IMPACT OF LARGE-SCALE AGRICULTURAL INVESTMENT ON THE LIVELIHOOD OF LOCAL COMMUNITY IN GAMBELLA REGION, ETHIOPIA

Amanuel Kussia Guyalo

A Dissertation Submitted to Centre for Rural Development, College of Development Studies

Presented in Fulfillment of the Requirements for the Degree of Doctor of Philosophy in Development Studies (Rural Development)

Addis Ababa University

Addis Ababa, Ethiopia

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Addis Ababa University
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DISSERTATION APPROVAL

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

This is to certify that the dissertation prepared by Amanuel Kussia Guyalo entitled: *Impact of Large-Scale Agricultural Investment on the Livelihood of Local Community in Gambella Region, Ethiopia* and submitted in fulfilment for the requirements for the Degree of Doctor of Philosophy (Rural Development) complies with the regulations of the Addis Ababa University and meets the accepted standards with respect to originality and quality.

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Declaration

I, the undersigned, hereby declare that this is my original work and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other University, and that all the resources and materials used for the dissertation, have been fully acknowledged.

Name_____

Signature_____

Date _____

Place _____

Date of submission _____

This dissertation has been submitted for examination with my approval as University supervisor.

Major Supervisor's name _____

Signature_____

Date_____

Co – Supervisor's name _____

Signature_____

Date_____

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Abbreviations/Acronyms

ADDP	Ada District Development Project
ADLI	Agricultural Development Led Industrialization
AILAA	Agricultural Investment and Land Administration Agency
AISD	Agricultural Investment Support Directorate
AMC	Agricultural Marketing Corporation
ATT	Average Treatment Effect on the Treated
AVA	Awash Valley Authority
BC	Before Christ
BITs	Bilateral Investment Treaties
CADU	Chilalo Agricultural Development Union
CARE	Christian Action Research and Education
CIA	Conditional Independence Assumption
CSA	Central Statistical Agency
CSI	Coping Strategy Index
DEFRA	Department for Environment, Food and Rural Affairs
DFID	Department for International Development
DTTs	Double Taxation Treaties
EATA	Ethiopian Agricultural Transformation Agency
E.C.	Ethiopian Calendar
EEA	Ethiopian Economist Association
EIAs	Environmental Impact Assessments
EIC	Ethiopian Investment Commission
EPRDF	Ethiopian People's Revolutionary Democratic Front
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agricultural Organization of the United Nations
FCS	Food Consumption Score
FDI	Foreign Direct Investment
FDRE	Federal Democracy Republic of Ethiopia
FGD	Focus Group Discussion
FPIC	Free Prior and Informed Consent
GHA	Global Humanitarian Assistance
GIS	Geographical Information System
GPNRS	Gambella People's National Regional State
GPS	Global Positioning System
GRSIA	Gambella Regional State Investment Agency
GRAIN	Genetic Resources Action International
GTP	Growth and Transformation Plan
HADP	Humera Agricultural Development project
HAIA	Horticulture and Agricultural Investment Authority
HDDS	Household Dietary Diversity Score
HFIAP	Household Food Insecurity Access Prevalence
HFIAS	Household Food Insecurity Access Scale
HLPE	High Level Panel of Experts
HVA	Handels Vereniging Amsterdam

IEG	Imperial Ethiopian Government
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IISD	International Institute for Sustainable Development
ILO	International Labor Organization
IPLAS	Institute for Poverty, Land, and Agrarian Studies
IRD	Integrated Rural Development
KII	Key Informant Interview
LSAI	Large-Scale Agricultural Investment
LSMS-ISA	Living Standard Measurement Study – Integrated Survey on Agriculture
MAHFP	Months of Adequate Household Food Provision
MCA	Multiple Correspondence Analysis
MoARD	Ministry of Agriculture and Rural Development
MoFED	Ministry of Finance and Economic Development
MoWR	Ministry of Water Resource
NBE	National Bank of Ethiopia
NGO	Non Governmental Organization
NN	Nearest Neighborhood Matching
OCHA	Office for the Coordination of Humanitarian Affairs of the UN
OECD	Organization for Economic Co-operation and Development
OHCHR	Office of the High Commissioner for Human Rights
OPM	Office of Prime Minister
OXFAM	Oxford Committee for Famine Relief
PASDEP	Plan for Accelerated and Sustainable Development to End Poverty
PCA	Principal Component Analysis
PSM	Propensity Score Matching
SDC	Swiss Agency for Development and Cooperation
SDGs	Sustainable Development Goals
SDPRP	Sustainable Development and Poverty Reduction Program
SLF	Sustainable Livelihoods Framework
SNNPRS	Southern Nations, Nationalities, and Peoples' Region State
SORADEP	Southern Regional Agricultural Development Project
SRI	Standford Research Institute
SS	Stratification Matching
SSA	Sub-Saharan Africa
TAHADU	Tach Adiabo and Hadekti Agricultural Development Unit
UN	United Nations
UNCTAD	United Nation Conference on Trade and Development
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
USA	United States of America
USOME	United States Operations Mission to Ethiopia
WADU	Wolaita Agricultural Development Union
WFP	World Food Program

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Dedicated to

My Sweet Lovely Daughter, Sara Amanuel Kussia. I miss you always!

ABSTRACT

The phenomenon of larege-scale agricultural investment (hereafter LSAI) has raised profound concerns and debates regarding food security, livelihoods, and socio-economic status of the societies where such investment projects transpire. Particularly, empirical evidence regarding the impact of LSAI on the livelihoods of the local community is limited. The purpose of this study is, therefore, to quantify the actual impact of such investment on the livelihoods of the local community and contribute to filling knowledge, empirical, and methodological gaps in the literature. By using a primary retrospective data collected from 505 households and 150 married women in Abobo and Itang districts, this study employed a Propensity Score Matching method to estimate the impact of LSAI on food security and asset/wealth status of the affected households as well as on women empowerment level. Statistical techniques such as Multiple Correspondence Analysis and Principal Component Analysis were employed to construct various indexes. The quantitative analysis was complemented by qualitative data collected from 31 key informants and nine focus group discussions. The qualitative data were analyzed using content analysis. Various primary and secondary data sources were also utilized to analyze and understand the history, policy and legal frameworks, nature, magnitude, and benefits of LSAI in Ethiopia in general and Gambella region in particular.

The result of this study indicates that government agencies have a weak capacity to administer investment land and projects and are characterized by flimsy horizontal and vertical coordination and integration. The land governance system is also found to be unresponsive, non-transparent, and unaccountable, and characterized by rent-seeking, corruption, and rule of man. The existing institutions, structures, land and investment policies are also failed to safeguard the local communities against potential and actual risks of the investment and to ensure potential benefits and rights expected from the investment. Above all, investment projects are poorly integrated to or isolated from the local community due to the enclave business model they adopted. Contrary to the neoclassical but consistent with middle path theories of investment, the study finds that LSAI has a negative impact on food security and wealth status of the affected households mainly due to government failure. On the other hand, in line with the argument of the resource in culture theory, the result shows that married women's employment in LSAI projects does not have an impact on their empowerment level.

In general, LSAI has contributed to the deterioration of livelihood assets of the local people and worsened the food insecurity and wealth status of the affected community than they would have been without the investment. Moreover, the federal government and Gambella regional state failed to respect, protect, and fulfil food security needs of investment hosting community through LSAI. From the gender perspective, women's access to paid employment in LSAI projects does not improve their empowerment level. We, therefore, recommend that the state should not promote LSAI at the expense of local people's livelihoods and urge the government to reform the sector in such a way that take the local context and rights into account and involve local people at each stage of decision making so that they can directly benefit from employment opportunities, infrastructural development, and technological transfer. Besides, the government need to look at other investment alternative models, for example, eco-tourism (that include diversified production systems of the indigenous community and promote people-centred and empowerment approach).

Keywords: Large-scale agricultural investment, Livelihoods, food security, asset, women empowerment, Gambella, Ethiopia

CHAPTER ONE: INTRODUCTION

....Once the local people begin to see the results of the investments in terms of jobs creation, availability of foreign exchange, and availability of various agricultural products in the local markets and so on, they will see the benefits for themselves and it would be completely irrational for them to shoot themselves on the foot (Meles Zenaw, interview with IMTN TV, 26 June 2011 cited by Ojot, 2013).

One of the newest things that the investors brought to us is a mysterious hefty 'wind'. Do you know 'wind'? I hope you know it. But the wind investors brought to our village is not the one that you know. The wind you and I know is the one that brings fresh air cools and relaxes us when we feel dreadfully warm. However, the investors brought the wind that destroys everything – our food, houses, and all of our livelihoods. They cleared the forest that protects us from the extreme wind. They strip our green coat. When the wind comes, since there is no protection, it takes everything. The extreme of their evil act is that they even not left a single tree (for a wind break) that could protect us from the heavy wind! (65 years old female interviewee, 2018)

1.1. Setting the Scene: Framing LSAI in the Global Land Rush Debate

1.1.1. Historical Accout of LSAI

Large-scale land acquisitions[1] for commercial farming have been a recurring historical event since olden times. For instance, there were large public estates under the primordial Kingdom of Egypt in the third millennium BC, where a number of villages were frequently compelled to supply unpaid labor to the state (Moreno, 2008). It was practiced by the ancient Rome in the fifth century BC where the Roman State rented out the larger part of *'ager publicus* – agricultural land deemed to be the property of the Roman people – to greatly powerful landed oligarchy in the form of large-scale agricultural estates known as the '*latifundia'* (Roudart & Mazoyer, 2016, p. 5). It was also practiced by the Great Britain since the fourteenth century after the occurrence of the Black Death (1347–1350) that killed about half of European population (Roudart & Mazoyer, 2016). Particularly, large-scale land acquisitions was intensified in the sixteenth century in Britain via what was so called 'land enclosure' where the landlords had created coalitions with their tenant farmers and forcibly took control over common land and the ones that were being cultivated by private farmers via demarcation of the boundaries of their estates using hedges or low stone walls (Roudart & Mazoyer, 2016). Moreover, the Spaniards who conquered the Americas after Christopher Columbus founded it (and opened up the New World to the Spanish Crown) introduced a system called '*haciendas'* - very large agricultural estates - in which the '*hacendado'* enjoyed the sole

[1] Many terms or phrases or labels such as 'land grabbing', 'global land rush', 'global scramble for farmland', 'land based investment', 'large-scale land deals' or 'large-scale land acquisitions', 'neo-colonialism' 'green grabbing', etc are given to large-scale agricultural farming carried out by private companies and/or government agencies in the literature. These terms are based on diverse agrarian viewpoints in agrarian studies which are resulted in a vast debate in the academic, political, and public arenas. 'Large-scale land acquisitions' is often considered as a neutral (Borras & Franco, 2012) term that we preferred to use throughout this dissertation which refers to acquisitions of large tracks of land (at least 200 ha) by foreign or domestic or joint (foreign and domestic actors) for the purpose of commercial farming.

ownership of the land (Kay, 1998). In this system, the indigenous American population was forced to communally pay tribute to '*hacendado'* in the form of labor or in kind (Kay, 1998). Portuguese Crown was also engaged in large-scale agricultural land acquisition in Brazil on the mammoth territory that fell within its control by the terms of the Treaty of Tordesillas (1494) signed between Spain and Portugal (Roudart & Mazoyer, 2016). The Portuguese Crown had transferred immense areas of fertile arable land, known as *seismarias*, to folks on long leases who subsequently installed large plantations with a labor force drawn from slaves captured from the indigenous populations and later imported from Africa (Roudart & Mazoyer, 2016). Besides Spanish and Portuguese colonies in the Americas, the expansion of colonization in the world had greatly hastened large-scale agricultural land acquisitions. For example, large-scale land acquisitions were practiced in North America, Australasia, and East and Southern Africa (British colonies); North America, Northern Africa, and Sub-Saharan Africa (French colonies); and South Africa and East Indies (Dutch colonies) (Bernstein, 2010). Above all, Africa had been terribly affected by colonial land grabbing where colonial investors were allocated big tracks of the most fertile land in their respective colonies (Friedmann, 2006; Huggins, 2011). Antagonistic displacement or relocation of indigenous people in reserves and exploitation of their land, labor, and other resources were the common features of all large-scale land acquisitions of the period (Bernstein, 2010). This shows that large-scale land acquisitions are not an utterly a new phenomenon that swiftly came up over the past two or so decades rather they have their own historical precedents.

Even though acquisition of land for large scale commercial farming is not new phenomena, such type of land acquisition in the contemporary era (in the past two or so decades) is distinct from the past eras in terms of the pace, drivers, and scale (Baglioni & Gibbon, 2013; Margulis *et al.,* 2013) including the multifaceted and polycentric political-economic settings within which it occurs (Margulis & Porter, 2013). It is understood that the recent rise in demand for arable land in developing countries is driven by what Hall (2011) called the global 'triple-F' crises of food, fuel, and finance (also known as neoliberal accumulation crisis by McMichael (2012)), as well as environmental crisis (Schoneveld, 2013). The assumption that there is 'unused' or 'idle' abundant fertile land, extremely low labor cost, splendidly welcoming business environment and hosting governments' interest and vow to attract and support large-scale land acquisition in global south in general, and Africa in particular have also facilitated the rush for land in developing countries (The Oakland Instiute, 2011).

Globally, food price index was doubled and oil price index was almost tripled between 2005 and 2011 (Schoneveld, 2013). Food price crises were the result of complex and interwoven factors related to depletion of global food stock, conversion of food crops (mainly maize) into bio-fuel production, financial speculation, high costs of agricultural inputs, poor harvest, and export bans, among others (FAO, 2008; DEFRA, 2010; HLPE, 2011). Moreover, the price of oil was skyrocketed due to scarcity of oil supply in the global market which is mainly stemmed from unwillingness and/or inability of the oil producing countries to meet the global oil demand (Hamilton, 2009). Besides this, vulnerability of commodity markets to financial speculation (due to deregulation of the financial sector – financialization process) (Moore, 2012) had badly affected the global price stability (DEFRA, 2010). Likewise, the growing understanding of global environmental crisis (climate change) and its consequences has led several worldwide initiatives to reduce carbon dioxide (CO_2) emissions, for example, by progressively rising green energy utilization as an alternate for fossil fuels via bio-fuel production (Cotula *et al.,* 2009). In general, the confluence of these global crises (food, fuel/energy, finance, and environmental) have given a rise to new wave of large-scale land acquisition and contributed to a remarkable revaluation of and rush to control land, particularly situated in the global south (Cotula *et al.,* 2009; Borras & Franco, 2010). Consequently, large scale land acquisition in the Global South by both foreign and domestic investors and governments is shockingly on the rise.

Several studies documented that the world's largest agricultural land reserve – 'land with cultivation potential' (for example, up to 80%) - is found in Africa and Latin America as around 95% of the arable land in Asia has already been used (Fischer *et al.,* 2002, p. 82) implying that the two continents are the most potential candidates for large-scale land acquisition in the world. According to the World Bank, 446 million hectares of lands are available for cultivation in the world; where above half of the land is found in ten countries, of which five of them are in Africa (World Bank, 2010). Furthermore, globally, over 40% of 64 million ha of land potentially suitable for irrigation is located in Africa (Fischer *et al.,* 2002) indicating that Africa has been in the radar of large-scale land based investments. Hitherto, Global south countries have leased out about 227 million hectares of land to private investors (Oxfam, 2011). Hideously, between 2008 and 2009 alone 70% of 56.6 million ha of land transferred globally to private investors and government agencies is situated in Africa (World Bank, 2010). According to Wiley (2010), two-thirds of the international land under lease and eighteen out of thirty three to forty countries leasing land to investors are in Sub-

Saharan Africa. Particularly, Ethiopia, Sudan, Madagascar, Tanzania, Mozambique, and Cameroon have been the top investment hosting and rural land leasing/selling countries in Africa (GRID-ARENDAL, 2013).

Even though Ethiopia is not colonized, its historical analysis shows that large scale land acquisition is a recurrent phenomenon for several decades regardless of the nature of the regimes ruled it. For example, there were historical patterns and practices of using huge tracks of land for commercial agriculture during the imperial feudal regime and collective state farms during the socialist regime called the *Derg*[2]. However, the current trend and scale of LSAI is much bigger and highly related to global processes and crises noted above. Particularly, the current government has leased a huge amount of land to the private investors under the umbrella of developmental state doctrine (Muradu, 2014). The scrutiny of large-scale land acquisition in Ethiopia has thus a salient historical connection in terms of state driven land allocation.

The current government has adopted an open door policy and welcomed large-scale agricultural investment[3] on the ground that it could help the country to modernize its agricultural sector. The government claims that the country has a huge amount of 'idle' or 'unused' land[4] (in lowland areas such as Gambella) that can be efficiently handled by financially and technologically strong private investors, without impeding the livelihood of local people (Dessalegn, 2011). However, government's assertion that huge 'unused' land exists in the country is found to be fallacious given that land, in many cases, provides multiple services for local people (source of income, food, medicine, and so on) and could temporarily be used by local users for various purposes, such as for shifting cultivation or bush fallowing (Dessalegn, 2011; Runyan & D'Odorico, 2016). The government has

[2] The Derg is an Amharic term that stands for the committee of soldiers - coordinating committee of the armed force, police and Territorial Army (Ofcansky & Berry, 1991).

[3] In this study, LSAI refers to a mechanized commercial agricultural investment being carried out on the tract of land exceeding 200 hectares which are granted to either foreign or domestic investor through long term leases. In this dissertation, terms like "large-scale agriculture investment", "large scale commercial farming", and large-scale land acquisition" are used interchangeably.

[4] The World Bank is the one that repeatedly broadcasted the 'idle' or 'unused' or 'underused' or 'unproductive' land rhetoric, particularly in Sub-Saharan Africa. For example, in its 2009 report entitled 'Awakening Africa's Sleeping Giants: Prospects for Commercial Agriculture in the Guinea Savannah Zone and Beyond, it speculates the existence of 'a vast underutilized land reserve' in the Guinea-Savannah zone that covers most of West, Central, East and Southern Africa, (a region characterized by low population densities and mobility) and proposes an intensive large-scale commercial agriculture across the region (Hall, 2011, p. 6; Lavers, 2012, p. 803). In Ethiopia, the rhetoric of 'empty' or 'idle' land was started during the Imperial regime where all laws including the constitutions of the 1931 and 1955 considered pastoralists' land (lowland areas) as 'unoccupied land' or 'no man's land' and so declared it as the property of the Imperial government (The Imperial constitution of the 1955 Article 130, sub-article 'd'). The subsequent regimes (the Derg, and EPRDF) had the same attitude, belief, and practices where lowland areas of the country are considered 'empty' or 'idle' areas (the properties of the government) and become the target of large-scale commercial farming in the country.

established a federal land bank at central level and urged regions (mainly those located in lowland areas of the country) to transfer investment land to the land bank. Following this, the regions have transferred about 3.5 million ha of land to the land bank. Between 1992 and 2018, the current government has allocated over 2.2 million hectare of land to numerous foreign and domestic investors (Keeley *et al.,* 2014; Maru & Rutten, 2015). Since 2008, in Gambella region alone, the government has leased more than 683,518 ha of land to domestic and foreign investors (OPM, 2017; GRSIA, 2018). These attitude and practices of the Ethiopian government can be described as what James Scott once called the 'legibility' (Scott, 1985, p.2) where the state uses its authority over nature and society and convert complex and illegible land tenure customs and local people's social practices into centrally administered 'standard gird'.

1.1.2 Perspectives and Debates on LSAI

There is a mixed (and even contradcting) viewpoints regarding whether or not LSAI brings discernible benefit to the investment hosting countries and the local populace. The views are polarized amongst those who view large-scale agricultural land acquisition as an opportunity or land investment (supporters) and those who view it as a threat and possible disaster – land grabbing[5] (opponents) (White *et al.,* 2012; Keeley *et. al.,* 2014). This made LSAI such a complex and controversial issue due to divergence in economic, political, legal, institutional, and ethical standpoints concerning local community's livelihoods (food security, income, employment, and access to land and water), technology transfers, poverty reduction, and rural development.

On one hand, proponents of LSAI (including Ethiopian government[6]) argued that such investment can benefit investment hosting countries by filling up capital and technological

[5] In the international media and activists labelled large-scale agricultural land acquisition in the global south as 'land grabbing'. The Spanish based NGO named 'Genetic Resources Action International' (GRAIN) was the first group to use the term 'Land Grabbing' for these kinds of land acquisitions (Kramer, 2011). Even though there is no comprehensive and universally agreed upon definition for the term 'land grabbing', Nunow (2011) defined it as the purchase, lease or other form of taking possession of colossal tracts of fertile land, chiefly in poor developing countries, by private sectors and national government agencies for the purpose of producing bio-fuel and food crops for export.

[6] The Ethiopian government perceives LSAI as having several noticeable benefits such as improvement in food security, in income through foreign currency earnings and job creation, in livelihoods of the local people, in rural infrastructures and access of the local people to the market, and technological transfer (Keeley *et. al.,* 2014). And so, the government has aggressively been promoting LSAI and attracting the attention of various investors and countries across the world by proving various generous investment incentives such as tax exemption, duty-free import of capital goods and construction materials, the right to make remittances, no or very low requirement for initial investment (EIC, 2017), and extremely low lease amount (which is approximately as low as US$1.08/ha/year and goes through US$8.44/ha/year to as high as US$38.17/ha/year)

gaps encountered by the rural households which eventually boost productivity and agricultural growth and so improve local people's livelihoods (FAO, 2001; Amani *et al.,* 2003; Elibariki, 2007; World Bank, 2010; Deininger *et al,* 2011). The investment is also claimed to create jobs, improve the capacity of local people (TeVelde, 2001; Kim, 2003; Kim 2011); improve access of the local people to market (Deininger *et al.,* 2011); enhance infrastructure (Keeley *et al.,* 2014; Herrmann & Grote, 2015); expand export opportunities as well as ensure energy security (Mitchell, 2011); and help to improve food security and solve the climate tragedy (by setting up climate sound agriculture) (Deininger *et al,* 2011) in such a way that stimulates broader rural development (IPLAS, 2014). The supporters of such investment assume that, once land is acquired, implementation starts immediately, slickly, and irrevocably, and so benefits begin to flow to local community via the channels noted above.

However, the World Bank, one of the the influential proponents of the LSAI, highlighted the risks associated with the existing pace and scale of LSAI expansions in Africa and so advocates the adoption of 'responsible agricultural investment' or 'good governance' (World Bank, 2010, p. xxvi). The principles for responsible agricultural investment is a voluntary guideline jointly developed by the World Bank, FAO, International Fund for Agricultural Development (IFAD), and United Nation Conference on Trade and Development (UNCTAD) to mitigate risks associated with LSAI and transform LSAI into development opportunities for poor countries (World Bank, 2010; Deininger, 2011). The main intention of the principles is to ensure that LSAIs create 'win-win' scenarios, benefiting both investors and local communities that are directly affected by such investment (De Schutter, 2011). The principles for responsible agricultural investment are, however, found to be extremely insufficient to ensure 'win-win' situation (De Schutter, 2011; White *et al.,* 2012) and are non-binding (on neither states nor private actors) and non-game changer ones, as their adoption depends on the interests of the actors (Borras & Franco, 2012). Moreover, facts on the ground seem to show the contrary reporting that rather than benefiting the affected communities such investments have devastating impacts on their livelihoods and the natural environment (Dessalegn, 2011; De Schutter, 2011; Anseeuw *et.al.,* 2012; White *et al.,* 2012; German *et al.,* 2013; Barbanente & Aisbett, 2016; Dereje, 2016; Maru, 2016; Azeb, 2017). Besides, the existing evidence shows that the performance of the majority of investment projects is very

(Bamlaku *et al.,* 2015) among the others. Chapter four of this dissertation discusses the policy and legal framework as well as incentives provided by Ethiopian government to private investors in detail.

low and even failed to reach operational stage. For example, in Ethiopia since 2008, of the total number of licensed projects, only 17.2%, 6.2%, and 76.6%, are at operational, implementation, and pre-implementation stages, respectively (EIC, 2018). This shows that the benefits preached and advocated by the supporters of such investments appear to be a myth or rhetoric.

