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The Impact of Urban Expansion on the Peri-Urban Farmers Livelihood: The Case of Dessie City

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Wisdom at the source of the Blue Nile

BAHIR DAR UNIVERSITY COLLEGE OF BUSSINESS AND ECONOMIS

DEPARTMENT OF ECONOMICS

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LIVELIHOOD: THE CASE OF DESSIE CITY

Msc. Thesis

BY

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As Thesis research advisor, I hereby certify that I have read and evaluated this Thesis prepared, under my guidance, by Aschalew Teshome entitled **"**The impact of urban expansion on peri urban farmers' livelihood: The case of Dessie City"**.** I recommend that it be submitted as fulfilling the thesis requirement.

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As members of the Examining Board of the Final M.Sc. Open Defense, we certify that we have read and evaluated the thesis prepared by Aschalew Teshome. We recommend that it be accepted as fulfilling the thesis requirement for the degree of Master of Science in Applied Development Economics.

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DECLARATION

This thesis has been submitted in partial fulfillment of the requirements for MSc degree at the Bahir Dar University Business and Economics College Department of Economics in Applied Development Economics.

I, the undersigned, declare that this thesis is my original work and all sources of the materials used for this thesis have been properly acknowledged and referenced. I understand that non-adherence to the principles of academic honesty and integrity, misinterpretation /fabrication of any idea/data/fact/source will constitute sufficient ground for disciplinary action by the university and can also evoke penal action from the sources which have not been properly cited and acknowledged. This thesis is not and it has not been submitted partially or fully to other institution anywhere for the award of any academic degree, diploma, or certificate.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADA   Amhara Development Association

AEQR   Adult Equivalent Rate

ATE   Average Treatment Effect

CSA   Central Statistics Agency

ETB   Ethiopian Birr

HH   House Hold

KA   Kebele Administration

MEQR   Man Equivalent Rate

NN   Nearest-Neighbor

NUID   Not Urban Induced Displacement

NUPI   National Urban Plan Institution

PSM   Propensity Score Matching

TLU   Tropical Livestock Unit

UE   Urban Expansion

UID   Urban Induced Displacement

ABSTRACT

In the present day urban expansion program is implemented in Ethiopia including Dessie City at large scale through intervention projects to achieve growth and transformation. However, availability of empirical evidences on the impact of urbanization of the city on its peri-urban community livelihoods is scanty.

This research was carried out to examine the impact of urban expansion on the displaced households' livelihood in Dessie City. In this study household survey data and focus group discussion were employed. Descriptive analysis, econometric results estimation with propensity score matching methods were used for ATT investigation. The logistic robust regression model was fitted to analyze the potential variables affecting urban induced displacement and for each of the key outcome indicators to analyze the displaced farmers' livelihood outcomes in the study area. Statistical tests such as T-test, Chi-square, sensitivity etc tests were employed. Household survey data was collected from 298 (111 displaced and 187 non-displaced) households through random sampling proportionately from three kebelles of urban periphery villages.

This study has found that the key outcome indicators signify the livelihood of the peri urban areas were negatively affected by urban expansion as shown in the treatment effect by observables factors. As the result, the urban expansion in its effect on total annual consumption expenditure has decreased for displaced households by Birr 3025.64 and livestock holding and eucalyptus tree assets were also depleted by 2.4 TLU and 18332.75 ETB, respectively. In contrast home durable furniture of displaced households is more than by Birr 1787.06, but, this could be due to displaced households use their compensation payment to increase their purchases of home durable furniture doesn't indicate positive impact of improvement in their livelihood.

The researcher recommend that compensation payment needs to be revised and beyond compensation relocation assistance needs to be focusing on sustainable source of income, job security and income for the farmers more to building long-term rehabilitation works in a fixed direction to sustain their livelihood. Effective urban land use & administration was also crucial on land saving & planning.

Key Words: Logit, PSM, Displacement, Impact, Urban expansion, Farmers Livelihood.

CHAPTER ONE: INTRODUCTION

1.1. Background

The level of urbanization is increasing nearly everywhere in the world today. Developed and developing countries of the world differ not only in the number of people living in cities, but also in the way in which urbanization is occurring. Because urban growth in many megacities of developing world is often uncontrolled or uncoordinated, the impact of urban expansion is a common problem since negative impacts override the positive sides and a substantial amount of city inhabitants live in slums within the city or in urban periphery in poverty and degraded environment (Bnatta, 2010). In contrast, when properly planned and managed, growth of these cities have become a positive and potent force for addressing sustainable economic growth, development, prosperity and for driving innovation from urbanization can play a key role in eradicating poverty (Gebremedhin and Bihon, 2009). This revealed that understanding urbanization depends on how urban growth is planned and managed, and the extent to which the benefits accruing from urbanization are equitably distributed.

The conversion of arable land to urban use in Ethiopia is directed by the national development policy. According to previous researchers conducted by ministry of urban development and houses indicates that in 1952 the level of town residents in Ethiopia was 6%. This level rises to 11%, in 1976-1986, 14% in 1986, and 16% in 1999 (NUPI, 2000). The cities in the country particularly the capital city and regional metropolitan cities are correlated with historical backgrounds of their establishment such as squatter settlement and illegal land trade intensified in the peripheries leading to the high expansion of cities (Tamrat, 2016).

An urban area of many African countries including Ethiopia is a recent phenomenon has been expanding even at times of poor economic performance (Tsega, 2012). Although little is being done to improve the sub-optimal social and economic infrastructures of the urban peripheries, cities expand outwards causes to displacement of farmers by including the immediate rural villages and their farmlands. This outward expansion of urban areas in its effect limits the availability of farmland in peri-urban areas which again affects farm income of the farm households in the periphery. As a result, the farm households may shift to the nonfarm activity to cope up the new means of living and to diversify their livelihood strategies. However with little

compensation and in the absence of government support displacement affects the livelihood of the farm households in peri-urban areas and how these farm households transform their means of livelihood is challenging for those displaced households.

In the same way, due to the increasing rate of urban expansion in Dessie city, displacement of farmers is an alarming issue regarding with farming community livelihoods. Ultimately, villages in peri-urban areas of Dessie city become dominantly urban and the adjacent rural villages become peri-urban which eventually shifts the cultivated land to the urban purpose and transforming to the new livelihood.

 Dessie city population growth reaches in 1976-1986 to 3.5%, in 1986-1999 it was 2.6 % and in 1999-2007 was about 3.6% (NUPI, 2000). Central Statistics Agency (2010) prediction also indicates that Dessie City horizontally expansion was 2.5% from 1986 to 1999 and annual construction growth at the same time was 4.5%. As a matter of this fact, Dessie city is among the Ethiopian urban locations experiencing unprecedented rate of urbanization through expansion.

Dessie city is categorized as a secondary city (metropolitan city) and the government direction indicates that Dessie–Kombolcha is one of the growth corridors in the country (FDRE: MOUDHC, 2012). Metropolitan Area, is an area containing a large population (at least 50,000 people) in the nucleus and the nearly communities that are integrated, in an economic sense, and commute to the nucleus (O'Sullivan, 2009). Thus Dessie is a metropolitan city with a population of 265000 that comprises six local kebeles. Kocha

According to the local government zoning plan the fate of Dessie city is towards commercial and service sector expansion (Dessie City Municipality Office, 2015). Following the government policy and program a process of urbanization in the city is realized by the rapid conversion of prime agricultural land to urban land use as well as transformation in the livelihoods of peri-urban inhabitants. Due to Peri-urban area of the city has attracted for urban purposes, the increased attention in urban expansion is accompanied in recent years. But, there is scant information and knowledge on the factors affecting smallholder farmers' livelihood in the expansion program. As a result this study gives emphasis to the impact of urban expansion on the livelihood of urban periphery households in Dessie city of the Amhara region.

1.2. Statement of the Problem

Past studies have shown that the existing world is predominantly characterized by the increase of urban population. Land for manufacturing, service and similar urban activities especially in developing countries is a driving force for physical urban expansion. Urbanization in most countries has historically pushed all forms of agriculture out of the city and into rural areas, considering it too dirty for the glory of the city (Janakarajan, 2007). Accordingly, this pattern of urbanization is failed to take into account environmental and social sustainability, and at the same time equitable food security. Although cities facilitate innovation, production, trade and hence they increase our standard of living but observing the negative impacts cities are also noisy, dirty, and crowded (O'Sullivan, 2009).

Urbanization in Ethiopia is stood at around 19%, significantly below the sub-Saharan average of 37% of the country's population living in urban areas (World Bank, 2014). However, afterwards 2005 Ethiopia's urban population growth has been increasing rapidly. According to the projection data of CSA(2011) the total country's annual population growth rate is 2.5% while the rate of urbanization is increasing at a rate of 4.4% due to high rate of in-migration to towns, natural rate of growth, and increase in the number of urban centers. Considering the current rate of growth, this rate will become tripled and hence the number of urban population will reach to 30 percent by 2037.

Yet, the Ethiopian regional urban centers including Dessie city are expanding horizontally in unexpected rate causing to peasant displacement with related loss of agricultural land and change of their livelihood strategy. Largely, urban expansion is spontaneous phenomenon that leads to spontaneous growth by displacing rural farming community. It has been pointed out that even planned displacement has its own negative effect on the peri- urban farmers' livelihood and the post displacement life of the affected community (Friew, 2010). When the official governments displace people for the purpose of urban expansion; this getting also follows by reducing the amount of land accessible for cultivation. Although Proclamation No 455/2005 on land expropriation and compensation to its effect provides direction on how the private holdings are to be expropriated and what and how the compensation is to be implemented at the government level, the situation in its effect is worsened by the compelled of land expropriation and compensation directives Gashaw (2015). Following the Ethiopia's urban expansion, the peri

urban farmers are induced to lead new way of life than their previous livelihood (Tamrat, 2016; Teketel, 2015; Zemenfes et al., 2014).

Like other Ethiopia urban dwellers, it is also true that for Dessie city, where the land ownership belongs to public with the amount of compensation paid to displaced households depends on government's good will as the payment is insignificant, it directly leads to insecurity of life of evicted communities. Expansion of the Dessie city is confronted to farmers' new livelihood adaptation beyond the compensation. Thus, the expansion of the urban settlement to the peripheries of the city and its consequences to the farmers has in a significant adjustment in the way of life, production, and social structure due to displacement. There are no information and awareness on impact of urban expansion program on peri-urban farming communities in the city. Because of this, the peri-urban agricultural community in Dessie city has been affected by the decisions of municipality. The periurban farmers offer appeals to the city administration in order to sound at strong opposition against the implementations of land expropriation, displacement and compensation. Regardless of the fear of displacement, urbanization is necessarily important to achieve the growth and transformation plan of the government. The urban expansion might make development better off but enhancing at the expense of peri-urban community may not be worthy. This indicates the problem is serious and needs attention of the government in order to make urbanization more integrated and supported by the community, otherwise, it may face to stuck in achieving its objectives.

Therefore, the motive of this study is to analyze the impact of urban expansion on peri urban farmer's livelihood in Dessie City of the Amhara region and to provide evidence based policy implication.

1.3. Objectives

The general objective

The general objective of the study was to assess the impact of urban expansion on farmer's livelihood.

The specific objectives of the study were:

- To analyzes the impact of urban expansion on displaced households' livelihood diversification strategies
- To identify the responsiveness of the government and the perception of the displaced farmers on the impacts of urban expansion programmes.
- To analyze the participation of the displaced farmers on the planning, decision making and implementation of urban expansion programs.

1.4. Research Questions

The primary purpose of this study is to assess the impact of urban expansion on rural household livelihoods in Dessie city. So, this study was tried to answer the following key questions.

- Does urban expansion have impact on the displaced farmer's livelihoods diversification?
- What are the perceptions of households and the government responsiveness on the impacts of urban expansion programmes?
- Does the community involve on the implementation of urban expansion programs in the form of planning and decision making?

1.5. Significance of the Study

This study measured the impact of urban expansion that affects the livelihood of farming communities in the urban periphery. So, the study helps to provide the necessary information to concerned bodies, policy makers, and other researchers. It also contributes a feedback to the municipality administration unit to evaluate causes and effects. Further the study forwards recommendations to create insight on the problems associated with urban expansions including land dispossessed farmers to their welfare improvement options. And on this area, it is important to motivate future researchers as well as input for urban planners for sustainable development that does not threaten peripheral farming communities.

1.6. Limitations of the Study

Following the urban expansion in Dessie city, then, there happen changes in both topography and settlement pattern of the pre-urban areas. In this research it is difficult to assess the impact and the change in land use and land cover on environment due to limited financial access, time constraint and lack of the necessary data in the short time. So the focus of this study was limited to analyze environmental impacts rather it is concerned only on the households level whose land

was expropriated and those who are urban induced displaced, relocated and their livelihood strategies get changed both by form and content. In addition, as expansion is a process taking place throughout time, there is a constraint to time series data about the displaced households. However, selected techniques such as propensity score matching methods were developed and employed as much as to solve those limitations in this study.

1.7 Organization of the Paper

This study is organized in to five chapters. The second chapter next from introduction deals with theoretical and empirical literature review on urban expansion. Chapter three introduces the methodology which includes description of the study area, source and method of data collection, data analysis, definition of variables and hypothesis. Chapter four describes the results and discussions of the study using both inferential, descriptive statistics and econometric models. Finally, chapter five presents conclusions and policy implications of the study.

CHAPTER TWO: LITRATURE REVIEW

2.1. Theories of Urban Expansion and Impact Evaluation

2.1.1. Concepts of Urbanization and Urban Expansion

According to O'Sullivan (2009) the definition of urban area in the field of urban economics is a geographical area that contains a large number of people in a relatively small area. In other words, an urban area has a population density of the surrounding area. This definition accommodates urban areas of vastly different size from a small town to a large metropolitan area.

According to Lulseged et al (2011) Urbanization refers to a growth in the proportion of a population living in urban areas and the further physical expansion of already existing urban centers cited in (Samson, 2009; Alaci, 2010).The urbanization process is accompanied with expansion of the city boundary which engulfs periurban settlements. The process of expansion of the city boundaries is resulting in periurban settlements coming within the city's "zone of influence" (Worku, 2013). Population growth, industrialization and economic development are the primary driving forces behind urban expansion (Zhao-ling et al, 2007).

The urban population in developing countries is expected to double in the next thirty years: from some 2 billion in 2000 to almost 4 billion in 2030. In 2014, sixteen countries still have low levels of urbanization in the world, i.e. below 20 per cent. The largest among them, with total populations of 10 million inhabitants or more, include Burundi, Ethiopia, Malawi, Niger, South Sudan and Uganda in Africa and Nepal and Sri Lanka in Asia. However, by 2050, all of these countries are expected to become significantly more urbanized, with as much as twice their respective proportions urban in 2014 (UN, 2014). In parallel, the urban population of industrialized countries is now expected to grow by 11% in the next thirty years: from some 0.9 billion to 1 billion.

 The results suggests that with increasing population, a clear spatial land use planning and management strategy is required to over- come the challenges and enhanced food systems and urban environmental sustainability in rapidly urbanizing cities (Wakuru, 2013). The process triggers the transformation of settlements from rural in character to modernity with an

augmented land use conflicts. However, the most unskilled peri-urban populations depend upon farm land for their livelihood than industrialization induced economic development nonfarm activities.

Urban expansion (UE) in Ethiopia context has assessed with empirical literatures in regional urban areas. Most finings imply only adverse impact of horizontal UE without briefing its extent quantitatively has on the livelihood of peri-urban agricultural community in Ethiopia. For example out ward UE of urban settlements and institutions as observed in Jimma adversely affects the periphery (Tamirat, 2016).

2.1.1.1. Challenges of Urban Expansion

Modest economic growth, high population expansion and massive rural-urban migration resulted in a situation of urban crisis across the region, with spreading shantytowns, ill-regulated land use, low sanitary conditions and increased poverty (UN, 2008).

A) challenges on prime agricultural land change to urban land use

From general theory of urban perspective, urbanization and urban growth are considered as a modern way of life manifesting economic growth and development. Because of agglomeration economies cities are engine of growth (O'sullivan, 2009). However, Peri-urban areas have become a highly challenged zone due to rapid urban expansion, demographic pressure and industrialization are affected the peri urban family to unemployment and poverty increased and livelihood options get shrunk (Janakarajan, 2007).

In urban regions in Ethiopia including the primate city, the situation is get worse by the land expropriation and compensation directives. The effects on asset holdings and earnings are inconsistent with the perceived view of difficulties in livelihood transitions and to accustom new institutions. This kind of situation happened in some urban areas such as in Addis Ababa (Leulsegged et al, 2011), in Hawassa sub-urban area (Friew, 2010), Jimma Town (Tamrat, 2016), Northern Ethiopia; Mekelle, Adigrat, Axum, and Alamata (Tsega, 2012). Since urban contexts are distinct from the rural ones and the households were not ready to be familiarized with the new situation, and also the nature of follow-up and support given at post displacement time was less, majority of them lead a risky living condition (Tamirat, 2016).

The aesthetic benefits from open spaces, the livelihood of farming community at the peri-urban area are being replaced by increasingly urban settlements. Hence, it is possible to argue that cities are expanding at the expense of peri urban farm land and other natural resources in which it seems uncompromising to worsen the farm households in its outcome. In this way the impact of UE around the peri-urban areas of Dessie city was less studied from peri urban farmers' livelihood point of view. In addition to area specifications, there are method, designs, and scope variations among these studies. Most studies explained above (except few studies) in regional urban peripheries were used qualitative data and they also had tried to study subjectively the displacement and the consequences of farmers livelihood exists in the peripheries.

B) The challenge of transformation in the livelihoods of peri-urban dwellers

Sustainable livelihood aims to promote development that means sustainable is not only just ecologically, but also institutionally, socially and economically and to produce genuinely positive livelihood outcomes rather than concerning themselves with narrow project outcomes with resources or with output (FAO & ILO, 2009). However, urban expansion on agricultural land is associated with changes in the level of land scarcity and off-farm opportunities (Jianga et al, 2013). That is why the change in livelihood as new way of household activities altered by peri urban farmers faces to challenges.

2.1.1.2. Peri urban Agriculture

Though an exact definition for the term "peri-urban" is difficult to formulate scholars generally agree that the peri-urban zone is at the fringes of the city is less densely settled than the inner city and is a place where transition from urban to rural can be observed (O'sullivan, 2009).

According to Drescher & Iaquinta (2002) there are five different types of peri-urban which can be based up on locational, demographic and institutional characteristics categorized as follows:

A. *"Village Periurban (VPU):- infers non-proximate to the city either geographically or in travel time, derives from sojourning, circulation and migration, and embodies a Network Induced Institutional Context (IC) wherein change is effected through diffusion or induction while institutions remain traditional in orientation and stable.*

B. *"Diffuse Periurban (DPU):- it is geographically a part of the urban fringe, derives from multiple point-source in-migrations, and embodies an Amalgamated Institutional Context*

where there is a high demand for negotiating novel institutional forms to address conflicting traditions and worldviews."

C. *"Chain Periurban (CPU):- geographically a part of urban fringe, derives from chain migration, and embodies a Reconstituted Institutional Context wherein links to the donor area remain strong and traditions and institutions are transplanted with some modification from the donor area and take on a somewhat defensive character.*"

D. *"In-place Periurban (IPU):- geographically close to the city; urban fringe, derives from in-place urbanization, natural increase and some migration, and embodies a Traditional Institutional Context with long-term stable institutions evidencing strong defensive insulation.*"

E. *"Absorbed Periurban (APU):- This infers geographically within the city, having been absorbed, derives from succession/displacement and traditionalism (ritualism), and embodies a Residual Institutional Context wherein the roots of social arrangements lie in the traditions of a previously resident culture group and are now maintained through ritualism. They are more likely in developing countries to occur vis-à-vis such processes as: The inflow of out-migrant remittances, Out-migrant infusion of "urban" ideas and modes of behavior, Out-migrant infusion of non-income resources, and/or, Out-migrant participation particularly strategic—in community decision-making.*"

There are also different views about urban and peri-urban agriculture. According to Foeken et al (2004) urban and peri-urban agricultural is less productive for various reasons such as inadequate land use, tenure security problems, low technology usage and poor working culture. However as to others urban and peri-urban agriculture is contributing to employment opportunity and income generation of households operating as individuals and organized as cooperatives. It has also become an area of investment opportunity. Agricultural producers in the urban and peri urban areas are able to satisfy their food need and supply the market with agricultural products mainly crops, vegetables, poultry, milk, livestock, fruits, honey and tree crops (Gebremedhin and Bihon, 2009).

