.183	.024	-7.76	0	-.229	-.136	***
DV2	Urbanization is a risk/threat for rural farming HHs						
GROUP	-.866	.43	-2.01	.044	-1.709	-.022	**
EDU	-.674	.205	-3.30	.001	-1.075	-.273	***
FSIZE	-.047	.073	-0.64	.52	-.189	.096	
LANDSIZE	-.719	.444	-1.62	.105	-1.59	.151	
DISTANCE	-.095	.02	-4.69	0	-.134	-.055	***
DV3	Urbanization increases rural HHs' income diversification						
GROUP	-1.196	.428	-2.80	.005	-2.035	-.358	***
EDU	.011	.202	0.05	.958	-.386	.407	
FSIZE	.336	.074	4.57	0	.192	.48	***
LANDSIZE	-.466	.449	-1.04	.299	-1.345	.414	
DISTANCE	.031	.02	1.61	.108	-.007	.07	
DV4	Urbanization increases agriculture production/productivity						
GROUP	-.865	.423	-2.04	.041	-1.695	-.035	**
EDU	-.168	.203	-0.83	.408	-.567	.231	
FSIZE	-.079	.072	-1.09	.275	-.22	.063	
LANDSIZE	-.246	.445	-0.55	.58	-1.118	.625	
DISTANCE	.055	.02	2.79	.005	.016	.093	***
DV4	Urbanization creates job opportunities						
GROUP	-2.567	.441	-5.82	0	-3.431	-1.702	***
EDU	.005	.202	0.03	.979	-.39	.401	
FSIZE	.02	.07	0.28	.777	-.118	.157	
LANDSIZE	-.564	.462	-1.22	.222	-1.469	.34	
DISTANCE	-.011	.02	-0.55	.581	-.05	.028	
DV5	Urbanization pollutes the rural environment						
GROUP	-3.641	.508	-7.17	0	-4.637	-2.646	***
EDU	-.372	.22	-1.69	.091	-.803	.059	*
FSIZE	-.154	.075	-2.06	.039	-.3	-.008	**
LANDSIZE	-1.308	.496	-2.64	.008	-2.281	-.336	***
DISTANCE	-.138	.023	-6.08	0	-.183	-.094	***
DV6	Urbanization decline HHs farmland						
GROUP	-3.224	.477	-6.76	0	-4.158	-2.289	***
EDU	-.568	.212	-2.68	.007	-.982	-.153	***
FSIZE	-.243	.074	-3.28	.001	-.388	-.098	***
LANDSIZE	-1.183	.476	-2.48	.013	-2.116	-.249	**
DISTANCE	-.15	.022	-6.94	0	-.193	-.108	***
DV7	Urbanization impact is not well addressed by government policy						

GROUP	-2.973	.468	-6.36	0	-3.889	-2.056	***
EDU	-.904	.213	-4.24	0	-1.322	-.486	***
FSIZE	-.2	.072	-2.77	.006	-.341	-.058	***
LANDSIZE	-1.843	.476	-3.87	0	-2.776	-.911	***
DISTANCE	-.15	.022	-6.85	0	-.192	-.107	***
DV8	Summary of all Perception						
GROUP	-4.358	.516	-8.44	0	-5.37	-3.346	***
EDU	-.589	.218	-2.70	.007	-1.016	-.162	***
FSIZE	-.149	.073	-2.05	.041	-.292	-.006	**
LANDSIZE	-1.402	.488	-2.87	.004	-2.358	-.446	***
DISTANCE	-.157	.022	-6.99	0	-.201	-.113	***
*** $p < .01$, ** $p < .05$, * $p < .1$							

Source;own computation,2022

Appendix E: Multicollenearty Test Results for different Models

Variable	VIF	1/VIF
MKTDIS	6.01	0.166388
Kebele_s	5.24	0.190912
LSIZE	2.51	0.398405
TLU	1.83	0.546236
AGE	1.66	0.601482
Annual_i_01	1.44	0.693501
SEX	1.42	0.706258
MARAGE	1.36	0.737663
Saving	1.35	0.740530
EDU	1.30	0.769050
Accredit	1.23	0.809955
FSIZE	1.23	0.813587
NFarmA	1.18	0.851003
Remittance	1.04	0.962815
Mean VIF	2.06	

Multicollinearity Test.

VARIABLES	VIEW	1/VIF
GROUP	4.88	0.204778
DISTANCE	4.68	0.213516
LANDSIZE	2.73	0.365766
SIZE	1.14	0.874018
EDU	1.08	0.928366
Mean VIF	2.90	

Ethiopia's ...