Opponents of LSAI, on the other hand, argue that the propagated and projected benefits of such investments are unclear at best, and underscore disastrous and adverse impact on the host countries (and communities). They noted that such investment could result in exploitation and degradation of natural environment, violation of local people's land rights, erosion of indigenous farming practices, loss of livelihoods, land dispossession, displacement, food insecurity, and conflict (Grain, 2008; Andersen & Robertson, 2010; Kachika, 2010; Theting & Brekke, 2010; Borras *et al.,* 2011; Dessalegn, 2011; De Schutter, 2011; Hall, 2011; Li, 2011; Steve, 2011; Oxfam, 2011; White *et al.,* 2012). The main reason for this is the high likelihood of large farming investments in securing land that have been–or could be – used by local people for farming, grazing, food, and forests to support their livelihoods. The opponents' claims have been supported by the majority of case studies conducted across Africa that reported the adverse outcomes of such investments on the livelihood of local people and the natural environment. For example, research showing the adverse impact of LSAI in Africa can be found in the works by Anseeuw *et.al.* (2012), German *et al.* (2013), Ferna´ndez & Schwarze (2013), and Dereje (2016) whose findings showed increased vulnerability of affected populations as well as by Robertson & Pinstrup-Andersen (2010), De Schutter (2011), Rulli *et. al.* (2013), Dye (2014), Bamlaku *et al.* (2015), Maru & Rutten (2015), Barbanente & Aisbett (2016), Dereje (2016), Maru (2016), & Azeb (2017) who reported the loss of local community's livelihoods, reduced access to food, water, and basic natural resources. Moreover, some studies reported that LSAI projects have reduced soil carbon stock and soil micronutrient levels and augmented soil compaction (Maru *et al.*, 2016) as well as resulted in deforestation (Dereje *et al.,* 2016, 2017; Maru *et al.*, 2016; Azeb, 2017). At last, the World Bank itself recognized that many of the LSAI projects did not benefit the local communities rather they contributed to asset loss and made them worse off than they would have been without the investment (World Bank, 2010).

Not only are the impacts of LSAI resulted in controversy at the global and national levels but also the purpose of the investment and circumstances of the investment hosting countries is full of contradictions. For example, on the one hand, the majority of the African countries

(including Ethiopia) report declining in farm sizes, land scarcity, extensive poverty, and often food insecurity (World Bank, 2010; Oxfam, 2011). On the other hand, states of investment hosting countries, private investors, and government agencies in some major food importing and capital exporting countries justify acquisition of large tracks of fertile farmland for agricultural investment in Africa based on the existence and availability of vast areas of 'idle', 'empty' or 'unused' land in the region (Borras & Franco, 2012). Particularly, the contemporary investments are meant to develop modern forms of agricultural production for food, feed, fuel, or fibre for export indicating that food produced for subsistence or domestic markets is replaced by food produced for foreign markets or energy purpose (such as bio-fuel) (De Schutter, 2011). This shift significantly contradicts with what should be the first precedence of the investment hosting countries 'to feed themselves' (De Schutter, 2011) and 'to eradicate poverty' which made the affected community more vulnerable to dispossessions (Hall, 2011). The puzzle here is that how investment hosting country (food insecure) can ensure domestic food security while the investing countries are motivated by the same intention – the need to guarantee food security for their own population.

It is within these international, regional, and national settings that this dissertation is initiated to contribute to the existing debate by systematically analyzing the actual impact of LSAI on the livelihoods of the local people by focusing on the food security, livelihood assets, and women empowerment.

1.2. Starting the Voyage and Searching for the Fissure

Initially, my interest was to do a Ph.D. study by examining the nexus between natural resource conservation, food security, and livelihood assets of the Konso community. I had a strong interest to study this issue a long time ago (mainly while I was doing my master degree in development studies at Addis Ababa University). Unfortunately, my attempt during master degree did not work mainly due to financial constraint. However, I had a second opportunity (Ph.D) to study the issue but again my ambition and interest were choked-up because of a horrifying brutal conflict among the Konso community (which continued at least for three consecutive years) that claimed lives of hundreds of innocent people and converted beautiful traditional villages into ash. It was during this critical time that one of my collegues, asked me about what I am thinking regarding my dissertation research area where I explained to him that my interest was on the issues noted above. I told him that due to the serious security problem, it is impossible to do the research and so my second interest was in the area of informal farmland transaction in Ethiopia. He hinted me to consider LSAI which is the

most contemporary and controversial issue, too. My journey has thus started after he ignited the light on the jungle of LSAI and connected me to one of the thematic research projects run by scholars from the College of Development Studies.

Instantaneously following reminder from my teacher, I just entered the phrase 'large-scale farmland acquisition into the Google search box which came up with an inundation of documents (grey literature, academic journal articles, short notes, speeches ...) under the variety of themes and topics. I thought as if the issue is the one that controlled the entire website. One animal having variety of names in the jungle - 'land grabbing', 'global land rush', 'the global scramble for farmland', 'land-based investment', 'large-scale land deals', 'large-scale land acquisitions', 'large-scale agricultural investment', 'neo-colonialism' 'green grabbing', etc. Here, the animal represents the investment and the jungle signifies a 'region' such as 'Sub Saharan Africa' or 'Latin America' or a 'nation' for example, Ethiopia. For a couple of days, I continued searching and reading but eventually I lost in the forest of such awe-inspiring subject. I stopped reading and started thinking about the issue. I could not sleep. Just like the website, my mind was filled by the issues of LSAI. Is this animal a cow that could give milk to the local people and improve their livelihoods or is it a dangerous one that could destroy their living? These questions have repeatedly popped up in my mind and put flames in my curiosity to dig the issue a little bit deep.

Besides reading, I started contacting researchers, students, and other individuals that I thought have better information regarding the issue who ultimately shaped my path and heightened my motivation to study the subject. Particularly, when I contacted students who came from Gambella region and pursuing their degree at the university that I am teaching at and my colleagues from the same region, they have expressed their big concern on the investment including their dissatisfaction about the ways Ethiopian government handles the investment. Particularly, the pace with which large-scale agricultural land acquisitions have taken place; amount of the land transferred (for example, 100,000 ha for one investors); extremely low lease rates (as low as US$1.08/ha/year); disregarding indigenous community's rights, consultation, participation, and voices; the fate of local peoples future livelihoods, and government's approach in dealing with the investment projects (top-down) shocked most of the students. They, thus, encouraged me to study the issue and contribute something new that could either inform the government to revise its approaches and policies or halt such practices before the livelihood of the local people perishes.

Following this, I started unfathomable reading for several weeks and finally understood that there are two contradictory viewpoints on the LSAI that split the intellectuals, practitioners, policymakers, and national and international institutions into two categories: those who argue for such investment (who consider the animal like a cow) and those who stand against it (who consider the animal like a dangerous one) (see sub-section 1.1. for the arguments of the conflicting views). Whatever the case may be, however, the general insight coming from the existing literature confirms that the trend of large-scale acquisition of land for an array of agricultural investment purposes, in several regions of developing countries including Ethiopia, has raised profound concerns over the food security, livelihood, and socio-economic status of societies where such investments take place. These concerns and contradictions have been the major areas of empirical investigations (mainly the actual impacts of LSAI on the livelihoods of local community) which are very thin in the literature (Cotula *et al.,* 2009; Scoones *et al.,* 2013; Maru, 2016) due to either formative years of the investment projects or lack of applying a suitable impact evaluation methodologies (Oya, 2013a, b; Maru, 2016). My motivation to study LSAI in Ethiopia is also intensified by these contradictions and gaps in the literature to comprehend the issue in depth, quantify the actual impact of the investment on the livelihoods of the affected community, and contribute to burgeoning debates and filling gaps in the literature.

1.3. Arguments and Research Questions

The fundamental argument of this study is that even where LSAI might emerge as beneficial in theory – in the existence of 'underused' or 'unused' land that can only be developed by financially and technologically powerful companies notion – in practice it is difficult to ensure that the investment will lead to 'win-win-win' scenarios in which all concerned stakeholders (such as the investors, investment hosting governments, and local community) benefit. Because such investment does always have a huge opportunity costs – shifting resources (land, water, forest) from the weak and poor countries to the powerful and rich ones or from the weak and poor communities to powerful and rich domestic and foreign investors – which when not governed properly and responsibly could result in pervasive socioeconomic and environmental externalities and adversely affect the livelihoods of the investment hosting communities. Such investment could have much less effective food insecurity and poverty reduction impacts if the investment projects are not designed in such a way that properly integrate local people into the global, regional, national, and local investment value chains via appropriate business models. Therefore, mere transfer of the natural resources upon which the

entire livelihoods of the local people depend to investors by the name of investment or development could not solve the problems of food insecurity and poverty of the investment hosting countries and communities rather it will deepen and make them worse. In general, this dissertation is based on the following distinct arguments.

***Argument #1: The* Policy Context** – understanding of the context within which LSAI have been operating is imperative to evidently see the reality on the ground. In Ethiopia, large-scale commercial farming is evident as the result of the development policies and strategies of the three regimes (the Imperial, *Derg*, and EPRDF) practiced for at least six decades in the country. The regimes had adopted idiosyncratic policies and strategies that were founded on the assorted development theories and approaches of their respective eras which led to the birth, growth, descend, and regeneration of the large-scale private commercial farming in Ethiopia. The regimes had similar agenda – modernizing the agricultural sector - in such ways that transform economy of the country. And so, they offered various incentive packages to promote such farming in the country though the investment does not have a success history. A deep understanding of why these regimes failed to learn from each other or from their earlier period plans is a key issue that needs to be looked at. We argue that the public policy and legal frameworks (the context) that aim at guiding LSAI should primarily be focused on the pressing need to contribute to rural development in general and to the improvement of livelihoods of the rural community in particular rather than destroying the natural environment and the living of the local people. Particularly, understanding of the weaknesses of the past and current policies could assist concerned bodies in addressing LSAI issues when formulating or revising policies and strategies (Degefa, 2005) and help them to refrain themselves from repeating the same mistakes.

What are the policy and legal frameworks within which LSAI operate in Ethiopia in general and study area in particular? What are the characteristics, trends, and magnitude of LSAI in Ethiopia in general and study areas in particular? How do the existing institutions, structures, land and investment policies safeguard the local communities against potential costs and ensure potential gains from LSAI?

***Argument # 2:* Food Security Consideration** - International Covenant on Economic, Social and Cultural Rights Article 11, obliges every State to ensure that for everyone under its jurisdiction has access to the minimum indispensable food which is adequate, nutritious and safe, and ensure people's freedom from hunger (Committee on Economic, Social and Cultural Rights, 1999). Within this provision, the duties of the states can be categorized into three clusters: respect, protect and fulfill its citizen's right to food. The state is compelled to

abstain from hurting individuals' and groups' ability to nourish themselves where such an ability exists (respect), and to avert others - especially private actors such as private large-scale agricultural investors - from intruding that ability (protect). Lastly, the state is urged to vigorously fortify individuals' capacity to feed themselves (fulfill) (De Schutter, 2009). From this viewpoint, it is clear that the obligation of the state is to protect the people from being dispossessed from their access to productive resources such as land which is one of the sources of their food. The primary objectives of Ethiopian government (as indicated in the frontlines of all of its policy and plan documents and advocated by state) are to ensure food security and eradicate poverty via modernizing agricultural sector in such a way that improves agricultural production and productivity.

In Ethiopia, agriculture sector has been the backbone of the economy wherein it accounts for 35% of GDP, over 80% of exports, about 70% of total employment, and is a source of livelihoods for over 83% of the total population (EATA, 2016; NBE, 2018) and of food for almost all people in the country. Development experts and scholars who visited Ethiopia in the 1960s described the country as having the prospective to be 'the breadbasket of the Horn of Africa and the Middle East' (Cohen, 1987, p.42). However, the agricultural sector of the country is unable to feed its own population let alone fulfils this promise. Even if the sector has been the backbone of the economy and a source of livelihood for the majority of Ethiopians, it is perhaps one of the least developed in the world (Adams, 1970). In the past two decades, the current government has started to focus on the large-scale agricultural investment as a way to modernize agricultural sector and improve food security and the livelihood of the local people. The government argues that LSAI will bring in the required capital and technology that would boost agricultural productivity and so improve the availability and access of food to the local people at lower prices.

Albeit the country is claimed to have vast arable land and water resources and transferred millions of ha of fertile land to both foreign and domestic investors, oddly, it has been suffering from poverty and food insecurity which are a leading challenge of people's livelihood (World Bank, 2016). Inadequate access to food is a defining characteristic of Ethiopian poor (GHA team, 2015). Internationally, Ethiopia is recognized as one of the poorest drought and famine-prone country and is one of the 'ten largest international humanitarian assistance recipients in the world' (GHA team, 2018, p.21). The latest UN Office for the Coordination of Humanitarian Affairs (OCHA) estimates indicate that 8.86

million Ethiopians are in need of urgent food or cash relief which requires 1.314 Billion USD (OCHA, 2019) showing that the country is in a severe problem of food insecurity.

Particularly, Gambella People's National Regional State (hereafter GPNRS), which is endowed with fertile land and abundant water resources and hosted the majority of LSAI in the country, paradoxically, is one of the most food insecure (Belay *et al.,* 2015) where food deficit endures for 3–6 months (Maru, 2016) and vulnerable regions in the country (Cascão, 2013). The region is also one of the poorest regions (with about 35% of the people living in the lowest quintile of the nation's wealth ranking) in the country (CSA, 2012a). The Ethiopian government has transferred about 683,518 ha of land to domestic and foreign investors in this region. However, whether or not such investment is contributing to the improvement of the food security and livelihoods of the local community is highly controversial and empirical issue, which this study tries to address. And hence, we argue that lack of empirical studies that quantify the actual impact of such investment on the food security status of the local people has made the government to sightlessly and brusquely promote such investments without knowing what is happing on the ground.

What is the status of food security of households affected by the LSAI? What is the impact of LSAI on the food security status of the affected households?

Argument # 3: **Livelihood Assets Consideration** - understanding various assets upon which people depend for their living is crucial to examine the link between LSAI and their livelihoods. Because the ability of people to choose between diverse livelihood strategies chiefly depends upon the crucial tangible and intangible assets that they have command over (Scoones, 1998). Access to and control over livelihood assets which often called the 'pentagon of assets' (such as Natural, Physical, Human, Financial, and Social Capital) in Sustainable Livelihoods framework (Scoones, 1998; DFID, 2000) are, thus, the ones that enable people to have or have not sustainable livelihoods[7]. Particularly, natural resources such as land, water, forest, and other resources embedded in them are central factors for farmers, pastoralists, and agro-pastoralists in pursuing their livelihoods (Degefa, 2005). In general, in agrarian society and economy like Ethiopian, natural capital (land and resources embedded in it) is a foundation of the livelihood of the local community and a source of all other capital. We thus argue that livelihoods of local community could be sustainable only if external intervention (such as LSAI) is carried out in such a way that complement the

[7] A sustainable livelihood is one that can help a household to cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation…."(Chambers & Conway, 1992, p.7).

community's current livelihood strategies and its adaptation capacity. In other words, commercial based LSAI that is being undertaken by private firms and vigorously promoted by Ethiopian government agencies could have detrimental consequences when local peoples' views, interests, concerns, and livelihood conditions are ignored; government fails (due to weak institutions, lack of transparency and accountability, and corruption) and market fails (due to too much emphasis on profit at the expense of natural environment and local people's livelihood). Unfortunately, studies in Africa in general and Ethiopia in particular that we are aware of which systematically examined the asset base of households affected by LSAI using a full range of asset variables are awfully limited. Our main contributions in this aspect is constructing household asset index and provide evidence-based data that illustrate the actual impact of LSAI on the wealth status of affected households and inform policy decisions.

What livelihood assets are being used by the households affected by the LSAI? What is the impact of LSAI on the livelihood assets (wealth status) of the affected households?

Argument # 4: **Gender Relation Consideration** – participation of women in the labour market (via employment) is thought to enhance their access to resources (socioeconomic resources) and so improve their empowerment level in the family unit (Kabeer, 1997). LSAI, as the government frequently claims is one of the agricultural sub-sectors alleged to create jobs for the local people (both men and women). The Ethiopian government has made serious commitments in its various policy initiatives and measures intended to fight poverty and gender inequality. One of the policy initiative areas of Ethiopian government is improving women's access to job opportunities in such a way that eradicate poverty and gender inequality at household level and society at large (Aynalem, 2016). The main policy assumption here is that women's access to paid work could play key role in enabling them to have access to power (within the household or outside the household). However, literature provides conflicting relationships between participation of women in income generating activities and their empowerment level. The views range from those who argue that women integration into the labour is the key enabling factor to their empowerment (Blumberg, 1991; Bergmann, 2005) to those who argue in the opposite direction (Elson & Pearson, 1981; Greenhalgh, 1991; Kopinak, 1995). From LSAI perspective, however, except few case studies (Daley, 2010) that have tried to capture gender dimension of large-scale land deals where the focus was on how such deals affect women's land right, empirical studies that quantify the actual impact of such investment on women's empowerment are very limited (Behrman *et al.,* 2011; Cotula, 2013). Therefore, this study tries to analyze the actual impact

of women's wage employment in LSAI on their empowerment and contribute to filling gaps in the empirical and theoretical literature.

How does LSAI affect women's decision making power and their self-worth (women's empowerment level)?

Argument # 5: **Empirical and Methodological Gaps** - empirical studies in various African countries including Ethiopia have reported the general trends, size, and implications of LSAI to the local livelihoods (Cotula *et al.,* 2009; Dessalegn, 2011; Maru, 2011; The Oakland Institute, 2011; Lavers, 2012a; and Keeley *et al.,* 2014). Several studies have also addressed governance issues focusing on the legal frameworks, land acquisition processes, power structure, and land tenure (Dessalegn, 2011; Getnet, 2011; Stebek, 2011; Ojulu, 2013; Schoneveld, 2013). Some studies have also analyzed the impact of LSAI on the local community and economy (Dauvergne & Neville, 2010; German *et al.,* 2013; Dessalegn, 2011; Fisseha, 2011; Lavers, 2012b; Baumgartner *et al.,* 2013; Bereket, 2014; Dye, 2014; Aisbett & Barbanente, 2016; Dereje, 206; Azeb, 2017). However, except very few studies (Bamlaku *et al.,* 2015; Aisbett & Barbanente, 2016; Maru, 2016), rather than verifying and quantifying the actual impact of such investment on the livelihoods of the local people, majority of the studies have reported the potential impact, risks, and implications of LSAI to the economy and local community through qualitative approach. Most of the studies conducted in Africa in general, and in Ethiopia in particular, are methodologically skewed for the reason that they are dominated by qualitative research (case studies) (Barbanente & Aisbett, 2016) and lacked proper impact assessment methodologies (Oya, 2013a, b; Maru, 2016). Consequently, they have missed the advantage that would otherwise be gained from the utilization of quantitative techniques and more so the use of a mixed method approaches. This implies that there is a pressing need to study the actual impact of LSAI on the local people through suitable impact evaluation methodology (Oya, 2013a & 2013b; Scoones *et al.,* 2013; Maru, 2016), which this study tries to do and contribute in filling methodological gaps in the literature.

Food security is a multidimensional concept that could not be captured by a single or few indicators. Previous studies (Bamlaku *et al.,* 2015; Maru, 2016) that quantified the impact of LSAI on the food security status of the affected households either address availability and access (Maru, 2016) or utilization (Bamlaku *et al.,* 2015) dimensions of food security. This study, however, employs various indicators to measure four dimensions of food security separately and creates an overall food security index that captures the multidimensional

nature of the concept via principal component analysis (PCA) and contributes to filling conceptual and methodological gaps in the literature.

Therefore, given this controversial situation of LSAI, this dissertation seeks to inform the development discourse by offering an empirical analysis of the effects of LSAI on the livelihoods of the local community in Gambella region, Ethiopia. It also aims to add insights to the existing literature by examining the actual impact of LSAI on the food security, assets, and women empowerment of the local community and explicate the difference between the rhetoric and reality on the ground. This study thus will provide valuable evidence-based information on the actual effects of LSAI in lowland areas of Ethiopia, and contribute to filling the knowledge, empirical, and methodological gaps identified in the literature.

1.4. Objectives of the Study

The overall objective of this dissertation is to investigate how the current phenomena of large-scale agricultural investment (LSAI) in Ethiopia affect livelihoods of the local people.

The specific objectives of the study are to:

I. assess the context within which LSAI has been operating in Ethiopia in general and the study areas in particular (Paper I, II, & III);

II. examine the impact of LSAI on the livelihood assets (wealth) status of the affected households (Paper V)

III. scrutinize the impact of LSAI on the food security status of the affected households (Paper IV); and

IV. examine impact of women's wage employment on their empowerment level (Paper VI).

1.5. Scope and Caveats of the Study

Studying livelihood of the people is very complex due to the fact that it deals with multiple contexts, actors, institutions, processes, assets, activities, strategies, and outcomes at numerous levels. The scope of this study is, thus, limited to examine the livelihood assets, food security, and women empowerment components of the livelihood. As Scoones (1998) suggested, while studying this complex issue (livelihoods), researchers must always apply the principle of 'optimal ignorance' given that some of the key variables depend on context and vary accordingly (Degefa, 2005). From actors view point, this study is concentrated on both domestic and foreign private commercial agricultural investment (though it did not include large-scale state farms). However, we do believe that conducting a comparative study regarding socio-economic impact of private and state large-scale agricultural farming is

essential in generating evidence based policy information and assisting policymakers. In terms of the size of the farm land, the scope of the study is limited to those investment projects operating on a land size exceeding 200 hectare. Moreover, even though studying impact of LSAI can be done at different levels (marco, meso, and micro), the study is concentrated on examining the impact at household (micro) level (and so the unit of analysis is a household). From food security perspective, the study did not capture intra-household and food sovereignty issues (which could be one of the limitations of this study) but it touched intra-household power relations from gender point of view. However, from gender perspective, this study did not capture how LSAI affect women's access to land, their responsibilities, and so their livelihoods. Among various business models (*enclave or large-scale plantations, out growing or contract farming, joint venture*, etc), this study is focused on the large-scale plantations or enclave business model (which could also be one of the weaknesses of this dissertation) given that the model is extensively applied in the study area and promoted by the government of Ethiopia.

1.6. Contribution

In a broader sense, this study will contribute to the understanding of the nexus between LSAI and local people's livelihood in the context of a globalized economic system and increasing pressure on land and other natural resources in Ethiopia. More specifically, it will expand knowledge and understanding regarding the nature and magnitude of LSAI in Ethiopia, mechanisms via which it affects the local community, and on the actual impact such investment has on the local people's livelihood. This study checked some of the key interdisciplinary theories of development studies in Ethiopian context (mainly in low land context) and contributes to the ongoing debates regading LSAI in the literature. In doing so, it also contributes to empirical understanding (knowledge) regarding the possible gaps between national and regional ambitions and local realities.

An understanding of the weaknesses of the past and current investment policies could assist concerned bodies in addressing LSAI issues when formulating or revising policies and strategies and help them to refrain themselves from repeating the same mistakes. In addition to this, the understanding of the emerging effects of LSAI on the wealth, food security, and women empowerment of investment hosting community will inform policymaking and public opinion about agricultural investments. Particularly, understanding of such impacts will help policymakers and practitioners to protect the local people and the natural environment from the potential and actual risks of the investment.

More importantly, the result of the study will serve as a source of information and a frame of reference for strategy and policy-related decisions taken by the national, regional, and local governments. The results of the study could serve as an important reference for other researchers interested in this area, as well. Methodologically, this study applied Multiple Correspondence Analysis (MCA) to construct household asset index and estimated the actual impact of LSAI on the wealth status of affected households using Propensity Score Matching (PSM) technique. Besides, it employed various indicators to capture four dimensions of food security separately and creates an overall food security index that addresses the multidimensional nature of the concept by employing Principal Component Analysis (PCA) and contributes to filling conceptual and methodological gaps in the literature.

1.7. Introducing the Chapters of the Dissertation

This dissertation has ten chapters with Chapter One already discussed in the foregoing sections. Chapter Two, discusses conceptual, theoretical and empirical issues related to LSAI. Most importantly, this chapter highlights the conceptual and theoretical frameworks that guided the whole dissertation. It discusses the recent empirical works and arguments regarding agricultural investment from LSAI perspective. Chapter Three sheds light on the research methodology by explaining study settings, sampling procedures, research design, and various methods employed in data collection and analysis. Chapter Four of the dissertation discusses LSAI policies and practices from historical perspective focusing on the three modern regime of Ethiopia. Chapter Five presents the magnitude and trends of LSAI in the past and present Ethiopia. Following this, Chapter Six elaborates the issue of LSAI by specifically focusing on the study area (Gambella region). It discusses the magnitude, nature, and the status of perceived benefits of LSAI in depth. Papers presented from Chapter Four to Six are written by elaborating the contributions made to the following manuscripts submitted for publications in journals.

Amanuel Kussia, Esubalew Abate, & Degefa Tolossa (2019). History of Large Scale Agricultural Investment in Ethiopia: Policies and Practices.Submitted to the Ethiopian Journal of the Social Sciences and Humanities, (Under review process).