2.1.2. Theories about the Impact of Urbanizations on Livelihoods

Livelihoods consist of the capabilities, assets both material and social resources and activities required for a means of living (FAO and ILO, 2009). The welfare situation discrepancy observed between urbanization-induced displaced households and their comparison group indicates

financial compensation and replacement land provision for residential house construction alone do not secure livelihood sustainability of urbanization-induced displaced households (Leulsegged et al., 2011).

Welfare from micro economic point of view can be defined as the level of prosperity and quality of living standards in an economy. Economic in the household level can be measured through a variety of factors such as income and other indicators which reflect welfare of the community such as literacy, levels of pollution which affects the health (Tejvan, 2016). Thus, economic welfare is concerned with more than just levels of income.

An increase in real incomes suggests people are better off and therefore there is an increase in economic welfare. Hence, it is likely possible to argue that impact evaluation on livelihoods *on* welfare status of households whether negatively or positively includes thoughtful to farm income such as household crops and livestock, productive assets of households, non-farm income such as employment in businesses, trade opportunities due to market affects both supply and demand, social transfer needs in the context of ability to meet needs, and temporary work opportunities in dexterities and reconstruction, facilities and demographics characteristics are to determines the household welfare.

Base on the above theories, researchers were observes the impact of urbanization in the arguments of livelihood analysis. For example according to Tamrat (2016) use the methodology is more of qualitative description of development-induced displacement and resettlement programmes on recall which leads to subjective precision. It also lacks setting objectively measurable indicators for post-displacement welfare situation evaluation of urbanization-induced displaced households. Others such as Harris (2015) also make analysis with short period of time a year after expropriation.

2.1.3. Theories of Impact Evaluation

Impact evaluation is the systematic identification of these positive or negative effects, which are intended or not, brought by a given development activity on households and environment (WB, 2010). According to Omoto (2003) the term impact refers to the wide and long term economic, social and environmental effects of an intervention resulting in anticipated or unanticipated and

desired and undesired, direct or indirect, positive or negative, primary or secondary outcome at the individual or organizational level that involve changes in cognition and behavior.

The impact of urbanization on peri-urban environment and livelihoods can be evaluated as like any development intervention effects. With this concept in mind, evaluation literatures can be seen in to two broad categories: environmental impact assessment, particularly land use and land cover dynamics, and impact of urbanization-induced displacement on peri-urban livelihoods (Leulsegged et al, 2011).

A good evaluation of an intervention is to ask what would happen in the absence of intervention and what would have been the welfare level of particular community or group, households and individuals with intervention. Evaluation involves an analysis of cause and effect in order to identify impact that can be traced back to intervention. The effect of intervention from other factors is facilitated if control groups are introduced. Control group is a group when a group is exposed to usual condition and consist a comparator group of individuals who did not receive the interventions. But groups have similar characteristics are these receiving the intervention are called treatment group (Caliendo and Kopeinig, 2005).

Random experiment method of impact evaluation

When the group is exposed to some novel or special condition, it is termed an experimental group. The process of examining the truth of a statistical hypothesis relating to some research problem is known as an experiment. Experimental designs, also known as randomization and generally considered the most robust of the evaluation methods. In practice there are several problems firstly randomization may be unethical owing to the denial of benefits or services, secondly it can be politically difficult to provide an intervention to one, and thirdly the scope of the program may not have non treatment group (Baker, 2000).

Non- experimental method of impact evaluation

Economists and econometricians have been studying statistical methods for program evaluation with evaluations and types of data should be collected. None experimental estimate in a single post treatment cross section to be correct that require the outcome variable be the same for in the absence for participants and none participants in the absence of treatment (Robert, 1991).

Quasi experimental method of impact evaluation

Quasi-experiments are defined as experiments that do not have random assignment but do involve manipulation of the independent variable. Quasi experimental methods are alternatives which includes matching methods, double difference methods, instrumental variable methods and reflexive comparisons. Quasi experimental methods used the treatment and comparison groups are usually selected after the intervention by using none random method (Baker, 2000). According to Harris (2015) quasi experimental design identify a comparison group as similar as possible to the treatment group in terms of base line or pre intervention characteristics whereas in the absence of baseline data there are also different techniques for creating a valid comparing group example propensity score matching by (Lulseged et al. ,2011). Quasi experimental method that involves the creation of the comparison groups are most often used when it is not possible to randomized individuals or groups to treatment and control groups. Matching methods relay observed characteristics to construct a comparison group using statistical techniques (Caliendo and Kopeinig, 2005).

2.2. Empirical Studies on Impacts of Urban Expansion in Peri-urban Livelihoods.

2.2.1. Land Expropriation, Compensation and Displacement

Expropriation: - It means the action of government taking away a private property of land from its owner with legal authority (Proclamation No 455/2005). The key element or condition the convenience of expropriation is the purpose of taking over private property. The basic criteria justifying admissibility of expropriation has been and still is the public purpose and public interest (Proclamation, No455/2005). The Federal government of Ethiopia enacted a "Land administration and Use Proclamation (Proc. 87/1997)" and then replaced it with the current legislation, proclamation No. 456/2005. Expropriation occurs when a public agency (for example, the regional government and its agencies, local authorities, municipalities, school boards and utilities) takes property for a purpose deemed to be in the public interest, even though the owner of the property may not be willing to accept it (Gashaw, 2015). Under these proclamations, rules and regulation provide documents for the amount payable as displacement compensation which shall be equivalent to ten times the average annual income secure during

the five years preceding the expropriation of the land. This implies that compensation payment in Ethiopia is too little to sustain life after eviction (Tsega, 2012).

Compensation:-According to Proclamation No 455/2005, compensation is a means of payment for the land property that is expropriated by the respective executing body of government both either in cash or in kind. The process of compensating for the evicted house hold should include all forms of asset ownership or use right among the affected population and provided a detailed strategy for partial or complete loss of assets. However, in the context of Ethiopia land use and land tenure property rights are subjected to claim by the peri urban farmers since they are not consent to be negotiable for compensation unless they are mandatory to loss their lands according to the proclamation disclosed above.

Displacement implies resettlement or relocation of periurban communities due to land expropriation. But unfair displacement of families whose main source of livelihood is subsistence agriculture, from their small land holdings resulting in complete deprivation and destitution (Zemenfes et al, 2014). Within a clear spatial land use planning and management strategy is required to overcome the challenges and enhanced food systems and urban environmental sustainability in rapidly urbanizing cities. But how much does community involvement? The concept of community involvement in planning for sustainable ecological conservation is highly insisted upon in country urban planning and land management policy, programmes and legal documents (Worku, 2013).

2.2.2. Empirical Review on Impacts of Urban Expansion

From the normative analysis, households that lose their land should not be made worse off as a result of expropriation and at the very least should be able to replace the income that they generated with their land (Harris, 2015). However, regardless of compensation, fully displaced people have failed to establish a comparable means of income earnings and they are pursuing asset depleting consumption style. This shows the failure for pre-displacement protective measures and post-displacement adaptation measures (Lulseged, et al., 2011). According to Harris (2015) Compensation payments should assist households in making the transition from small-scale agriculture to other income generating activity and yet, in this short time period, it seems that the majority of households are not able to do so.

According to Tsega (2012) finding out from the four cities at the same time in Northern Ethiopia, the scale and type of land compensation given to the dispossessed farmers varies depending on revenue of the town. The other issue is the towns differ in terms of size of economic activities, access to infrastructure and information, market size, population, and agricultural production potential of the adjacent rural districts (locally Known as woreda). Thus it is possible to argue that compensation is not the only means to cope up new way of life. What is needed to be done is then, household's limited labour market response, the low number of new business starts and the high propensity to save in bank accounts that yield a negative real rate of return, suggests that households are constrained in their ability to effectively absorb lump-sum payments (CSAE, 2015).

According to Drescher & Iaquinta (2002) urbanization and urban growth has its own benefits and limits such as innovation in science, the arts, and lifestyles; contain many of the cultural assets of the country; and offer some of the best opportunities for people to lead full and satisfying lives. Yet they also suffer from environmental pollution, traffic congestion, a shortage of water, and the proliferation of slums, crime, and social alienation. There are also debates about urban expansion. Some say to be the expansion is horizontal or vertical the basic dimensions of the policy debate on the expansion of cities are certainly not new. At one extreme, there have been those who fought to limit the growth of cities by any and all means. At the other, there were those who welcomed it and actively prepared cities for absorbing the oncoming waves of new migrants (Buckley et al., 2005).

Studies about the impacts of UE in Ethiopia shows expropriation of land from small-scale farmers is commonly used by the Ethiopian government to provide land for rapidly growing cities and industrial investment projects (Friew 2010, Lulseged et al., 2011, Tsega 2012, Harris 2015, Teketel 2015, Tamrat 2016). The analysis to this studies indicates surveyed households received a lump-sum compensation payment for their land, which was intended to help them transition to new income generating activities. However, nothing is known about what happens to the benefits of compensation to households that lose their land or the way in which they find new income generating activities in Dessie city. Although studies in the other cities are similar in many ways, these previous studies practiced different approaches to reveal the analysis and they obtained some different findings among the same variables.

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Regarding the researchers approach, Harris (2015) using panel data with first difference regression specification estimates the average treatment effect of losing land and receiving compensation on a number of key outcomes including household consumption, savings, asset holdings and off-farm work. As to Lulseged et al (2011) multinomial logit model was employed at cross-section and used PSM estimator indicates the mean difference in per capita income/expenditure and their asset holdings over the common support appropriately weighted by the propensity score distribution of urbanized induced displacement. According to Tsega (2012) executes the logit model with two years panel data to estimate the welfare effect of urbanization and the estimators used difference in difference (DID) and the main out comes including in her analysis consumption and asset holdings. Given the above key outcome indicators both researchers' include in their analysis demographics, services and utilities. However, others use qualitative and subjective analysis than impact evaluation techniques and econometric models (Friew, 2010), (Tamrat, 2016) and Teketel (2015).

The findings discovered upon the previous studies as explained above are almost similar in many variables. According to Mkhize et al (2016) Urban growth also has a large effect on education, followed by commercialization and then on the use of modern varieties such as technology. These in turn have a strong impact on agricultural and rural non-farm income. As to Harris (2015) income generating strategies employed by the household depend on inherent characteristics of the household such as business skills or education, household endowments and on the asset portfolios owned by the household. In addition, any members of the household working for a non-agricultural household business depends on the amount of payment received. Lulseged et al., (2011) indicate in their analysis age, gender and education status were found to affect the probability of involving in nonfarm sector related livelihood strategies and locations like access to road were significant in determining participation decisions and have created disparities in employment opportunities. The non-farm activities that the households participates to create an additional source of income were diverse; they include business activities, professional employment, non-farm wage, and farm wage labour on the nearby agricultural farm (Mandere et al, 2010). According to Teketel (2015) horizontal urban expansion affected human capital of these households explained by inadequate food, poor nutrition, poor health and

education and very limited marketable skills and knowledge all of which are the functions to the households' welfare situations that in turn is determined by the type and nature of the livelihood alternatives**.**

Consumption expenditure can also be another key indicator of the outcome variable which is investigated as a proximate to income in the analysis was made as follows. According to Tsega (2015) consumption expenditure of the farm households included to urban has significantly reduced over two years. Her results show that the consumption expenditure of the untreated households catches up more than with that of the treated households. This in turn signifies untreated households able to sustain their existing level of consumption and maintaining or improving their asset base. However, the analysis on the assessment of Harris (2015) relative to consumption executed that the increase nominal consumption in response to receiving compensation is due to household's income has increased. There may be a behavioral explanation when a household holds a large sum of cash; it is easy to rationalize spending a small amount to supplement household consumption.

2.2.3 Conceptual Framework of Livelihood

To analyze this research it is important to provide some insights about livelihood, the definitions and conceptual framework about livelihood is put as follows:

According to Chambers and Conway (1992, page 7) cited in Morse (2009),

"A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living; a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long-term."

According to FAO and ILO (2009) livelihood frameworks are characterized by existing institutions and policies affecting people in which assets are put into use through certain strategies and activities to produce certain livelihood outcomes. Assets refer to the resource base of people. Assets are often represented as a pentagon in the Sustainable Livelihood Framework (SLF) consisting of the following five categories: natural resources (also called 'natural capital'), physical reproducible goods ('physical capital'), monetary resources ('financial capital'),

manpower with different skills ('human capital'), social networks of various kinds ('social capital'). Vulnerability implies individuals, households and communities are exposed to unpredictable events that can undermine livelihoods and cause them to fall into poverty or destitution. Some of these events have a sudden onset example earth quake while others develop over a longer period e.g. drought but all can have negative effects on livelihoods. But the vulnerability and resilience of people to the impact of the shock will vary. Vulnerability depends on the asset base that people have prior to the crisis and their ability to engage in various coping strategies.

The other basic livelihood outcomes relate to satisfaction of elementary human needs, such as food, water, shelter, clothing, sanitation, health care, and better education. The ultimate outcomes are to achieve the preservation of the household and to rear the next generation with a desirable quality of life. People tend to develop the most appropriate livelihood strategies possible to reach desired outcomes such as food security, good health, and better education all these affects the "well-being" of house hold (FAO and ILO (2009).

One of the most widely used frameworks is the one used by the UK Department for International Development (DFID). The framework consists of livelihood assets and activities, vulnerability and coping strategies, policies, institutions and processes and livelihood outcomes. Abdissa (2005) used the sustainable livelihoods framework (DFID, 1999) to describe the urban induced displacement in the peri-urban areas of Addis Abeba city cited in (Lulseged et al., 2011).

Figure 1 : Conceptual Framework of Livelihood
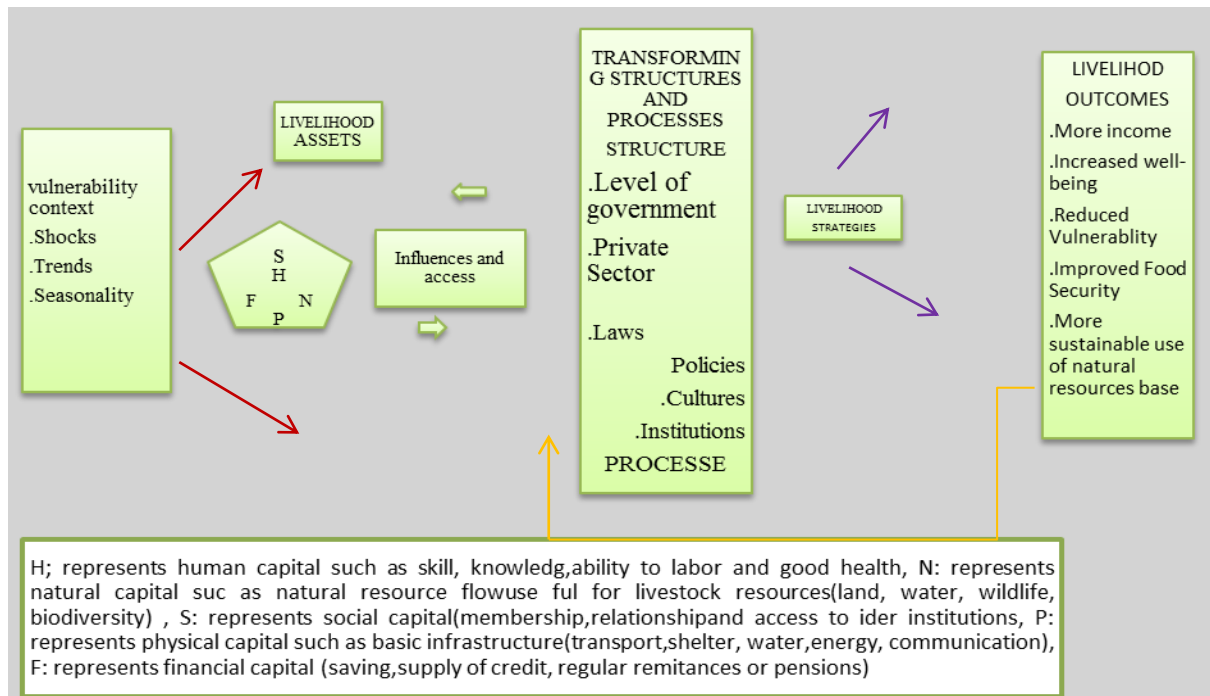
Source: DFID as cited by Morse (2009)

The above frame work depicts government introduce urbanization induced policy. The rules of land expropriation and compensation to land dispossessed farmers tend to change their livelihood strategies based on activity alternatives. The households in respond to displacement go through livelihood strategies have a tendency in order to achieve livelihood outcomes. This indicates the farming community to transform to new way of life in their welfare situation depends on those outcomes. So the household welfare is determined by income/expenditure per capita or increase in wellbeing such as better education and better health for families and improved food security can be expressed by food and nonfood household expenditures and more sustainable to natural resources. Besides, their asset holdings in type and content which help to overcome unpredictable events or reducing vulnerability and may also transform due to urban induced displacement throughout a serious of time.

Table 1: Review Summary on Empirical Evaluations & key Findings in peri-urban livelihood

Author name, Year, country	Evaluation Method And data type/ source	Method of Analysis And model used	Key Findings on HHs livelihood
Mandere et al., (2010) Kenya (Nyahururu)	Use cross sectional data, HH survey questionnaire & open interviews with individual households & groups on primary data	Use Qualitative analysis & Focus was on population dynamics. Urbanization is the main reason for the changes in land, HHs livelihood & income.	Most HHs adopt Diverse&Productive nonfarm activities But HH engaged in to the low income return.
Mkhize et al., (2016) Kenya	Using panel data, double differ. & eliminating fixed effect. Executes Elasticity of variables, use impact estimation method.	Econometric model, urban gravity analysis HH income, investigation on quantitative analysis.	Farming drops due to urban gravity. Nonfarm income is impacted by educ. and commerce
Lulseged et al., (2011) Ethiopia (Addis Ababa)	Use cross sectional data, multistage of the area & HH survey, probability sampling, method & impact evaluation to investigate the welfare effect estimation, and environmental impact evaluation was done	Multinomial logit model PSM, ATT, land use and change with instruments. Livelihood-outcome with descriptive statistics and econometrics estimation on income and assets.	HHs establishing comparable income earnings. Average per/capita income Birr 2597 lower Ave/capital.expend exceed by Birr 970.
Tsega G/Medihin (2012) Ethiopia (N/Ethiopia four cities)	Use two year's panel data, HH survey, HHs welfare effect estimation, impact evaluation method was executed.	Binary logit model, DID, ATE, descriptive statistics & econometrics estimation analysis on quantitatively on consumption and assets	Negative effects on Asset &consumption. Difficulties in livelihood shift
Harris Antonio (2015) Ethiopia (Kombolcha)	Use a baseline & Panel data, 299 HH survey, use sub-village level and HH sample selection, HH livelihoods effects, impact evaluation	ATE estimation was done On consumption, saving & assets. Use Difference in Difference regression. Descriptive & econometric analysis quantitatively.	Increase consumption Declines livestock asset. They put the compensation in bank(raise saving)

Teketel(Hosanna,2015),Friew(Hawassa,2010), Tamrat (2016) Jimma, Ethiopia	Both use qualitative & quantitative data, cross-section HH survey, focus group and key informants livelihood evaluation	Non econometric method, descriptive type statistics method, qualitative and quantitative analysis on Asset and income	Low compensat[n], Lack of awareness Good governance has a limit of risk. Difficult livelihood.
Sara Nelson, (2007) Dar es salaam, Tanzania	Use at cross section, Based on a literature review and semi-structured interviews conducted in three peri-urban villages.	Use qualitative analysis, in-depth interview method And focus on HH survey method	structural change in way of life and the Land tenure rules. Impact on agricul. livelihood changes

Most of the researchers named above are concerned in the analysis of consumption expenditure and livestock asset as key indicators of the farmers' livelihood. Similar results obtain with Lulseged et al., (2011) and Harris (2015) argues that livestock, poultry, and eucalyptus were found important in terms of providing alternative employment opportunities to fully displaced households. Harris (2015) looks that even though households that receive large payments losing more land, and therefore having less need of oxen, in contrast, cattle, sheep and goats represent both a store of real value and a business opportunity for households that lose their farmland and only few of them had tried to purchase public transport vehicles. So it is unsurprising to see that majority of the treated households have increased their investment in the types of livestock. On the contrary according to Tsega (2015) urban has diminished the physical asset, particularly livestock and farmland holdings of the dispossessed farm households. Thus her analysis shows livestock ownership is positively associated with farmland in subsistent farming systems. There seems different conclusion of analysis in response to livestock holdings among the above researchers. However, livestock is not the only focus in their area of research interest. Due to the variation in the findings of the above researchers, the main concern of this research is to investigate these gaps regarding with the area and time variation to investigate the impact of urban expansion on rural household livelihoods in Dessie city.

In addition, most cases and effects in the above research were focused on qualitative and descriptive research type than econometric impact modeling (Mkhize et al., 2016, Teketel 2015, Friew 2010, Tamrat 2016) and there is a variation in analysis among researchers for example

gender, skills, household endowment, and asset portfolios such as livestock and tree assets and durable home furniture's owned by household in response to nonfarm income which are addressed only by some researchers. It is also important to keep in mind the timing of the survey was conducted within one year after expropriation may difficult to investigate the real impact and households were permitted to harvest their land before it was taken from them, which means that treated households may still have had stores remaining because this short term behavior of assumption may not hold always true in all levels and areas (Harris, 2015). According to Harris (2015) consumption of the displaced households is increasing even if it is irregular but the survey analysis with time variation was conducted one year prior to expropriation, following the announcement of the project, and a follow-up survey was conducted eight months afterwards unparalleled to Tsega (2015) had find out an implication in consumption was declining with a survey after two years of expropriation.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Description of the Study Area

Dessie is one of the oldest cities in north-central along the highland of Ethiopia and the capital city of South Wollo zone in Amhara National Regional State. Astronomically, it is located between 39^0 33.6` to $39^0$43.3` longitude and of $11^0$2.6` to $11^0$17.2` latitude with an elevation between 1922 and 3041 meter above sea level in the nearby Tossa mountain ridges. It is located on the Addis Ababa-Mekelle highway, at about 401 km distance from Addis Ababa, in the northern part of the country. The mean annual rainfall is about 866.25mm. The proportion of the precipitation in the months of July and August is about 55 percent of the annual total rainfall. The mean annual temperature of the city is 24.25 ºC (Dessie city Municipality report, 2015). Land use describes how a patch of land is used (e.g. for agriculture, settlement, forest, whereas the land cover describes the materials (such as vegetation's, soils, rocks, water bodies or buildings) that are present on the surface. From the total of 17184.54 hectare: cultivated land 9429.08 hectare 54.85 percent takes the lion's share followed by Shrub and bush land 3352.98 hectare 19.5 percent, grassland 2067.97 hectare 12.03percent, Built-up Area 1594.76 hectare 9.27 percent and others cover 742.75 hectare 4.32 percent (Dessie City Municipality report, 2015). In recent years rural land around the town has been expropriated to make space for Wollo University, cooperative housing, for ADA schooling board establishment, for solid waste treatment plant and for other construction and housing purposes. The land for urban expansion activity was transferred to these institutions through expropriation by compensation.

Figure 2: Dessie City Boundary and Urban Settlement Pattern

MAP OF AMHARA REGION
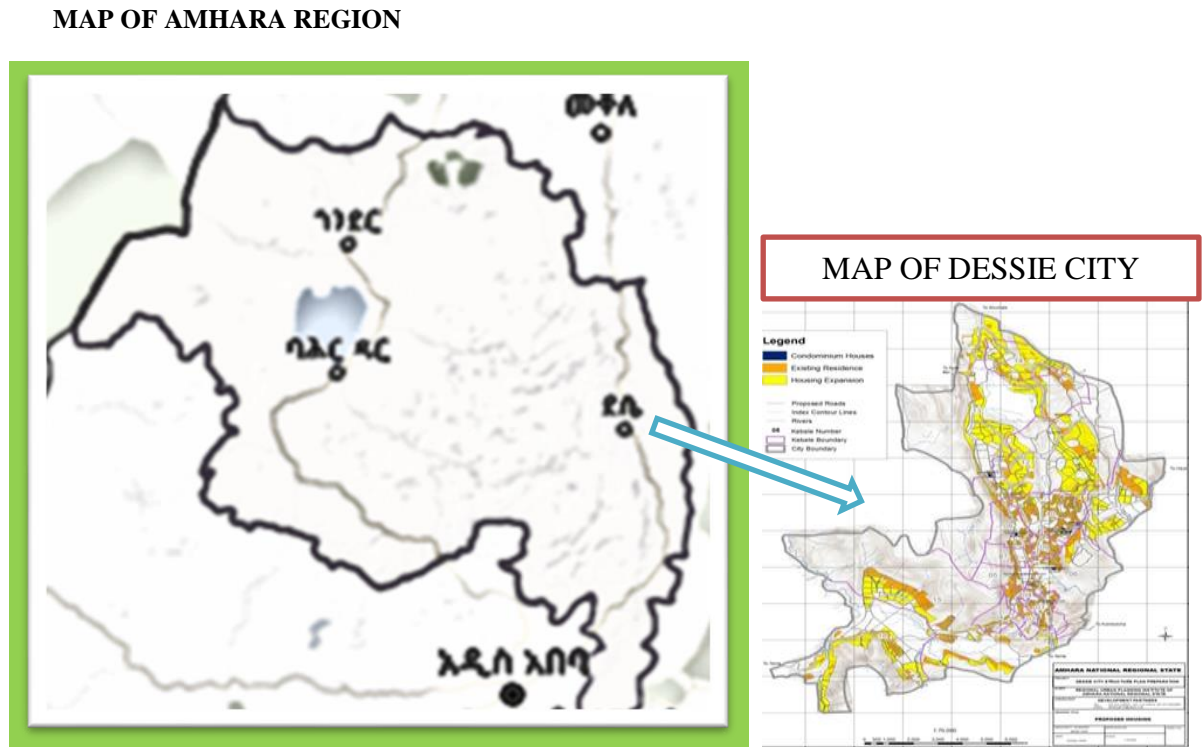
Source: Dessie City Municipality office (2017).

3.2. Data Type and Source

In the study, basically, quantitative data from primary data sources were collected and used. Household survey was the main primary data source to generate information from the household level through questionnaire survey. In addition qualitative data from focus group discussion was employed as a supplement source of information. Checklist and structural questionnaire were used to collect the primary data and the questionnaire was pre tested before the actual conduct of data collection. All the primary data such as demographic characteristics, socio-economic characteristics, infrastructure related questions and the necessary facilities based up on both close-ended and open-ended questions were obtained from the urbanization Induced Displaced (UID) and Not Urban Induced Displaced People (NUID) in the peripheries of Dessie city. Secondary data and information were also taken from Dessie City Municipality and Land Administration Department of Physical Planning and Kebele Administrations in the city were used to undertake relevant documents.

3.3. Method of Data Collection

The main approach to collect all the necessary data was face to face data collection on pre designed questionnaire survey through nearby supervision of enumerators. Experienced enumerators were recruited based on their proficiency in the local language and then trained on data collection techniques and on the content of the questionnaire. This research was run with structured and semi-structured form of questionnaire to conducting the interview and pre-test of the interview schedule was done and then accordingly revision of the data was gathered, analyzed and finalized. Household survey questionnaires were constructed and designed carefully by including the relevant variables on the base of household characteristics (age of household head and education level, family size, access to credit service, distance from nearest market and urban center, land size, income sources from non-farm and on farm activities, household food and non-food consumption expenditure, household asset such as eucalyptus tree and livestock holding) were considered. The main activities to sustain livelihood (farming, trading, daily labor and transfer payments), nutritional undertakings (once a day, twice a day or three times a day), farm and non-farm employment, government service improvement such as health and education and other factors were considered. The better scenario to measure livelihood and its key indicators such as income sources and or consumption expenditure, saving, and asset ownership were carried out through systematic inquiry carefully.

Focus group discussion was conducted with a total of 23 representatives of those 3 were from local kebele government agencies/leaders, 2 from municipality office management members, 6 from local community coordinating committees and 6 from kebele and village officials, 3 kebele development agents and 3 cooperative representatives were drawn and included considering age, gender and literate status in order to balance the discussion. The focus group respondent perceptions were very important to obtain information from actions taken by the experts and local officials where they support farmers to cope up during displacement since the displaced farmers' life was changed. The main objective of focus group discussion was to capture relevant information about compensation estimation implementation drawbacks and strengths, participation of grassroots' level community decision on the process of urban expansion and displacement. Qualitative views and practices of individuals were used to triangulate the information obtained from FGD with field survey so as to draw important policy implications.

3.4. Sampling Methods

The sampling method of the research was probability and non-probability sampling technique. Among the probability techniques both multistage sampling and single stage sampling techniques were used. Multistage sampling technique was used to select the sample households. The first stage of this sampling technique, Dessie City, was selected purposely based on the context of urban expansion in Amhara region. The study area is classified structurally in to ten sub cities and six rural periphery kebelles for administration purpose. In the second stage from the total of 6 urban periphery kebeles 3 kebeles were included in the city administration and then 3 villages (Boru, Kurkur and Titta) found at immediate boarders and subsequent to the urban expansion were selected and represented purposely based up on the intervention of the urban expansion programme. In the final stage, the sample households from both urban induced displaced and non-displaced respondents were selected by using systematic random sampling technique operational to the specific number of households from the sampling villages.

As a result 111 households selected from the treatment group and 187 households from comparison group and a total of 298 samples were selected by using probability sampling techniques. The desired significance level was 5% then appropriate sample size was determined from displaced and non- displaced groups (Yemane, 1967).

$$n = \frac{N}{1+N(e)^2}$$ Where n = sample size, N= size of population, and e =desired significance level

Source list was also known as 'sampling frame' from which sample was drawn. Such a list was comprehensive, correct, reliable and appropriate. The sampling frame to identify respondents was extracted from the list of households at each kebelles were collected from the kebelles and listed in an alphabetic order independently. After the list of farmers using the sampling frame samples were selected with the same chance through simple random sampling from the list of the total population based on the number of the required sample size by proposing the randomly chosen numbers. Whereas non-probability sampling method was to obtain other qualitative data by selecting members from the population in some non-random sampling techniques to achieve focus group discussion.

3.5. Sample Size Determination

The total samples were 298 to which all 111 displaced households and 187 non-displaced households were taken proportionately among the total population in each kebelles from Titta, Kurkur and Boru, respectively. In addition 10% (i.e 30) samples were taken into account for the purpose of eventuality for any loss or unforeseen event. To select samples from each village the whole households and comparable non-displaced households is indicated as follows in the table.

Table 2: Sample size of displaced and non-displaced households

According to Yemane(1967) Formula: n=N/1+N(e)²				Displaced, non-displaced & total population, respectively
let e= 0.05, e = level of precision , N= total population				
n=1172/1+1172(0.0025), n= total sample size				011 Titta = 73 + 226 = 299
n=1172/1+2.93				012 Kurkur = 118+ 204 = 322
n=1172/3.93				013 Boru = 249 + 302 = 551
n=298 is the total sample size out of 1172 population				N= 440 + 732 = 1172
proportion = 298/1172 =0.254				
Share of sample size by proportion from each 3 kebelles/ Villages				
Household status	Titta Kebele 011KA	Kurkur Kebele 012KA	Boru Kebele 013 KA	Total samples
Controlled	226*0.254=57	204*0.254= 52	302*0.254=77	187 = Non-displaced
Treated	73*0.254= 19	118* 0.254=30	249*0.254=63	111 = Displaced hh
Total samples	76	82	140	298 = Total hh

Source: Own sample design with population list taken from K.A office data (2017)

3.6. Research Design and Data Analysis

In this research, the analytical or explanatory research design was employed to make intensive investigation. Descriptive statistics analysis and econometric estimation was done for the impact of the horizontal urban expansion on the livelihood of peri-urban agricultural community. Hence,

the design manifests the basic features of descriptive statistics and tools; choosing the appropriate model, estimation techniques; matching methods, treatment effects, and the description of the dependent and relevant explanatory variables were revealed as follows.

3.6.1. Descriptive Statistics and Tools

Descriptive statistics such as percentages, standard deviations, mean values, mean differences, frequencies and inferential statistics such as t-test and chi-square analysis were used in order to work out for the comparison of issues between displaced and non-displaced households in the study area based on observed covariates, outcome indicators and treatment assignment to summarize, interpret and conclude the results.

3.6.2. Choice of Econometric Model and the Outcome Analysis

Empirical studies show that the focus on investigating the effect of social programs or interventions applies quasi-experimental methods on the treated families of Average Treatment Effect methods (Wooldridge, 2002). So, in order to evaluate urbanization induced displacement on the welfare situation of displaced households, quasi-experimental methods was used. The logit model was chosen than linear probability because for mathematical simplification needs to estimate the probability of displacement vs. non displacement and when response variable is skewed predictions that are outside the [0 and 1] bounds of probabilities (Caliendo and Kopeinig, 2005). For this research purpose displacement implies urban induced displaced farmers and non-displacement implies non-displaced farmers due to urban expansion.

According to Gujarati (2004), the logistic distribution function for determining the determinant factors of urban induced displaced households could be specified as:

$$P(i) = \frac{1}{1+e^{-z(i)}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$ where

P(i) is a probability of household being displaced for i^{th} household and Z(i) is a function of many explanatory variables (Xi) such as observable demographic characteristics.

$$Z(i) = \beta_0 + \beta_1 X_{1} + \beta_2 X_{2} + \dots\dots + \beta_n X_n + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(2)$$

where β_0 is intercept and $\beta_1 \dots \beta_n$ are unknown slopes /parameter / which are estimated using maximum likelihood, $X_1 \dots X_n$ indicates characteristics and ε_i implies an error term.

The probability of households belongs to non-displacement is $(1-P_i) = \frac{1}{1+e^{z(i)}}$ ………….………. (3)

Therefore $\left(\frac{pi}{1-pi} \right) = \frac{1+e^{z(i)}}{1+e^{-z(i)}} = e^{z(i)}$ ………………………………………………………… (4)

and $\left(\frac{pi}{1-pi} \right) = \frac{1+e^{z(i)}}{1+e^{-z(i)}} = \frac{\frac{e^{X\beta}}{1+e^{X\beta}}}{1-\frac{e^{X\beta}}{1+e^{X\beta}}} = e^{X'\beta} = e^{\beta 0} + \sum_{i=1}^{n} \beta iXi$ …………………………………….(5)

Usually, the logit model is written as log-odds ratio. Taking the natural logarithms of the odds ratio of equation (5) will result in what is known as the logit model as indicated as:

$Ln \left(\frac{pi}{1-pi} \right) = Ln \left[e^{\beta 0} + \sum_{i=1}^{n} \beta iXi \right] = Z_{(i)}$ ………………………………………………….……(6) If

the disturbance term is taken into account the logit model becomes:-

$Z_{(i)} = \beta_0 + \sum \beta iXi + ui$ ....(7)

If a logistic distribution (mean of 0 & variance of $\pi \frac{2}{3}$) is considered, we get what is called the logit model. According to Caliendo and Kopeinig (2005) there are practical steps in implementing PSM. These are estimation of the propensity scores, choosing a matching algorism, balancing test, checking on common support condition and testing the matching quality were done after logistic regression results. Based on this, the analysis was implemented in detail as follows.

3.6.3. Estimation of propensity Score

To estimate the average impact of treatment on treated (ATT), this study was used. The word "Treatment" implies the probability of displacement due to urban expansion, and "impact" is meant for the change of their livelihood influence in their well-being. On the other hand, "Treated" stands to urban induced displaced households and "controlled" stands for non-displaced households in urban expansion used for comparison occupied from nearest neighbors takes the value of 1 and 0, respectively.

Propensity score (PS) is the probability of participating in a programme given observed characteristics X. Thus, matching procedures based on this balancing score is known as Propensity score matching (Caliendo and Kopeinig, 2005). In the case of binary treatment D_i implies individuals i receive for treated equals one and zero for controlled. The potential outcomes are $W_{i/}(D_i)$ for each individual i, where i=1….N, N denotes total population.

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In treatment effect of individual "i" can be written as $D_i = W_i (1) - W_i (0)$………….……….(1)

Here the fundamental problem arises because only one of the potential out comes is observed for each individual. Hence estimating the individual treatment effect D_i is not possible and then need to concentrate on population Average Treatment Effect (ATE).

The parameter interest i that received the most attention in evaluation literature is the Average Treatment on the Treated (ATT) which is defined as:-

$T\!ATT = E [I/D =1] = E [W (1)/D =1] – E [W (0)/D=1]$………….……………….… (2)

As the counter factual mean for those being displaced $E[W (0)/D =1]$ is not observed since it has to choose a proper substitute for it in order to estimate ATT. Using the mean outcome of non-displaced individuals $E[W (0)/D=1$.

ATT can be $E[W (1)/D=1]-E[W (0)/D=0] = T\!ATT + E[W (0)/D=1] - E[W (0)/D=0]$………….(3) The difference between the left and $T\!ATT$ is the so called self-selection bias. Thus, the true parameter $T\!ATT$ is only identified if $E[W (0)/D=1] – E[W (0)/D=0] =0$………………… (4) This means $ATT = T\!ATT+$ bias, and if there is no bias $ATT = T\!ATT$. But this can be granted in pure experimental design. However, in quasi-experimental studies this holds true if and only if Conditional Independence Assumption (CIA) holds and Common Support Region (CSR) meet (Caliendo and Kopeinig, 2005) to solve the selection problem stated in equation (3) above.

Another parameter of interest is ATE defined as $T\!ATE = E [W (1) –W (0)]$……………… (5) The additional challenge when estimating ATE is both counter factual $E [W (1)/D=0]$ and $E [W (0)/D =1]$ have to be constructed examination of ATE requires that the treatment effect for each individual i is independent of treatment displacement of other individuals or it means stable unit treatment value assumption (Caliendo and Kopeinig, 2005).

3.6.4. Determining the Region to Check Overlap or Common Support

One possible identification strategy is to assume, that given a set of observable covariates X which are not affected by treatment, potential outcomes are independent of treatment assignment of Un-confoundedness is:-

$W (0), W (1) \Pi D/X, \forall X$. ………………………………………………………….……… (6)

This means selection is solely based on observed characteristics and all variables that influence treatment assignment and potential outcomes simultaneously are observed by the researcher.

The conditioning on all relevant covariates which are all dichotomous; the number of possible matches will be two. To deal with these dimensional problems, Rosenbaum and Rubin (1983) suggest using the so called balancing score. It means if potential outcomes are independent of treatment conditional on covariates X, they are also independent of treatment conditional on balancing score b(X).

The propensity score P (D=1/X) = P(X) =b(X) i.e. the probability for an individual to participate in a treatment given his observed covariates X, is one possible balancing score. The conditional independence assumption (CIA) based on the propensity score (PS) can be written as (un-confoundedness given the P(S): W (0), W (1) Π D/P(X)…………………………………… (7)

A further requirement besides independence is the common support or overlap condition. It rules out the phenomenon of perfect predictability of D given X.

Overlap is when 0 < P (D=1/X) < 1……………………………………………………… …(8)
It means that the persons with the same X values have positive probability of being both participants (Heckman, Lalonde, and Smith, 1999).

An important step was done to check the overlap and the region of common support between treated and controlled groups. Several ways are suggested in the literature, where the most straightforward one is a visual analysis of the density distribution of the propensity score in both groups. Lechner (2000b) argues that given that the common support problem can be spotted by inspecting the propensity score distribution, there is no need to implement a complicated formal estimator. Implementing the common support condition ensures that any combination of characteristics observed in the treated group can also be observed among the controlled group (Bryson et al., 2002). For ATT it was sufficient to ensure the existence of potential matches in the controlled group, whereas for ATE it is additionally required that the combination of characteristics was observed from both in the controlled and treated groups (Brysonet al., 2002).

3.6.5. Decision to Choose Matching Algorism

There were several alternatives of matching methods. Among these techniques the matching methods employed in this research were discussed as follows. Nearest neighbor matching (from NN1up to NN5) was used as the straightest forward matching estimator. Caliper matching was used a tolerance level on the maximum propensity score distance called caliper (0.01, 0.05, 0.5, 0.1& 1) were executed to avoid risk of bad matches. Kernel matching was also used (kernel bwidth 0.01, 0.05, 0.5, 0.25 & 0.1) to match all treated unites with a weighted average of all controls with weights which are inversely proportional to the distance between the propensity score of treated and controlled groups. Each had their own advantages and disadvantages up on efficiency and bias. However, each individual were managed properly and produce more or less the same result (Caliendo and Kopeinig, 2005).

3.6.6. Propensity Score Matching/ PSM/ Analysis

The impact of urban expansion on peri-urban farmers' livelihood was measurable to the difference with comparable in households between displaced and non-displaced farmers. However, a household that is displaced and non-displaced was not possible to simultaneously observe in two circumstances. A household at a time can either be displaced or non-displaced. Hence, this study applied a type of non-random experiment assignment the so called a propensity score matching technique, which was widely applied as an instrument in the absence of baseline survey data was done for impact evaluation at cross section (Lulseged et al., 2011).