Amanuel Kussia, Esubalew Abate, & Degefa Tolossa (2019). The Magnitude, Trends, and Issues of Large-Scale Agricultural Investment in Ethiopia in the Past and Present. Submitted to the Journal of Development Research, (Under review process).

Amanuel Kussia, Esubalew Abate, & Degefa Tolossa (2019). Scramble for the Green Gold: Understanding Large scale Agricultural Investment in Gambella Region, Ethiopia. Submitted to the Journal of Eastern Africa Social Science Research Review, (Under review process).

Chapter Seven of the dissertation presents the impact of LSAI on the livelihood assets/wealth status of the investment hosting community. It is based on the data collected through household survey, KII, and FGDs. This chapter examines the asset profile of the households by looking at each asset (natural, human, social, physical, and financial) from livelihood perspective. It employed both quantitative (PSM & MCA) and qualitative (content analysis) approaches to explain the magnitude of investment effects on the local community. The chapter is written based on the article submitted for publication to the Journal of World Development.

Amanuel Kussia, Esubalew Abate, & Degefa Tolossa (2019). Impact of LSAI on the Livelihood Assets of Local People in Gambella Region, Ethiopia.

Chapter Eight discusses the empirical evidence collected from various study participants such as household (via survey), community representatives, and government employees drawn from different government levels (via KII and FGDs). It presents the results of the actual impact of LSAI on the food security status of the local people that is estimated through the Propensity Score Matching (PSM) technique. This chapter is based on the discussion of the following article submitted for publication to the Journal of Food Policy.

Amanuel Kussia, Esubalew Abate, & Degefa Tolossa (2019). Impact of LSAI on the Food Security Status of Local People in Gambella Region, Ethiopia.

Chapter Nine examines the impact of women's access to income-earning jobs on their empowerment level which is conceptualized along two dimensions: self-worth and decision making power at the household level. More specifically, it focuses on answering the research question "what is the impact of LSAI on the women empowerment?" based on the data collected from wage employed women and non-income earning ones. The chapter is written based on the manuscript submitted for publication to the Journal of Gender Studies.

Amanuel Kussia, Esubalew Abate, & Degefa Tolossa (2019). Impact of Women's Wage Employment on their Empowerment Level in Gambella Region, Ethiopia.

The final chapter presents the synthesis of all chapters, conclusion, policy implication, and areas of further research. It links theories with empirics based on the actual data analyzed throughout the dissertation.

CHAPTER TWO: REVIEW OF CONCEPTUAL, THEORETICAL, AND EMPIRICAL LITERATURE

This chapter presents the theoretical concepts and framework that are employed in elucidating and analysing the results of study. For the purpose of guiding this study, we used various theories drawn from the interdisciplinary theories of development studies. Conceptual tool adapted from Sustainable Rural Livelihoods framework was also employed. The chapter also presents the review of empirical studies conducted in African in general, and Ethiopia, in particular.

2.1. Basic Concepts

Due to the complexity and multi-dimensional nature of the issue under investigation, diverse conceptual and theoretical lenses that are drawn from multidisciplinary backgrounds were employed. This study, therefore, depends on the variety of concepts and theories within the tradition of interdisciplinary theories of development studies.

2.1.1. Livelihood

One of the early and most widely used definitions of livelihood is the one that is provided by Chambers & Conway (1992) who defined it as "the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living (Chambers & Conway, 1992, p.7). A sustainable livelihood is "the one that can help a household to cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation…."(Chambers & Conway, 1992, p.7). At the household level, the principal focus of the sustainable livelihood is on the manners wherein a household utilizes its assets to carry out a variety of livelihood activities and enhance its livelihood security (Woller, 2009). Livelihood security in this context is household's "adequate and sustainable access to income and other resources to enable it to meet basic needs–food, education, health, other personal needs" (Frankenberger, 1996, p.4).

Ellis also defines livelihood as "the assets (natural, physical, human, financial and social capita), the activities and the access to these (mediated by institution and social relations) that together determine the living gained by individual or households" (Ellis, 2000, p.10). The above definitions imply that livelihood encompasses various elements such as possibilities, assets (both productive and protective) and the basic activities that are essential to enhance a living (Dyner *et al.,* 2005). More importantly, a livelihood is sustainable when it enhances people's resilience to various tensions and shocks and, simultaneously, ensures sustainable

development in such a way that uphold and advance potentials both for the present and for the future generations without destructing the existing natural resource base (FAO, 2003). In this study, livelihood is conceptualized as household's sufficient assets (natural, physical, human, financial and social capita) endowment and continual access to these assets that enable him/her to attain family's food security and meet other basic goals – education, health, and other personal needs. Among various components of livelihood framework, this study is focused on the household's livelihood *assets*, *food security*, and *women empowerment*. It examined how households gain and enhance their assets, undertake various activities, and improve their food security and wealth within the prevailing LSAI ventures.

2.1.2. Food Security

The concept of food security has historically passed through various evolutionary phases for the last five decades or so from a narrow conceptualization as national and global food availability, to one that comprises multiple dimensions (Coates, 2013). The concept is intrinsically 'unobservable', relatively indistinct, and multidimensional (Barrett & Lentz, 2009). Due to this, it lacks a single and universally accepted definition. However, the most widely used and generally agreed upon definition of food security at the 1996 World Food Summit, is the one which says food security is "a situation whereby all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 2002). Alternatively, food insecurity is the situation where the above condition is not fulfilled (when people do not have such access all the time) (Misselhorn, 2005; Webb *et al.,* 2006). Getachew (1995, p.29) has conceptualized food security from rural Ethiopian context as "household's ability to establish access to productive resources such as land, livestock, agricultural inputs and family labour combined to produce food or cash". However, his definition is narrow in that it only captures access dimension of the concept. Degefa has defined food security as "the capability to sufficiently meet food needs from both own production and partly by purchasing from the market" (Degefa, 2005, p.350). His definition encompasses both availability and access dimensions though utilization and stability aspects are made implicit.

In general, the definition of food security involves four pillars: availability, access, utilization, and stability (FAO, 2006). Food availability is the supply side of food security which is determined by the physical presence of food in a given country/locality/household via own production or imports or donation. Food access is the demand side of food security

which represents people's ability to acquire food from purchases, gifts or transfers. It is determined by overall household income and food prices; physical access to markets and the presence and quality of infrastructure (Barrett, 2010). Food utilization involves the ability of people to obtain complete biological benefits from food, based on food safety, food quality and diversity, health care, and sanitation. Food stability cuts across the all three dimensions, and denotes variability and uncertainty in availability, access, and utilization (FAO, 2006; Barrett, 2010; Thompson *et. al.,* 2010). In this study, household food security is conceptualized as households' stable and sustainable physical, social and economic access to adequate, safe and nutritious food to meet their dietary needs for an active and healthy life (WFP, 2015).

2.1.3. Asset and Wealth

Understanding the various assets upon which people depend for their living is crucial to examine the link between LSAI and their livelihood. Because the ability of people to choose between diverse livelihood strategies chiefly depends upon the crucial tangible and intangible assets that they have power over (Scoones, 1998). In general, assets comprise the assortment of resources upon which households rely on to generate income, meet their basic needs, and handle risk, stresses, and shocks (Woller, 2009). It is often considered as an ownership of resources (Bale *et al.,* 2010). Assets comprise physical (such as a bicycle, a car, house), financial (cash, stocks, shares, remittance), social (the network among people), human (education, health), or natural (land) capital. They offer a stock of wealth which can grant a return or income flow (Montgomery *et al.,* 2001). In this study, asset is conceptualized as all kinds of resources owned by a household that have economic value.

Proper conceptualization of household wealth is also decisive in various research settings, as wealth plays a vital role as an outcome, a causal factor, and a control variable. Wealth is defined as the accumulation of all assets (or the value of all assets owned by a household) (Jan, 2014). It is a measure or value of resources/assets that a household and its members have access to at a given point in time (Jan, 2014; Searle & Köppe, 2014). It provides a capacity to households to raise a mixture of funds to maintain consumption either during unforeseen economic or financial shocks/crises or to respond to new opportunities. Therefore, in this study wealth is conceptualized as the level of accumulation of natural, physical, human, financial, and social capital. It is treated as an outcome variable captured by a composite index called asset index.

2.1.4. Women Empowerment

The concept of empowerment is relatively a recent theme that has got due attention in development discourses since the late 1990s. It came to development dialogue in response to the historic gender problems, urging that women and disadvantaged men must be organized to make a difference in the structures of power that confine them to secondary status. It is generally defined as a process through which women and men in disadvantaged positions increase their access to knowledge, resources, decision-making power, and raise their awareness of participation in their communities, in order to reach a level of control over their own environment (UNESCO, 2003). Women's empowerment can thus be defined as a process by which women get better control over the circumstances of their lives (Sen, 1990).

In this study, women empowerment is conceptualized as the ways via which women gain greater access to knowledge (information) and resources (income) so as to enhance their self-worth and decision making power in the household. Decision making power in this context is the ability of women to make a major decision or have a say in the final decision that affects their life and/or the life of household members. It is assumed that LSAI could improve access of women to income (via jobs), and so improve their decision making power at household level. However, due to the dominance of the patriarchal culture (that considers women as subordinates) and social norms in the community; LSAI may not have a significant effect on the women empowerment.

2.1.5. Large Scale Agricultural Investment

There are several terms intended to describe LSAI based on the impact the investment has on host countries and local community. For example, terms like 'green colonization,' 'new land colonization,' 'climate colonization,' 'water plunder,' 'land deals,' 'the land rush,' or more widely known as, 'land grabbing' (Matondi *et al.,* 2011, p.1) are common in the literature. These terms often shows a negative allegation of the investment. Rather than jumping to apply one of these terms, we prefer to remain neutral and leave such judgment only to empirical evidence.

Different definitions of LSAI exist. However, they are often filled with the special interests of parties (be it a scholar, NGOs, investors, host governments, etc.) defining the concept. For example, the World Bank conceptualizes LSAL as an investment on at least 500 hectares (World Bank, 2011) whereas Land Matrix defines it as an investment on at least 200 hectares of land (Land Matrix, 2016). Unfortunately, LSAI does not have an official definition in Ethiopian context. In this dissertation, LSAI is conceptualized as a mechanized commercial

agricultural investment on the tract of land exceeding 200 hectares and carried out by either foreign or domestic investor since 2008. We decided to examine the impact of LSAI on the livelihood of local community since 2008 mainly due to: i) the period's coincident with the time when such investments exploded across the world including in Ethiopia, and ii) temporal scope: though local communities are affected by such investment immediately, impact can relatively be observed over this period of time. Therefore, we do believe that this period could be adequate to undertake impact assessment.

2.2. Some Theories on Large Scale Agricultural Investment

To properly understand the impact of LSAI on the livelihoods of local community, some theories of investment such as neoclassical (Hill, 2000), dependency (Dos Santos, 1970), and the middle-path/integrative (Sornarajah, 1994) are relevant and must be studied. These theories mainly approach investment from different perspectives, ranging from those that advocate for it, arguing that it has unconditional benefits to host countries (neoclassical), to those that oppose it and arguing that the said investments do nothing but destruct economies (dependency), and finally those that recognize both potentially beneficial and detrimental effects of investment on host countries (middle – path). Given their pre-eminence, these theories are found to be appropriate for the purpose of guiding this dissertation.

2.2.1 The Neoclassical Theory of Investment

This theory argues that LSAI, mainly in the form of FDI, is wholly and exceptionally beneficial to host countries (Hill, 2000; Sornarajah, 2010) and is a prerequisite for accelerated and sustainable growth and development (Jenkins & Thomas, 2002; Mohammed, 2012). It claims that such investment could contribute to national economy in general and rural development in particular by bringing in capital, technology and know-how (Cotula *et al.,* 2009) and so improve agricultural productivity (Deininger & Byerlee, 2011), create job opportunities, improve market access (Cotula *et al.,* 2009; Deininger & Byerlee, 2011), enhance infrastructures (Herrmann & Grote, 2015), boost export opportunities (Mitchell, 2011), and increase government revenue (Cotula *et al.,* 2009). LSAI is considered as one of the key development strategies to modernize agricultural sector of host countries in such a way that brings economic transformation in rural areas and improves the overall standard of living of the local people (Cotula *et. al.,* 2009; Deininger & Byerlee, 2011). It also promotes domestic food and energy sovereignty (Cotula, 2013). This theory, however is highly criticized for being superfluously optimism (von Braun & Meinzen-Dick, 2009), appears to be exploitative (Wilhelms & Witter, 1998) and ignores the negative impacts and risks of

foreign investment on the livelihoods of local people, environmental sustainability, as well as the absorptive capacity of the host countries.

2.2.2. Dependency Theory

The proponents of this theory argue that rather than supporting national economies and improving the livelihoods of local community in the host countries, benefits from the LSAI flow only to the investment host country's elite where the majority of the population, in contrast, is exploited, causing unfair development within the host countries (Sornarajah, 2010). It argues that foreign giant investors exploit and turn the hosting nations into a passive subsidiary economy that serves the needs of the inventor's home states (Nolan, 1998). It contends that the local people are not absorbed by the investment projects rather are excluded from the means of production (Baird, 2011; Li, 2011; Peters, 2013). Disempowerment and dispossession of the poor (Seyoum, 2001; Von Braun & Meinzen-Dick, 2009); unemployment/underemployment, local food insecurity, conflict, and poverty (Engstöm, 2009; Von Braun & Meinzen-Dick, 2009; Havnevik, 2011) are also asserted to be the results of LSAI. This theory, however, has been found to be too pessimistic in that it considers LSAI as destructive and calls host countries to adapt autarky economic system, which is indeed impractical in today's globalized world.

2.2.3. The Intervention/Integration/Middle Path Theory

This theory neither entirely supports nor opposes neoclassical or dependency theories, rather it critically looks at both the positive and negative effects of LSAI on the host countries. It tries to understand and analyze LSAI from the view of both host countries and private investors (Sornarajah, 1994). This theory particularly stresses the importance of regulating LSAI using codes of conduct that restrict detrimental business practices so as to minimize the risks and take full advantage of the benefits (Sornarajah, 2010) in such a way that promote socioeconomic development of host countries. Therefore, it demands the application of a combination of intervention (regulation) and openness in handling LSAI but urges host countries to balance between openness and intervention by neither favouring too much openness nor too much intervention (Seid, 2002). This theory demands well-built and capable state institutions that are able to achieve socio-economic objectives of the government in hosting the foreign investment (Sornarajah, 2010).

We support the viewpoint of this theory by arguing that LSAI can contribute to the improvement of local people's livelihood only if the policy, institutional, legal, and regulatory frameworks are strong enough to properly manage such investments, protect local

community from potential and actual risks or adverse impacts, and ensure local people's rights and benefits. In this set-up, LSAI could improve people's asset and enable them to enhance their livelihood outcomes and build their capacity to resist and absorb shocks created by LSAI. Besides, the contribution of such investment could be beneficial when investment hosting government uses proper business model(s) that effectively integrate local people into the investment value chain.

2.3. Critical Agrarian Political Economy

LSAI involves an array of actors, institutions, processes, as well as interactions between and/or among these actors which includes power relations. Agrarian political economy, which is conceptualized and theorized by Bernstein & Byres (2001), is found to be appropriate to explore these dynamic issues. This theory explains temporal social interactions, changes in production and replica, assets and power in agrarian formations as well as processes of changes (Bernstein & Byres, 2001). In an attempt to explore the agrarian economy (mainly the interactions as well as effects of the capitalist mode of production on smallholder farming); agrarian political economists have asked four key questions: in a given society, 'who owns what?' (Resources), who does what? (Labor), who gets what? (Distribution), and what do they do with it?' The present-day critical agrarian political economists have included some key elements such as gender; ethnicity, livelihoods multiplicity, rural-urban linkages and migration, elements that were previously overlooked (White & Dasgupta, 2010). These questions are often used as analytical questions that can be applied across various scales of social reality ranging from households through communities, local and national socio-economy to the whole global economy (Bernstein, 2017). Within the general sustainable livelihood framework, this study is focused on the two key questions: 'who owns what?' and who gets what? as well as gender issue (family power relations) while analyzing the impact of LSAI on the local community livelihoods.

2.4. Developmental State Model

It is believed that developmental state existed and practiced in Bismarck period in Prussia and Japan during the Meiji era (Bolesta, 2007) though its development as a theory or model is much more recent which is linked to the work of Chalmers Johnson. Johnson in his book MITI and the Japanese Miracle introduced developmental state theory after analyzing the process of the industrialization in Japan between 1925 and 1975 (Johnson, 1982). Particularly, the developmental state has been a theoretical framework to explain the success

and achievement of East Asian economies since the 1960s which gave rise to a new outlook on development discourse (Woo-Cumings, 1999).

A developmental state is generally conceptualized as a state that directly intervenes into the economy and leads the pace and direction of the development process (Johnson, 1982). It is a state with the adequate capacity (institutional) and power to provide persistent economic guidance; formulate, implement, and support development policies, programs, and plans in an authoritative and fastening manner; and create national consensus on common development agenda in such a way that improve the performance of the economy and create benefits to all citizens (Evans, 1995; Woo-Cumings, 1999). The model promotes an active and positive role of the state in the development process, competent bureaucracy, inspection of both local and international factors (Johnson, 1982;Evans, 1995; Chang 2002b); development - orientated political leadership (Woo-Cumings, 1999; Leftwich 2002; Beeson, 2003); a production oriented private sector (Booth, 1999); and performance-oriented governance (Leftwich 2002; Chang 2003d).

Particularly, Evans coined a phrase called 'embedded autonomy' as a unique characteristics of the developmental state to explain his argument regarding developmental outcomes of nations, that he says, are largely determined by the structure of state organization, the bureaucratic elements and the nature of its affiliations with prevailing societal interests (Evans, 1995). He described embedded as the ability of the state to maintain a close and firm ties with dominant social groups in society to negotiate and solicit the essential resources needed for transformation process that it shares with the groups. On the other hand, autonomy focuses on making the state apparatus (bureaucracy) immune from powerful rent-seeking groups outside the state domain (Evans, 1995; 1998) who prioritize their short-period benefit over the national development (Routley, 2014).

In Evans' embedded autonomy thesis, the state serves as a catalytic agent and leader which partners with the private sector to accelerate the development process of the country. The private sector is thus considered as an engine of economic growth and development, wherein the state plays a leading role in creating an autonomous bureaucracy, favourable policy and legal frameworks, and engaging in a continual dialogue and interaction with a broad section of social groups (farmers, labourers, business leaders, civil societies) in such a way that ensure economic transformation. According to Evan, developmental state should have power that could enable it to hold unified capacity and authenticity to lead and prioritize development programs; have purpose that could enable it to organize a development vision;

and have a capacity, which could emanate from a mix of institutional, technical, administrative, and political factors (Evans, 1995) and give it the competence and embeddedness to implement development programs (Evans, 1998). Founded on the Evans' embedded autonomy thesis economic report of Africa summarizes developmental state as "a state that has the capacity to deploy its authority, credibility, and legitimacy in a binding manner to design and implement development policies and programs for promoting transformation and growth, as well as for expanding human capabilities" (UNECA and AU, Economic Report on Africa 2011, p.7). However, one of the key challenges of development state was and has been rampant rent-seeking behavior and corruption even observed in East Asian countries and other nations that call themselves as developmental state, which led to questioning the validity of 'embedded autonomy' thesis in actual fact on the ground.

Within the developmental state framework, four key roles of the state are pointed out in the literature: *custodian/regulatory, producer/demiurge, the midwife, and the husbandry* (Evans, 1995). The first two roles focus on the conventional roles of regulator and producers while the remaining two roles deal with the relationship between public and private sectors. The custodian role of the developmental state is generally related to law making and enforcing – regulatory role. In its producer role, the state not only takes direct responsibility in delivering some basic services and/or directly producing some types of goods (that often include basic social and physical infrastructures) assumed to have collective or public good characteristics but also directly intervene into the economy by establishing public enterprises that either compete with or assume the responsibility of the private sector (Evans, 1995). According to Evans, the state assumes this role when private sector lacks the capacity (capital) and/or unwilling to take part in some strategic economic sector that could enhance the economy development of the nation. Regarding the midwifery role, instead of directly playing the role of the private sector, the state provides diverse incentives (to encourage the existing private entrepreneurs or attract the new ones) and takes measures to reduce investment risks so that they can play an 'engine' role in the development process of the country. In its midwifery role government focuses on establishing state institutions to take over "risky complementary tasks" for instance, setting up research and development facilities (Evans, 1995, p.14).

The legitimacy of developmental states, as East Asia experience showed, highly depends on substantial improvement in living standards of the large proportion of population (mainly the smallholder farmers and urban poor) (Johnson, 1987; Leftwich, 2008; Fritz & Menocal, 2007; Lin & Monga, 2011) through growth with redistribution principle of the 1970s and 80s.

This shows that besides ensuring economic transformation via industrialization at macro level, developmental states priority has been ensuring the welfare effect (poverty and food insecurity obliteration) of such changes at micro-level (on the mass population). Therefore, rural and agricultural development has been considered as a keystone for developmental states (Routley, 2014). South and East Asian developmental states adopted "Agricultural and rural policies that raised rural incomes and levels of well-being, leading directly to mass poverty reduction, and indirectly to the creation of a conducive climate for industrial development" (van Donge *et al.,* 2012, p. 12).

Ethiopia has recognized itself as a 'developmental state' that is founded on the experience of economic transformation achieved in South East Asian countries such as Japan, South Korea, Taiwan, Singapore, Hong Kong, and more lately China. Even though whether or not Ethiopian government fulfills the characteristics of the developmental state is highly a controversial and an empirical investigation issue, one can fairly argue that it has some basic features of such states and embedded autonomous which are manifested in its policy documents. Since the introduction of Agricultural Development Led Industrialization (ADLI) strategy in the early 1990s, the government of Ethiopia has designed and implemented various development policies and strategies meant to transform the economy and improve food security and livelihoods of the people. It has been playing custodial role by formulating various investment rules and regulation[8] though the enforcement aspect is questionable; plays producer role by investing in basic social and physical infrastructures and directly engaging in business activities (such as mega projects in sugar plantation); playing midwifery or promotional role by providing various types of incentives[9] to attract both domestic and foreign investors (LSAI); however, playing limited husbandry roles attributable to lack of national research institutions capacity to generate knowledge (Maru, 2016). The thesis of embedded autonomy is well-defined in government's series of successive development

[8] Some of the major once include: Investment Incentives Council of Ministers Regulations No. 7/1996, Investment Incentives (Amendment) Council of Ministers Regulations No. 9/1996, Investment Areas Reserved for Domestic investors Council of Ministers Regulations No. 35/1998, Investment Incentives Council of Ministers (Amendment) Regulations No. 36/1998, Investment Incentives and Investment Areas Reserved for Domestic Investors Council of Ministers Regulations No. 84/2003, Proclamation No. 373/2003 Investment (Amendment) Proclamation, and Investment Incentives and Investment Areas Reserved for Domestic Investors Council of Ministers Regulations No. 270/2012.

[9] Incentives such as 100% exemption from the payment of customs duties and other taxes levied on imports is granted to all capital goods, such as plant, machinery and equipment and construction materials; income tax exemptions for a period ranging between 1 and 9 years, depending on the specific activity and the location of the investor; with the exception of a few products (e.g. semi-processed hides and skins-150%), no export tax is levied on Ethiopian export products; a foreign investor has the right to make remittances accruing from investment out of Ethiopia in convertible foreign currency (EIC, 2017).

plans[10] that give top priority to smallholder agriculture and later on give due attention to LSAI to play a complementary role in the economy in such a way that modernize agricultural sector, improve food security and livelihoods of the rural communities. This study, therefore, looks at how the role of developmental state of Ethiopia in promoting LSAI impacted livelihoods of the local community by analyzing empirical data collected from households affected by the investment.

2.5. Theoretical Orientation on Food Security

Theoretical approaches to study food security have passed through various evolutionary phases - from the oldest and narrower versions to the latest and more advanced ones. Since the careful examination of how food security is theorized, measured, and finally analyzed is imperative to understanding various policy effects, it is very imperative to briefly review the chronological and logical order of food security theoretical approaches.