The PSM technique enabled us to extract from the sample of non-displaced households a set of matching households that give the comparison to the urbanized induced displaced households in all relevant pre-intervention characteristics. In other words, PSM matches each displaced household with a non-displaced household that were almost the same likelihood of displacement due to intervention.

3.6.7. Examining Treatment Effect or Impact Analysis

Given that conditional independent assumption holds assuming that there was a successful overlap between both groups called 'strong ignorability' by Rosenbaum and Rubin (1983). The PSM estimator for ATT can be written in general as:

Υ^{PSM}_{ATT} = E [W$_1$-W$_0$/D-1, P(X)] = {E [W (1)/D=1, P(X)] –E [W (0)/D=0, P(X)]}…..….. (9)

To put it in words, the PSM is simply the mean difference in outcomes over the common support, appropriately weighted by the propensity score distribution of participants. Based on this brief outline of the matching estimator in the general evaluation frame work it was possible to implement the PSM and hence the plan of impact evaluation on ATT was possible.

3.6.8. Assessing the Matching Quality and Treatment Effects

Since the researcher do not condition on all covariates but on the propensity score, the procedure was employed to check if the matching procedure is able to balance the distribution of the relevant variables in both the control and treatment group to compare the situation before and after matching and there was no remain any differences after conditioning on the propensity score. Because there were remedial measures done example dropping variables to matching on the score due to it was not (completely) successful at the beginning and it was corrected to eliminate differences (Rosenbaum and Rubin; 1983, 1985).

Sensitivity Analysis: It was used to checking the sensitivity of the estimated results with respect to deviations from the identifying assumptions. If there are unobserved variables which simultaneously affect assignment into treatment and the outcome variable, a 'hidden bias' might arise to which matching estimators are not robust (Rosenbaum, 2002). Thus it is possible to make 'mhbounds' Sensitivity analysis for Average Treatment Effects (Caliendo and Becker, 2007). The method, 'rbounds' focuses on the case of binary outcome variables and "allows the researcher to determine how strongly unmeasured variable influences the selection process in order to determine the implications of the matching analysis. If there is hidden bias, two individuals with the same observed covariates X have differing chances of receiving treatment. Let us assume we have a matched pair of individuals i and j and F is the logistic distribution. The odds that individuals receive treatment are then given by $\frac{pi}{(1-pi)}$ and $\frac{pj}{(1-pj)}$ and the ratio given by

$\frac{\frac{pi}{1-pi}}{\frac{pj}{(1-pj)}} = \frac{pi(1-pi)}{pj(1-pj)} = \frac{\exp(BXi+\gamma ui)}{\exp(BXj=\gamma uj)}$ ….. (1) If both units have identical observed covariates, as implied by the matching procedure the X-vector cancels out implying that: $\frac{\exp(BXi+\gamma ui)}{\exp(BXj=\gamma uj)} = \exp(\gamma(ui-uj)$……………………… (2) But still, both individuals differ in their odds of receiving treatment by a factor that involves the parameter γ and the difference in their unobserved

covariates $\boldsymbol{u}$. So, if there are either no differences in unobserved variables (ui = uj) or if unobserved variables have no influence on the probability of participating ($\gamma = 0$), the odds ratio is one, implying the absence of hidden or unobserved selection bias.

Rosenbaum (2002) shows that "the following bounds on the odds-ratio that either of the two matched individuals will receive treatment: $\frac{1}{e^\gamma} \leq \frac{\text{pi}(1-\text{pi})}{\text{pj}(1-\text{pj})} \leq e^\gamma$ both matched individuals have the same probability of participating if $e^\gamma = 1$ otherwise, if for example $e^\gamma = 2$, individuals who appear to be similar (in terms of X) could differ in their odds of receiving the treatment by as much as a factor of 2. "In this sense e^γ is a measure of the degree of departure from a study that is free of hidden bias (Rosenbaum, 2002). So to make standardized bias assessing the matching quality and the treatment effect is necessary in order to reduce the bias.

Multicollinearity analysis: If multicollinearity is perfect, the regression coefficients of the X variables are indeterminate and their standard errors are infinite. If multicollinearity is less than perfect, the regression coefficients, although determinate, possess large standard error which means the coefficients cannot be estimated with great precision or accuracy. Multicollinearity is when sampling over a limited range of the values taken by the regressors in the population and when the model has more explanatory variables than the number of observations. Thus, in this study multicollinearity among dummy explanatory variables was checked using contingency coefficient and VIF for continuous variables and since remedial measures can be done by dropping a variable and it was possible to correcting specification bias and transformation of variables. However, there was no explanatory variable dropped from the estimation model since no serious problem of multicollinearity was detected from the VIF and contingent coefficient results.

Heteroscedasticity analysis: It can also arise as a result of the presence of outliers, (either very small or very large) in relation to the observations in the sample; constant variance is likely to change. If important variables are omitted from the model, due to skewness in the distribution of one or more regressors included in the model (example the distribution of income and wealth in most societies is uneven, with the bulk of the income and wealth being owned by a few at the top) and can also arise because of incorrect data transformation, members may be of different sizes. However, in this research some of the informal and formal methods were used for

detecting heteroscedasticity fulfilled example the sample size fairly large, and check through Breusch-Pagen test was applied. Moreover robustness is fairly used to detect the problem.

3.7. Variables Definitions, Relationships and Measurements.

Among the previous researchers a combination of variables were put in to investigate the livelihood analysis which can be employed the same way to the objective of this research. These variables can be categorized as demographic variables, socio-economic variables such as income sources of households, consumption expenditure, saving, loan, asset; and services such as education and health, land size, location from the urban center, market, and utility accesses such as power and water access. So, this study was considered the outcome of the program in terms of welfare status of the household.

Treatment Variable: The dependent variable was displacement of farmers which were represented in the model by a value of 1 = treated if a given households displaced due to urban expansion and 0 = controlled for non-displaced households.

Outcome Variable: - In this research the livelihood status in the household level was specified by key indicators such as household per capita expenditure, saving and asset (livestock and eucalyptus tree assets) and income from non-farm activities. The households' level of wellbeing is determined by a number of key outcomes, including, household consumption, savings, asset holdings and farm and non-farm work, services like potable water supply, electricity, road access, schools, and health services (Harris, 2015).

Consumption Expenditure: It is not only driven entirely by changes in food consumption but also in durable consumption (Harris, 2015). Consumption expenditure is collected at household level and expressed in ETB. It consists of expenses on, or equivalent values of, all food items consumed and nonfood consumables excluding expenditures on investment, durable goods. Household expenditure represents the monetary value of household consumption originating from purchases, own produces, gifts and transfer sources. Items consumed by the household from own produce, gifts and transfer sources are converted to an equivalent monetary value using the local market prices.

The consumption basket of the household consists of food (such as cereal, pulses, vegetable, oil, livestock products, coffee, spices, honey and sugar), non-food goods (such as energy, transport

and communication, ceremonial, taxes, social contributions and other miscellaneous household items), beverages and private clothing.

Household food consumption expenditure was collected on a weekly recall basis which comprises of household consumption from purchased products, own produce, transfers and gifts. Consumption from non-purchased sources was collected on monthly recall basis represented by an equivalent monetary value using the local market price, i.e. the proxy for the producer's farm gate price. The 7-day recall is effective compared to longer recall periods but not error free because of recall and telescoping errors and incapable to capture individual expenditures outside the pure view of the respondent (Tsega, 2012).

The total weekly food expenditure and monthly non-food expenditure expected purchase frequency of each item for the year is converted to annul total expenditure.

Livestock Asset: It is a continuous variable and a type of major productive asset measured in Tropical Livestock Unit (TLU). According to Tsega (2012) livestock is the most important productive asset rural households reduce their livestock asset due to urban expansion. Lulseged et al., (2011) livestock represents a major asset in all livelihood systems and to secure for vulnerable food insecure households.

Household Off farm/Non-farm Income Sources: Authors used to classify off-farm activities as formal and informal activities (Barrett and Reardon, 2001). The former stands for wage labor and the later stands for activities like hunting and gathering. Nonfarm activities refer to those activities that are not primary agriculture or forestry or fisheries. However, non-farm does include trade or processing of agricultural products even if, in the case of micro-processing activities, they take place on the farm (Barrett and Reardon, 2001), and stress that this definition is sectoral, i.e. a distinction is made between primary production, secondary (manufacturing) and tertiary (service) activities) Lulseged et al., (2011). According to Barrett et al., (2001) stated off-farm activities as "activities that are taken place away from home .i.e. all activities away from one's own property. Thus, the overall income generating activities (on/off/non-farm), which takes the value of 1 if households have participation in off and Non-farm activity and 0 otherwise.

Eucalyptus Tree Assets: Were found important in terms of providing alternative employment opportunities to households particularly in in this study area households can have a good chance becoming a dual significance role for buffer consumption smoothing and income generating

from eucalyptus resource. It was measured using local price evaluation method by counting the number of trees and converting in ETB.

Land Size of Household: Land holding size is the total area measured in hectare cultivated by each household. According to Lulseged et al., (2011) formal financial sectors has been identified as important in improving productivity by making financial service available to producer in agricultural sectors.

Market Distance: Causes high increase/decrease in costs and makes to determine whether the productivity improvement activity. Therefore optimum size and distance of farm land and crop market directly affects productivity.

Explanatory Variables

The explanatory variables are expected with the association of participation of household in livelihood of income and assets. The explanatory variable is the variable expected to change or influence the dependent variable.

According to Lulseged et al., (2011) urban induced displaced household background explanatory variables such as family composition (age of household, sex of household, number of household adults), education (maximum years of education of a household member and education of household head), land size are observable characteristics of households.

Sex of the Household Head (SEX): It is dummy variable for male or female household head which takes value 1 for male 0 for female.

Age of Household Head: It is the age of household head measured in years. The middle age of the household may high for great economic contribution of the study area.

Education Level of Household: It is the educational level of rural household measured as level of education categorized in to 4 groups. According to Tsega (2012) the gap in educational level between households is problematic for employment and particularly there is a strong association between household welfare and parental education.

Household Family Size: The total numbers of people live together in the same house measured in numbers and directly linked to share household income and consumption expenditure. The variable (family size) relates to number of children(0-14)age and old (above 65 years) age households are dependent to working age of population with age (15-64). The dependency ratio refers to the number of children aged 0 to 14 years plus the number of persons aged 65 years or over per 100 persons aged 15 to 64 years.

Availability of Utility Services and Infrastructure

Availability of basic utility services and infrastructures such as water access in the HH level are important to improve livelihood status if the two groups are comparable.

Potable/ Clean Water Access: Possession of water access measured by households who have pipeline and gage equal one otherwise zero.

Electric Power Access: possession of electric power access measured by households who installed the access to their home equals one otherwise zero.

Ocupation: The principal activity the households can be engaged in their life that they do to earn sustainable means of income. The line of main business or the act of occupying being farmer equals one otherwise zero.

Shock experienced: Shock is ultimately affects the farm household's asset portfolio which is accompanied by adjustments to alternative employment options. The intentions of the farm household to adjust into alternate employment option could be to cope with and recover from the shock; or to maintain and enhance wealth. Hence, some households may easily offset the shock and fit in to the nonfarm sector smoothly while others may become more susceptible to poverty. As a result, some households may smooth their consumption by depleting their asset base (for instance saving) and then become vulnerable (Tsega, 2012).

To conclude, taking the above observations, the researcher defines to include the independent variables which determine or influence the livelihood of peri urban community are demographic variables such as Age of the house hold head(Agehh), Sex of the household head(Sexhh), Education status of the head(Educhh), Family size (Famsize), Labor in the working age 15-65(Employ), Land size (Agriland), Saving of the house hold, Loan received by the household/year(Loan), Transfer income to the house hold/year (Income), Eucalyptus trees possessed (Euctree), livestock asset holding in the house hold head(Livestock), Durable Home furniture(durable asset), property loss due to any shock (prplost), member of household sick or death (hhsickd), Expenditure by hh/year (hhspending), member of household head main job (occupation), location distance to urban center (urbdist), one way distance to the market(mktdist).

The above relationship between variables is taken from literatures according to Lulseged et al, (2012) Cited in Roy Rubin model (Caiendo and Kopeinig 2007), Harris (2015) and Tsega

(2016). Thus the variables included in model are: W = f (Agehh, Sexhh, Educhh, Famsize, Employ, Agriland, Saving, Loan, Income, Eucalyptus tree, Livestock, Durable asset, Water access, Extension service, Shock experience, hhsickd, hhspending, Urban distance, and market distance, Health status). According to Lulseged et al., (2011) cited in Tegegne (2008) the theoretical relationship between the dependent variable (livelihood status) and the explanatory variables is put as follows.

Table 3: variables definitions, measurements and hypothesis

No	Variables symbols	Definitions	Measurement	hypothesis
1	Agehh	Age of the house hold(hh) head,	Years	Negative
2	Sexhh	Sex of the household head,	1 if male,0 otherwise	Positive
3	Educhh	literacy status of the head,	Measured by 4 category	Positive
4	Famsize	Family size of the house hold	Number	positive
5	occupation	Household head main job	1if farming,0 otherwise	positive
6	Employ	Labor in the working age (15-65)	Number	Positive
7	Land size	Agricultural land holding	Hectare	Positive
8	Saving	Saving of the hh/year	ET Birr	Positive
9	Loan	Loan received by the hh/year	ET Birr	Positive
10	Income	Income to the hh/year,	ET Birr	Positive
11	Euctree	Eucalyptus trees possessed,	ET Birr	Positive
12	Livestock	Livestock asset holding in the hh	TLU	negative
13	Urbdist	Distance to the urban center	KM	negative
14	Extenservice	Extension service delivery	1 if yes, 0 otherwise	positive
15	Water access	Availability of clean water	1 if yes, 0 otherwise	positive
16	Mktdist	One way distance to the mkt,	KM	negative
17	Durable asset	Home furniture having in the hh	ET Birr	positive
18	Shock exper.	Property loss in any shock	1 if yes, 0 otherwise	negative
19	Health status	Member of household health status	1improve 0, otherwise	negative
20	hhspending	Annual total expenditure	ET Birr	positive

CHAPTER FOUR: RESULTS AND DESCUSSIONS

4.1. Overview

This chapter presents the findings of impacts of urban expansion program on periurban household livelihood using both descriptive statistics and econometric analyses. The results of the descriptive analyses are presented in the form of mean, standard deviations, percentages and significance tests such as chi^2 and t-test are included. On the econometric analyses, Propensity score matching (PSM) method was employed to estimate the impact of the urban expansion on household livelihood. Average Treatment Effect analysis was done based on key outcome indicators such as household total expenditure, household saving, nonfarm livelihood, livestock and eucalyptus tree assets owned by household, and durable home furniture were included in the analysis. Significant tests are also executed in econometric analysis. Sensitivity analysis is used to checking the relevance of the research based on the identifying assumptions.

4.2. Descriptive Analysis of the Survey Findings

Both continuous and discrete variables were used to describe the sample households in this study. There were various household characteristics and economic variables used to describe the displaced and non-displaced households status. These socio-demographic characteristics and economic variables were age of the household head, sex of the household head , family size, educational level of household head, land holding size measured in hectares, distance to the nearest market, distance to the urban center, utility services accessed to household, livestock asset in TLU, eucalyptus tree assets in ETB, and occupation(main job of household head), expenditure (including food and non-food consumption expenditure but excluding investment expenditure), household saving, amount of loan received to the household, access to credit service or source of loan and extension services were evaluated in descriptive statistics in the following sections.

4.2.1. Descriptive Analysis of Explanatory Variables

Age of the Household Head

The mean difference between the age of displaced and non-displaced sample household heads is found to be 0.159 due to the fact that the mean age of the treated and controlled household heads is 49.54 and 49.7 years, respectively. As indicated in table 4 below, statistically, there was no significant difference between displaced and non-displaced households in terms of age. This implies households in the treatment and control groups have almost similar distributions regarding the age of the household head.

Livestock Asset

The household's livestock ownership is represented in Tropical Livestock Unit (TLU). As shown in table 4 bellow displaced households have, on average, 4.28 while non-displaced households have 3.82 livestock measured in TLU. Statistically, the mean difference (0.46 TLU) between the two groups had revealed 10% significance level of livestock holdings in pre-program intervention.

Family Size

The mean difference between displaced and non-displaced households in terms of family size in this study is 0.17. The average family size of displaced and non-displaced households is 5.12 and 4.95, respectively. The mean family size of sampled households among the two groups is little variation because there is statistically no significant difference between the two groups (Table 4).

Land Holding Size in hectare

Land is one of the main factors of production to produce enough to support family consumption and it is a fixed asset of household. The mean difference regarding the land size of the treated and controlled household is 0.018 hectare because the average land holding for displaced and non-displaced households are 0.75 and 0.77, respectively in hectare (Table 4). Due to the fact that the mean difference in land size among the two groups was little difference which implies the land resource is necessary to ensure the households in the displaced and non-displaced groups have similar distributions in possession of land in pre-intervention of the urban expansion program while it was unaffected by the treatment (Heckman et al., 1998). The hypothesis of this result indicates the cultivable land of both displaced and non-displaced were equal chance of

motivating in agricultural activities such as crop production and tree planting in the pre-program intervention of urban expansion. However, the land size is an important physical asset which was significantly reduced for displaced households after expropriation is assumed to be shrinking of agricultural products and productivity for those displaced households to drive their livelihood from agricultural related activities and livelihood strategies to non-farm activities.

Market Distance and Urban Center Distance in KM

The mean distance to the nearest market center and urban center distance of the displaced sample households is 2.77 km and 3.07 km, whereas for controlled sample households the nearest market and urban center distance is 2.78 km and 3.38 km, respectively. The survey result as indicated in the table 4 below shows, the displaced households are living nearer to the market and the urban center than the non-displaced households. Statistically, the nearest local market distance was insignificant while the distance of household residence from the urban center (on average 0.3 km) is significant difference at one percent probability level among two groups(Table 4).

Table 4: Statistical difference between displaced and non-displaced households

Variable	Displaced (N=111)		Non-Displaced (N=187)		Differences		T-value (F-test)	P-value (Sig.)/ T-test
	Mean	Std. DV	Mean	Std. Dv	Mean	Std. Err		
HH_Age	49.54	10.94	49.70	12.37	0.159	1.377	0.013	0.908
Livestock	4.28	2.568	3.82	1.523	-0.46	0.268	-1.8*	0.087
Family size	5.12	1.756	4.95	1.565	-0.17	0.20	-0.8	0.40
Landsize	0.75	0.235	0.77	0.230	0.018	0.028	0.64	0.52
Mktdist	2.77	0.696	2.78	.695	0.017	0.083	0.21	0.83
Urbdist	3.07	1.0	3.38	0.82	0.30	0.11	2.7***	0.007

***, ** and * implies 1%, 5% and 10% significant level, respectively

Source: own source survey result (2017).

4.2.2 Statistical Analysis of Discrete and Categorical Variables

Sex of Household Heads

From the total of 298 respondents 43 (14.43%) were female headed respondents whereas 255 (85.57%) were male headed household respondents. Among the urban induced displaced households 15(13.51%) were female headed and 96(86.49%) were male headed households while the non-displaced households 28(14.97%) and 159(85.03%) were female and male headed households, respectively. Own survey statistical test analysis shows that there was no statistically significant difference between treated and controlled groups regarding sex of the household (Table 5). This result explained that being male or female doesn't have any role in urban induced displacement of the urban periphery community.

Education status of Household Head

Previous studies show education was an important determinant factor for asset building and education was significant in determining participation decisions and has created disparities in employment opportunities in non-agricultural sector in improving the livelihood status of the household (Lulseged et al., 2011). Own survey result (Table 5 below) shows that, from the total of 298 sample respondents those 131 (43.96%), 106(35.57%), 47(15.77%) and 14(4.70%) were illiterate, can read and write, primary level educated and high school level educated households, respectively. There was statistically significance at 10% significance level between displaced and not displaced households regarding to illiterate and high school educational level of household heads.

Availability of Utility Services and Infrastructure

Availability of basic utility services and infrastructures such as water and power access, road access, extension service and health centers in the sub-villages are important to improve livelihood status if the two groups are comparable. Although no ex-ante data for the amenities, ex-post data is used to address these issues. As shown in (table 5) below except road access, health status and extension service the rest issues have an implication of statistically significance differences between the displaced and non-displaced households.

Potable/ Clean Water Access

From the total of 298 respondents 106 (35.57%) households have received safe to drink water whereas 192 (64.43%) have not accessible for clean potable water. Among the 111 urban induced displaced households 21 (18.92%) households have accessible to clean and safe water and 90(81.02%) have not addressed for safe water. In comparison the non-displaced households 85(45.45%) have received clean water and 102(54.55%) have no access for clean and safe water. Statistically, there is 1 % significant difference between two groups regarding clean and safe water at the household level (Table 5). The non-displaced peri urban farmers were better users for well supplied clean water than the displaced households. This might be due to displaced households were neglected to be benefited with clean water supply and hence they would be included neither in the rural nor in the urban water supply program. However, potable water supply is less accessible for both households in the urban periphery since water supply was (35.57%) which was below the overall city water coverage (75%).