2.5.1. Food Availability Approach

This approach is the oldest and still is the influential one. It`s origin is traced back to Venetian thinker, Giovanni Botero (1588), yet popularized by Thomas Malthus (1789) and thus it is known as Malthusian approach. The approach is based on the balance between population growth and food availability. The idea is that food production growth should not be lower than the population growth (Burchi & De Muro, 2012). According to this view, food security is a matter of aggregate or per capital availability of food. Therefore, in closed economies this is based on stocks and production, where as in free market economy food trade can also contribute a major part. This approach was the only reference idea until early 1970s both for political and academic world. It yielded in the definition of food security provided by World Food Conference (1974) that says "availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices" (UN, 1974). The policy implications of this definition are the need to reduce population growth rate and boosting agricultural production growth rate (Burchi & De Muro, 2012). The methodological aspect, that is, the unit of analysis of this approach is a country (and its food balance sheet) or the world, and the

[10] The first generation plan which is often called the Sustainable Development and Poverty Reduction Program (SDPRP) was launched in 2002/3 and completed in 2004/5.The second generation known as the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) was developed and executed between 2005/6 and 2009/10. The third generation plan the so-called Growth and Transformation Plan I (GTP I) was designed and executed between 2010/11 and 2014/15.The fourth generation program called Growth and Transformation Plan II (GTP II – 2015-2020) was launched in 2015/16 and is still underway.

agricultural sector (its production and productivity) (Burchi & De Muro, 2012). However, one of the serious weaknesses of this theory is that it ignores the demand side of food (mainly income and purchasing power of people) given that sufficient availability of food at global and/or national levels (supply side) alone could not ensure food security at household and individual levels (Degefa, 2015). This critique has necessitated the shift of emphasis from 'global' and 'national' to 'household' and 'individual' food security (Degefa, 2015, p. 67) and from food availability to food access.

2.5.2. Income-based Approach

This approach is a shift from one sector (agriculture and later on trade for open market) focused to the analysis of national macro economy which comes into consistency with the famous economic theory, Ricardo`s Comparative Advantage theory. However, the major shift is from macro-level food availability to income at micro- level (Burchi & De Muro, 2012).Thus, food insecurity is considered to be lack of enough income to procure the required amount of food calories. Households' expenditures surveys are used to categorize the amount of expenditures on each food items and the calorie content of each food item is calculated and aggregated to estimate total calories available for all members of the household. Thus, the household is the unit of analysis for this approach. The shortfall is that it assumes equal distribution among the members of the household. Moreover, the approach more fits the ideal market economy where no one works in subsistence agriculture. Therefore, "in rural areas of low-income countries, where the dominant part of the population is in subsistence agriculture, the method is not highly reliable" (Burchi & De Muro, 2012, p.7).

2.5.3. Basic Needs Approach

This model is proposed by International Labour Organization (ILO) in 1976. It views development as a process of satisfying basic needs (food, cloth and shelter among others) for the satisfaction of full-life (Burchi & De Muro, 2012). Food being "basic need," and "basic right," has led to the birth of the food first view (Maxwell, 1996) of food security. Therefore, the basic needs approach views food security as the "ability ... to satisfy adequately food consumption needs for a normal healthy life at all times" (Burchi & De Muro, 2012, p.8). Different ways of assessing food security in line with this approach are food frequency assessment and direct observation of food consumed. The former method is simple to measure but it focuses on frequency than quantity; thus makes it difficult to measure calorie intake. The second measurement obtains the available calorie by weighing the food items consumed according to their nutritional contents and aggregate them. Regarding the unit of

analysis, the food frequency is done at household level where as the direct observation assessment is done at individual level (Burchi & De Muro, 2012). The main advantage of this approach is that it focuses on the main commodity (food) rather than income, and recognizes food produced locally rather than purchased. However, this approach focuses on a short term food security (captures whether or not a household has enough food to feed all its members at a given time) rather than providing information on the possibility of the future food deprivation.

2.5.4. Entitlement Approach

Malthus thought of food availability had dominated the debates regarding hunger and famine until the 1980s. However, Amartya Sen came up with a new thesis, the Entitlement approach, which shifted the focus from food availability to food access. According to Sen (1981, p.434), "the entitlement approach concentrates on each person's entitlements to commodity bundles including food, and views starvation as resulting from a failure to be entitled to any bundle with enough food." Entitlements depend on two components: 1) the personal endowments, which are the resources a person legally owns including house, livestock, land, and non-tangible goods; 2) the set of commodities the person can have access to through trade and production, i.e. the "exchange entitlement mapping" (Sen, 1981, p. 435). Entitlement failure, either due to production reduction, or due to food price rises when their terms fell, leads a person to deprivation. In the case of production fall, there is a direct entitlement failure, where as in the second case it is a trade entitlement failure (Sen, 1981). This tells us which group of the people is at risks of deprivation if something changes.

According to Sen, starvation is not a matter of there being not enough food to eat but it is a matter of some people not having enough food to eat (Sen, 1981).Therefore, having enough food at national level is necessary but not the sufficient condition for food security. According to this view, in order to make food security assessment data on the major variables related to people's endowment such as productive and no-productive assets, education, membership of certain social group, wages and prices of food and non-food items, and access to services and goods that have direct influence on hunger and food security (such as, water, sanitation and health care) need to be collected (Burchi & De Muro, 2012). The unit of analysis employed by this approach is individuals and households. In general, the Entitlement approach gives better assessment perspectives than the preceding ones. Though there is slight difference with income, it is better than income approach as income is not necessarily the only instrument to access food, and also as it is much difficult to measure incomes in rural

areas of developing countries. Moreover, income approach shows the current economic status of individual or household, whereas entitlement considers long-term wealth and possible deprivation. Seen in relation with basic needs/food first approach, entitlement approach predicts future deprivation and also considers the wider services and commodities such as water, health care and sanitation than only food. Even if this approach moves better to multi-dimensions of food security, it is criticized for overlooking intra-household food distribution; omitting relief entitlement (i.e. aid food), emphasizing contiguous causes of famine rather that the basic ones; ignoring non-legal transfers of resources, cultural preferences, and temporal aspects (Devereux, 1993)

2.5.5. Sustainable Livelihoods Framework

Sustainable Livelihoods Framework (henceforth SLF) is not only related to food security but it is also a broad approach to development and poverty. The concept of livelihoods is emphasized by Chambers in 1984, who introduced the main components of livelihoods in his influential book where he focused on rural development and poverty. Since then, the approach is further elaborated by various scholars such as Chambers & Conway (1992); Ellis (2000); Scoones (1998) and adapted by different development practitioners and organizations (CARE, OXFAM); UN agencies (FAO, IFAD, WFP, UNDP); and government agencies (DFID, IISD, SDC). There are many common elements that sustainable livelihood shares with the Basic Needs and Entitlement approaches. It shares the idea of "gaining a living" with basic needs approach that focuses on the "necessities of life". It also shares with the entitlement approach the "focus on the "means" of securing a living; in fact, the SL framework is mainly concerned with the (tangible and intangible) assets commanded by a household, which are very similar to the concept of "endowments" in the entitlement approach (Burchi & De Muro 2012, p.15).

The central idea of the SLF rests on the "Pentagon of assets": Natural, Physical, Human, Financial, and Social Capitals (Scoones, 1998; DFID, 2000). It is used in food security measurements; particularly more suitable for analyzing food crises and emergencies, famines, or extreme food poverty (Burchi & DeMuro 2012, p.15). It has two peculiar advantages over other approaches to food security: the first is its long-term perspective; the second is the attention to the context (political, economic, physical, social, cultural, etc). Some of the criticisms of SL in the food security analysis are that it overlooked intra-household distribution inequalities; the utilization dimension of food security; freedom and agency issues; and that it puts less emphasis on general food security and development issues (Burchi

& De Muro 2012). However, due to its advantages over other approaches, its wholeness, people orientation, flexibility, macro-micro linkages, and participatory nature (Degefa, 2005) this study is guided by SLA to effectively capture at most all of the research objectives.

2.6. Theories of Women Empowerment

To examine the impact of wage employment on the women's empowerment within Ethiopian context, among various theoretical frameworks, we found resource theory of family power (Wolfe, 1960) and theory of resource in cultural context (Rodman, 1972), as relevant in guiding our study.

2.6.1. Resource Theory of Family Power

Resource theory of family power (which is derived from the social exchange theory[11]) is initially devised by Wolfe (1960) and later enriched and detailed by Blood & Wolfe (1960) is frequently used as a theoretical framework to study marital/family power relations. In the context of this theory, resources refer to everything that a family member can give to other member to assist that person in meeting and achieving his or her needs and goals (Hesse-Biber & Williamson, 1984). These resources were initially restricted to income, education, occupational status/prestige (and mainly drawn from external systems of family - extrinsic) (Blood & Wolfe, 1960) but later expanded to embrace physical attractiveness, love, affection, and attention (Heer, 1963) and physical strength (Steinmetz, 1978) (which is mostly intrinsic). This theory argues that a partner who owns and contributes the greatest resources to the marriage has immense decision making power within the family unity (Blood & Wolfe, 1960). Therefore, according to this theory the household member who owns the large number or amount of resources that enable other family members to meet their needs and aspirations is considered as the one who has the greatest power in the family (Hesse-Biber & Williamson, 1984). Nevertheless, this theory is critically criticized for ignoring the effect of cultural context on the marital power structure and for giving greatest attention to resource

[11] Social exchange theory is a dominant theoretical perspective in family research which explains why social exchanges occur and how they are preserved (Edwards, 1969; Scanzoni, 1979; Sabatelli & Shehan, 2009). The theory explains marital relationship as a specific, purposive or goal oriented kind of human interaction rather than random phenomena (Aynalem, 2016). According to the theory, couples form marital relationships for the purpose of maximizing rewards (such as social approval, respect, economic benefit, appreciation, and compliance to normative roles) and avoiding non-rewarding conditions (for example, punishment) (Nye, 1979; Scanzoni, 1982). Such relationships are mainly governed and preserved by the norms of reciprocity (exchange) and fairness (Blau, 1964). Particularly, Dowd (1980) used exchange theory and introduced the concept of 'power resources' (a concept that is closely associated with the concept 'resources' in resource theory of family power) while studying the power and dependency among the aged).

dimension as key determinant of marital power relation within a family (Mukhtar & Mujahid-Mukhtar, 1989).

2.6.2. Theory of Resource in Cultural Context

To address the weaknesses of the theory explained above, Rodman (1967, 1972) came up a theory called "the theory of resource in cultural context" based on the empirical study in which he made 'a cross-cultural comparisons' and noted a conflicting findings about the relationships between the family's resources and their power. He disproved some of the empirical findings that support the resource theory of family power that state there is positive (linear) correlation between husband's status and his power, rather he found a curvilinear relationships of weak association that are not statistically significant (Rodman, 1972). He used the theory of resources as starting point to formulate 'resources in cultural context theory' by using a deductive approach (principally in the context of less developed countries) (Rodman, 1972, p. 57-59). He suggested that not only do the normative explanations regarding who should have power most likely influence the descriptive explanations (who actually posses power), but they also function as a 'contingent variable' that influence the effect of resources on marital power (Rodman, 1972). He argued that in less developed society resources variables such as income, education, and occupation prestige are not solely resource variables, but are positional variables in the social structure (Rodman, 1972).

According to Rodman's thesis, "the balance of marital power is influenced by the interaction between two key themes: (a) the comparative resources of husband and wife and (b) the cultural or sub-cultural expectations about the distribution of marital power" (Rodman, 1972, p.60). In other words, it recognizes the joint influence of resources and culture on marital decision making power and claims that cultural context in less developed countries plays disabling role in empowering women and/or limits the effect of resources on the women empowerment. This theory is, thus, found as appropriate to study the impact of women employment on their empowerment (decision making power) in Ethiopian society that is enormously characterized by patriarchal system (culture) (Bieswar, 2008; Jemal *et. al.,* 2014).

2.7. Review of Empirical Literature

Several studies that examined the contemporary LSAI and of the associated land acquisitions divulge the striking condition of Sub-Saharan Africa (henceforth, SSA), as 70% of all large-scale land transactions take place in this area (Wiley, 2010; World Bank, 2010; Deininger & Byerlee, 2011). Researchers who attempted to analyze the phenomena of LSAI in SSA have employed a critical approach to large-scale land acquisitions and challenged its potential

benefits to the economy of investment hosting countries and the livelihoods of the local communities arguing that the phenomena do not have development potential rather than damaging it via 'land grabbing' (Zoomers, 2010; White *et al.,* 2012; Cotula, 2013). Several scholars have examined the potential impacts of such investment on the local people's livelihood and natural environment in Africa (Vermeulen & Cotula, 2010; Cotula *et al.,* 2011; Schoneveld *et al.,* 2011). Others have studied the issue from international human rights perspective (De Schutter, 2011; Claeys & Vanloqueren, 2013; Künnemann & Monsalve, 2013). Some studies have also examined the legal framework and processes via which LSAI takes place in investment hosting countries by focusing on the land tenure systems (Desalegn, 2011; German *et al.,* 2011; Anseeuw *et al.,* 2013; Nolte, 2014).

Studies conducted in several sub-Saharan countries have also reported the dispossession of local people as well as lack of compensation for those who lost their land (Desalegn, 2011; Schoneveld *et al.,* 2011; Makki , 2012; German *et al.,* 2013; Phiri *et al.,* 2015); lack of consultation with local communities and their free, prior and informed consent (Vermeulen & Cotula, 2010; Desalegn, 2011); forced evictions and endangered right to food (Alden, 2011; Cotula, 2009; De Schutter, 2011) and consequently threatened food security and worsened vulnerability of local communities (De Schutter, 2011); asymmetries of power (Cotula, 2009) that benefited the elites at the national and local levels (Cotula & Vermeulen, 2011; Schoneveld, 2016); weak government institutions (Lavers & Boamah, 2016) and pervasive corruption that paralyzed land and investment governance system and benefited the elite (German *et al.,* 2013).

In general, the majority of case studies conducted in Africa have documented negative impacts of such investment on the investment hosting countries and communities. For example, research showing the adverse impact of LSAI in Africa can be found in the works by Anseeuw *et al*. (2012), German et al. (2013), and Ferna´ndez & Schwarze (2013) who have reported increased vulnerability of rural populations. Scholars such as Robertson & Pinstrup-Andersen (2010), Rulli *et al.* (2013), De Schutter (2011), Dye (2014), and Barbanente & Aisbett (2016), Dereje (2016), Maru (2016), and Azeb (2017) have documented reduced access of the local community to food, water and basic resources. Other researchers like Kachika (2010), Theting & Brekke (2010), Deininger & Byerlee (2011), Bamlaku *et al.* (2015), Dereje (2016), and Maru (2016) have found that LSAI did not result in improving the promised infrastructures and employment creation.

Our study confirmed majority of the findings indicated above (in Africa context) based on the empirical data which could strengthening the results of these case studies and influence African policymakers to take timely and correct measures in such a way that transform the existing and forthcoming projects into development opportunities. However, in contrary to above results, few case studies show a positive contribution of LSAI to employment and income of the local community. For example, Vath & Kirk (2011) and FAO (2012b), reported that LSAI in Ghana and Uganda has contributed to job creation, although not sustainable. Ahlerup & Tengstam (2015) systematically analyzed the impact of the commercial farm on wage incomes for rural smallholder households in Zambia and found that commercial farm investments are linked with a robust moderate positive effect, though only for households having a scarcity of land.

The results from different case studies in Africa regarding the impact of LSAI on the local community underscored the importance of type of crop investors produced and the type of business model they adopted. For example, Schoneveld (2011) reported that compared to investment projects that produce food crop, bio-fuel investment projects threaten local people's food security and livelihoods. Inventors may adopt business models such as plantation (estate) where after acquiring land they hire wage workers and casual labourers to farm the land or employ out-growing and/or contracting farming models that support local smallholder farmers to produce crops for the investors with a different degree of contractual agreements (Cotula, 2012). The latter model is highly promoted by activists, scholars, and practitioners for the reason that it integrates smallholder farmers into the investment value chain in such a way that improves their livelihoods and the resultant food security.

Even though these studies broaden our understanding on LSAI in African context, majority of them are dominated by qualitative case studies (Barbanente & Aisbett, 2016) and lack appropriate impact assessment methodologies (Oya, 2013a, b; Maru, 2016). Moreover, studies that capture multi-dimensions of food security and livelihood assets are very limited in Africa. This study is, thus, aims to contribute to the literature of LSAI by employing an inter-disciplinary analysis of the impacts of such investment on the local community's food security, asset, and women empowerment status based on the sustainable livelihood framework.

Likewise, the majority of the studies conducted in Ethiopia have shown the potential adverse impact of LSAI on the local community and natural environment. For example, Cotula *et al.* (2009) reported the risks of LSAI to local food and livelihood security. Similarly, The

Oakland Institute (2011), Dessalegn (2011), Lavers (2012a) reported the potential adverse impact of LSAI on the household's food security. Others, such as Dauvergne & Neville (2010), Desalegn (2011), and German *et al.* (2011) reported the possible negative impact of such investment on the natural environment. Conversely, Baumgartner *et al.* (2013) reviewed the trend and type of LSAI in Ethiopia and analyzed the impact of LSAI on income, price, and employment. They found that natural resources such as land and forest are vital for the rural poor, though the losses can be compensated by gains from job creation and business possibilities. At this juncture, it is worthwhile to review some of the empirical studies related to the issue under investigation in detail within Ethiopian context.

Imeru (2010) assessed the governance circumstances of large-scale agricultural investments at the national level by focusing on a set of issues related to land, investments, and social and environmental safeguards. He used a qualitative approach such as desk review, interview, and an expert panel. He reported that there are no land use plans in rural areas, lack of coordination or minimal cooperation among government agencies, the absence of transparency and consultations with stakeholders and mainly the public, and nonexistence of benefit sharing mechanisms as well as environmental and social safeguards. Getnet (2011) also examined the trends and processes of large-scale land acquisitions and their impact on the food self-sufficiency through a qualitative method in Gambella and Oromia regions and came up with similar findings. Likewise, Desalegn (2011) used a qualitative approach to study how LSAI affects land rights of communities and how state-power dynamics promote commercialization of land in Gambella and Oromia regions. He reported lack of integration and coordination, lack of consultation with the local community, lack of capacity and poor management practices at all levels of the government as key institutional weaknesses. He argued that commercialization of land enhances the hegemonic authority of the state and "dis-empowers" individuals and communities. He concluded that the damage done by the LSAI outweighs the benefits gained. While these studies are very important in understanding the governance processes and the implications of LSAI to the national economy and local community, they did not quantify the actual impact of such investment on the livelihoods of the local people. Therefore, empirical studies that estimate the actual impact of such investment via proper impact evaluation methodology are equally imperative.

Lavers (2012a) used a qualitative approach and reported that expropriation of land to investors could adversely affect the income and food security status of local community, however not quantified the level of the impact. Ojot (2013) examined the implications of

large-scale land transfers for the state- community power relation and rights of indigenous people in Gambella region. He employed a qualitative approach (interview, focus group discussion, observation, and document analysis). The author found that LSAIs do not recognize the existing land rights of the indigenous communities; deny continued access of community to crucial natural resources such as water, grazing land, and communal forests; and failed to consult and involve the indigenous communities. He also reported that the claim of the government that LSAI will reduce food insecurity appears to be empty speech that is not supported by facts on the ground.

Schoneveld (2013) assessed the conditions (governance issues) under which large-scale agricultural investments can be sustainable and prudently achievable by focusing on countries such as Ghana, Zambia, Ethiopia, and Nigeria. In Ethiopia, he held semi-structured interviews with government representatives drawn from different levels of government. The author reported that while the Ethiopian government officially claims that the execution of modern large scale commercial farming will contribute to improvement of the traditional production systems, highly centralized implementation of agricultural modernization policies and its insensitivity to local community's interests are causing conflicts. He concluded that Ethiopia's strategy of modernizing traditional agricultural sector through LSAI is failed as it shares many of the characteristics of numerous unsuccessful large-scale agricultural development projects across the world. However, reaching at such bold conclusion based on the only few qualitative case studies may be misleading. This study will check this claim by quantifying the actual impact of such investment on the livelihood of the local community by using mixed research method.

Keeley *et al.* (2014) presented an inventory of large scale land investments in Ethiopia and provided a description of key characteristics of the large-scale land investment process in Ethiopia. The authors employed a qualitative approach (key informant interviews and a limited number of case studies of farm investments) and document analysis. They reported that there is lack of environmental impact assessment as well as weak supervision, monitoring and evaluation practices. The authors also reported that land allocations in some lowland areas have the potential to significantly undermine pastoralist systems and the degree to which land is vacant is overstated by some officials. However, the study is found to be too general focusing on macro issues and methodologically lacks rigorous analysis. As the authors suggested, the study would be a base for more and detailed studies that could critically examine the actual economic returns from large-scale land investment.

Bamlaku *et al.* (2015) examined contribution of large-scale farms to the local-level food security and employment in Bako Tibe District, Oromia Region. They employed a mixed unequal status research design where high attention was given to quantitative (econometrics) part. They used a Propensity Score Matching and a Stochastic Frontier Model to evaluate the impact of LSAI on household's food security and technological transfer, respectively. They also applied a qualitative approach including KII and FGD in each study village. Food consumption score (FCS) and household food expenditures were used as indicators of food security. They found that foreign land deals increased food insecurity of households and created employment opportunities that are both temporal and marginal. This study can enrich our understanding of the actual impact of LSAI at household (micro) level, mainly in the context of Bako Tibe district. However, as the authors acknowledged, findings from a case study (like Bako Tibo) cannot be generalized to the other regions of the county. Therefore, more context-specific studies that at least capture the multidimensional nature of food security and livelihood assets are needed.

Aisbett & Barbanente (2016) analyzed the impact of LSAI on the rural households in Gambella and Benshangule Gumuz regions. They employed a multi-method research approach based on the data obtained from the Living Standard Measurement Study – Integrated Survey on Agriculture (LSMS-ISA) and from the Land Matrix dataset. The authors reported that LSAI have resulted in losses of land and resource rights for rural households yet there is some compensating evidence of increased household expenditure. Nevertheless, the authors used Gambella and Benshangule as treatment areas and considered all other regions as control areas, which are not comparable due to various reasons: agro-ecology, farming system, culture, level of development, and so forth. Moreover, even if there are differences in scale and level of project maturity, LSAI have been practiced in almost all of the regions. Hence, methodologically the study lacks rigor in the Ethiopian context. The study is also silent on the issue of food security and livelihood assets.

Dereje (2016) investigated the features and level of inclusiveness of large-scale transnational commercial land deals and their effects on the environment and livelihood of local people in Benishangul-Gumuz region, Ethiopia. He reported that large-scale transnational land acquisition has increased vulnerability of local people's livelihood, generated too little socio-economic gains, increased deforestation, woodland degradation, and the magnitude of runoff. Even though the author has tried to capture food security issue in the livelihood part, he only addressed availability component by constructing food poverty line based on the

consumption expenditure described in adult equivalence. However, the impact of large-scale transnational land deals on the food security status of the local people is not quantified using impact estimation method(s). The impacts of such deals on the gender and wealth status of the local people were not well captured, as well.

Maru (2016) studied the impact of LSAI on the local economic development, household food security, and environment in Oromia, Gambella, and Benishagul Gumuz (BG) regions. The author quantified the actual impact of such investment on the local people's income and food security by using econometric models such as Propensity Score Matching and Difference - in – Difference. He reported the loss of income and increased food-insecurity for households that lost customary grazing and farmland. This study can serve as a means to comprehend the actual impacts of LSAI on the local community and a base for further research. However, utilization and stability dimensions of food security are not well captured. The issue of livelihood assets and gender (women empowerment) are not captured, as well. Therefore, this study takes these issues into consideration and contributes to filling these gaps.

More recently, Azeb (2017) examined the socio-economic and environmental impacts of large scale land acquisition on local people's livelihoods in Gambella region. The author used a qualitative approach (interview, direct-observation, documentary analysis and a focus group discussion). She reported that LSAI deprived livelihoods of the local community and increased food insecurity, and resulted in tremendous environmental devastation. Besides, she reported that due to corruption, lack of good governance and transparency in the region, the natural resources are depleted and societies became food insecure. Though the study provides rich information on the scale of the investment using satellite images, it is not comprehensive enough in quantifying the actual socio-economic impacts of such investment on the livelihoods of the local people.

As far as empirical studies regarding gender are concerned, they are very scant in developing countries. However, the existing evidence shows that LSAIs decrease women's access to land and other resource and negative effect women's livelihoods and households' welfare (Chung, 2017). Studies also found that LSAI increases burden on women's job, decreases their income, and excludes them from consultation and decision making spaces (Chu, 2011; Daley, 2011; Chung, 2017). Likewise, Daley (2011) has reported that even in the areas where LSAIs brought technical change and new farming systems or practices; they commonly resulted in adverse impact on women. Since gender issue such as empowerment is highly context-

specific, a systematic study is needed in Ethiopian context, mainly in pastoralist and agro-pastoralists communities where the issue has been a serious concern.