Electric Power Access

As shown in (table 5 below) the only 26 (8.7) respondents were accessible for electric power whereas the majority 272 (91.2%) households were not user of electric power. particularly only 11(9.9%) displaced households and 15(8.02%) non displaced households are not accessible for electric power. This result indicates there is lack of access or low coverage of electricity for both households in the urban periphery. In terms of electric power accessibility it was statistically significant at 5% level between groups. This would be peri urban farmers were included neither in the rural electric power expansion program nor in urban distribution of power for residents.

Ocupation

From the total of 298 sample respondents those 239 (80.2%) were engaged only in farming activities whereas 6(2%) and 53(17.79%) from both groups are engaged in off farm business activity and daily labor in addition to farming activity. There was statistically significance at 5% significance level between displaced and not displaced households.

Shock experienced

Among Sampled respondents 249(83.56%) were not affected by shock in the previous harvesting period of time rather 49(16.44%) of the total sampled households challenged with shocks. From

each groups 104(34.9%) and 145(48.65) were not exposed for shock challenges. The statistical difference among groups is at 5% significance level. From the data we can understand that the majority of sampled households are not affected by shock in the previous harvesting year.

Table 5: Descriptive Statistics of Sampled Households (for Discrete Variables)

Variables	Category	Displaced hh		Non-displaced hh		Total		X^2
		N	%	N	%	N	%	
HH_Sex	Male =1	96	86.49	159	85.03	255	85.57	0.12
	Female =0	15	13.51	28	14.97	43	14.43	
Educhh	Illiteracy =01	56	50.45	75	40.11	131	43.96	3.02*
	Read & Write =02	38	34.23	68	36.36	106	35.57	0.138
	Primary educ. =03	15	13.52	32	17.11	47	15.77	0.679
	Highsch& above =04	2	1.80	12	6.42	14	4.70	3.314*
Roadaccess	no access=0	62	55.85	113	60.42	175	58.72	0.60
	yes road=1	49	44.15	74	39.98	123	41.28	
Shock Exper.	Yes have shock	7	6.3	42	21.32	49	16.44	13.22**
	No shock	104	93.7	145	78.68	249	83.56	
Wateraccess	Have access=1	21	18.92	85	45.45	106	35.57	21.4 ***
	No access=0	90	81.02	102	54.55	192	64.43	
Extenservice	No access=0	14	12.6	22	11.76	36	12	0.047
	yes access=1	97	87.4	165	88.24	262	88	
Poweraccess	Have access=1	11	9.9	15	8.02	26	8.72	6.95*
	No access=0	100	90.09	172	91.98	272	91.27	
Health status	Have access=1	13	11.70	36	19.25	49	16.44	1.08
	No access=0	98	88.29	151	80.75	249	83.56	
Ocupation	Farmer=1	82	73.8	157	83.96	239	80.2	7.79 *
	petty trade=2	5	4.5	1	0.53	6	2	
	Daily labor=3	24	21.6	29	15.5	53	17.79	

***, ** And * implies 1%, 5% and 10% significant level, respectively

Source: own survey result (2017).

4.2.3 Descriptive Analysis of Outcome Variables

Household Annual Expenditure in ETB

Consumption expenditure is collected at household level and expressed in ETB. It consists of expenses on, or equivalent values of, all food items consumed and nonfood consumables (health and education expenditure were included) but expenditures on investment and home durable goods or assets were excluding from expenditures. As displayed in table 6 below, on average, the annual food expenditure for displaced and non-displaced households was Birr 11,022.97 and 11,626.00, respectively and the mean difference between the two groups is 603.98 ETB. However, the difference among the two groups was statistically insignificant. On the other side there was statistically significance mean difference(2883.92 ETB) at less than 5% level regarding annual non-food expenditures between the displaced and non-displaced households which was an amount of Birr 9648.11 and 12532.03 in their respectively amounts.

The average annual consumption expenditure of the displaced and non-displaced households is Birr 20678.47 and 23777.54 ETB, respectively. Moreover, the mean difference of real total annual consumption expenditure between the two groups is 3099.07 ETB which is significant at 1%. This difference signifies that the displaced households have the lower annual total expenditure than the non-displaced households accordingly own survey data in 2017 (Table 6 below). This would be due to declining agricultural production because of land expropriation; there were not providing alternative income sources and lost permanent job security. This also in turn aggravates food insecurity of these households.

Household Annual Total Saving in ETB

The survey result shows that, among the two groups the mean difference saving amount in the year 2017 is Birr 2062.8. But displaced households average saving in the same year is Birr 2819.82 which is below the average saving amount (4882.62 ETB) of the non-displaced respondents. This revealed the level of savings held by the displaced groups is significantly less than the amount saved by non-displaced households. The difference is statistically significant at 10% level (table 6 below). This could be due to there is a connection between saving and shrinking of permanent asset and income sources.

Loan Received by Household in ETB

In the study area, out of the total 298 sampled respondents 272 were free of receiving loan or debt. Among the total of 28(9.39%) credit liable households 18 of them were displaced households. From those 28 receiving loan the majority of (24) households were gain access from relatives, friends and traditional money lenders. From this data, loan was, on average, received Birr 704.69 which indicates they have lower access to credit. However, the displaced households have gain loan, on average, Birr 1490.99 whereas for the non-displaced households is Birr 237.96. The numbers of loan received respondents are insignificant in both groups (Table 6). So credit inaccessibility is one critical problem to tackle food insecurity in the study area.

Livestock Asset in TLU

The main Livestock owned by the sample households in the year 2017 includes cattle, donkey, horse, mule, sheep and goat, and poultry. The mean difference of livestock populations owned by the displaced and non-displaced households is 1.95 TLU (Tropical Livestock Unit). The average livestock unit for those displaced by program was 2.57 TLU and for non-displaced have 4.52 TLU. From this result there was significance mean difference at one percent probability level between the two groups in livestock holding in terms of TLU. From own survey (tale 6) the mean of livestock holding of displaced households were significantly less than those non-displaced households. This could be as a result of grazing land expropriation followed by livestock asset depletion which exacerbates the food insecurity and poverty problems in the urban periphery.

Share of Durable Asset Owned by the Households in ETB

On average, the value of durable asset owned by displaced and non-displaced households have Birr 3,327.93 and 2,839.04, respectively. The mean difference (488.89 in ETB) is statistically insignificance between the two groups with regard to possession of durable housing furniture's (Table 6). The value of household durable assets were measured using 2,017 local market price as base year prices to avoid the impact of the current price inflation on value of the assets. Depreciation was calculated using Dessie City Revenue Agency information and it helps to avoid over or under estimation of a similar unit values of household assets in one of the years. In this study, home durables furniture was considered as household assets.

Eucalyptus Tree Asset Owned by the Household in ETB

In the study area farmers were planting Eucalyptus tree in some parcel of their land because it is the main source of income earned by the households. So the tree asset is valued in ETB and the amount in the survey data was converted in to local price. The monetary value of tree asset owned by the households is expressed in constant prices because the tree value is computed using the average local market prices for the possession of total tree asset. The result indicates that the average eucalyptus tree is valued at Birr 5656.98 and 25229.41 for displaced and non-displaced households, respectively. Statistically, there was significant mean difference (19572.4) at 1% level in terms of tree asset as shown in (Table 6 below). This shows as land was expropriated displaced households might be reduce their encouragement to planting more tree assets and fall in loss of permanent income sources regarding eucalyptus tree assets.

Table 6:   Descriptive Statistics of Sampled Households (outcome variables)

Variable	Displaced (N=111)		Non-Displaced (N=187)		Differences		T-value (F-test)	P-value (Sig.)
	Mean	Std. DV	Mean	Std. Dv	Mean	Std. Err		
HH food Expend. in ETB	11022.97	3854.91	11626.95	4354.39	603.98	500.3	1.2	0.23
HH Non-food expenditure in ETB	9648.11	3661.12	12532.03	4789.74	2883.92	527.7	5.46***	0.00
HH annual Total Expenditure in ETB	20678.47	6245.293	23777.54	6608.49	3099.07	775.9	3.99**	0.0001
HH Saving in ETB	2819.82	4598.32	4882.62	6593.49	2062.8	710.64	2.1*	0.072
Loan received to HH	1490.99	5406.22	237.97	1209.64	-1253.02	411.259	-3.04**	0.0025
Livestock Asset in TLU	2.57	1.89	4.52	2.00	1.95	0.235	8.289***	0.0000
Durable Equip in ETB	3327.93	5449.56	2839.04	5569.47	-488.89	662.02	-0.7385	0.46
Eucalyptus tree in ETB	5656.98	4801.44	25229.41	27903.8	19572.4	2673.43	7.32***	0.000

***, ** and * indicates 1%, 5% and 10% significance level, respectively.

Source: own survey result (2017).

4.2.4 Further Livelihood Characteristics Description

Average compensation amount was received 112730.39 in ETB for each individual household. But the variation among them is the minimum of Birr 12495.00 and the maximum amount received Birr 185330.00. On the other hand, on average, the dispossessed land size for each individual household was 0.75 hectar with the minimum of 0.5 and the maximum of 1.25 hectar. As the size of farmland decreases, it is discouraging to these households to derive their livelihood from agriculture related activities and strategies. This implies for those urban induced households, since they loss the farm land, they will have less production and productivity dis-incentives to stick on agriculture and they be unsuccessful to better livelihoods while they need to shift and diversifying other means of earnings.

Table 7: Compensation received in ETB and land size in hr. for displaced households

Variables	N	Mean	Std. Dev.	Std. Er.	Minimum	Maximum
Compensation pay. (in ETB)	111	112730.39	29985.38	2846.09	12495.0	185330.0
Land size in hr.	111	0.75	0.23	0.022	0.50	1.25

Source: own survey result (2017).

According to proclamation number 455/2005 state that set a rule to determine the amount of compensation can be calculated by taking the previous five years for productiveness and value amount practically the average yield was five years back from the displacement year. However, displaced households strongly opposes about 5 years back calculating the farm yield compensation payment because it bring lose for farmers rather than make them benefited. This is because while agricultural extension activities brings improvement and the value of agricultural products increase from time to time taking the average value of farmers products the previous low productivity and les value is considered as discouragement. Therefore it's better to take the yield of better productive year and market relatively the highest value rather than taking in low price even it is not possible to say the money is enough to cope up new way of life.

4.3. Focus Group Discussion Results

The discussion was done with a total of 23 representatives with a composition of those 3 were from local kebele government agencies/leaders, 2 from municipality office management members, 6 from local community coordinating committees and 6 from kebele and village officials, 3 kebele development agents and 3 cooperative representatives were drawn and included considering age, gender and literate status in order to balance the discussion.

Farmers raise some issues to compare land price against compensation amount such as government land transferring fee to investors after compensation, Farmers themselves divide their lands in to parcels and transferring to the third parties in un- low fully market, investors who get land from city administration and transfer to the other investor with high price, the condition of their land location value determine the price, benefits gained from renting their lands for a long term contract greater than ten years with high earning were taken as comparative condition.

Officially, households should be paid 10 times the market value of what can be produced on their land whereas on the contrary their land usages for production do not limited in time. So, less focus and attention was for the farmers to produce in their life time and their natural resources also become source of reservations based on this compensation payment for their properties. In addition the benefits to farmers gained from their agricultural activates like /communal grazing land, wood for fuel energy, water resource, construction materials etc/ were ignored to account in to compensation.

Aged persons or elders who get income by renting their land for a long term contract greater than ten years, youths who built family and have earning their income from contracting of farm lands but they are in the absence of owning land during the distribution of land, peoples who live in villages and get income by supplying construction materials such as stone from the quarry site, those who were engaged by traditional metal working become highly injured and risk taker because they sign agreement to resign the land without any pre-conditions since there was a shift of natural resource particularly land was from rural to urban based activities.

4.4. Econometric Results

This section describes the whole process to arrive at the impact of the urban expansion on the displaced household livelihoods. The practical steps were fitting the binary logistic regression, estimating the PSM (predicting pr), matching across exposure (using different matches), choose the matching algorism; throw away off support observations, assessing balance between groups, balancing test, and sensitivity analysis.

4.4.1. Estimation of Propensity Score

The logit model was used in implementing the propensity score matches. In propensity score matching, the control groups were used to assess what happened to be in the absence of urban expansion. PSM was used to obtain information from a pool of units that did not displaced due to urban expansion and it was possible to evaluate the effect of program by comparing with the outcomes of displaced groups. The propensity scores were avoided bias that was generated matching method to find controlled units that were similar to treated units allowed the estimation of program intervention impact (Tsega, 2012). Pre-intervention covariates were used to estimate to the pscore to insure that should not be contaminated with the treatment or anticipation of treatment. In this study urban induced displacement is the dependent variable and it takes a value of 1 if the household is displaced and 0 if households not displaced. To estimate the propensity scores on STATA 12 software data analysis was employed.

Looking the estimated coefficients (in the table 8 below), the pseudo-R2 value is 0.223. The pseudo-R2 indicates how well the regressors overall fitness to explain the displacement probability. After matching there should be no systematic differences in the distribution of covariates between both groups and therefore, the pseudo-R2 should be fairly low (Caliendo and Kopeinig, 2005). The maximum likelihood estimate of the logistic regression result shows that the urban induced displaced households were statistically significant.

Observing into the estimated coefficients, the result indicates that urban expansion induced displacement was significantly influenced by nine explanatory variables namely Educhh_03, Livestock and Eucalyptus (at 5%) while Educhh_04 (at 10%) significant level and the rest Ocupation, Urban distance to the residence of the household, shock experienced, Credit access, and Wateraccess were strongly significant at 1% level on the probability of households displaced due to the program.

Table 8: Logistic regression results of households displaced by urban expansion

Treatment	Coef.	Robust Std. Err.	z	P>z	[95% Conf. Interval]	
HH_Age	-0.0151	0.0145	-1.04	0.299	-0.0430	0.0133
HH_Sex	0.1475	0.4557	0.32	0.746	-0.7456	1.0407
Familysize	0.1854	0.1008	1.84	0.066**	-0.0122	0.3830
Educhh_02	0.7149	0.4862	1.47	0.141	-0.2380	1.6678
Educhh_01	0.9857	0.4589	2.15	0.032**	0.0863	1.8852
Educhh_04	-0.6755	1.1078	-0.61	0.542	-2.8468	1.4958
Livestock	0.1506	0.0689	2.18	0.029**	0.0150	0.2856
Ocupation	0.3520	0.1271	2.77	0.006***	0.1028	0.6012
Landholding	-0.0096	0.6019	-0.02	0.987	-1.1895	1.1702
Mktdist	0.1811	0.2329	0.78	0.437	-0.2755	0.6377
Urbdist	-0.5100	0.1519	-3.37	0.001***	-0.8089	-0.2134
Shock exper.	-1.8767	0.5382	-3.49	0.000***	-2.9310	-.8218
Creditaccess	1.6949	0.5290	3.20	0.001***	0.6580	2.7319
Health status	-0.5860	0.5239	-1.12	0.263	-1.6129	0.4409
Extenservice	0.2035	0.4119	0.49	0.621	-0.6038	1.0108
Poweraccess	1.9550	1.6820	1.16	0.245	-1.3416	5.2518
Wateraccess	-2.1973	0.4566	-4.81	0.000***	-3.0922	-1.3024
Roadaccess	-0.6733	0.4078	-1.65	0.099*	-1.4726	0.1261
_cons	-0.4708	1.2885	-0.37	0.715	-2.9962	2.0547

***, ** and * indicates 1%, 5% and 10 % significance level, respectively. & [1& 2] interpretation of words in the foot note.

Source: own survey result (2017).

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[1] N, B: Educhh_01 (hh head no read & write) is base category, Educhh-02, Educhh-03, Educhh_04 implies the education level of the head i.e read & write, primary level & high school &above respectively. Mktdist and urbdist implies market distance from residence village of households and urban center distance from household villages And shock experience means households who are exposed to shock in the previous year.

2. Number. of obs. = 298, Wald chi2 (18) = 51.78, Prob> chi2 = 0.000, Pseudo R2 = 0.213, Log pseu. LR = 154.79

From these observed covariates, we can infer that the variables have explanatory power on displacement due to urban expansion has impact of in the farmers' livelihood in the study area. The rest of the variables were not statistically significant (Table 8). As the regression in logit model (table 8) shows it was likely to say that majority households who were involved in urban induced displacement had less education level, less access to clean and safe water, less education access, less to health access, and they also possess relatively more Eucalyptus tree and livestock assets regarding the pre-program intervention. In addition they were more accessible to credit and they were nearest to the urban center relatively to the non- displaced households.

However, the parameter estimates of this regression in the above model need not to interpret because urban expansion affects all periurban households in the targeted villages where decision to displacement is not an issue to these covariates regarding selection to displacement. But this procedure is necessary to generate the pscore. The pscore is used to create best matches between the two groups conditional on sharing similar pre-intervention covariates.

4.4.2. Determining the Region of Common Support

Common support method was one of the matching methods of observed mean outcome of non-treated to estimate the mean of counterfactual outcomes of the treated being were not treated. The common support estimation was improved by dropping the comparison observations whose estimated propensity score was greater than the maximum or less than the minimum of the treated group propensity scores (Figure 3 below). The figure in the left corner is indicating the common support region before matching whereas the right corner is after matching.

Figure 3 below shows, the distribution of the households with respect to estimated propensity scores. In case of treated households, most of them are found in the center side of the distribution and they are partly found in the right side of distribution. On the other hand, most of the controlled households partly found in the left side of the distribution and are partly found in the center. However, one can visually observe that there are considerable wider areas in which the distribution of propensity score of both groups shares sufficient common support region.

Figure 3: Distribution of Common Support Region (Before & After matching)
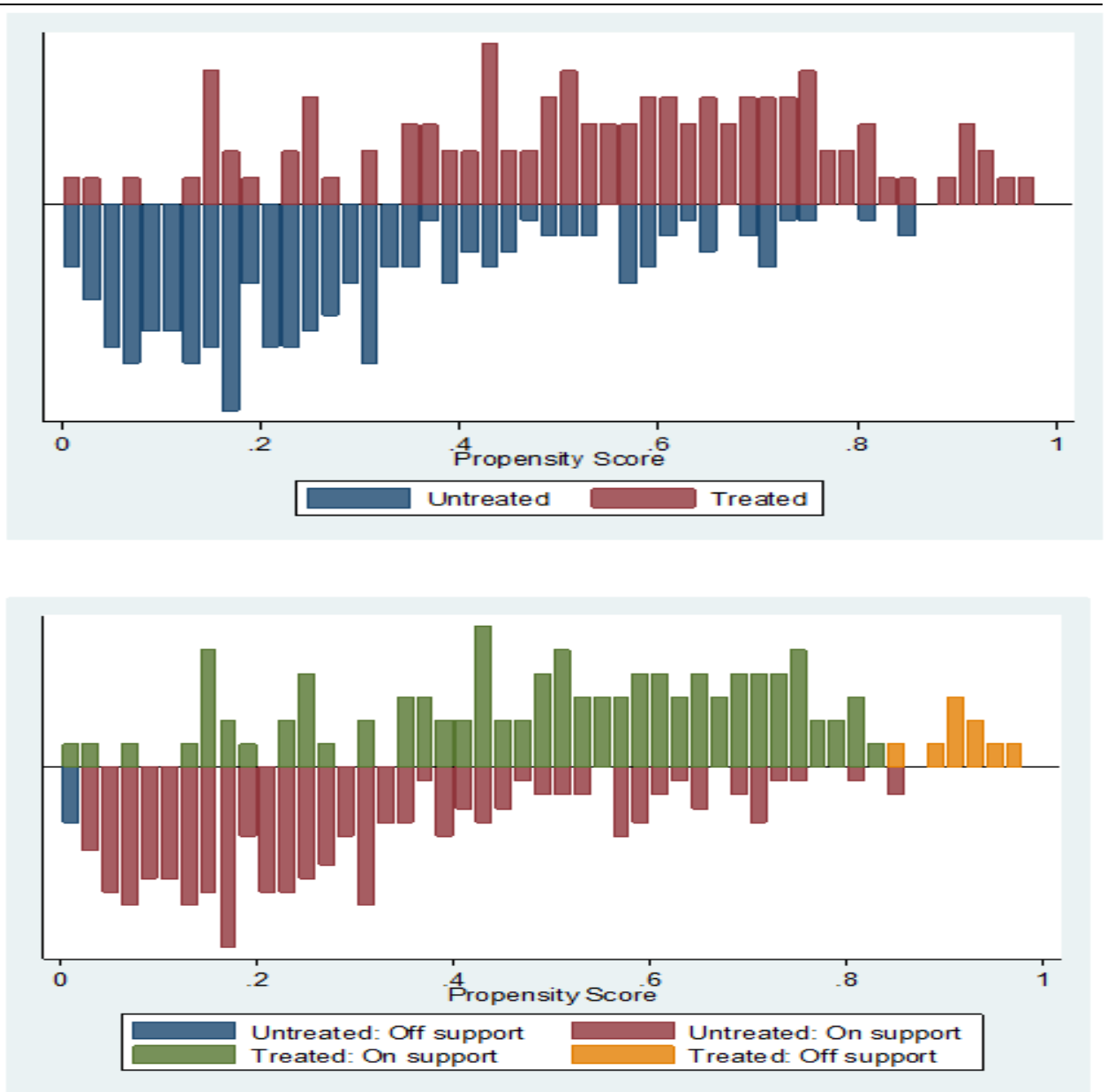
Moreover, both treated and controlled groups' leis between 0 and 1 and fall to the common support region indicates there was sufficient to ensure the existence of potential matches in the

control group. Regarding this analysis, any combination of characteristics observed in the treatment group can also be observed among the control group.

4.4.3. Distribution of Propensity Score Matching

The following output shows that the identified region of common support is [0.01878, 0.96150303] and the final number of blocks is 5, and the balancing property is satisfied. In table 9 bellow, the description of the estimated propensity score in region of common support shows that the average of the mean propensity score of the controlled and the treated groups were 0.545 and 0.27 and standard deviation were 0.228 and 0.202 respectively which indicated comparison and treatment groups were no significant difference in terms of standard deviation before matching estimates. The minimum and the maximum of the controlled groups were 0.01878 and 0.9024 respectively and of the treated groups were 0.01878 and 0.9615 respectively.

Table **9**: Distribution of propensity score matching before matching

Group	N	Mean	Std. Dev.	Std. Err	Minimum	Maximum	F
controlled	187	0.545	0.228	0.015	0.01878	0.9024	83.67
Treated	111	0.27	0.202	0.022	0.01878	0.9615	
Total	298	0.378	0. 2437	0.167	0.01878	0.9615	

Source: own survey result (2017)

More explicitly, with cross-section data and within the common support, the treatment effect can be written as follows (Heckman, Ichimura, and Todd 1997; Smith and Todd 2005) can be specified as the mean difference in Y over the common support, weighting the comparison units by the propensity score distribution of participants.

Table **10**: Distribution of propensity score matching after matching

Group	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum	F	Sig.
controlled	187	0.270	0.202	0.015	0.0214	0.832		
Treated	111	0.52	0.211	0.022	0.0187	0.853	106.74	0.00
Total	298	0.341	0. 1212	0.014	0.01878	0.857		

As it was indicated in table 10 above, the distribution of propensity score matching estimates after matching of the controlled and treated groups, the minimum of the estimated propensity scores were 0.0214 and 0.0187 respectively and the maximum were 0.832 and 0.853. The common support of the total was lay between [0.01878 and 0.857]. Out of this support the households were discarded in the matching exercises. In other words, households whose estimated propensity scores were less than 0.01878 and larger than 0.857 are not considered for the matching exercise. Individuals that fall outside this region have to be disregarded and for these individuals the treatment effect cannot be estimated. As a result of this restriction, only 9 controlled and 4 treated households were discarded. This shows that the study does not have to drop many non-displaced and displaced households of the sample in computing the impact estimator.

Figure 4: Kernel Density Distribution Result
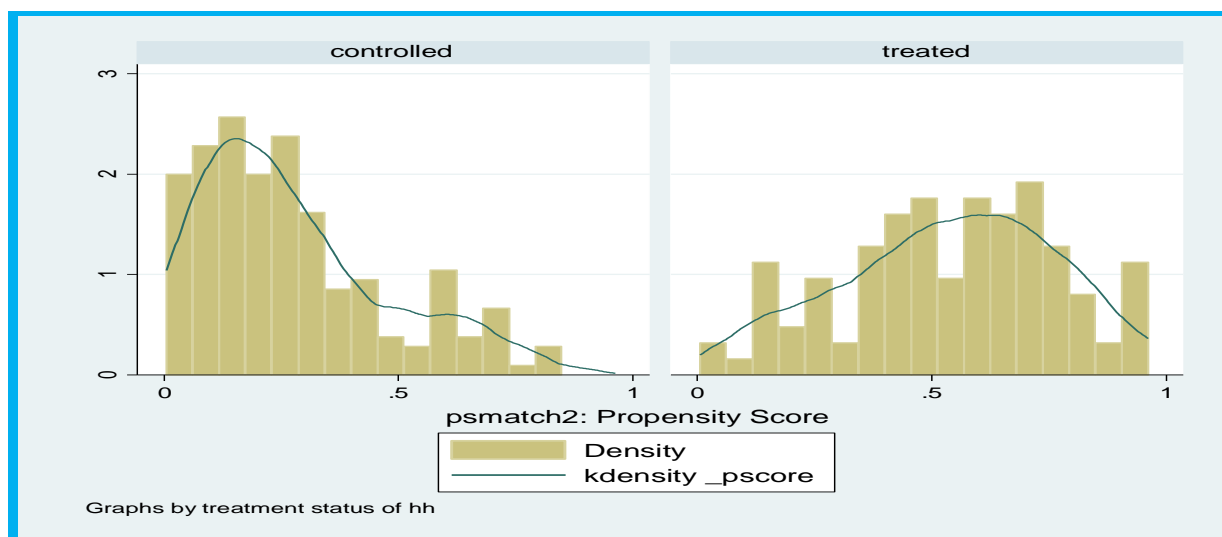
Source: own survey result (2017)

The output of this command as shown in Figure 4 above, it is likely possible to observe visually the quality of overlap by considering the kernel density distribution that was checked by using graphical diagnosis of the covariates distribution. We can see that propensity scores mean distribution tend to be higher in the treated than the untreated. However, because of the limits of bounds to 0 and 1 on the propensity score, both distributions are skewed to left at 0.014 and relatively very close support was executed after matching at the right to (0.857) which was reduced from (0.9615).

4.4.4. Decision to Choose Matching Algorism

Among several matching alternatives, in this research, at least three alternative matching estimators were tried in matching the treated and controlled households in the common support region (table 11). The final choice of a matching estimator was guided by different criteria such as equal means test referred to as the balancing test (Caliendo and Kopeinig, 2005), pseudo-R2 and based on matched sample sizes. Specifically, a matching estimator which balances most explanatory variables (i.e., results in insignificant mean differences between the two groups), bears a low pseudo R2 value and results in large matched sample size is preferable. Table (11) bellow shows the estimated results of tests of matching quality was based on the performance criteria mentioned above. Regarding these combined criteria, because these tests ensure that proposed model reasonably identifies the pscore in terms of distribution of the covariates, the best matching estimators should be appropriate to identify the distinction between the outcomes of treated individual with outcome of comparison households. As shown from own survey computation results, the nearest neighbor matching method have produced almost similar estimation outputs and each individual caliper matching method also produced almost similar results. But the nearest neighbour and radius caliper matching method have the highest bias, which is slightly above 5%, while kernel bandwidth matching estimation output has relatively the lowest bias. For this reason, the discussion focuses on the estimation outputs of kernel bandwidth matching.

Even though, each individual method was producing more or less close to one another result Caliendo and Kopeinig (2005), after looking into the results from own econometric computing matching estimation procedures, it was found that kernel bwidth (0. 1) was the best estimator for this research since it was produce largest sample size (285) with the lowest Pseudo-R2 value (0.012) , least mean bias(4.3%) and equal means test or in this research case the mean balancing test of the number of all 19 explanatory variables were tends to almost equal mean between controlled and treated groups after matching with no statistically significant mean differences as shown in the insignificant statistical test and p-value among the matched groups of displaced and not-displaced households. Thus we can conclude that, the balancing is good since the separate results in the t-test for all covariates are insignificant after matching.

Table **11**: Performance matching estimators /values before &after matching

Matching estimator	Performance criteria					
Nearest-Neighbor	Balancing test	Pseudo-R ^{2}		Matched	Mean bias	
		Before	After	Sample Size	Before	After
NN(1)	18	0.22	0.042	285	22.6	7.9
NN(2)	19	0.22	0.041	285	25.6	8.8
NN(3)	19	0.22	0.027	285	25.6	7.0
NN(4)	19	0.22	0.032	285	25.6	7.7
NN(5)	19	0.22	0.028	285	25.6	6.7
Caliper						
0.01	18	0.22	0.041	236	25.6	7.5
0.05	18	0.22	0.042	285	25.6	7.9
0.1	18	0.22	0.042	285	25.6	7.9
0.25	18	0.22	0.042	285	25.6	7.9
0.5	18	0.22	0.042	285	25.6	7.9
1	18	0.22	0.042	285	25.6	7.9
Kernel						
Bandwidth (0.01)	19	0.22	0.018	236	25.6	6.0
Bandwidth (0.05)	19	0.22	0.013	285	25.6	4.6
Bandwidth (0.1)	*19*	*0.22*	*0.013*	*285*	*25.6*	*4.3*
Bandwidth (0.25)	19	0.22	0.018	285	25.6	4.4
Bandwidth (0.5)	18	0.22	0.021	285	25.6	11.6

Source: Own survey result (2017)

Given to the above criteria's and base on selecting the best matching estimator, the following estimation results and discussions are the direct outcomes of the kernel matching algorithm based on a kernel band width of 0.1 since it was better to match all treated unites with a weighted average of all controlled with weights. Subsequently, the weighted averages of all not-displaced households in the control group are used to construct the counterfactual outcome; kernel matching has an advantage of lower variance because more information is included in the analysis (Heckman et al., 1998).

4.4.5. Testing the Balance of Pscore and Covariates Analysis

Once the best performing matching algorithm is chosen, the next task is to check the balancing of propensity score and covariate using different procedures by applying the selected matching algorithm kernel bwidth (0.1) matching was better in this research case. As indicated earlier, the main purpose of the propensity score estimation is not to obtain a precise prediction of selection into treatment, but rather to balance the distributions of relevant variables in both groups (table12).

The balancing powers of the estimations were determined by considering different test methods such as the reduction in the mean standardized bias between the matched and unmatched households, equality of means' using t-test and chi-square test for joint significance of the variables are the commonly used balancing tests in propensity score matching analysis.

The choice of covariates to insert the propensity score model were based on theory and empirical findings and the model for propensity score matching did not need behavioral interpretation. Only variables influence simultaneously with the treatment status and outcome variable should be included. The propensity score reduces the dimensionality problem of matching treated and control units. In the conditional independence assumption states that given set of observable covariates X that are not affected by treatment, potential outcomes of livelihood impact indicators were independence of treatment assignment (Displacement).

The fifth column table 12 bellow shows the standardize bias before and after matching is in range of 1.4% and 123.1% in absolute value and the six column also indicates after matching the total reduction bias of covariates obtained by matching procedure lies between 0.9 % and 11.2 % which are much below the critical level of 20 percent suggested by Rosenbaum and Rubin (1985). Because the t-test is not significant almost for all covariates and the mean bias is $\leq 4.3\%$ in this research case at kernel 0.1, the overall matching performance is good after matching. In addition the only 13 unmatched sample households were discarded from the sample out of 298 after matching. The process of matching thus creates a high degree of covariate balance between the treatment and control samples. Similarly, t-values before matching with nine of chosen variables exhibited statistically significant differences while after matching all of the covariates are balanced principally in the best matching estimator.

Table **12**: propensity Score and covariates balancing

Variable	Unmatched Matched	Mean Treated	Control	%reduction %bias.	bias	t-test t	p>t	V(T)/ V(C)
_pscore	U	0.538	0.274	*123.1*		10.46	0.000	1.31
	M	0.504	0.497	3.2	97.4	0.24	0.813	1.00
HH_Age	U	49.541	49.701	*-1.4*		-0.12	0.908	1.28
	M	49.422	49.058	3.1	-127.2	0.22	0.824	1.46
HH_Sex	U	0.865	0.850	4.2		0.35	0.730	0.92
	M	0.873	0.836	10.4	-150.7	0.74	0.461	0.81
Familysize	U	5.117	4.947	10.3		0.84	0.400	0.79
	M	5.078	4.928	9.0	11.8	0.67	0.502	0.95
Educhh_02	U	0 .342	0.364	-4.4		-0.37	0.712	0.98
	M	0.333	0.353	-3.9	12.4	-0.28	0.780	0.97
Educhh_01	U	0.505	0.402	20.8		1.74	0.082	1.04
	M	0 .500	0.444	*11.2*	46.2	0.79	0.429	1.01
Educhh_04	U	0.018	0.064	-23.3		-1.82	0.069	0.30*
	M	0 .020	0.029	-4.7	79.7	-0.43	0.666	0.68
Livestock	U	4.283	3.823	21.8		1.72	0.087	0.35*
	M	4.249	4.425	-8.3	61.8	-0.56	0.576	0.29*
ocupation	U	1.694	1.471	19.2		1.63	0.105	1.28
	M	1.657	1.637	1.7	91.3	0.11	0.909	0.99
landholding	U	0.753	0.772	-7.7		-0.64	0.520	0.97
	M	0 .754	0.736	7.6	2.1	0.56	0.574	1.09
mktdist	U	2.766	2.783	-2.5		-0.21	0.832	1.00
	M	2.770	2.802	-4.7	-84.3	-0.35	0.726	1.24
urbdist	U	3.072	3.377	-33.3		-2.71	0.007	0.67*
	M	3.137	3.146	-1.0	97.0	-0.08	0.937	0.93
Shock Exper.	U	0.063	0.224	-47.2		-3.71	0.000	0.34*
	M	0.069	0.061	2.3	95.0	0.23	0.817	1.12

Creditaccess	U	0.162	0.043	40.0		3.59	0.000	3.33*
	M	0.108	0.104	1.2	97.1	0.08	0.937	1.03
Healthaccess	U	0.117	0.193	-20.9		-1.70	0.090	0.67*
	M	0.108	0.114	-1.8	91.4	-0.15	0.884	0.95
Extenservice	U	0.126	0.118	2.6		0.22	0.829	1.07
	M	0.127	0.130	*-0.9*	64.0	-0.06	0.948	0.98
Poweraccess	U	0.009	0.080	-34.9		-2.66	0.008	0.12*
	M	0.010	0.015	, -2.7	92.3	-0.35	0.725	0.64*
Wateraccess	U	0.189	0.455	-59.0		-4.79	0.000	0.62*
	M	0.206	0.197	1.9	96.8	0.15	0.881	1.03
Roadaccess	U	0.441	0.396	9.2		0.77	0.440	1.03
	M	0.451	0.461	-1.9	79.0	-0.14	0.891	1.00

***, ** and * indicates 1%, 5% and 10% significance level, respectively, U = unmatched, M = matched, mktdist= market distance, urbdist= urban distance, Educhh= education of the head

Source: Own Estimation Survey (2017)

Table **13**: Chisquare Test for Joint significant

Sample	PseudoR2	LRchi2	p>chi2	MeanBias	MedBias	B	R	%var.
Unmatched	0.22	87.75	0.000	25.6	20.8	123.8	1.23	42
Matched	0.013	3.68	1.00	4.3	3.1	26.8	0.84	11

Source: Own Estimation Survey (2017)

All of the above tests suggest that the matching algorithm that has been chosen is relatively best with the data at hand. The result in table 13 above signifies that after matching there is fairly low Pseudo R2 value was reduced from 0.22 to the lower insignificant value of 0.013, insignificant likelihood ratio test (3.68), insignificant p-value (raise to ≥ 10%) and overall bias was reduced satisfactorily from 25.6% to 4.3% after matching or there is insignificant (4.3%) mean difference between the two groups. Thus, it is possible to precede estimation of ATT for those urban induced displaced households.

4.4.6. Estimating Average Treatment Effect on Treated/ATT/ or Outcome Analysis

In order to answer the objective of this research estimating average treatment effect on treated is evaluated the main impacts of urban induced displacement on outcome variables for displaced households. This study suggests that welfare of the urban periphery households might be systematically affected by the displacement (i.e. urban expansion) instead of differences in the observed covariates. The estimation result presented in Table 14 below provides supportive evidence that, the urban expansion brings negative correlation and significant effect on the peri-urban households' livelihood.

After controlling for the differences in demographics, utilities, services and asset endowment characteristics of the urban induced displaced and non-displaced households, it has been found that, on average, the displaced households' total consumption expenditure is reduced by **3,025.64** ETB, significantly. This might be due to those displaced households loss alternative income earning employment opportunity and they prefer to use their compensation for expenditure than using for the real return because of fearing that on starting or scaling up a non-farm business since it results to negative return in absence of effective competitiveness to others. Because most farm households from their life time experience know how to farm, but they may lack the necessary experience or skills to operate a new non-farm business or any other option rather they are experienced in farming and while after a meantime as the liquid money was declines their consumption at large and saving amount also slightly reduced.

In line with this estimation result, even though they have received compensations, given the absence of parallel business and skill development interventions most of urban induced displaced households could not engaged on alternative nonfarm livelihood strategies that can grant them comparable income to sustain their expenditure (Lulseged et al, 2011). In contrast to this, the biggest effect of the intervention in terms of magnitude is the increase in savings held by households that lost land since they choose to leave their compensation payments in a savings account and increase their consumption, start more businesses and participate more in non-farm activities because they offer a safe, liquid asset (Harris, 2015) and Tsega (2012).

Table **14**: Average treatment effect on treated (ATT)

Variable	Sample	Treated (A)	Controls (B)	Difference (A-B)	S.E.	T-stat
Totalspending	Unmatched	20678.47	23777.54	-3099.07	775.936	-3.99
	ATT	20342.75	23368.39	**-3025.65**	983.456	-3.08**
Savinamount	Unmatched	2819.82	4882.62	-2062.80	710.638	-2.90
	ATT	3068.63	3542.88	-474.25	892.025	-0.53
nonfarm livelihood	Unmatched	0.33	0.25	0.08	0.0539	1.52
	ATT	0.33	0.32	0.16	0.0687	0.23
Durablaset	Unmatched	3327.93	2839.03	488.89	662.026	0.74
	ATT	3587.25	1800.19	**1787.05**	848.455	2.01*
EcualiptusA	Unmatched	5656.98	25229.41	-19572.43	2673.436	-7.32
	ATT	5661.03	23993.78	**-18332.75**	3248.123	-5.64**
livstockA	Unmatched	2.57	4.52	-1.95	0.235	-8.29
	ATT	2.6	5.05	**-2.41**	0.298	-8.09***

 ***, ** and * indicates 1%, 5%& 10% significance level, respectively

Source: Own survey result (2017)

According to the finding on this research the urban expansion has also resulted negative and there is a mean difference between displaced and non-displaced households due to the program intervention in terms of livestock holding and eucalyptus tree assets. In contrast the durable home furniture was increased. As a result it had been found out that, on average, the effect of urban expansion has to decreased livestock holding and eucalyptus tree assets in the displaced households by **-2.41** TLU and –**18,332.75** ETB at 1% and 5% significance level, respectively.

In line with this result, livestock asset and eucalyptus tree assets for displaced households were reasonably depleted with associated loss of land for the displaced households which indicates the negative impact of urban expansion (Tsega, 2012). In contrast to this result, Harris (2015) and Lulseged et al, (2011) livestock assets for displaced households is significantly increased except the number of oxen.

The result also signifies that durable home furniture on average possessed by displaced households as compared to the non-displaced households is increased by Birr **1,787.06** at 10% significance level. However, it could be displaced households were owned more durable home furniture may be due to they were purchasing more furniture during compensation of displacement when they received cash payment. Although there is the increase in durable asset for displaced families, it doesn't show the real impact due to it is unproductive asset. In line with durable asset, the evidence suggests that treated households use their compensation payment to increase their purchases of durable assets, but the size of the effect is not large Tsega (2012).

As the result of this research out put the negative and significant values of ATT verified that consumption expenditure, livestock holding and eucalyptus tree asset has been declined due to the negative impact of urban expansion in the study area (table 14). Thus it is possible to conclude that since displaced households' are less potential to spend on both food and non-food expenditures and due to depletion of assets they are unprotected from shock, fall to insure food security and the instability of livelihood status was critical problem in the study area. The other lesson, which we can infer from the results, is that, the observed negative and significant difference between urban induced displaced and non-displaced community indicates the impact of urban expansion needs careful management.