Even though various studies have attempted to disclose the scale, trend, and potential outcomes of LSAI in Africa in general and Ethiopia in particular, the depth of understanding its actual impact on the livelihoods of the local community remains limited (Maru, 2016). In general, except few attempt made by some researchers, empirical studies that quantify the actual impact of LSAI on the multi-dimension aspects of food security are scant. Empirical studies examining the impact of LSAI on the wealth status of the local community as well as women empowerment are also limited. Methodologically, much of the literature on the effect of LSAI is dominated by qualitative case-studies (Ahlerup & Tengstam, 2015; Barbanente & Aisbett, 2016; Maru, 2016) and document analysis, and lacks the application of standard impact assessment methodologies (Oya, 2013a, b; Maru, 2016). Hence, this study intends to contribute filling these gaps.

2.8. Conceptual Framework

This study is guided by the Sustainable Livelihood Framework (SLF) given that the approach rightly suits the nature of the problem under-investigation. In general, SLF is a holistic and integrated approach that explains the processes by which people attain (or fail to attain) sustainable livelihoods (Scoones, 1998). As Maxwell & Frankenberger (1996) noted, treating food security as a basic need independent of broader livelihood framework is deceptive. Hence, SLF will enable us to understand the context in which households pursue and protect their livelihood and improve their food security and wealth.

SLF (Figure 2.1) shows the interaction between and/or among five components of sustainable livelihood: context, assets, institutions, strategies, and outcomes. It demonstrates how, in diverse contexts (socio-political, agro-ecology, and economic conditions), a given society can achieve sustainable livelihood within the available resources which are pooled to adapt different livelihood strategies (Scoones, 1998; Ellis, 2000). Particularly, policies, processes, institutions, and structures (such as LSAI) play a decisive role in determining access of the local people to assets (DFID, 2000).

It is absolutely crucial to understand the contextual factors (such as policies, plans, programs, historical accounts, trends, and so on) related to LSAI and shape its operation (see #1 in Figure 2.1)[12]. This is because such factors can enable LSAI to flourish or make them to

[12] Various arrows with unidirectional tip in the conceptual framework demonstrate the interaction between various variables or flow of the immediate effects, outcomes, and impacts such variables have upon each other.

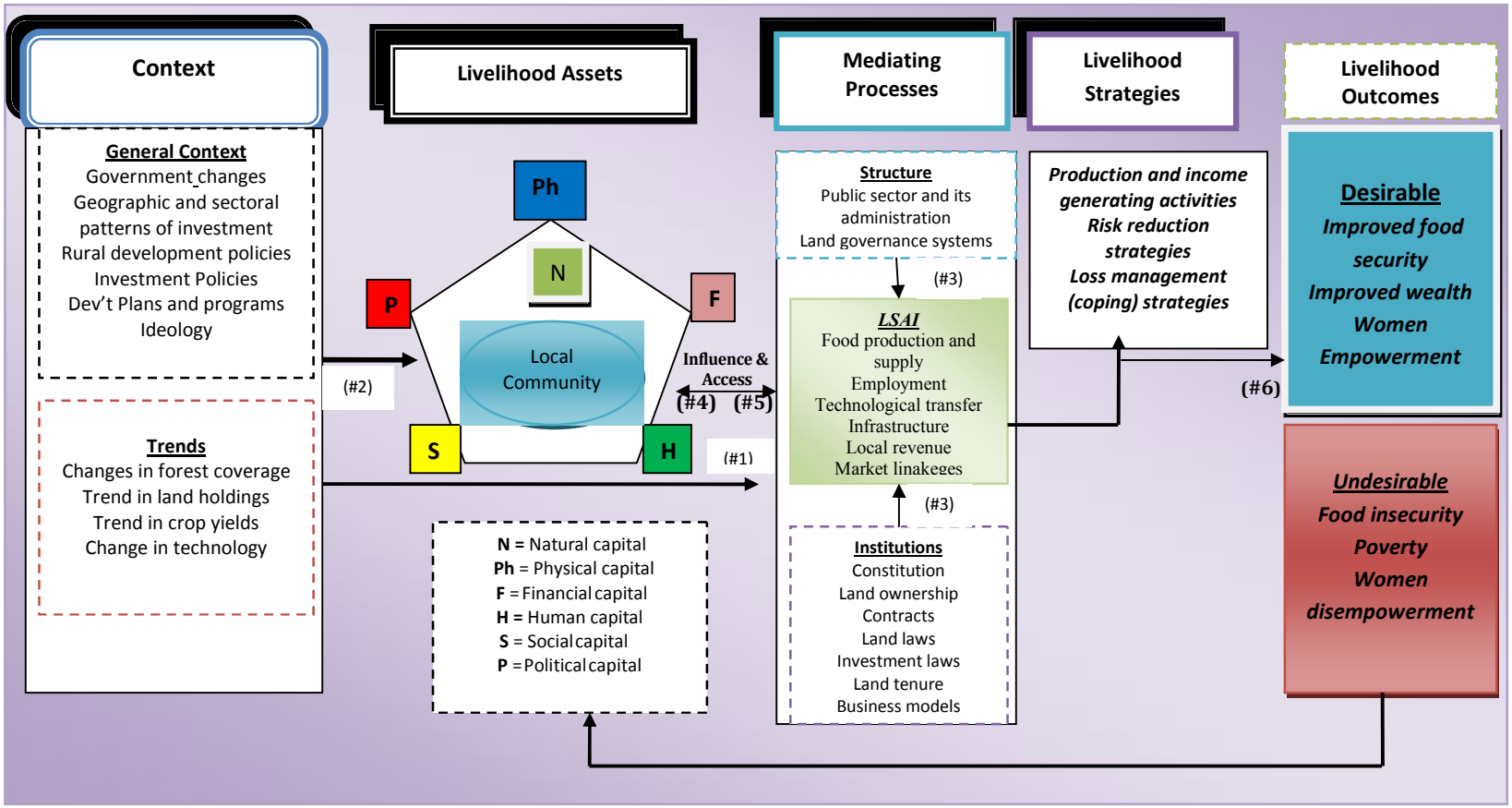
vanish. For example, the government has offered various incentive packages, devised favourable policy frameworks, and design development strategies and programs to attract both domestic and foreign investors into the agricultural sector for the purpose of modernizing the sector and improving the livelihoods of the local people (see # 6). These factors can also have a significant contribution in facilitating or impeding access of the local people to the livelihood assets (see # 2), as well as protecting the local people from or exposing them to potential risks generated by LSAI projects (see # 4). The review of this dynamics is imperative to understand the context within which households pursue and protect their livelihoods and improve their food security and wealth as well as to comprehend the mechanisms via which LSAI impacts the livelihoods of the local people.

Institutions (such as land tenure; land related laws, rules, and regulations; contractual agreements, etc) and structures (such as government administration at various levels, land governance systems, and so on) play a decisive role in determining access of the local people to livelihood assets and terms and nature of the exchange between types of assets (DFID, 2000) (see # 4). These structures and institutions are also critical in determining the success or failure of LSAI (see # 3). For example, the existence of transparent, inclusive, and responsive land governance systems, legal frameworks, business models, and contracts accompanied by strong government agencies that are capable to govern investment land and projects and effectively enforce the laws can reduce the cost of doing businesses for investors and enable them to generate positive outcomes (see # 3) and impacts of LSAI on the livelihoods of the local people (see # 6).

In this framework, we put local community at the centre of the 'Asset Pentagon' since it is a heart and focus of development policy and program. Close to the people, there is natural capital which is a foundation of the livelihood of the local community and a source of other capital. LSAI is likely to affect local people's access to and use of natural capital through direct transfer of forest, farm, or grazing land to the private investors. In agrarian society like Ethiopia the significance of land to the livelihoods of the rural people cannot be undervalued (Lipton, 2009). "Land is not only the primary means for generating a livelihood but often the main vehicle for investing, accumulating wealth, and transferring it between generations" (Deininger & Binswanger, 1999, p. 247). It serves as a safetynet for the rural people in the event when other sources of their income are lost as well as acts as a source of identity (Lund & Boone, 2013).

On the other hand, arrows with two directional tips explain the two-way interactions or impacts between different variables.

Figure 2.1: Conceptual Framework – Household Livelihood Framework.



Source: Adapted from Scoones (1998) and DFID (2000)

Communal land is vital, principally for the poor (Place & Otsuka, 2000) given that it serves as a source of food - 'hidden harvest' - and fuel for many rural community (Stellmacher & Mollinga, 2009). Therefore, since such investments heavily target the natural capital, the intervention is conceptualized to produce an immediate effect on land tenure system of the local communities by changing their access to and use of the natural capital such as farm, forest, and grazing land, and watersheds (see #4 in Figure 2.1).

The immediate effects of the intervention (LSAI) are further conceptualized to produce various outcomes. These outcomes are mainly emanated from the arguments of those who support LSAI including Ethiopian government claiming that such investment can result in positive outcomes that benefit the investment hosting community. The perceived outcomes include employment opportunities, improved food production and supply, technology transfer, better infrastructure, contribution to local revenue, and market linkages, among the others (MoARD 2010; MoFED 2010a; Keeely *et al.,* 2014) (see # 5). Based on this argument, the government of Ethiopia supposes positive impacts of LSAI on the local people's food security, wealth, and women empowerment status (see # 6).

A household is the main source of labor in rural areas for most of the agricultural production. Household members can be engaged in on-farm jobs to support their family's production or off-farm activities to generate extra income (Herrmann *et al.,* 2013). Hence, LSAI is anticipated to affect household's labor supply via creating job opportunities and directly impact its income and wealth (Mano *et al.,* 2011). Particularly, when agricultural investment projects adopt labour intensive technologies, they could create jobs for the local people in such a way that enhance their income. Improvement in income may, in turn, increases the demand of the local people to various good and service which could encourage the growth of micro and small businesses in the local areas (that may also further create jobs for the poor, mainly for women and improve their income). Likewise, technological transfers to local community can significantly affect agricultural production and productivity and directly impact food security (Yamano *et al.,* 2011; Rao *et al.,* 2012). In general, technological transfer could increase agricultural productivity which, in turn, could improve the income of the households (via sales of surplus and/or access to the cheap product in the market). Investment in physical infrastructure could also improve access of the local people to the market (buying food and non-food commodities and selling products). Investment in social infrastructure will improve access of the local people to services such as education, health, potable water, and information that would then enhance their physical and mental capacity

and productivity. This is particularly important not only for the local people but also to the investors given that they will get healthy and productive workforce in the local areas. In doing so, LSAI could contribute to sustainable and stable food security of those households exposed to the investment. The investors are also expected to pay land lease fees and tax to the local people, which could be reinvested to enhance local economy.

Particularly, by improving women's access to income (through employment) and information LSAI could enhance their economic capacity so that they can make major decisions that affect their life as well as that of their family. By improving their access to education, health, and information (awareness), LSAI would also enhance women's self-confidence (self-worth) so that they can challenge and/or reject bad practices that they previously accepted as normal. LSAI could also have a positive effect on the asset/wealth of the local community only if the investors take care of natural resources upon which the livelihoods of local community entirely depend. As indicated in above, natural capital (land, water, forest) is a foundation for rural people's livelihoods. And so, any change in this capital would affect all other assets of the households.

When the business model adopted and agreed upon in the contract promotes the integration of smallholder farmers/agro-pastoralists and other land users into the commercial agricultural value chain (*contract farming* or *commercialization in situ* models) (Hall, 2011), the likelihood of LSAI to improve local people's livelihood could be high. On the other hand, when the investment contract promotes the short-run benefits of the investors via stripping natural resources without long-term investment (such as infrastructures) (*extraction model) or* taking over the land and related resources from local people (often resulted in displacement) but investors invest in social and physical infrastructures to facilitate their commercial operations *(enclave model)* (Ferguson, 2006), the possibility of LSAI to deteriorate livelihoods of the local people would be high. The former models may generate a win-win situation where both the local people and investors could benefit from the investment. The latter models may lead to lose-win where investors reap profit at the expense of the local people's livelihood and natural environment. In general, private investors in agriculture sector could play 'an engine' role in the economy of the country only if they adopt a model that integrates the local community into national and global commercial agriculture value chain. Or else, they could turn out to be 'a gun machine' or 'dangerous animal' that would destroy the natural environment and the livelihood of the local people.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

The nature, characteristics, and impacts of LSAI which will be discussed in the subsequent chapters, require proper methodological approach that account for the complexity of the issue under investigation. This chapter, therefore, is devoted to discuss the methodological themes by outlining the whole research process followed to address each objective of the dissertation. The chapter starts by introducing the study area looking at administrative, demographic, socio-economic, and agro-ecological issues of the Gambella region in general and two study districts in particular. This is followed by the discussion of philosophical orientation that guided the dissertation. This chapter presents the details of research design, sampling procedures, data collection instruments, and methods of data analysis, as well.

3.2. Background of the Study Area

This study was conducted in Gambella People's National Regional State (in short Gambella region) – one of the nine administrative regions in Ethiopia - where LSAI is intensively practiced. The region is located in South-western part of Ethiopia, about 780 kilometres from the national capital, Addis Ababa, with a total land area of 34,063 km^2 and estimated population of over 409,000 inhabitants (Central Statistical Agnecy (CSA), 2015). The region shares boarder with Oromia Regional State to the North and East and South Nation and Nationalities and Peoples Regional State (SNNPRS) to the South and the Republic of South Sudan to the West. The region was included into the modern Ethiopian state at the end of the nineteenth century where the international boundary between Ethiopia and Sudan was demarcated by the Ethiopian Imperial and the British government in the Sudan following four years of diplomatic bickering and choreography (Bahru, 1976). The region was the vital economic corridor of the country by serving as a key inland port for the import and export trade with Sudan, mainly during the first three decades of the 20^{th} century (Bahru, 1976).

The region has one of the lowest population densities in Ethiopia, that is, nine inhabitants per square kilometre (CSA, 2007). Administratively, the region is divided into three zones (Aynak, Nuer and Majong) containing 12 *weredas*[13], one special *wereda* (Itang) and one City Municipality (Gambella City). There are five indigenous ethnic groups (the Anuak, Nuer, Mejenger, Opo and Komo) with distinct language, culture, and livelihoods in Gambella with a small but growing population of migrants coming from the highlands (Wondwosen, 2017).

[13] *Woreda* is a fourth tier of administrative unit in Ethiopia which is equivalent to a District.

Agro-ecologically, the region is predominantly lowland (*Kolla*) with a few midlands (*Weynadega*) and with a topography of the lower piedmonts ranges from 500 to 1900 masl and the flood plains of below 500 masl (Azeb, 2017). The climate of the region is mainly semi-arid with an extensive rainy season that starts in May and ends during August wherein most agricultural activities are carried out (Baumgartner *et al.,* 2013). The region is renowned for its forest coverage, that is, about 534,600 ha of the land is covered by forest; 1,167,192 ha by woodland; 148,952 by shrub land; and 970,327 by grassland (GPNRS, 2012). The region has a National Park that covers nearly 5061 square kilometres (19.6% of the Region's territory) though threatened by the investment projects (Azeb, 2017). In terms of water resource, the region is endowed with 26,924 million m^3 of water, of which 25,640 million m^3 is surface water and 1,284 million m^3 is ground water (Belay *et al.,* 2015). Studies show that 11,780 million m^3 of water can be utilized for irrigation and 884.2 million m^3 of water can be used for human, livestock and other animals drinking (GPNRS, 2012). The main rivers crossing the region include: the Baro, Gilo, Akobo and Alwero. The region also has favourable temperature and rainfall for agricultural activities (Samson *et al.,* 2009). This generally indicates that the region has a massive potential to produce diverse annual and perennial crops, livestock, and fishery.

Subsequently, the Ethiopian government has identified Gambella as one of the regions which is suitable for large scale agricultural investment in the country. The government has identified about 1.2 million hectares of potential land, in Gambella region alone, and made it available for both domestic and foreign investors (Dessalegn, 2011). Recent studies have estimated that 683,518 hectares of land have already been allocated to both local and foreign investors, with federal government intervention which allocated about 273,812 hectares of land to various investors (HAIA, 2018). Ethiopian government has been promoting LSAI as a key development strategy to enhance food security and livelihoods of the investment hosting community through increased agricultural production and productivity, improved incomes via job creation, technological transfer, foreign exchange earnings, and infrastructural development (Keeley *et al.,* 2014). Despite the region is blessed with natural resources, paradoxically, it is recognized as one of the poorest (with about 35% of the people living in the lowest quintile of the nation's wealth ranking) (CSA, 2012a) and food insecure (Belay *et al.,* 2015; Maru, 2016) regions in the country. It is at this juncture that this dissertation tries to examine how LSAI has impacted the livelihoods of the local community through analyzing the impacts on food security, livelihood assets, and women empowerment based on the

empirical evidence collected from the affected community. The livelihood of the Gambella people entirely depends on the natural resources where the Nuer are transhumant pastoralists; the Anuak and Opo are largely sedentary agriculturalists; and the Mejenger mix hunting and gathering with shifting farming (Wondwosen, 2017).

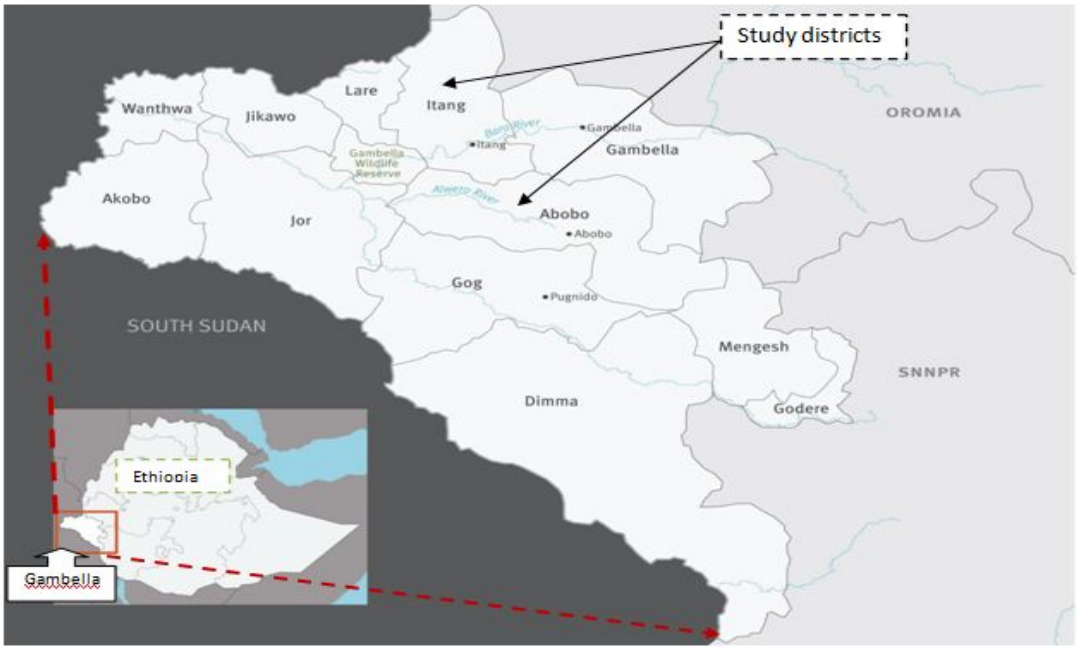
This study was, thus, conducted in two *woredas* - Abobo and Itang - in Gambella regional state (Figure 2.2). Abobo is one of the five woredas in Agnuak zone, situated at 47 kilometres away from the regional capital city. The *woreda* borders the Mejenger zone in the southeast, Gog *woreda* in the south, Jor *woreda* in the southwest, Godere *woreda* in the west, Itang special *woreda* in the northwest, Gambella Zuria *woreda* in the north, and Oromia region in the east. Abobo *woreda* has a total population of 15,741 (of whom 8,184 were men and 7,557 were women) (CSA, 2007) with a total of 3,108 households (Abobo *Woreda* Agriculture Office, 2017). The *woreda* has a total land area of 3,116.17 km^2 with a population density of 5.05 person per km^2. The main ethnic groups of this *woreda* include the Agnuak (44.05%), the Kambaata (20.1%), the Amhara (12.57%), the Oromo (6.31%), the Mejenger (5.99%), and others 10.98% (CSA, 2007). The *woreda* is made up of 18 *kebeles*[14] and one town (Abobo). About 74% of the *woreda* population lives in rural areas with agriculture as a predominant livelihood activity (livestock rearing and subsistence farming). 53% of the inhabitants of the *woreda* are settlers who came to the region during the *Derg* regime via resettlement program (Abobo *Woreda* Agriculture Office, 2017).

On the other hand, Itang special *woreda* is situated in the Northern end of GPNRS, particularly in the lower plain of Baro-Akobo basin with a distance of 35 km from Gambella Town (the Regional capital). It borders Anguak Zone in the south and southeast, Nuer Zone in the west, the Republic of South Sudan in the northwest, and Oromia Region in the north. According to 2007's National Census, Itang had a total population of 35,686 (of whom 17,955 were men and 17,731 women) with a total of 6,578 households. The Woreda has a total land area of 2,188.34 km^2 with a population density of 21 person per km^2 (CSA, 2007). Itang special *woreda* is made up of 21 *kebeles* among which 95% are located in the floodplain zones of Baro river basin (Alemseged *et al.,* 2014). Flood recession farming, mainly the cultivation of cereals crops (such as sorghum and maize), root crops, fruit crops, and a variety of vegetables; livestock rearing; and fishing are found to be the major livelihood activities of the local people in the woreda (CSA, 2015). The *woreda* is frequently hit by

[14] *Kebele* is the lowest tier of government in Ethiopian governance structure.

natural calamities such as drought and flood as well as water born diseases, and so becomes one of the food aid recipient areas in the region (Alemseged *et al.,* 2014).

Figure 3.1: Location of the Study Areas.



3.3. Philosophical Orientation

Looking at the various literature, I came across many 'isms' and 'logies' which are accompanied by intense debates between scholars, philosophers, and practitioners. In the beginning, it was like searching for a fish in the Pacific Ocean without having a compass. However, after some readings and taking research methodology courses, I have recognized that all of the debates are based on the divergent views in answering key philosophical questions: what do we know about the reality? (ontology), what are we going to know? or how we know what we know? (epistemology), and how we are going to know? (methodology)'. Finally, it becomes clear that detailed understanding of research philosophy and its conflicting ontological and epistemological assumptions about reality and knowledge are decisive factors in social science research.

Traditionally, philosophical paradigms in research fall into objectivism and subjectivism. The former was the dominant paradigm between 1930s and 1960s (Gray, 2004) and ontologically assumes that there is a distinct, exterior, and concrete reality that is free and independent from the researcher perspective (Wildemuth, 1993; Pring, 2000a; Gray, 2004; Cohen *et. al.,* 2007; Aliyu *et al.,* 2014). Epistemologically and methodologically, positivists assert that 'the knower and the known are independent' and that the attributes of the known can be directly measured quantitatively via observation (empirical data) just like in natural science (Gray,

2004). Conversely, subjectivists ontologically argue that there is no such thing called 'reality' that exist free and independent from the knower rather 'reality' is our own construction (Gray, 2004). Epistemologically, the argument is that our knowledge of reality is unavoidably our own construction wherein knower focuses on understanding the meaning from socially constructed reality (Degefa, 2005).

We do believe that the nature of the problem under consideration should dictate the type of research method, design, and technique. We, therefore, neither exclusively base our research methodology on the objectivism nor on subjectivism philosophical positions, rather we let our research objectives/questions determine our methodology. This shows that pragmatist paradigm best fits our study. The pragmatic research paradigm which is often called a 'middle grounded' position between qualitative and quantitative approaches (Reta, 2018) is found to be a relevant philosophical stand to answer our diverse research questions. Because this approach is a context specific that often integrates qualitative and quantitative methods in such a way that maximizes the gain from both objectivists and subjectivists' philosophical standpoints (Reta, 2018). Rather than throwing itself into burning debates regarding 'ontology,' 'epistemology,' and 'methodology,' pragmatists often let the research questions guide the whole research process (Tashakkori & Teddlie, 2003). Therefore, to properly address research questions, this study was guided by pragmatism and employed a mixed method research design.

3.4. Research Design

Designing a research project is one of the most important though challenging endeavours in the research process and requires a cautious and an intellectual decision. This decision, however, must be based on the research questions and/or objectives that are specified in the research project. Particularly, this phase of research process embraces all the components and phases of our research project together. Therefore, to effectively and properly respond to the research questions, this study employed a mixed research approach involving exploratory, descriptive, and explanatory (quasi – experimental) research designs. The central notion of a mixed method research is that since each method has its own strengths and weaknesses, combining them are believed to compensate each individual method's intrinsic weaknesses by the other method's strength (Creswell, 2003; Dudwick *et. al.,* 2006). More specifically, this design enables us to triangulate and validate results, enhance the depth and breadth of the study, and effectively address research questions.

The choice of each of the research design is based on the distinctive utility of each type. For example, exploratory research is often used to provide detailed information on the issues under investigation and clarify research problem based on the contextual setting. It helps researchers to select data collection tools and identify variables that are locally relevant in setting up a cause-effect relationship though it could not give definite answers to research questions (Maru, 2016). On the other hand, descriptive research gives logical description on the conditions of relationships that exist; practices that prevail; beliefs and process that are going on; effects that are being felt; or trends that are developed (Calderon, 1993) in accordance with specified criteria. Explanatory research design tries to establish cause - and - effect relationships and provides conclusive answers to research questions (Malhotra, 1997).

As mentioned above, due to diversity of the research question and/or objectives a single research design cannot fully capture the purpose of our study. Consequently, we employed a mixture of the three types of research design. We carried out an exploratory research in April 2017 before the formal and more planned study to deeply comprehend the issues under investigation, test data collection instruments, be acquainted with local food names, and identify study areas. We did direct observation of the study area, formal and informal discussions with the official, agricultural extension workers and experts, and the local people. This kind of exercise enabled us to familiarize ourselves with the issue under investigation, study area, prepare context specific data collection tools, and identify coping strategies used by the local communities during the period of food insecurity. We also carried out, a desk review **(**an intensive literature exploration, review, and analysis of pertinent documents) concerning the issues under investigation. This exercise helped us to identify gaps (in theories, empirical studies, and methodologies), deeply understand the nature of the problem to be investigated, design appropriate research questions, and apply a methodology that best fits research questions and objectives. Descriptive research design was used to describe magnitude and trends of LSAI, patterns of interaction (between LSAI and local people), and practices and processes (laws, policies, and institutions) – objective number I. An explanatory (quasi – experimental) research design was employed to study the impact of LSAI (intervention variable) on the various outcome variables such as food security, livelihood assets, and women empowerment by establishing a cause – effect relationships between these variables – objective number II, III, and IV.

An observational research design (like the one that this study employs) can also be divided into cross-sectional and longitudinal, mainly based on the data collection time period (a

single point in time or over a period of time). This study employs a cross-sectional research, mainly due to the absence of longitudinal data on the issues under study. This research design is found to be cost-effective and facilitates the inclusion of study subjects or groups from whom a comparison group can be formed (Rubin, 2001). Within the general framework of cross-section design, to establish cause-effect relationships and examine the actual impact of LASI on the food security, livelihood assets, and women empowerment of the affected local people, we used a quasi–experimental research design. This type of research design enabled us to identify a comparison group that resembles the treatment group in terms of some basic socio-economic characteristics. The comparison group is frequently identified to capture the counterfactual situations (what would have been the status of food security, livelihood assets, and women empowerment of the affected households if the intervention such as LSAI had not been introduced in the area).

In the context of this study, treatment group involves those households who reside in the *kebeles* hosted the investment and directly affected by LSAI (affected group) whereas the comparison group is the households that reside in the *kebekles* where LSAI is absent and so not affected by the event of investment (non-affected group). Since the intervention (LSAI) is imposed by the government and is already exist in the community, we could not randomly assign households to treatment or comparison group and ensure that our sample is perfectly as homogeneous as sought. That is why we went for a quasi-experimental due to the fact that randomization is impossible (due to non-random intervention placement). See the details of quasi-experimental design typologies in annex VI.

In this study, intervention and non-intervention *kebeles* and then affected and non-affected households were randomly selected as treatment and comparison groups, respectively. *Kebeles* with and without investment were carefully identified and selected based on the *woreda*' (Abobo and Itang) information, consultation with experts working in the area of LSAI at *woreda* level, and direct observation before data collection. A serious consideration was given to identify a comparison group that resembles to treatment group in some basic cultural, socio-economic, and livelihood characteristics. For example, the Anuak community living in Abobo *woreda* with similar socio-economic and livelihood characteristics to treatment group living in the same *woreda* was selected as comparison group. The same – procedure was applied in Itang special *woreda* to select the Nuer community. The underlying argument is that both treatment and comparison groups have similar basic socio-economic characteristics but differ in intervention (i.e. LSAI). It is likely to directly observe spatial

effects when two cases are satisfactorily similar and fittingly explain the same thing (Gerring & McDermott, 2007). We summarized our research design in Table 3.1.

Table 3.1: Summary of quasi – experimental design

Research design	Space	Variables	Time [t_1]	t_2
Spatial comparison	Treatment group in Gambella	Y	$\not\subset$ |	**?**
		X1	$\not\subset$ |	+
		X2	$\not\subset$ |	$\not\subset$
	Comparison group in Gambella	Y	$\not\subset$ |	**?**
		X1	$\not\subset$ |	$\not\subset$
		X2	$\not\subset$ |	$\not\subset$

Source: Own construction based on the Gerring & McDermott (2007)

Nota Bene:

Y= dependent/outcome variable of interest
X1= independent variable of interest
X2= a vector of control
Treatment group = group with investment
Control group = group without investment
[t_1] = Pretest (before intervention – hypothetical)
t_2 = Posttest (after intervention)
| = intervention
$\not\subset$ = static (no change in status of variable)
+ = change (change in status of variable)
? = the main empirical decision: Y changes (+ or -) or does not ($\not\subset$)

In any spatial comparison studies, spatial differences in the outcome variable (Y) noticeable across the treatment and comparison groups are supposed to be the product of independent variable ($X_{1a, \ldots}X_{1n}$), not exogenous variable ($X_{2a}\ldots X_{2n}$) that may influence the relationship between Y and X_1. In Table 3.1 above, Y represents the outcome variables, in our case food security, livelihood assets/wealth, and women empowerment status of the local community, which is assumed to be static ($\not\subset$) or similar for both treatment and comparison groups before the commencement of LSAI. However, what has been happening to Y because of the intervention (LSAI) is unknown, (**?**) for the investment hosting community – treatment or affected group (i.e. whether it is improving (+) or deteriorating (-) or unchanging ($\not\subset$) is not known). The status of Y for those who do not host the investment is not known (non-affected or comparison), as well. It is this **puzzle** that this study investigated in such a way that informs policy decisions based on the evidence. X_1 represents the intervention variable of interest, that is, LSAI that takes the value of 1 if the intervention is introduced in the area and 0 otherwise. It is apparent that both treatment and comparison groups did not experience the event of LSAI before the commencement of the investment ($\not\subset$). However, after the launch of the investment, there may be significant changes (+) in the *kebeles* with investment (treatment group) yet the situation of comparison group remained the same ($\not\subset$). X_2 which stands for a vector of controls (other important exogenous – socio-economic factors other than X_1 that may significantly influence the relationship between Y and X_1) were kept static

($\not\propto$) across both groups. These factors are often directly measured and/or assumed for both groups (Gerring & McDermott, 2007) and kept constant during analysis so as to correctly estimate the effect of X_1 on Y.

However, to ensure that changes in Y (food security, assets, women empowerment) had happened due to changes in X_1 (LSAI), certain assumptions and conditions must be fulfilled. First, the assumption of ceteris paribus must be satisfied, that is, any changes in Y should be the product of X_1 and only X_1, ceteris paribus. To ensure this assumption, covariates were directly measured and kept constant in the PSM model during analysis so as to obtain unbiased estimation of the effect of X_1 on outcome variables Y. Second, to ensure satisfactory similarity across groups, treatment and comparison groups were selected with comparable basic characteristics (cultural, socio-economic, agro-ecological, and livelihoods) that may affect the causal relationship between Y and X_1. Third, to prevent spatial contamination that may influence the relationship between Y and X_1, treatment and comparison groups were detached or isolated by selecting *kebeles* with no investment (as comparison group) in such a way that avoid any spill over due to the investment. And finally, an econometric technique called Propensity Score Matching (PSM), proposed by Rosenbaum & Rubin (1983), to minimize the bias in observational data sets during the estimation of the treatment effects, was used to develop a comparison group that is similar to the treatment group in terms of observable characteristics and estimate the impact of LSAI on the food security, assets, and women empowerment status of the affected community.

This study employs PSM model based on the growing theoretical and empirical literature (Rubin 1980; Rosenbaum & Rubin, 1983; Heckman *et al.,* 1997; Imbens, 2004; Caliendo & Kopeinig, 2005; Smith & Todd, 2005; Gilligan & Hoddinott, 2007; Ho *et al.,* 2007; Austin, 2011; De Silva, 2012; Maru, 2016). This model is appropriate to provide cause and effect explanation in quasi-experimental design and properly construct statistical treatment and comparison groups (Rosenbaum & Rubin, 1983). It is well known in addressing the problem of selection bias and effect of confounding that crop up as a result of the non-random assignment of the treatment group (Austin, 2011). Maru (2016) used PSM and Different in Different (DiD) model to study the impact of LSAI on the local economic development, household food security, and environment in Ethiopian context and came up with consistent results from the two estimators proving that PSM model is appropriate for this study. The details of PSM model and its specification are discussed in section 3.7.1. of this chapter.

3.5. Sampling Procedures

A multi-stage sampling method was used to select the study households. In the first stage, GPNRS was purposively selected due to the reason that since 2008 the region has been the leading destination of domestic and foreign LSAI, has the largest number of investment land (1.2 million hectares) registered by the federal land bank in the country (Ojot, 2013; Desalegn, 2011), has the largest number of investment land (46.6%) acquired by foreign investors in the country (HAIA, 2017), and is the centre for both challenges and opportunities of LSAI in Ethiopia (Horne & Mousseau, 2011; Keeley *et al.,* 2014). Secondly, Anuak zone and Itang special *woreda* were purposively selected because of the high concentration of LSAI projects (74%) of the region in the areas (GRSIA, 2018). Thirdly, Abobo *woreda* was purposively selected from Anuak zone due to a high volume of investment in the *woreda* (42% land leased in the zone and 53% of zone's investors are located in Abobo *woreda* (Fana, 2016).

From the field observation and information acquired from the local government officials and agricultural experts, selecting a single LSAI project (either local or foreign) to study its impact on the local people's livelihoods is very complex. Because several of such investment projects are located within one *kebele*/village and so isolating one project from the others for impact study is impossible. For example, there is 27, 21, and 19 number of investment projects in Pekudi, Village 8/9, and Perpengo *kebeles* in Abobo Woreda, in that order (Abobo *Woreda* Agriculture Office, 2018). Likewise, there is 47, 23, and 14 number of projects in Wanke, Pukuma, and Watgach *kebeles* in Itang special *woreda*, respectively (Itang Special *Woreda* Agriculture Office, 2018). In general, from the total of 18 *kebeles* in Abobo *woreda*, 12 of them (six each from indigenous Anuak community and settlers[15]) are affected by the LSAI. Similarly, of 23 *kebeles* in Itang special woreda, 8 of them (two occupied by Opo, four by Anuak, and two by Nuer communities) are affected by the investment. However, since the main purpose of this study is to estimate the impact of LSAI on the local people's food security, livelihood assets, and women empowerment by using PSM model, construction of a control group is mandatory. From the preliminary field observation in Abobo *woreda* and the

[15] In this study the term settles refers to the individuals or households or families from the highlands of Ethiopia, many of whom were taken to the Gambella region during the resettlement program of the Derg regime in the 1980s, mainly from Tigray, Shäwa, and from Kambaata and Haddiyya in the current SNNPRS and former province of Southern Shewa.

data obtained from the *woreda* Agriculture Office, it is clear that getting a comparison group which at least matches on some similar observable basic characteristics to affected community (for settlers) is not viable (because all of them are affected by the LSAI). Therefore, the focus of this study is on the indigenous community.

We stratified *kebeles* into affected (those hosted LSAI and experienced its direct effect) and non-affected (those did not host LSAI). At the fourth stage, due to relatively a small number of households in each Anuak *kebeles*, four affected *kebeles* were randomly selected. On the other hand, due to relatively a large number of households in each Nuer *kebeles*, two *kebeles* (one each from affected and non-affected *kebeles*) were randomly selected. To address gender aspect and get a representative sample from both sexes, fifthly, affected households were stratified into male and female-headed. Based on the sampling frame, sixthly a systematic sampling technique was used to randomly select study participant households. A systematic sampling technique is a technique in which every k^{th} subject in the sampling frame is selected, where *k*, denotes the sampling interval. For the qualitative part, a purposive sampling technique was used to select subjects who took part in the interview and Focus Group Discussion (FGD). A household was taken as a unit of analysis.

Determining sufficient sample size is one of the critical decisions in sampling design. The purpose of the study and the nature of the population (finite or infinite) are often used to determine sample size. Since this study intends to assess the impact of LSAI on the livelihood assets of the local community, we need to estimate the true proportion of population impacted by the investment with the required margin of error and confidence level. Since our target population is finite, we calculated the sample size by using the formula proposed by (Krejcie & Morgan, 1970, p.4):

$n = \frac{Z^2 NP\,(1-P)}{d^2\,(N-1) + Z^2 P\,(1-P)}$, *where* n *is the sample size,* Z^2 *is significance level (usually 1.96 for 95% confidence level), N is population size, P is a proportion of impacted population (expressed as decimal), and d is degree of accuracy or margin of error (5%), expressed as a proportion (.05).*

According to Abobo *woreda* Agriculture Office (2017), there are 3,108 (1,345 Anauk and 1763 settler) households in the *woreda*. Among this, 2,089 households (682 indigenous in six *kebeles* and all of the settlers) are affected by the investment. Since our target is an indigenous community, the proportion of the affected Anauk is 682/1345 = 0.50.7 ~ 51%.

Total sample size for Abobo Woreda $= \frac{(1.96)^2\,1345(0.51)\,(1-0.51)}{(0.05)^2\,(1345-1) + (1.96)^2\,(0.51)\,(0.49)}$ = 299. Based on this, a proportional sample, that is, 299/682 (43.8%) of household was taken from each

selected *kebele*. The total sample size from the four selected affected *kebeles* in Abobo, therefore, becomes 167 participants. For a comparison group, four non-affected *kebeles* were randomly selected, as well. Households from these *kebeles* were selected through systematic sampling technique. To compensate for poor matching, the number of non-affected households was oversampled (by about 10%). The total sample size for Anauk community is, therefore, 351 (167 affected + 184 non-affected). The distribution of the Anuak affected and non-affected household's population and the corresponding sample size in Abobo *woreda* is summarized in Table 3.2.

Table 3.2: Distribution of affected and unaffected household's and sample size (Anuak).

Affected Kebele	Total No of HHs and Sample proportion				Total sample size	Non--affected Kebele	Total No of HHs and Sample proportion				Total
	M. H.	S. proportion	F. H.	S. proportion			M. H	S. Proportion	F.H	S. Proportion	
Perpengo	37	37×43.8%=16	46	46×43.8%=20	36	Tegni	98	47.2%=46	55	47.2%=26	72
Pukedi	39	39×43.8%=17	42	42×43.8%=18	35	Dumbong	43	47.2%=20	11	47.2%=5	25
Terkodi	98	98×43.8%=43	55	55×43.8%=24	67	Potelam	50	47.2%=24	17	47.2%=8	32
Uchockchalla	52	52×43.8%=23	14	14×43.8%= 6	29	Terichuri	40	47.2%=19	25	47.2%=12	31
Total	226	99	157	68	167	Total	231	109+(16)	108	51+(8)	160*15%=24 160+24=184

Source: Own computation based on the information obtained from Abobo *woreda*
Note: M.H. stands for Male Headed and F.H. for Female Headed households

In Itang special *woreda*, *kebeles* occupied by Opio and Anuak communities were dropped from the sample selection. Information obtained from the Agriculture office of the special wereda indicates that all of the Opo *kebeles* are affected by the investment and getting a comparison group for them was a tricky exercise. Since the Anuak community were addressed in Abobo there is no need to include them again in the sample. Therefore, the focus in Itang special *woreda* was on the Nuer community. Accordingly, due to relatively a large number of households in each *kebele*, two *kebeles* (one each from affected and non-affected *kebeles*) were randomly selected.

There are 7504 households in Itang among which 1289 of them are affected by the LSAI (Itang Special *Woreda* Agriculture Office, 2018). The proportion of impacted households is thus 1289/7504, which is equal to 0.1718 (17.18%).

Total sample size for Itang special Woreda $= \frac{(1.96)^2\, 8744(0.46)(1-0.46)}{(0.05)^2\,(8744-1)+(1.96)^2(0.46)(0.54)}$ = 213. Based on this a proportional sample, that is, 213/1289 = 0.165% ~ (17%) of participants was taken from the selected affected kebele. Watgach *kebele* which has 381 households (279 male headed and 102 female headed) was randomly selected from affected *kebeles*. The sample size for affected households is thus, 381*0.17=65 (48 male headed and 17 female headed) but we included five additional households to the sample which makes the sample size 70 (51

male headed and 19 female headed households). For comparison group (unaffected households), to compensate for poor matching, we oversampled non-affected households by 20% which makes the total sample size of unaffected households 84 (i.e. 70 + 14) of which 58 were male headed (84*68.9% (proportion of male headed households in the *kebele*) and 26 were female headed (84*31.1% (proportion of female headed households in the *kebele*)). The total sample size for the Nuer community is thus, 154 (70 affected + 84 unaffected households). Therefore, 154 households were used to estimate the impact of LSAI on the food security and livelihood assets status of the affected community.

As far as the study of the effect of women's entrance to employment (specifically in LSAI projects) on the women empowerment all married women who are hired in the LSAI projects were taken as the target population. To get such category of women, we first searched for (with the assistance of Abobo *woreda* agricultural experts and *kebeles'* DA) the investment projects that are currently active and hired local women. And so, we found Saudi Star Agriculture Development PLC[16] that is located in Gambella region, Abobo *woreda* and working in Alwero (Village 17), Terkudi, and Perpengo *kebeles*. Alwero *kebele* (Village 17) is occupied by settlers who mainly came from southern region (majority of whom are Kambata ethnic group). On the other hand, Terkudi and Pepengo *kebeles* are inhabited by the Anuak community. However, we could not manage to find married Anauk women who are employed in the farm (except few single and divorced ones). Hence, the focus was on the married women residing in village 17. With the help of *kebele's* manager, administrator, health extension workers, and a couple of employed women, we created a sampling frame (the list of the employed married women) which comprised 65 married women. We used census method (due to small number of the participants) and included all of them for the analysis of impact of employment on the women empowerment. These women (the employed ones) were used as treatment group in the estimation model. As far as the comparison group is concerned, we oversampled the participants by 30%. This category of respondents was selected via systematic sampling technique based on the list of households provided by the *kebele* administrators. Therefore, the total number of participants for this part of study is 150 married women. Hence, the total number of participants (total sample size) for this study is 655 (351 Anuak +154 Nuer +150 married women).

[16] Saudi Star Agricultural Development PLC - a company producing rice on the 10,000 ha of land in Gmabella region, Abobo *woreda* - is one of the subsidiaries of Midroc Ethiopia PLC, owned by Saudi-Ethiopian billionaire Mohammed Al-Amoudi.

To collect qualitative data via KII and FGDs, various categories of the respondents were approached. KIIs were held with individuals who were believed to have in-depth understanding and knowledge on the issues of LSAI. Purposively selected key informants comprise 31 - six federal higher officials and experts, five regional officials and experts, eleven district/*woreda* official and experts, three *kebele*/village extension workers, and six *kebele*/village representatives (Annex IV). Nine focus group discussions were carried out in the three affected villages with 5 to 6 discussants. The FGD participants comprised of old and adult men, the youth, and women villagers. The FGD was separately conducted for each category of the participants to facilitate free expression of opinion and to mitigate the influence of some participants, mainly of the men, on women and youth (annex IV).

3.6. Sources and Tools of Data Collection

Both quantitative and qualitative types of data were collected from primary and secondary sources. Primary data sources were the Anuak and Nuer households; and *kebele*, *wereda*, regional and federal government office workers (officials and experts). Primary data were collected using a structured questionnaire (meant to collect quantitative data) from household heads. Key informant interview (KII), FGD, and direct observation checklists were also used to generate qualitative data. KIIs were held with individuals who were believed to have in-depth understanding and knowledge on the issues of LSAI and its impact on the livelihoods of the investment hosting communties. Besides taking key notes, the interview and FGDs were recorded by using tape-recorded. Secondary data were collected through reviewing pertinent literature from various source including journal articles, books, government reports and documents, and other relevant materials.

Household survey – a survey questionnaire was developed and administered to both affected and unaffected households and women who are employed in the farm. The survey questionnaire intends to capture key issues related to the impact of LSAI on the food security, asset/wealth, and women empowerment. The questionnaire included: demographic information; linkage between LSAI and local community; asset endowment; crop production; livelihood activities and income generated from each activity; food and non-food expenditure; food consumption score/dietary diversity score; household food insecurity access score; food insecurity coping strategies, and women's decision making practices (Annex I & II). The questionnaire was initially developed in English. But after conducting a pilot test, we came to know that majority of the enumerators in Abobo district face a serious difficulty in understanding the question items. This led us to translate the questionnaire into

Amharic language and used the translated questionnaire during the actual data collection stage. In contrast, enumerators in Itang especial *woreda* could not thoroughly read and understand Amharic question items which forced us to use the original English questionnaire in Itang. 30 enumerators (20 in Abobo and 10 in Itang districts) were trained and hired for data collection purpose.

3.7. Method of Data Analysis

Both quantitative and qualitative methods were used to analyze data generated from various sources. To analyze qualitative data, content or thematic approach (that basically involves sorting and breaking data into patterns and themes) was used. Particularly, the data collected via KII and FGD using a tape recorder were transcribed. The transcribed and field note data were brought together by using content analysis where due attention was given to understand the data by reading and re-reading the texts. The data were then sorted and organized by common themes using a matrix table. Finally, the themes were brought together for interpretation. In this study, interviewees are referenced in accordance with the code given to them. For instance, (FIC E03, 2018) refers to the third (expert) interviewee from the Federal government institution (Investment Commission) interviewed in 2018 (annex IV). The FGD participants are referenced in two ways. First, when stories, opinions, and arguments of the discussion are shared by the majority and/or all of the discussants, we refer to the number of FGD, participant category, and the *woreda* and *kebele* at which the discussion is held. For example, FGD2-MAT, 2018 indicates second FGD held with Men in Abobo *woreda*, Terkudi *kebele*. Secondly, when we directly quote a statement expressed by a particular discussant, we added specific identification number for that discussant. For example, FGD3-M-TP2, 2018 refers to an idea expressed by the second participant in the third FGD held with Men in Terudi *kebele* (annex IV). We did this coding mainly due to the sensitivity of the issue under investigation and so for the purpose of protecting the identity of the participants. On the other hand, the quantitative data were analyzed by using a descriptive method (percentages, mean, and standard deviation) as well as statistical techniques such as Propensity Score Matching (PSM), Multiple Correspondence Analysis (MCA), and Principal Component Analysis (PCA). MCA and PCA were used for index construction whereas PSM was employed for impact estimation (see the details below for both). Quantitative data management and analysis were carried out by using STATA version 13 and SPSS version 25 software.

3.7.1. Propensity Score Matching (PSM) Model

To minimize selection bias from treatment assignment in observational data sets, PSM technique was used to form a comparison group that is similar to the treatment group in terms of observable characteristics and estimate the impact of LSAI on the food security status of the households. This model is appropriate to provide cause and effect explanation in quasi-experimental design and properly construct statistical treatment and comparison groups (Rosenbaum & Rubin, 1983) and measure the magnitude of the impact in terms of the Average Treatment Effect on the Treated or affected households (ATT).

Households or women exposed to or affected by the investment and having similar basic observable characteristics (treatment group) to the unexposed/unaffected ones (comparison) but differ only in an intervention (LSAI) were matched by using PSM model. The matching was based on a distinctive variable, that is, the propensity score. Following Ronsenbaum & Rubin (1983), propensity score, the conditional probability that a given household or woman is exposed to a treatment (LSAI) given pre-treatment characteristics X is expressed as:

$$_{P}X = P(Z=1|X) = E(Z=0|X) \quad (3.1)$$

where $Z=\{0,1\}$ is the indicator of exposure to treatment (LSAI) and X is multidimensional vector of pre-treatment characteristics (covariates). The model summarizes pre-treatment characteristics of each household into a single-index (i.e. propensity score) to match the treated households with relatively similar untreated ones prior to making any comparison of outcomes.