4.4.7 Assessing the Matching Quality and Treatment Effects

4.4.7.1 Sensitivity Analysis

The sensitivity analysis Rosenbaum bounds (2002) calculates for average treatment effects on the treated to test whether the presence of unobserved heterogeneity (hidden bias) between treatment and control cases which allows us to determine how strongly an unmeasured confounding variable may affect selection in the treatment. If there are unobserved variables that simultaneously affect assignment into treatment and the outcome variable, a hidden bias might arise to which matching estimators are not robust (Rosenbaum, 2002).

In this study, under the assumption of no hidden bias, indicating a significant treatment effect sensitivity analysis was carried out on the estimated average treatment effect using alternative matching estimators for only significant outcome variables since testing sensitivity analysis for insignificant outcome indicators is meaningless. The results were performed sensitivity analysis

at gamma 1, 2, 3 and alpha level (0.95 confidence interval). The results indicated in Appendices 5 and 6 for each significant outcome indicators such as (livestock and eucalyptus tree assets respectively) shows the effect of the program is not changing though it was stable between upper and lower bounds implies insensitive regarding these outcome indicators. For total expenditure the significance level have been allowed to differ in their odds of being treated up to the maximum value of gamma 2 with 0.004 significance level is insensitive in terms of unobserved covariates(see Appendix table 4).

Thus, it possible to concluded that our impact estimates (ATT) of households' total expenditure, livestock and eucalyptus tree assets were insensitive to unobserved selection bias and were the result of the effect of the urban expansion program.

4.4.7.2 Multicollinearity Analysis

Variance inflation factor (VIF) was applied to test for the presence of strong multicollinearity problem among the explanatory variables as shown in Appendix 3.A. The mean VIF was 1.42 which is less than 10.There was no explanatory variable dropped from the estimation model since no serious problem of multicollinearity was detected from the VIF results. Contingent coefficient evaluation also checked for categorical variables which implies all are below the tolerance limit (see appendix table 3.B)

4.4.7.3 Heteroscedasticity Analysis

The heteroscedasticity analysis revealed that chi2 (1) = 0.05 and Prob > chi2 = 0.8194, Ho: Constant variance. This test resulted in fail to rejection of the non-existence of heteroscedasticity hypothesis (since Prob>chi2=0.8194) which indicates insignificant and there was no heteroscedasticity problem. However, robust standard errors were estimated in the logit model to tackle heteroscedasticity problem in the data. The explanatory variables included in the model are assumed to affect not only a household's displaced in the urban expansion program but also the key outcomes indicators of livelihood. So, the robustness of standard errors and Breusch-Pagen test was applied to test heteroscedasticity.

4.5 The Perception & Involvement of Farmers on the Urban Expansion program

The researcher was interested to investigate the responsiveness of the government and the perception of the displaced farmers on the impact of urban expansion program. On behalf of government, displacement of farmers for the interests of the public ground content is mandatory, but government support and management regarding financial compensation would not be enough rather it measures lonely the current property they have. Estimation of the compensation is difficult to build new home and substitution for other new assets.

On the other side, urban induced displaced farmers' as they raise during focus group discussion, farmers repeatedly emphasized for criticism in connection with the compensation charge of ensuring, the right to use on land is not limited by the time and conditions whereas regarding displacement compensation was restricted only by the 10-years. Besides, community-level established properties were left out in absence of compensation and in fact less focus was for use right of natural resources. As a result, farmers were not paid for their full property and compensation payable for agriculture and the environment from a variety of benefits received (communal grazing land, fuel wood, water, building materials such as stone, etc.) and to describe in words by comparing the compensation amount to all the above issues they explain the condition as they said government was comparing with the ""Infinity resource gifts changed with the limited money".

Farmers involvement in planning and decision making process during the implementation of urban expansion program is the other issue of this study as expected by the researcher. Accordingly issue raised by participants in the focus group discussion, the displacement was accompanied by a variety of management imperfections and low support for the farmers' new way of life. Besides, the participation of farmers to incorporate their interest in the performance of displacement is almost very little. Regarding this problems the researcher understood from the community that, urban expansion is not seen as good opportunity has been created for farmers rather they suspect to view as a threat. As a result of the threat and suspicion, they feel worship less on the ownership right and on the benefits from urban development and the promotion.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The primary purpose of this paper was to investigate the impact of urban expansion on the displaced households' livelihood due to dispossessed their farming lands. In this study descriptive analysis, econometric results estimation based on propensity score matching methods and focus group discussion were executed. The primary data was collected from 298 households (111 displaced and 187 non-displaced households) using structured and semi-structured questionnaires. The focus group discussion was to support the econometric results basically on perception and involvement of farmers about the implementation of the program.

As shown in the results and discussions in chapter four above, households' demographic variables and economic characteristics indicate statistically significance variations between urban induced displaced and non-displaced households. Substantially on the econometric logistic regression results, looking into the estimated coefficients specifies that urban induced displacement is significantly influenced by nine explanatory variables. Among these significant variables education level of the household head being at primary and high school level, clean water supply, and urban center distance to residence of the household head, and shock experience are found to have negative relationship to displacement whereas livestock and eucalyptus tree assets, occupation and credit access have significant positive association to the treatment assignment.

The key indicators signify on the welfare of the displaced households in the peri urban areas might be systematically affected by urban induced displacement (i.e. urban expansion) as presented in the ATT by observables factors. The urban induced displaced household annual expenditure has declined by Birr 3025.65 over a year as compared to non-displaced households. In addition, in the role of livestock holding and eucalyptus tree asset creation were declining in urban induced households by 2.41 TLU and 18,332.75 Birr, respectively. These results were signified due to less access to alternative income earning employment (non-farm income) opportunities and dispossession of cultivated land for different urban activity followed by the displaced households challenged with deterioration of living status. So they were severely discouraged on livelihoods of displaced households as compared to the comparison groups. As a

result, it is likely to say that urban induced households have less access to improve their livelihood status since urban expansion induced displaced farmers who leave their lands for public interest exposed to food insecurity and absolute poverty because the compensation payments and other government supports was less and it cannot help the treated households to rehabilitate and to create sustainable income source.

Urban expansion, displaced households property estimation, compensation payment, and ensuring sustainable livelihood basis would not be a separate assignment for city administration rather it needs the collaboration effort of the government and the society as whole. However the involvement of the urban periphery community was little during the implementation of the program followed by bad perception due to maladministration. Because new projects and land used allocation for urban activity carried out by the city administration to transform rural lands is not based on updated socio-economic and environmental impact assessment (EIA), the implementation is not truly exists to empower properly to ensure better livelihood and it is difficult to get better development. Although urban expansion is necessarily the recent development issue, particularly its consequence to periurban displaced farmers' livelihood looks worse than better benefited to improve their living status.

5.2 Recommendations

In the study area, the urban induced displaced farmers in accordance with the interests of the public owners of property, the compensation amount for displaced farmers were not paid enough because that was inefficient to keep the new way of life already been worsened due to failure in source of sufficient income to support a permanent resettlement. As a result of households should be paid only 10 times the market value of what can be produced on their land, given low financial compensation is obviously effects a lot of people into poverty.

So, the following recommendations forwarded to curve the problem of negative consequences of urban induced displacement households.

Although urban induced displacement is compulsory and inevitable to resettlement of farmers for the sake of development, but there should have to be done in a manner of permanent improvements of the displacement recovery and rehabilitation package. So displaced households would be more benefited from urban expansion through providing sustainable source of income,

decent and secured job, market and alternative production opportunities must be implemented by those responsible bodies besides financially or in-kind compensation. The city admiration staff should provide training, Continuous follow up and extension services, business development services for those farmers leave their conventional livelihood strategy to facilitate the adoption of new lifestyles.

The city should be regularly expanding with the presence to accommodate additional land for urban purpose by saving the land in the following ways. Firstly, the focus in providing the land that needs to utilize first in the center of the city the unused land. Secondly, the urban expansion program needs to be based on the forecast of deep demographic and socio-economic analysis. Thirdly, as well as how the city, by how much, when should be expanded could be based on the criteria in reality of planning to be directed by policy direction and hence benefited displaced farmers from urban development.

Farmers who have not their own land but engaged with equal share contract farming and/ or per-urban residents who are engaged with non-agricultural source of income is difficult to continue due to the terminated source of income and loss of job security. These landless communities would be equally treated with land owners who were displaced due to the expansion of urban. In addition installing critical infrastructure at the new villages would be mandatory.

Finally, it is not possible to say this research alone is reliable to conclude about the impact of urban expansion on the livelihood of peri-urban community in the country level. Besides this research is limited in scope even in the study area on environmental impacts since urban expansion affects the natural resource such as deforestation due to the conversion of land and deposits of wastes adversely affects the environment. Furthermore there need to investigate comparable means of the compensation payment rate to be valued in the fair payment rules to determine fair resource evaluation system including water, communal grazing land, stone quarry sites since these are means of sustained to the next generation. Considering this issue to provide recommendation by the researcher, the valuation of resources based on the standard payment rate give a chance to correct the imbalance between the previous residence livelihood and the current living status. Unless these issues reconsidered by the responsible body farmers living status should be accompanied by wondering.

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APPENDICES

Appendix 1: Conversion Factors for Adult Equivalent and Man Equivalent

Age	Sex	AE	ME
0-7	Male	0.6	0.0
	Female	0.6	0.0
8-10	Male	0.8	0.4
	Female	0.8	0.4
11-15	Male	0.9	0.5
	Female	0.9	0.5
16-24	Male	1	1
	Female	0.8	0.8
25-50	Male	1	1
	Female	0.8	0.8
51-65	Male	0.9	0.9
	Female	0.7	0.7
>65	Male	0.8	0.7
	Female	0.6	0.5

AE= Adult Equivalent   ME = Man Equivalent

Source: Storck, *et al*., 1991

Appendix 2: Livestock Conversion Factor (TLU)

Livestock type	Conversion factor	Livestock type	Conversion factor
Cow/Ox	1.00	Sheep/Goat Young	0.06
Young bull	0.80	Donkey adult	0.70
Heifer	0.75	Donkey Young	0.35
Calf	0.20	Chicken	0.013
Weaned Calf	0.34	Sheep/Goat adult	0.13
Horse/Mule	1.10		

Source: Storck, *et al*., 1991

Appendix 3: Multicollinearity Test for Explanatory Variables

A. Test result for continuous variables multicollinearity problem

Variable	VIF	1/VIF	Variable	VIF	1/VIF
Livestock	1.09	0.91777	Ecualiptus	1.06	0.942
Familysize	1.06	0.941	Mktdist	1.04	0.962
Landholding	1.04	0.964	Urbdist	1.02	0.984
Mean VIF	1.05				

Source: own survey result (2017)

B. Test result for Dummy variables multicollinearity problem/Contingency coefficient

	HH_Sex	Educh~02	Educh~03	Educh~04	ocupation	Educaccess	Creditaccess
HH_Sex	1.0000						
Educhh_02	-0.1138	1.0000					
Educhh_03	0.0991	-0.3215	1.0000				
Educhh_04	0.0912	-0.1650	-0.0961	1.0000			
Ocupation	-0.0849	0.1058	-0.1287	-0.0104	1.0000		
Educaccess	0.0533	0.0675	-0.0181	0.0726	-0.1353	1.0000	
Creditaccess	-0.1438	0.0435	0.0293	-0.0686	0.0581	-0.0730	1.0000
Healthaccess	0.1306	-0.1027	0.1309	0.0299	-0.0326	0.4382	-0.0409
Extenservice	-0.0236	0.0687	0.0091	-0.0823	-0.0443	-0.1367	-0.0781
Poweraccess	0.0554	0.0096	0.0603	0.1582	-0.0241	0.5370	-0.0736
Wateraccess	-0.1537	0.0190	-0.1484	0.0669	0.0630	0.0486	0.0187
Roadaccess	0.1503	-0.0534	0.1608	0.0393	0.0232	-0.0409	-0.0901

	Healthaccess	Extenservice	Poweraccess	Wateraccess	Roadaccess
Healthaccess	1.0000				
Extenservice	-0.1367	1.0000			
Poweraccess	0.5370	-0.0883	1.0000		
Wateraccess	0.0675	-0.0388	0.3206	1.0000	
Roadaccess	-0.0409	0.0866	0.2841	-0.3382	1.0000

Appendix 4: Sensitivity Analysis for Estimated ATT of Total Expenditure (Rbounds)

Gamma	sig+	sig-	t-hat+	t-hat-	CI+	CI-
1	0.00001	0.00001	-4198.13	-4198.13	-5259.61	-2499.37
1.25	7.0e-08	0.000476	-4780.14	-3482.85	-5777.24	-1341.07
1.5	4.2e-10	0.005295	-5165.29	-2744.65	-6173.15	-617.808
1.75	2.4e-12	0.026178	-5501.29	-2029.3	-6432.23	14.8259
2	1.3e-14	0.078348	- 5778.1	-1337.04	-6689.56	424.686
Gamma	sig+	sig-	t-hat+	t-hat-	CI+	CI-
1	0.00001	0.00001	-4198.13	-4198.13	-5259.61	-2499.37
2	1.3e-14	0.078348	-5778.1	-1337.04	-6689.56	424.686
3	0	0.557846	-6480.99	73.3782	-7431.51	1642.96

Appendix 5: Sensitivity Analysis for Estimated ATT of Livestock Asset (Rbounds)

Gamma	sig+	sig-	t-hat+	t-hat-	CI+	CI-
1	8.9e-15	8.9e-15	-2.17246	-2.17246	-2.56408	-1.76516
1.25	0	8.3e-12	-2.36171	-1.96846	-2.7897	-1.54303
1.5	0	8.0e-10	-2.52062	-1.81105	-2.97169	-1.377
1.75	0	2.1e-08	-2.67503	-1.66518	-3.10348	-1.23061
2	0	2.4e-07	-2.78999	-1.54298	-3.22917	-1.09596
Gamma	sig+	sig-	t-hat+	t-hat-	CI+	CI-
1	0.00001	0.00001	-4198.13	-4198.13	-5259.61	-2499.37
2	1.3e-14	.078348	-5778.1	-1337.04	-6689.56	424.686
3	0	0.557846	-6480.99	73.3782	-7431.51	1642.96

Appendix 6 : Sensitivity Analysis for Estimated ATT of Eucalyptus Tree Asset (Rbounds)

Gamma	sig+	sig-	t-hat+	t-hat-	CI+	CI-
1	0	0	-19853.1	-19853.1	-20926.1	-18854.5
1.25	0	2.2e-15	-20433.6	-19466.7	-21467	-18392.2
1.5	0	4.1e-13	-20810.5	-19006.1	-21860.9	-17912.7
1.75	0	1.7e-11	-21128.7	-18590.3	-22225.2	-17544
2	0	2.8e-10	-21467.9	-18391.4	-22499.8	-17224.7

Gamma	sig+	sig-	t-hat+	t-hat-	CI+	CI-
1	0	0	-22357.1	-22357.1	-23456	-21209.3
2	0	1.9e-10	-23984.4	-20587.9	-25239.9	-19157.4
3	0	1.6e-07	-24902	-19488.2	-26314	-17876.2

Source own survey result (2017)

NB: * gamma, log-odds of differential assignment due to unobserved factors, sig+ - upper bound significance level, sig- - lower bound significance level, t-hat+ - upper bound Hodges-Lehmann point estimate, t-hat- - lower bound Hodges-Lehmann point estimate, CI+ - upper bound confidence interval (a= .95), CI- - lower bound confidence interval (a= .95) were used for all outcome indicators.

Appendix 7: Household Survey Questionnaires

BAHIR DAR UNIVERSITY, SCHOOL OF GRADUATE STUDIES, BUSSINESS & ECONOMICS COLLEGE

The Impact of Urban Expansion on Peri-Urban Farmers' Livelihood: The Case of Dessie City.

This questionnaire is prepared to analyze the impacts of urban expansion on the peri urban farmers' livelihood and this dissertation is in partial fulfillment of the requirements for the Master of Science Post Graduate Applied Development Economics at Bahir Dar University. Respondents' cooperation to honestly respond questionaries' is too much important to disclose the reality in order to achieve the purposefully objective of the researcher. The researcher in turn must responsible and confidential to keep any of the respondents' response not to use for any other issues without the purposefulness of the research. So in order to protect respondents' privacy and promising confidentiality, the data would not be transferred in ways where a third party could identify them.

Summary of Survey Questionnaire

Enumeration profile

Enumerator's Name	Interview Date	Time Int. Started	Time Int. Ended	Interview Place	Checking($\sqrt{}$)

  Notes to Enumerators

Get prepared on the questions to be asked before meeting your respondent. Carefully respect social norms at the beginning, during and at the end of the interview. Explain to the respondent the purpose of the interview that it is for research. Smoothly connect one question to the other, but avoid leading questions. During interview, take breaks between different parts of the questionnaire. Please use the mark ($\sqrt{}$) for appropriate answer in the choices put in the following box ($\square$) and fill in description if there is blank space. All the years are in Ethiopian calendar.

Part I. General Information

1. Region _____ 2. City_____3. Kebele. _____5. Village.
_____ 6. Selection cod number of the hh. _____7. Religion. _____
_____ 8. Ethnicity _____

Part II. Demographic Characteristic of the Household

2.1 Household information

HH Serial No	02 Marital status	03 Relationship to the hh head	04 Sex M=1,F=2	05 Age (Years)	06 Education level	07 Main occupation(activity)
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						

Note

For codes 02) 1) Un-married, 2) Married, 3) Divorced, 4) Widowed, 5) below marriage age

For codes 03) 1) Husband 2) Wife   3) Daughter   4) Son   5) Relatives   6) Others

For codes 04) 0= Illiterate, 1= Read & write, 2= If attending elementary School, 3= If attending high School write the grade, 4= diploma and above

For codes 07) 1= Farming, 2= Merchant, 3= House hold work 4= Schooling 5= Daily labor, 6 = other specify

2.2 Since the last five years, how is the change in your family size? (Use√) 1) Increased ☐ 2) Decreased ☐ 3) Not changed ☐

2.3 If there is change, describe the reasons: 1) due to newly born children ☐ 2) Relatives returned from other places ☐ 3) Marriage and extended family☐ 4) due to migration of family members ☐ 5) others ☐-----------------------------

2.4 Has any member of your family ever migrated out due to shortage of food? 1) Yes ☐ 2) No ☐

2.4.1 If yes: A) who   1) HHH ☐ 2) Son ☐ 3) Spouse ☐ 4) Daughter ☐ 5) other ☐ specify_____ B) Where   1= Kombolcha   2= other bigger towns 3) Dessie in the other village 4= other specify C) Which year? _____ D) which season of the year _____ E) for how long _____

2.5 If children, aged 6 years and above, are not attending school, why? 1) School is too far ☐ 2) No money ☐ 3) Disabled ☐ 4) needed for work/labor ☐ 5) enough attending ☐ 6) Lack of interest ☐ 7) others ☐ specify _____

2.6 How much is the number of households' current status who are 15 years and above? Employed in number ---------- unemployed in number------------

2.7 If unemployed, what are the reasons? 1) Disabled ☐ 2) didn't want ☐ 3)No job/No one employs me/No employment ☐ 4) Scarcity of agricultural land ☐ 5) Sick ☐ 6) old aged ☐ 7) others ☐ (specify)_____

Part III. Land use information

1. Land holding (Timad)

Ownership	Cropland	Grazing	Forest	Irrigable	garden	Others	total	
Own land								

Rent in								
Gift								
Total								

2. List the type of crops you cultivate and their average production (including garden crops) by comparing two years.

Ser. NO	Type of crop	In 1999/2000 E.C			In 2008/2009 E.C			Remark
		Total land in Timad.	Total produced in q/l.	Value in Birr.	Total land in Timad.	Total produce in q/l.	Value in Birr.	
1								
2								
3								
4								
5								
6								
7								
	Total							

3. Are you displaced from your land? -------------- If yes,   A) when -----------.B) How much was your land size before displacement? --------------Timad. After displacement: -------------Timad. C) How much was your land productivity per year/Timad --------------Q/l

Part IV. Asset Ownership

1. Livestock number and related information

S.N	Livestock type	Total amount in Number ,1999	Total amount in No 2009	Current unit price	Costs in the year 1999 (ETB)	Costs in the current year 2009 (ETB)

1	Ox					
2	Cow					
3	Hifer					
4	Woyfen					
5	Calf					
6	Sheep					
7	Goat					
8	Horse					
9	Mule					
10	Donkey					
11	Hen					
12	Other					
13	Total					

2. Possession of Durable Commodities/assets

Item Description	Number Owned	When did you obtain	how did you obtain/ gift or own purchase	How much this item if you sell now in the salvage value	Remark
Television					
DVD					
Radio/Tape					
Pool/carambula					
Motor Cycle					
Bajaj					
Motor Vehicle					
Chair /Table					
Sofa net/ Mejlis					
Cup board					
Motor Pump					
Jewelry					
Mobile Phone					
Horse Cart					

Others				
Total Durables				

3. Possession of tree assets: total number of eucalyptus tree-----------value in ETB-----------------

4. Nature of the house you live in. 1) grass roofed ☐ 2) corrugated iron sheet with wood and mud ☐ 3) blocket-wall with cemented floor ☐ 4) other ☐ specify-------------------------- number of housing rooms ----------------------

Part V. Income and consumption

A) Income

1. Is there a change in source of income in the last 5 years? 1) Yes ☐ 2) no ☐ , if yes how have incomes of the household changed since being urban resident? 1) Much better ☐ , 2) somewhat better ☐ , 3) the same ☐ , 4) somewhat worse ☐ , 5) much worse ☐

2. If the change is positive, what are the main sources of your income?

a) Daily labor wage income (masonry, carpentry, quarry extraction, cobblestone block production, and manufacturing like metal work and woodwork) ☐. If so what is your daily wage -----------------in ETB

b) Self-employment Trade opportunities such as trade and commercial activities (retail shops, local brewer and drinks sales, Coffee and tea sales, services/like photo copy and others sells) ☐. If so what is your monthly sell------------in ETB

c) Livestock breading & fattening ☐ (cattle's, poultry, herd &others including by products) ☐ if so what is the amount of sells --------------in ETB

d) Crop production ☐, and sell of crops and vegetables yearly cash ------------ in ETB

e) Sale of eucalyptus tree in number -------- yearly cash ----------------in ETB

f) Has the household participate in safety net program? 1) Yes ☐ 2) no ☐ if yes, how much was the monthly payment in cash in--------------ETB.

g) Others specify ☐ ------------------------ (Remittance, pension, transfers and other annual income such as rent) --------------in ETB.