The central elements of PSM model are individuals (sample households or married women), treatment (LSAI) represented by Z, and potential outcomes (food security status, wealth status, or women empowerment) represented by Y. For the simplification purpose, let us define the treatment indicator as Z_i, where Z_i equals 1 if a household or woman i is affected by the investment and zero otherwise. Let us define the potential outcomes (food security, wealth, or women empowerment) as $Y_i(Z_i)$ for each household or women i, where i=1,2,…N. In the potential outcome model, for each household i or woman, the difference between the outcomes of treated and comparison groups (treatment effect) can be expressed as:

$$\delta i = Y_{i1} - Y_{i0}, \quad (3.2)$$

where δi is the treatment effect, Y_{i1} is the outcome of the affected group (food security or wealth status of i^{th} treated household or empowerment level of i^{th} wage employed woman), Y_{i0} is the outcome of the non-affected (comparison) group. However, the fundamental challenge in such model is making a proper inference based on the causal relationship

between the treatment (Z) and outcome (Y) by just comparing the outcome variables of the treated and comparison groups (Y_{i1} &Y_{i0}) (De Silva, 2012). That is, we cannot estimate $\delta_i = Y_{i1} - Y_{i0}$ for each household or woman i, for the reason that two potential outcomes (such as Y_1 & Y_0) for the same household or woman cannot be observed simultaneously (Austin, 2011). The unobserved outcome is often called the counterfactual outcome (Ronsenbaum & Rubin, 1983; Austin, 2011). The counterfactual question here is: 'what would have happened to food security or wealth status of the households that exposed to the investment or women's empowerment that were hired in the farm (received treatment) if they had not exposed to or experienced such event?'

In general, for treated group (households affected by the investment or wage employed women) the outcome (food security, wealth status or empowerment level) after households exposed to the investment or women participated in the labour market Y_{i1} can be observed but the untreated outcome Y_{i0} (the food security or wealth status of households exposed to investment or the empowerment level of wage employed women if they had not exposed to or hired in LSAI projects) cannot be directly observed. Likewise, for non-affected group the treatment outcome before investment (Y_{i1}) cannot be directly observed but the untreated outcome (Y_{i0}) can be observable. This problem is often called a missing data problem which is found to be a major impediment in the impact evaluation (Smith & Todd, 2005; Heckman *et. al.,* 1997) and can be solved by techniques of casual inference (such as PSM) executed through counterfactuals (De Silva, 2012).

Since the central focus of this study is to estimate the impact of LSAI on the exposed or affected households or women, our main parameter of interest (the causal estimand) is Average Treatment Effect on the Treated (ATT). In random experiment, the expected value of ATT is defined the mean effect of those households who actually affected by the investment or of the women who actually hired by the investors. Following Heckman *et al.* (1997), this can be expressed as:

$$\delta ATT = ATT(\Delta Y|X;Z=1)=E(Y_1-Y_0|Z=1)=E(Y_1|Z=1) - \boldsymbol{E(Y_0|Z=1)} \quad (3.3)$$

where δATT is the average effect of LSAI on the food security, wealth status of the affected households or on empowerment level of the wage employed women, Z is an indicator variable representing whether a household or a woman i is actually affected by or employed in LSAI or not, $E(Y_1|Z=1)$ is the expected outcome of affected households (food security or wealth status of i^{th} affected household or empowerment level of i^{th} employed woman), $E(Y_0|Z=1)$ is the expected outcome of affected households if they hadn't exposed to the

investment or of employed women if they had not been employed (counterfactual), and X stands for a vector of control variables. As explained above, the counterfactual mean for those households being affected or for those women being employed (the second term of the right side in equation 3.3), i.e. $E(Y_0|Z=1)$ [?] is unobserved. If the condition $E(Y1|Z = 1) = E(Y0|Z = 1)$ holds, one can use unaffected households or non-income earning women as the comparison group. However, with non-randomized groups and observational data sets, this condition could not hold. Therefore, a proper substitute has to be selected to estimate ATT. ATT can thus be expressed as:

$$E(Y_1|Z=1) - E(Y_0|Z = 0) = \delta ATT + \mathbf{E(Y_0|Z=1) - E(Y_0|Z = 0)}, \quad (3.4)$$

where $E(Y_0|Z = 0)$ is the expected outcome of untreated/comparison group. The difference between the left hand side of equation (3.4) and δATT is known as selection bias - the difference between treated and non treated outcomes in absence of treatment (Caliendo & Kopeinig, 2005). Here, the true parameter, δATT can only be identified if the outcomes of households or women from the treatment and comparison groups are equal in the absence of treatment, i.e.

$$E(Y_0|Z=1) - E(Y_0|Z = 0) = 0 \quad (3.5)$$

However, the serious evaluation problem at this juncture is that $E[Y_0|Z = 1]$ is unobservable. Moreover, in actual setting selection bias term is not always equal to zero, which often leads to a biased estimation of the ATT (Austin, 2011). Three practical solutions are proposed in the literature to deal with this problem: using experimental or quasi-experimental or non-experimental strategies (De Silva, 2012). As indicated above, we employed quasi-experimental approach with matching (PSM) technique. To properly estimate the effect and address selection bias problem (that would crop up due to non-overlapping supports of X in the treated and comparison groups), unbalance in observed confounders between treated and comparison units, and unbalance in unobserved confounders between treated and comparison units) (Grilli & Rampichini, 2011), we invoked to two identification or theoretical assumptions of PSM, such as Conditional Independence Assumption (CIA) and overlap assumptions (Rosenbaum & Rubin, 1983, Caliendo & Kopeinig, 2008; Heinrich *et al.,* 2010; Austin, 2011; Grilli & Rampichini, 2011; De Silva, 2012). Conditional Independence Assumption (CIA) is one of the strong assumptions that says given a set of covariate X which is not affected by the treatment, potential outcomes are independent of the treatment assignment (Caliendo & Kopeinig, 2005), and is expressed as:

$$Y_{(0),}Y_{(1)} \perp Z|X, \ \forall X, \quad (3.6)$$

$Y_{(0)}$ $Y_{(1)}$ are values of the outcome variables for treated and comparison groups, respectively, ⊥ denotes independence, X represents a set of covariate, and Z is a dichotomous treatment variable (with *Z = 1* indicating the treatment group and *Z = 0* the comparison group). This means that selection is exclusively based on observable characteristics and that a researcher can observe all variables that influence the treatment assignment and potential outcomes at once. In other words, it assumes that after controlling for *X*, the treatment assignment is 'as good as random' (Heinrich *et. al.,* 2010, p.16). If the decision to get the treatment (investment) is exclusively random for households or women with similar values of a set of observable covariates, then we could use the average outcome of some similar households who were not exposed to the investment or of some similar non-income earning women (Grilli & Rampichini, 2011). Following Caliendo & Kopeinig (2005), conditional independence assumption (CIA) based on the propensity score (PS) can be expressed as:

$$Y_{(0),}Y_{(1)} \perp Z|P(X), \ \forall \ X \qquad (3.7)$$

where P(X) stands for the propensity score. This means that the food security or wealth status of households or women's empowerment level is independent of treatment assignment (exposure to LSAI or employment status) given that all factors influencing LSAI are controlled for.

The second identification assumption in PSM is called the overlap or common support assumption, which is expressed as:

$$0<P(Z=1|X)<1 \qquad (3.8)$$

It holds that households or women with the similar Z values have a positive probability of being both treated and untreated (Heckman *et. al.,* 1997). It indicates that for each value of covariate X, both treated and untreated households or women exist (i.e. for each treated household or woman there is untreated households or women with similar covariate X). This means that the probability of receiving or not receiving treatment for each value of X lies between 0 and 1. One of the practical challenges that subsist in this assumption is that as the number of covariates X_i increases, the probability of getting a match reduces (De Silva, 2012). Rosenbaum & Rubin (1983) proposed a solution that enables researchers to carry out matching on the propensity score *p*(X) (balancing score), which has the power to produce consistent estimates of the treatment effect similar to matching on all covariates. This study uses matching on the propensity score *p*(X) which matches treatment group to comparison group based on the single propensity score to avoid the 'curse of dimensionality' related to trying to match treatment group and comparison group on each possible characteristic X (Rosenbaum & Rubin, 1983).

To enforce a common support region which ensures that every combination of observable characteristics in the treated are also observed among comparison group, a strategy called the 'minima and maxima' (De Silva, 2012; Austin, 2011; Caliendo & Kopeinig, 2005) was used. This strategy enabled us to discard or ignore all households in the treated group whose propensity scores are lower than the minimum and higher than the maximum in the comparison group while estimating the treatment effect.

If these two assumptions hold or valid, then possible outcomes are independent of treatment assignment given observed covariates X: and treatment assignment is supposed to be strongly ignorable (Rosenbaum & Rubin 1983). In other words, hidden bias could be eliminated. And so, after conditioning on P, the Y_0 distribution observed for the matched group (non-affected households or non-income earning women) can be substituted for the missing Y_0 distribution for treated group (affected households or wage employed women) (Tagel & van der Veen, 2015). And so, if treatment assignment is strongly ignorable, at any value of a balancing score the difference between the means of treatment and comparison groups is an unbiased estimate of the average treatment effect on treated at that value of the balancing score (Grilli & Rampichini, 2011). Under this condition, ATT can be estimated as:

$$ATT= E(Y_1-Y_0|Z=1) = E(Y_1|Z=1)-E_{P|Z=1}\{E_Y(Y_0|Z=1,P\} = E(Y_1|Z=1)-E_{P|Z=1}\{E_Y(Y_0|Z=0,P\} \quad (3.9)$$

From this equation, one can estimate ATT for affected households or employed women from the first term of the right hand and for non-affected ones or non-income earning ones from the second term. Given that CIA holds and there is overlap between both groups, following Caliendo & Kopeinig (2005), the general form of PSM estimator for ATT can thus be expressed as:

$$\delta^{PSM}_{ATT} = E_{P(X)|Z=1}[\{EY_1|Z=1, P(X)\} - E\{Y_0|Z=0, P(X)\}|Z=1] \quad (3.10)$$

where $E_{P(X)}$ represents the expectation regarding the distribution of propensity score. In general, PSM method solves the problem of the missing data in the counterfactual situation by searching for each affected household or employed women, at least one non-affected or non-income earning women having the same value of propensity score. The true ATT indicates the mean difference in food security or wealth status of households or women empowerment level between affected and unaffected households or wage employed and non-income earning women, over the common support region, properly weighted by the propensity score distribution of participants (who are similar in propensity score) (Caliendo & Kopeinig, 2005). Therefore, the PSM model allows us to estimate the magnitude of changes in outcome variables in terms of average effects of the treatment for the treated

households (ATT). It is clear from the literature that estimation of propensity score requires two choices: decision regarding the model to be used for the estimation and the variables to be included in the model.

3.7.1.1. Model Choice

In principle any discrete model can be used to estimate the impact of the intervention (Caliendo & Kopeinig, 2005; Caliendo & Kopeinig, 2008) though some other strategies such as classification and regression trees (Breiman *et al.,* 1984), generalized boosted models, or discriminant analysis (McCaffrey *et al.,* 2004) are also proposed. Preference for logit or probit models (compared to linear probability models) derived from the recognized limitations of the linear probability model, particularly the un-likeliness of the functional form when the response variable is extremely skewed and predictions that are outside the [0; 1] bounds of probabilities. Therefore, in this situation, a linear probability model doesn't capture the non-linear true population regression function (Stock & Watson, 2010). Since the binary dependent variables (LSAI) permits the predicted values to be between 0 and 1 logit and probit models often yield similar results (Lechner, 2001). The main difference between the two models is that the probit regression applies the standard normal cumulative distribution while the logit uses the logistic cumulative distribution function (Lechner, 2001). The main motivation behind using logistic regression is that the logistic cumulative distribution could be computed quicker than the normal cumulative distribution function (Stock & Watson, 2010). Moreover, the logistic distribution (logit) model is mathematically easy and the parameter estimates are asymptotically consistent and efficient (Hosmer & Lemeshow, 2002). In this study, propensity scores (PS) were estimated by using a logistic model where vector of household characteristics X were regressed on (PS). Following Agresti (2013), a propensity score for a household *i*, was thus estimated based on the following logistic regression model of the treatment condition *Zi* on the covariate vector X_i:

$$P(Z_i = 1 | X_1, \ldots, X_p) = \left[\frac{exp(\beta_0 + \beta_1 X_1 + \ldots + \beta_p X_p + U_i)}{1 + exp(\beta_0 + \beta_1 X_1 + \ldots + \beta_p X_p + U_i)} \right] \quad (3.11)$$

where β_i is a vector of the regression coefficients; U_i is error term, and Xi is observed or measured covariates.

Besides finding similar comparison group for treated ones, so as to estimate unbiased propensity score for treated and comparison groups (to reduce hidden bias), we adapted some key advices indicated in the literature (Heckman *et al.,* 1997). First, we administered the same survey questionnaire for both treated and comparison groups at the same time to ensure

that the covariates used in the PSM model are measured in similar manner cross the two groups and capture the same issues. Second, we have used systematic random sampling technique to draw representative sample and over sampled comparison group to facilitate good matches and improve the precision of propensity score. Thirdly, we selected treatment and comparison groups from the same community, same geography area, and with similar livelihoods.

3.7.1.2. Variable Selection

As far as variable selection is concerned, literature provides a little guidance as to which variable(s) to include in or exclude from the PSM model. In general, there is lack of agreement in the empirical literature regarding the variables to be included in and/or excluded from the propensity score model (Austin, 2011). Some scholars argue that researchers should include all variables at their hand and should give a compelling justification for not including whichever measured variable in the propensity score model (Thoemmes & Kim, 2011). Others warn that including every variable in the model will introduce a new and an augmented bias (Brookhart *et al.,* 2006; Pearl, 2012) and so covariates that are unaffected by treatment or fixed overtime or measured before the intervention should be included (Grilli & Rampichini, 2011; Magrini & Vigani, 2014). Some others advice researchers to include all measured baseline covariates: all baseline covariates that are associated with treatment assignment, all covariates that affect the outcome (i.e., the potential confounders), and all covariates that affect both treatment assignment and the outcome (i.e., the true confounders) in the propensity score model (Austin, 2011). Moreover, it is suggested that incorporation of all variables that are potentially related to the outcome variables is highly beneficial (Imbens 2004; Ho *et al.,* 2007). However, it is argued that selection and inclusion of covariates into propensity score model must be based on the theory and extant empirical evidence (Shadish *et al.,* 2002).

In this study, variables included in the propensity model were based on some theoretical reflections that recommend to use covariates which are relatively stable over time or evidently exogenous to the treatment (Caliendo & Kopeinig 2005; Magrini & Vigani, 2014), covariates that are potentially related to the outcome variables (Imbens 2004; Ho *et al.,* 2007; Austin, 2011) as well as few previous empirical studies that examined the impact of LSAI on food security status of households and on women empowerment by using PSM model (Bamlaku *et al.,* 2015; Aynalem, 2016; Maru, 2016). However, it should be noted, that the main purpose of using covariates in the PSM model is neither for statistical significance

(Rubin & Thomas, 1996) nor for predicting selection into treatment (determinants model) (Khandker et al., 2010; De Silva, 2012) rather it is for balancing the means and covariates between the treatment and comparison groups (Rubin & Thomas, 1996; Khandker *et al.,* 2010; De Silva, 2012). The detail of variables incuded in PSM model is discussed under each chapter that deals with the impact evaluation.

3.7.1.3. Matching Algorisms

There are varied mathematical algorisms and matching strategies used to handle the search for the nearest treated household to be matched to the comparison households or women who have the most similar propensity score (Becker & Ichino, 2002; Imbens, 2004; Dillon, 2010; Heinrich, *et. al.,* 2010; Khandker *et al.,* 2010; Garrido *et al.,* 2014). Among these, we employed the most frequently applied ones such as, nearest neighbour (NN), caliper (or radius) and kernel matching strategies. All of the matching techniques were applied by using 'psmatch2' command in STATA software. However, it is vital to note that tradeoffs between bias and efficiency exist in choosing a particular strategy. The details of matching strategies are discussed in annex VII of this dissertation.

3.7.1.4. Matching Quality Evaluation

Double checking the quality of covariate balance is a critical issue in PSM. In other words, after selecting a matching strategy and carrying out matching procedures, it is imperative to check whether or not the treatment and comparison groups are balanced in the matched samples. Various matching quality diagnostic techniques such as comparing the standardized differences across treated and comparison groups (Ho *et al.,* 2007); statistical criteria or techniques (such as selection bias (*B*) with a significance test, standardized bias (*SB*), percent bias reduction (*PBR*), and variance ratio (Austin 2011); and graphs are often used. Double checking the quality of the covariates balances using several techniques provides robust evidence for proper specification of the propensity scores (Garrido *et al.,* 2014).

In this study, Standardized bias (*SB*) technique was employed to examine the distance in marginal distributions of the *X*-covariates. For each covariate *X,* SB is defined as 'the difference of sample means in the treated and matched control subsamples as a percentage of the square root of the average of sample variances in both groups' (Austine, 2011, p.15). SB before matching is defined as (Rosenbaum & Rubin, 1985):

$$SB_{Before} = \frac{(\overline{X_1} - \overline{X_1})}{\sqrt{\frac{V_1(X_k) + V_0(X_k)}{2}}} \times 100\% \qquad (3.20)$$

where $V_1(X_k)$ is the variance of the covariate for all the units in the treatment group and $V_0(X_k)$ is the variance of the covariate for all the units in the comparison group. SB after matching is defined as (Rosenbaum & Rubin, 1985):

$$SB_{after} = \frac{(\bar{X}_{1M} - \bar{X}_{0M})}{\sqrt{\frac{V_{1M}(X_k) + V_{0M}(X_k)}{2}}} \times 100\% \qquad (3.21)$$

where X_1 (V_1) is the mean (variance) in the treatment group before matching and X_0 (V_0) is the analogue for the comparison group. X_{1M} (V_{1M}) and X_{0M} (V_{0M}) are the corresponding values for the matched samples. Even if there is no a clear indication for the success of the matching procedure, in most empirical studies if a biased reduction below 5% after matching is achieved, the matching method is considered as sufficient in balancing the distributions of the covariate (Caliendo & Kopeinig, 2008; Austin, 2011). We also examined the percent of biased reduced after matching by using PBR criteria. Following Cochran & Rubin (1973) percent reduction in bias on the covariate is defined as:

$$PBR = \frac{B_{before\ matching} - B_{after\ matching}}{B_{before\ matching}} \times 100\% \qquad (3.22)$$

Albeit there is no pre-specified cut-off value for *PBR*, Cochran and Rubin (1973) suggested an eighty percent of *PBR* as a sufficient amount of bias reduction. A two-sample t-test was also used to check if there are significant differences in covariate means for treated and controlled groups after matching. Even though differences are expected before matching, covariates should be balanced after matching and so no significant difference should be observed between the groups. Based on the suggestion of Sianesi (2004), we used pseudo-R^2 to check after matching is completed there should be no systematic differences in the distribution of covariates between both treated and comparison groups and so; the pseudo-*R*2 should be quietly low. Furthermore, we also performed an F-test on the joint significance of all covariates. As a rule of thumb, the test should not be rejected before but should be rejected after matching (Sianesi, 2004). This provides a clear evidence for an assessment of matching quality to be used to determine the propensity score specification.

3.7.1.5. Sensitivity analysis

Sensitivity analysis is imperative in PSM due to some strong assumption, such as, CIA that says selection process is accounted for by observable characteristics. It is suggested that sensitivity analysis should always be carried out after impact estimation and complement propensity score analysis (Steiner & Cook, 2013). We run sensitivity analysis by using 'Rosenbaum bounds approach' to assess the potential impact of unobserved confounders on

the treatment effect. We used the rbounds package in STATA program to check Rosenbaum's method of sensitivity analyses for matched data. According to this test, if conclusions change for critical values of gamma (Γ) is slightly above one, the analysis signifies the existence of the high sensitivity to hidden bias (Rosenbaum, 2005).

3.7.1.6. Test for Heteroskedasticity

The Breusch-Pagan (Cook-Weisberg test) for hetroskedasticty was carried out to test if the error terms have constant variance or not. This technique tests the null hypothesis that the error variances are all equal against the alternative hypothesis that the error variances are a multiplicative function of one or more variables. In our case, since the p value is greater than 0.05, heteroskedasticity is not a problem (Annex VIII).

3.7.2. Food Security Measurement

The notion 'food security' does not have a single and universally accepted definition due to its multidimensional and unobservable nature (Barrett & Lentz, 2009). In this study, food security status of households is used as an outcome variable we are interested to measure and notice whether or not it is impacted by the interventions such as LSAI. To properly capture the multi-dimensional nature of food security at household level, it is operationalized along four dimensions: availability, access, utilization, and economic vulnerability.

3.7.2.1. Food Availability Component

In this study, food availability is conceptualized as the physical presence of food in a locality or to the household from all sources (such as own production or gift or barter or food aid). We measured food availability by using two indicators: daily calorie consumption and Months of Adequate Household Food Provision (hereafter MAHFP). To estimate the average daily amount of food energy (i.e. kilocalories) consumed by a household member, we used daily calorie intake indicator based on per adult equivalents. We opted per adult equivalent given that it accounts for demographic composition of the household (such as sex and age) by considering variations in household food composition and varied individual energy requirements. This approach is often preferred over per capital one (which is obtained by dividing total household calories by the number of household members) given that it increases the precision of household food energy needs computation (Mathiassen *et al.,* 2017). We calculated per adult equivalent by converting each household member to an adult equivalent unit (henceforth AEU) using nutrition based adult equivalent conversion factor developed by Dercon & Krishnan for Ethiopia (Dercon & Krishnan, 1998) (see Table 3.3). To do this, we created AEU variable by assigning an age-sex category to each individual in

the household, calculating the number of members in each age-sex category in each household, multiplying the number of household in each category by the corresponding conversion factor, and adding up the number of adult equivalents to obtain the total number of adult equivalents for each household.

To estimate calorie consumption, we followed standard procedures indicated in the literature. First, we converted all reported quantities into grams. All quantities of food reported by kilograms and litres are multiplied by 1000 to get gram metric quantities. Food quantities reported by local units are converted to kilogram (to match units with the conversion factor and measurement unit) and then multiplied it by 1000 to obtain gram metric quantities. The conversion of local units to standard measurement unit was done in consultation with local experts and community representatives (especially women).

Table 3.3: Nutrition based adult equivalent conversion factor**.**

Age	Sex	
	Male	Female
<1	0.33	0.33
1-2	0.46	0.46
2-3	0.54	0.54
3-5	0.62	0.62
5-7	0.74	0.70
7-10	0.84	0.72
10-12	0.88	0.78
12-14	0.96	0.84
14-16	1.06	0.86
16-18	1.14	0.86
18-30	1.04	0.80
30-60	1.0	0.82
60 and above	0.84	0.74

Source: Dercon & Kirshnan (1998, p.40).

Food items reported by monetary values are converted to metric quantities by dividing the expenditures by local market price. The practice of eating food outside the home is very low in the study areas and thus this category is not included in the computation. We believe that excluding this category does not affect our estimates significantly. Secondly, after we converted all quantities to grams, we once again converted grams to calories (to estimate total daily calorie consumption) by taking the quantity consumed per household for each food item and multiplying it by its energy value (kilocalories) based on the Ethiopian Food Composition Table developed by Ethiopian Public Health Institute for each region (2013) (we used food composition table prepared for Gambella region) and divide the value by seven. In our questionnaire, the survey reference period (recall period) was seven days; and so, to get the daily value, we divided the total calorie consumption of each household by

seven. Finally, to get a daily calorie intake per adult equivalent we divided total daily energy value (kilocalories) of each household by its respective AEU.

We computed household's caloric adequacy by using the universal threshold of 2,100 Kcal per adult equivalent per day (WFP, 2015). Households with daily Kcal per adult equivalent below 2,100 are classified as food insecure. In general, we adopted Consolidated Approach to Reporting Indicators of Food Security (CARI) classifications method of the World Food Program (WFP) (2015) to determine the status and prevalence of household food security. This approach classifies households into four categories as follows: 1=food secure, 2=mildly food insecure, 3=moderately food insecure and 4=severely food insecure. The description of each category is presented in the Table 3.4.

Table 3.4: Description of Food Security Classification.

Food security Category	Description	Food secure/Food insecure
Food secure	A household is able to meet essential food and non-food needs without depletion of assets	Food secure
Mildly food insecure	A household has minimally sufficient food consumption, but incapable to afford some essential non-food expenditures without depletion of assets	
Moderately food insecure	A household has food consumption gaps, OR, Marginally able to meet minimum food needs only with accelerated depletion of livelihood assets.	Food insecure
Severely food insecure	A household has large food consumption gaps, OR, has extreme loss of livelihood assets that will lead to large food consumption gaps, OR worse.	

Source: WFP (2015, p.29)

We converted household's daily calorie intake into the corresponding four point food security scale categories as illustrated in Table 3.5.

Table 3.5: Grouping household's daily calorie intake into four point food security scale.