3. If there is a new job since the last five years, when did the job set up to acquire the business? Year--------------------E.C

4. What was the startup capital-------------in ETB, the current capital----------- in ETB? The change in ETB is -------------------

5. Number of workers at starts up------at last month------------- the change in employee---------

6. How much was last three months total cost------------in ETB, total revenue--------------in ETB.

7. Did the household lease out any asset /land, livestock, motor pump, house etc/? 1) Yes ☐ 2) no ☐ if yes, how much the total was rent cash in ETB----------------duration period------------

B) Consumption

1. From where do you get food for your family? 1) Own produce or purchase ☐, 3) Borrow from relatives/neighbors ☐, 4) PSNP in kind or cash ☐ , 5) Gift /share from relatives ☐ , 6. Others ☐ specify--------------------------

2. How many meals per day did your household eat in the current year? 1) Once ☐, 2) Twice ☐, 3) Three times ☐, 4)As obtained ☐, 5) More than 3 times ☐.

3. Did the household exposed to food shortage in the last 12 months? 1) Yes ☐ 2) no ☐ if yes, how many months did the household exposed to food shortage? ---------------How did cover the food gap? 1) from sell assets ☐ , 2) loan from friends/ relatives ☐, 3) participate in safety net program ☐, 4) received food aid ☐ , 5) own saving ☐, 6) others ☐ specify------

4. How much was last week consumption of the sum total for each of the food items in amount and the total expenditure to feed your family (such as Teff, Maize, Sorghum ,Wheat ,Barely, Peas , Beans ,Chickpea ,Lentils------------------ETB ,Milk ,butter ,Beef ,Egg , Honey------------ ETB Coffee Sugar ,Oil ,Pepper   and Others-----------------ETB) sum total--------------------in ETB

5. How much annual expenditure of the sum total for each of the nonfood items in amount and the total value for (Kitchen equipment, Furniture, Charcoal, Fuel wood, Kerosene, Sop/omo------------------ETB, , Ceremonial expenses, Social obligation like Idir, Donation to religious institution, Taxes-----------------ETB, Water fee, Medical expenses, School fee, Transport expenses, Drinks, Rents, Farm implements, Farm oxen, Animal feed, veterinary, service----------------ETB, labor cost etc, Chemical, Seed, Fertilizer-----------------ETB Building materials and Others------------------ETB) nonfood items total value -----------------------in ETB.

6. No 4 & 5 (the sum of food and nonfood items) total ----------------------------in ETB

Part VI. Credit, Saving and Marketing

1. Have you received any type of credit last year? 1) ☐ Yes 2) No ☐

2. If yes, A) where? 1) Service cooperatives☐, 2) Friends and relatives☐, 3) Local money lender☐, 4) Rural institutions ☐ 5) Banks☐, 6) others ☐

B) How much was it? ------------------- What was the interest rate? ----------------------------------

C) For what purpose you obtained the credit? 1) To purchase agricultural inputs☐, 2) for commercial activity☐ 3) to fill family requirement☐, 4) to settle debt☐, 5) others ☐

3. If no why? 1) Fear to repay☐, 2) High interest rate☐, 3) Lack of collateral☐, 4) No one to give credit☐, 5) No need for credit☐, 6) others ☐

4. What are the basic sources of marketing information? 1) Radio☐, 2) Merchants/traders☐, 3) Development /Extension Agents☐, 4) Friends /relatives/neighbors☐, 5) others ☐

5. How much was your saving amount/in any bank or in ACCI --------------in ETB, At home/ in pocket----------------------in ETB, in traditional saving like Equib--------------in ETB, Others--------------in ETB total saving amount----------------in ETB

Part VII: Some other welfare and welfare change indicators based perception and attitudes

1. How much total compensation does you received during displacement in ETB: ------------

2. How much did the household allocate the compensation money: A) to saving----------------in ETB, B) to investing---------------in ETB, C) to consumption--------in ETB D) others specify

3. Is there a reasonable/ fair compensation for your land? 1) Yes ☐ 2) no ☐, how do you feel about land compensation? ---
----

4. How satisfied is the household after being an urban residence? 1) Very satisfied ☐, 2) satisfied ☐, 3) neither satisfied nor dissatisfied ☐, 4) dissatisfied ☐, 5) very satisfied

5. Compared to the non-displaced farm households in neighbour villages, how do you rate your living condition? 1) Much better ☐, 2) somewhat better ☐, 3) the same ☐ , 4) somewhat worse ☐, 5) much worse ☐

7. Since 1999 E.C did the household purchase machinery, motor pump, vehicle, new house or other durable asset? 1) Yes ☐ 2) no ☐, if yes what-------------------- how much cost in ETB------------------

9. Since 1999 E.C, what improvements in government service have been useful to the household? (Choose at least the most three) 1) better sanitation &health care ☐, 2) better water supply ☐, 3) new or improved road ☐ , 4) better schooling ☐ , 5) better housing ☐ 6) others specify---------------, 7) no improvement at all

10. What do you expect will be the households' life next year? 1) Much better ☐ , 2) somewhat better ☐ , 3) the same ☐, 4) somewhat worse ☐,

11. What improvements or worsens do you feel due to urban expansion in the household life?

Improvements in the household	Worsens in the household
1. able to own new business ☐	11.no regular income ☐
2. able to build house for rent ☐	12. jobless family member ☐
3. able to own more livestock ☐	13. reduce livestock asset ☐
4. better job opportunity ☐	14. life is risky due to no permanent income ☐
5. living in better house ☐	15. have too many loans ☐

6. better infrastructure & utility service☐	16. money & durable asset reduced☐
7. better health and education for hh☐	17. health & education of hh declines ☐
8. better consumption style of hh☐	18. family consumption style declines☐
9.better saving amount☐	19. decline saving amount☐
10.others specify☐	20. others specify☐

12. What is the current status of the household total wealth compared to others living in the locality that was at the same asset position before 5 years ago? 1) Rich☐, 2) medium☐, 3) poor☐, 4) very poor☐ , 5) I don't know☐

Part VIII: community participation and government response & support

1. Did you participate in decision making process in the implementation of expropriation program? 1) Yes☐, 2) No☐, if "Yes", what're benefits you obtained because of participation? 1) raised own interest☐, 2) created access to benefit packages☐, 3) created opportunity to livelihood means☐, 4) no change due to my participation☐, 5)other ☐ specify_____

2. Who were the main decision makers in determining the amount of benefit packages to the community?1) Government body ☐, 2)local community committee ☐, 3) both ☐

3. Did the household receive any official guidance or technical assistance on how to utilize the compensation money? 1)Yes☐, 2)no☐, if yes

4. How do government officials /Extension agents support to cope up the new livelihood due to urban expansion? Is there any support? 1)Yes , 2)no , if yes what type of support is there?

1) Training on private business development☐, 2) management and supervision☐, 2) financial management saving☐, 3) technical training for livelihood means ☐ 4) 0thers ☐ specify------

Part IX: Facilities and Services Available

1. Services; A) How long is one way livestock travel distance to the nearby market/ minute ------ ----- B) How long is one way public transport distance to the center of the city or to the nearby commercial market/ minute ----------- C) How long is one way on foot travel distance to the nearby health service/ minute ----------- D) how long is one way on foot travel distance to the

nearby elementary school/ minute -------------- E) how long is one way on foot travel distance to the nearby high school/ minute ---------------

2. Utilities: supply of utilities received to the household: i) Electric city 1) yes☐, 2) no☐ ii) potable water supply 1) yes☐, 2) no ☐ iii) mobile phone user 1) yes☐, 2) no☐

Part X: Household Shock & Vulnerability

1. Does the household exposed to any of negative events in the last five years? 1) Yes☐ , 2) no☐, if yes how is the household affected by the event? 1) very badly, 2) badly☐ , 3)not that much☐

2. Did the household sell either of the assets in response to the negative event? 1)Yes ☐ 2) no ☐, if yes which asset did you sell-------------------value ----------------in ETB

3. Is there any member of the household suffered from any kind of illness or disability? 1) yes ☐, 2) no☐, if yes, how much spending for medical treatment -----------------in ETB

    Name of enumerator _____ Date of interview _____ Signature_____

Appendix 8: Check List Used as a Tool for Focus Group Discussion

 1. Additional reviews/ please list your opinions without restrictions?

1.1 Is urban expansion good or bad? ------------ Why? ---

1.2. How the local government does help and support he displaced farmers to cop up? -------------
----

1.3. What do the displaced farmers have benefited or loss from urban expansion? ------------------
----

1.4: Do the urban periphery participate actively in the urban expansion planning and implementation process? ----------------- Why? ---

----

1.5 What do you have a suggestion being in the future? ---
---

1.6 If you remember, can you compare relatively the livelihood status (based on the total wealth, asset, income, consumption, saving) before and after displacement? -------------- If yes, which one is better? ----------------------------- Why the difference is appearing? ----------------------------
--- What challenges you face during displacement? --

1.7 Do you agree with the compensation amount, valuation, and overall implementation process? Why? --
----

2. In addition: Actions taken by the displaced farmers to cope up during displacement when their life was changed, Actions or measures and decisions taken by local officials, Close supervision, Participatory ways and decision process, Cash or Compensation management system and Alternative employment opportunities provided during and after displacement to shift from farming practice due to expropriation of their farmland and Other relevance questions will be considered and treated in open ended discussion.
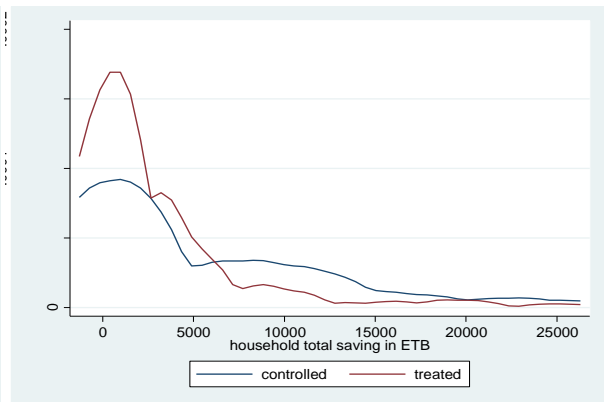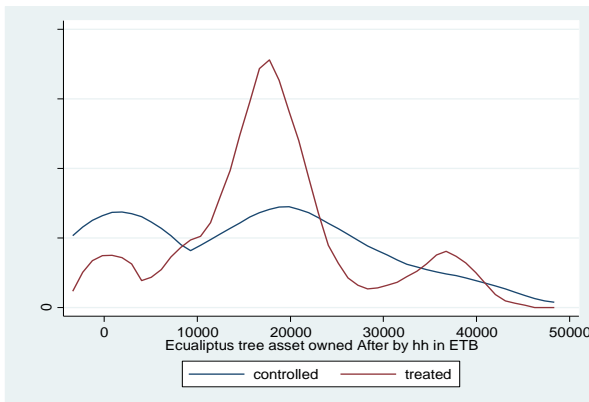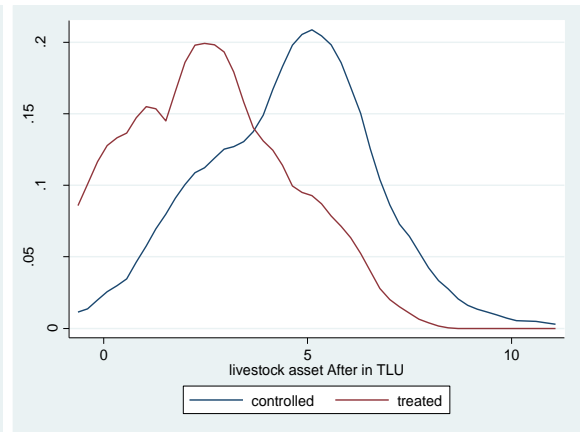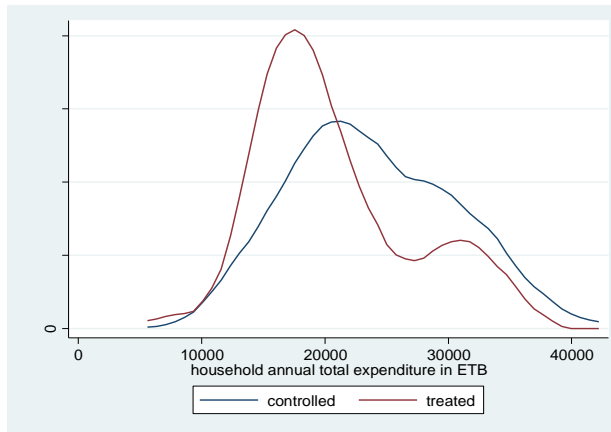
   Thank you for your kindly response!!

Appendix 9: Kernel Density Distribution of Pscore by Treatment   Status
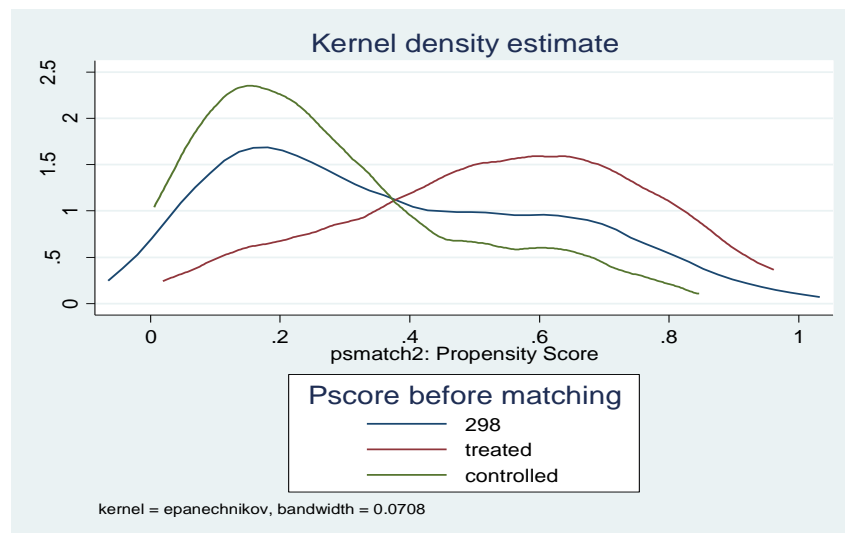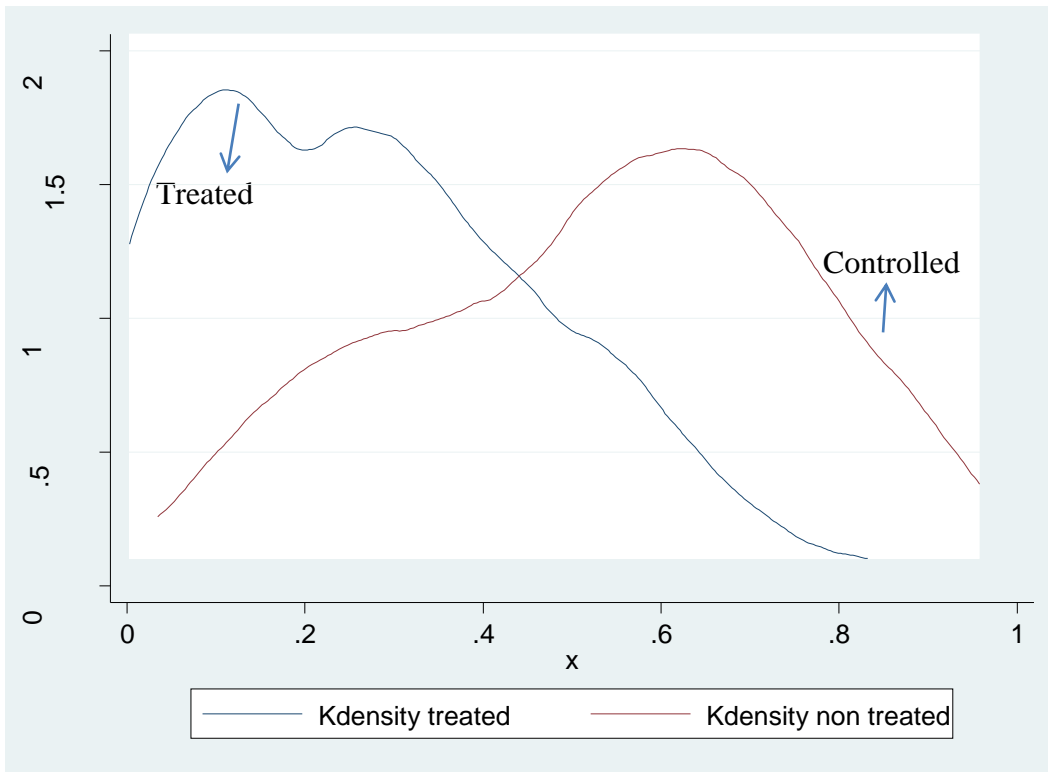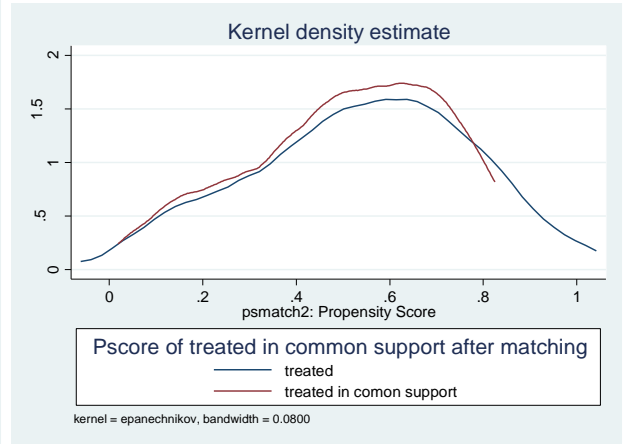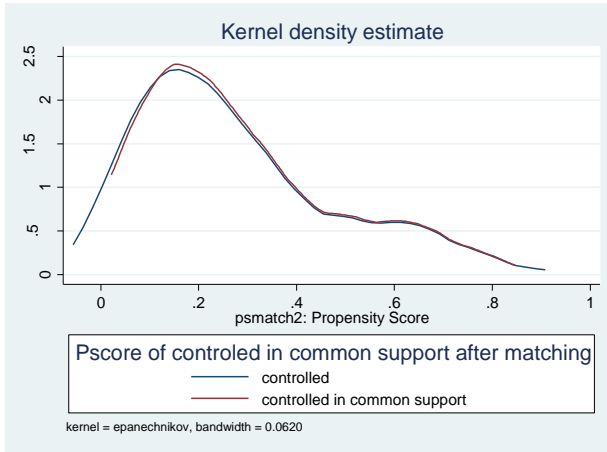
Appendix10: KDensity Distribution of Outcome Indicators for Treated & Controlled Groups

Source: own survey result (2017)