Indicator	Classification			
	Food secure (1)	Mildly food insecure (2)	Moderately food insecure (3)	Severely food insecure (4)
Food Energy Intake	kcal/p/d ≥ 2100	kcal/p/d < 2100 kcal/p/d ≥ mean (MDER, 2100) i.e. ≥1925	kcal/p/d < mean (MDER, 2100) i.e. < 1925, kcal/p/d ≥ MDER i.e. ≥ 1750	kcal/p/d < MDER i.e. < 1750

Note:

(1) Households with a daily calorie intake per adult equivalent greater than 2,100 calories

(2) Households with a daily calorie intake per adult equivalent less than 2,100 calories but greater than the mean of a) the national Minimum Dietary Energy Requirement (MDER) (which is the weighted average of the minimum energy requirements of the different gender-

age groups in the population) and b) 2,100. The national MDER is obtained from Food and Agriculture organization of the United Nations (FAO). FAO has established MDER for 182 countries based on the gender and age and different levels of physical activity to estimate the prevalence (percentage) of the undernourished population in each country. For Ethiopia, MDER was estimated at 1730 (1990 to 1992), 1730 (1995 to 1997), 1740 (2000 to 2002), and at 1750 (2006 and 2008). We used ***1750*** as the national MDER. Therefore, the mean of the national MDER (1750) and 2100 is 1925 (i.e. 1750+2100/2=1925).

(3) Households with a daily calorie intake per adult equivalent greater than or equal to the national MDER (i.e. 1750) but less than the mean of 1) the MDER and 2) 2,100 (i.e. 1925).

(4) Households with a daily calorie intake per adult equivalent less than the national MDER (1750).

The second indicator used to estimate household food availability is Months of Adequate Household Food Provision (MAHFP). This indicator is emerged as food security measure since 1990s where Africare developed the tool to identify vulnerable groups and measure its program impact (Nanama & Souli, 2007). The indicator captures changes in the household's ability to deal with exposure to food insecurity in such a way that ensures food availability over a minimum level the year round (Bilinsky & Swindale, 2010). The main purpose of this indicator is to identify the months in which a household is unable to get adequate food in spite of source of the food (be it production, purchase, barter or food aid) (Bilinsky & Swindale, 2010). First, respondents were asked to indicate whether or not they had enough food (from all sources) to eat during all the months in the past twelve months. And then, those households that were unable to provide adequate food for their family during all the months were asked to specify in which month(s) during the past twelve months they did not have enough food to meet their family's food needs. As suggested by Bilinsky & Swindale (2010), albeit in our questionnaire the response options for the months start with the January, to facilitate easy recall period and get correct information, we asked the respondents to think back over the past twelve months, starting with the month the interview is being carried out. Values such as 0 and 1 were assigned for each month where 0 indicates the absence of food shortage while 1 shows the household had encountered food scarcity to meet family's food need in that month. To compute the MAHFP for each household, we carried out a simple computation by deducting the total number of months out of the past twelve months that the household was unable to meet family's food needs from twelve months of the year.

Based on the MAHFP value of each household, to determine the status and prevalence of household food security we classified households into four food security scale categories. We conducted these classifications based on the previous empirical research carried out by Namana & Souli (2007) in Burkina Faso and Getachew *et al.* (2018) in Ethiopia. The authors classified households into three categories with some differences. For example, Namana & Souli (2007) classified households as food secure when they were able to meet their family's food needs for all 12 months, moderately food insecure when they were able to fulfill their food needs for nine months, and most food insecure when they were unable to meet their family's needs for more than three months during the past year. On the other hand, Getachew *et al.* (2018) classified households that were able to satisfy their food requirement for 10–12 months, 7-9 months, and 6 and less months as food secure, moderately food insecure, and the most food insecure, respectively. We modified the authors' categorization and classified the households into four categories. We categorized households as food secure when they were able to satisfy their family's food needs for all twelve months, mildly food insecure when they were able to meet their family's food requirements for 10 to 11 months, moderately food insecure when they were able to meet their food needs for 8 to 9 months, and severely food insecure when they encountered food shortage for 5 and above months.

3.7.2.2. Food Access Component

Household's food access depends on his/her ability to acquire food either from its own production, purchases, gathering, stocks, or obtain via food transfers from relatives, the community, government or donors. In this study food access is conceptualized as households' capacity (in terms of having sufficient income or other resources) to purchase or procure or obtain adequate levels of appropriate food needed to maintain consumption of sufficient diet/nutrition level (Coates *et al.,* 2007). This definition shows that food access represents the demand side of food security.

In this study, we used Household Food Insecurity Access Scale (henceforward HFIAS) as an indicator to measure access part of food (in)security. The HFIAS is one of the recent food security measurement tools that is designed to capture the common experience of household food (in)security throughout countries and cultures (Coates *et al.,* 2007), but needs just a slight adjustment to the local contexts (Maes *et al.,* 2009). The argument behind HFIAS method is that when households experience food insecurity (access) they often roused to develop foreseeable reactions or responses that can be described and measured through a household survey (Coates *et al.,* 2007).

The HFIAS is designed as an easy to use and a simple measurement tool in such a way that capture household's experience of difficulties in accessing food based on the three domains of food insecurity believed to be universal across socio-cultural contexts (Frongillo *et al.,* 2003; Coates *et al.,* 2006; Swindale, & Bilinsky, 2006; Webb *et al.,* 2006; Coates *et al.,* 2007; Carletto *et al.,* 2013). The domains include (a) feelings of anxiety and uncertainty about the household food access, (b) perceptions of the households that food is of insufficient quality (including variety, preferences, and social acceptability), and (c) inadequate food intake and its physical consequences (Coates *et al.,* 2007). The HFIAS as an indicator of the access component of food (in)security has been validated and in use in many developing countries including Ethiopia (Maes *et al.,* 2009; Becquey *et al.,* 2010; Knueppel *et al.,* 2010; Seifu *et al.,* 2015).

We used standard HFIAS questionnaire (tested and validated in the developing countries – including Ethiopian - context), which has a list of 9 detailed questions (occurrence questions) representing universal features of the experience of problems of food access such as worry and availability of and accessibility to food for the household during the previous seven days. These questions were followed by other nine frequencies – of - occurrence questions that were asked as follow-up questions to every occurrence question to find out how often the event occurred. We followed the standard scoring procedure recommended in the literature (Coates *et al.,* 2007). We computed the HFIAS score for each household by adding up the frequency of occurrence question responses code (that is, Q1a + Q2a + Q3a + Q4a + Q5a + Q6a + Q7a + Q8a +Q9a) which could range from 0 (food security) to 27 (severely food insecurity). The maximum score for a household whose response to all frequency-of-occurrence questions is "often" (coded as 3) could be 27 and the minimum score for a household whose response is "no" to all occurrence questions could be 0. The higher HFIAS shows the household had experienced more food insecurity (access) and vice versa (Coates *et al.,* 2007).

To determine food (in)security status and prevalence, we computed a categorical indicator called the Household Food Insecurity Access Prevalence (HFIAP). We categorized households into four hierarchies of household food insecurity (access): food secure (coded as 1), mildly food insecure (coded as 2), moderately food insecure (coded as 3) and severely food insecure (coded as 4) based on the respondents' reply to frequency – of - occurrence questions. Those households that gave affirmative response (i.e. yes) to more sever conditions and experienced those conditions more frequently are classified as steadily food insecure and vice versa. We created these categories through the following algorithm classification process (Table 3.6) by using STATA software version 13.

Table 3.6: HFIAS Classification Algorithm.

HFIAS category	Algorithm classification process
Category 1 = Food secure	If [(Q1a=0 or Q1a=1) & Q2a=0 & Q3a=0 & Q4a=0 & Q5a=0 & Q6a=0 & Q7a=0 & Q8a=0 & Q9a=0]
Category 2 = Mildly food insecure	If [(Q1a=2 or Q1a=3 or Q2a=1 or Q2a=2 or Q2a=3 or Q3a=1 or Q4a=1) & Q5a=0 & Q6a=0 & Q7a=0 & Q8a=0 & Q9a=0]
Category 3 = Moderately food insecure	If [(Q3a=2 or Q3a=3 or Q4a=2 or Q4a=3 or Q5a=1 or Q5a=2 or Q6a=1 or Q6a=2) & Q7a=0 &Q8a=0 & Q9a=0]
Category 4 = severely food insecure	If [Q5a=3 or Q6a=3 or Q7a=1 or Q7a=2 or Q7a=3 or Q8a=1 or Q8a=2 or Q8a=3 or Q9a=1 or Q9a=2 or Q9a=3]

Source: Coates *et al.* (2007)

3.7.2.3. Food Utilization Component

As indicated in chapter two, food utilization mainly involves the ability of people to obtain complete biological benefits from food, based on food safety, food quality and diversity, health care, and sanitation (FAO, 2006). Following this, we conceptualized food utilization as the household's capacity to fulfil his/her biological needs derived from nutritious food (food with quality and diversity). We measure utilization aspect of food security by using two indicators: Household Dietary Diversity Score (HDDS) and Food Consumption Score (FCS). These indicators are often used as proxy indicators to capture nutritional quality of diet (Swindale & Bilinsky, 2006) since a variety of foods in the diet is required to ensure a sufficient intake of important nutrients (Faber *et al.,* 2009).

Research shows that HDDS, i.e. the number of diverse food groups consumed by household members over a given reference period (usually 24 hours) is one of the most widely used proxy indicators of diet quality for the following justifications. A more diversified diet is a vital outcome in and of itself (Hoddinott & Yisehac, 2002); a more diversified diet is linked with various enhanced outcomes in the areas of birth weight, child anthropometric status, and healthier hemoglobin concentrations (Hoddinott & Yisehac, 2002; Kant, 1996); a more diversified diet is greatly associated with factors such as caloric and protein sufficiency, proportion of protein from animal sources, and other intake of a variety of nutrients (Hoddinott & Yisehac, 2002; Tarini *et al.,* 1999; Hatløy *et al.,* 1998; Onyango *et al.,* 1998), and household income (Hoddinott & Yisehac, 2002). This indicator is developed to easily collect data from households with in a short period of time and its computation is straightforward.

Twelve set of food groups proposed by FANTA (Swindale & Bilinsky, 2006) such as: cereals; root and tubers; vegetables; fruits; meat, poultry, offal; eggs; fish and seafood; pulses/legumes/nuts; milk and milk products; oil/fats; and sugar/honey were used to examine the dietary diversity status of the households in the study areas. Households were asked to indicate which food group did they consume in the last 24 four hours. The responses were

coded as one if a household had consumed a particular food group and zero if it had not consumed. We focused on the number of food groups rather than the number of different foods consumed for the reason that consumption of food groups offers a number of diversity in both macro- and micronutrients (Hoddinott & Yisehac, 2002) and is a stronger predictor of dietary quality (Hatløy *et al.,* 1998). For example, a household that consumed five different foods which might all be cereals (rice, maize, sorghum, wheat, and Teff) is dietary poor than the one that on average consumed five different food groups (cereals, fruits, meat, egg, and fish). Therefore, the computation of HDDS for each household is based upon the 12 food groups mentioned above.

We calculated HDDS by adding up the number of food groups consumed by each household during the last 24 hours. The value of the scores range from 0 to 12 wherein the lowest value indicates poor dietary diversity (sever food insecurity) and the other way round (Swindale & Bilinsky, 2006; Carletto *et al.,* 2013). There are no accepted standards or internationally agreed upon cut off points for HDDS in the literature. It is suggested that cut off points should be defined in the context where they are adopted by taking into consideration local food systems and dietary patterns (Ruel, 2003). For example, Hatløy *et al.* (1998) used 6 as a threshold to classify households into two categories based on their dietary diversity scores. Faber *et al.* (2009) used 4 as cut off point and classified households with DDS less than or equal to 4 as low dietary diversity (food insecure) and above 4 as high dietary diversity (food secure). On the other hand, Getachew *et al.* (2018) categorized households into three groups based on the HDDS as follows: HDDS $\leq$ 5 low dietary diversity (severely food insecure), HDDS 6-7 medium dietary diversity (moderately food insecure), and HDDS $\geq$ 8 high dietary diversity (food secure). By taking the local context into account, we adopted thresholds recommended by IFPRI (Wiesmann *et al.,* 2009) (i.e. HDDS > 6 good dietary diversity, HDDS 4.5-6 medium dietary diversity, and HDDS < 4.5 low dietary diversity).

FCS is another indicator that we used to examine the unitization dimension of food security. This indictor mainly captures the dietary diversity, food frequency, and the relative nutrient quality of various food groups (Hatløy *et al.,* 1998; Ruel, 2003; Torheim *et al.,* 2004). It is a composite score describing the frequency of weighted diet diversity through a standard weight for eight food groups (Table 3.7) which reflects nutrient density. Based on the works of Ruel (2003) and Hoddinott & Yohannes (2002), the World Food Programme (WFP) has developed FCS as a proxy indicator of food security where data are collected from households on a seven-day recall period of frequency of consumption of numerous food

groups. In our case, respondents were asked to indicate the number of days they consumed a particular food item or group in the last seven days (the number of days ranges from 0 to seven). The responses were coded based on the number of days a household consumed a distinctive food item or group. For example, if a household did not consume any food item or group in the last seven days, the response was coded as zero and when consumed all seven days it was coded as 7.

We calculated FCS using the frequency of consumption of eight food groups consumed by a household during the seven days before the survey by using the following formula:

$$FCS = (a \text{ cereals}*X_{cereals}) + (a \text{ pulses}*X_{pulses}) + (a \text{ vegetables}*X_{vegetables}) + (a \text{ fruits}*X_{fruits}) + (a \text{ animal}*X_{animal}) + (a \text{ milk}*X_{milk}) + (a \text{ sugar}*X_{sugar}) + (a \text{ oil}*X_{oil})$$

$$= \sum_{i=1}^{m} a_i x_i \qquad 3.23$$

where a_i is a relative nutritional weight of food group, X_i is the number of days of consumption (frequency) for each food group (<= seven days), and m is the number of food groups (Table 3.7). We dropped condiments food group from our calculation due to its zero nutritional value. The weighted score of FCS has a range of 0 to 112, the maximum value (112) indicating that all food groups are consumed by a household every single day a week and vice versa. Once we obtained FCS, standard thresholds of 21 and 35 proposed by WFP (2008) were used to define the three food consumption groups. We recoded FCS variable to a categorical one to identify and understand the status and prevalence (the percentage of food secure and food insecure households). And so, households' with FCS $\leq$ 21 were classified as having poor food consumption (severely food insecure), those households whose FCS falls between 21.5 and 35 were categorized as having borderline consumption or vulnerable group (moderately food insecure), and households with FCS >35 were classified as having acceptable consumption (food secure).

Table 3.7: Food groups and their weight in the FCS Approach**.**

Food Items	Food Groups (definitive)	Weight (definitive)	Justification
Maize, maize porridge, rice, sorghum, millet pasta, bread, and other cereals	Main staples (cereals and tubers)	2	Energy dense, protein content lower and poorer quality than legumes, micronutrients (bound by phytates)
Cassava, potatoes, and sweet potatoes			
Beans, peas, groundnuts, and cashew nuts	Pulses	3	Energy dense, high amount of protein but of lower quality than meat, micronutrients (inhibited by phytates), low fat
Vegetables and leaves	Vegetables	1	Low energy, low protein, no fat, micronutrients
Fruits	Fruits	1	Low energy, low protein, no fat, micro nutrients
Beef, goat, poultry, pork, eggs, and fish	Animals (meat and fish)	4	Highest quality protein, easily absorbable micronutrients (no phytates), energy dense, fat. Even when consumed in small quantities, improvements to the quality of diet are large.
Milk, yogurt, and other diary	Milk	4	Highest quality protein, easily absorbable micronutrients, vitamin A, energy. But milk could be consumed in very small amounts and should then be treated as condiments, and so reclassification in such cases is needed.
Sugar and sugar products	Sugar	0.5	Empty calories. Usually consumed in small quantities.
Oil, fat, and butter	Oil	0.5	Energy dense but usually no other micronutrients. Often consumed in small quantities.
Spices, tea, coffee, salt, fish power, small amount of milk for tea	Condiments	0	

Source: WFP (2008)

3.7.2.4. Stability/Vulnerability Aspect

Food stability is mainly focused on the changes in the household food security condition over time. Pieters *et al.* (2013) identified two components of stability: vulnerability - the risk that food security status of the household is undermined by some events such as LSAI, and resilience - the ability and the time needed to renovate from or transcend the pre-shock status. Our focus here is on the vulnerability or in-sustainability dimensions of food insecurity described in (Maxwell, 1996) which we conceptualized as the possibility that food security status of the affected households is destabilized by LSAI. To capture the economic vulnerability Coping Strategies Index (CSI) and Food expenditure share were used as proxy indicators.

CSI, is one of widely used proxy indicator of food security designed to capture economic vulnerability or coping capacity based on the household's food consumption behavior (coping strategies) such as dietary change, food seeking, household structure, and rationing strategies (Maxwell, 1996). The indicator is quick and easy to use, simple to understand and analyze, provides rich information on the transitory food insecurity, and well correlates with other indicators of food security (Maxwell, 1996; Maxwell *et al.,* 2014). CSI measures behaviour - the things that most people do when they do not have enough food and/or money to buy food (Maxwell *et al.,* 2003). The logic is that as the problem of food availability and

access worsens, households are more likely to utilize strategies that are less reversible, and so signify a more acute form of coping and higher food insecurity (Devereux, 2000).

Respondents were asked to indicate what they do when they do not have enough food and/or money to buy food in the past 30 days. We used 30 days as a recall period based on the CARE/WFP (2003) suggestion. To compute CSI, we used three pieces of information. The first one is the list of locally applicable coping strategies/behaviours that we adopted from literature based on the four classes of strategies: dietary changes, short-term measures to increase household food availability, short-term measures to decrease numbers of people to feed, and rationing or managing the shortfall (Maxwell *et al.,* 2003). The second is the relative frequency – of – occurrence of the strategies. If a household employed a particular strategy all the time (every day in a week) we coded it as 7; if a strategy is employed pretty often (3 to 6 times per week) we coded it as 4.5 (the mid-point of the range 3 and 6); if it is used once in a while (1 to 2 times per week) we coded it as 1.5 (the mid-point of the range of 1 and 2); if the strategy is employed hardly at all (less than 1 times per week) we coded it as 0.5; and if a household never employed that particular strategy we coded it as zero. The third include the severity level - weight of each strategy that is generated through focus group discussion (FGD). The strategies were grouped into four severity levels: very severe=4, severe=3, moderately sever=2, and least severe=1. Six different focus groups were consulted in each *woreda* to express their perceptions and opinions regarding the severity level of diverse strategies. The average weight of severity level of each strategy was calculated and finally the most frequent response is taken as consensus rank. The results of these exercises are presented in annex IX.

We, thus, multiplied the relative frequency of each strategy by its respective severity level and added up the results to obtain the CSI score. Mathematically, we used the following formula:

$$CSI\ score = (fCS1*sCS1) + (fCS2*sCS2) + (fCS3*sCS3) + (fCS4*sCS4) + \ldots + (fCS12*sCS12)$$

$$= \sum_{i=1}^{n} f_i s_i \qquad 3.24$$

where f_i is the relative frequency – of – occurrence of the strategy and s_i is the level of severity (weight). The score reflects the current and seemingly future food security status of the households (Maxwell, 1996). The higher score shows that a household is greatly food insecure due to adapting the most sever coping strategy more frequently. Once we get CSI

score for each household, we created a categorical variable to examine the status and prevalence of households' food (in)security based on the thresholds proposed by Maxwell and his colleagues in Ethiopian context (2014). The authors classified households into four categories as follows: households with CSI score from 0 to 2, food secure (1); from 3 to 12, mildly food insecure; from 13 to 40, moderately food insecure; and above 40, severely food insecure (Maxwell *et al.,* 2014).

The second indicator used to capture the economic vulnerability of households is food expenditure share (the share of total money spent on food items to total expenditure of a household in a month). Research shows that compared to a relatively rich or food secure households that spend a smaller proportion of their total expenditure on food, poor or more food insecure households expend a huge amount of their money on food items (WFP, 2015; 2017). Therefore, the higher proportion of total expenditure on food implies that the household is more economically vulnerable to food insecurity (WFP, 2017).

Households were asked to specify the total amount of money they spent (both in cash and credit) on various food and non-food items in the past 30 days and 6 months (long-term expenditure), respectively. Based on the data, we created monthly food expenditure variable for each household by summing together the total food expenditure for the 30 days. Likewise, we created a variable called 'non-food expenditure 1' by adding together the money spent by households on non-food items in the past 30 days. We also created a third variable called 'non-food expenditure 2' by adding together all long-term (6 months) non food expenditure and dividing it by 6 to get monthly expenditure. Finally, we calculated food expenditure share by dividing monthly food expenditure by the total of monthly food expenditure, non-food monthly expenditure 1, and non-food monthly expenditure 2. Mathematically, the following formula was used:

$$Food\ expenditure\ share\ = \frac{\text{Monthly Food Expenditure}}{\text{Monthly food expenditure} + \text{non-food monthly expenditure 1} + \text{non-food monthly expenditure 2}}$$

To understand the status and prevalence of food security, we converted the 'food expenditure share' indicator to the 4-point categorical scale, based on the cut off points proposed by the (WFP, 2017). And so, households with food expenditure share < 50% of the total expenditure were categorized as food secure (1), with food expenditure between 50% and 65% as mildly food insecure (2), with food expenditure >65% but <75% as moderately food insecure (3), and those with food expenditure >=75% as severely food insecure (4).

3.7.3. Asset Based Measurements

Livelihood asset/wealth index is used as an outcome variable we are interested to measure and scrutinize whether or not it is impacted by the intervention variable (LSAI). Income and consumption are the most widely and frequently used indicators to capture wealth status at the household level (OECD, 2013). While many economists commonly apply income as a proxy indicator to measure wealth, welfare, and other indicators of wellbeing, income data has weaknesses in terms of both accuracy and measurement (due to its variability and seasonality), particularly in the context of developing countries (Moser & Felton, 2007). Consequently, expenditures and consumption are often used as proxy indicators to measure the socio-economic status of the households (Chen & Ravallion, 2000; Ellis, 2000). Expenditure data are utilized to resolve some of the problems of income, such as income variability or seasonality. For example, a household can save his/her income from flush times as a buffer against bad times. This "consumption smoothing" is both theoretically appealing and has empirical regularity (Moser & Felton, 2007). However, several similar problems of income can also be an issue to expenditure, for example measuring the value of exchanging good for good. Work done for oneself, such as house improvement, and the proportion of goods consumed from own production (especially in rural settings) also tends to be missing from expenditures (Moser & Felton, 2007).

The major justifications for using asset index thus include: it requires less recall and measurement problems and easily measured (Rutstein & Johnson, 2004); assets could give a superior picture of long-term living standards than an income snapshot since they have been accumulated over time and last longer (Moser & Felton, 2007). Likewise, as Filmer & Pritchett (2001) note asset-based measures show an individual's or a household's long-run economic status and so do not certainly justify short-term fluctuations in economic well-being or economic shocks. Therefore, in this study, we constructed a household asset index - a recent and popular approach (Moser & Felton, 2007; Wai-Poi *et al.,* 2008a) to measure the wealth status of households. At the moment, there is a substantial literature that applies asset indices as a proxy indicator to measure welfare or wealth status of the households in development and policy studies (Moser & Felton, 2007). Particularly, development economists have strongly advocated the use of assets, mainly, to complement income and consumption-based measures of welfare and wealth in developing countries (Moser & Felton, 2007) though asset-based index overlooks the age and quality of the asset (Moser, 1998).

Assets comprise physical, financial, social, human, and natural capital. In this study, the asset is conceptualized as an assortment of capital or resources upon which households depend to generate income, meet their basic needs, and handle risk, stresses, and shocks (Woller, 2009). On the other hand, wealth is a multi-dimensional notion conceptualized as household's accumulation of the natural, physical, human, financial, and social capital. Therefore, to properly address the multi-dimensional nature of wealth, we operationalized it along these five livelihood assets dimensions used as indictors to capture wealth status of the households.

In this study physical capital is conceptualized as the combination of productive (such as agricultural machineries, tools, and equipments) and non productive (such as watch, radio, TV, phone, table, chair, stove, etc) assets of the households; household amenities (housing characteristics, cooking energy, light sources, toilet, water supply, etc); and basic transport infrastructure that enhance households' wealth status. We used numerous indicators to measure the physical capital of the households (annex V). At a household level, we conceptualized human capital as a combination of skills, knowledge, labor capability and health status that could contribute to generating household's livelihood. Highest education level attained by household heads, perceived health status of the households, dependency ratio, family size, and various kinds of training received were used as indicators to measure human capital (annex V).

In this study, social capital is operationalized as institutions or associations (formal and informal), relationships, trust, and norms that facilitate social interaction among the community for mutual benefit (that could be generated by LSAI) and mitigate the opportunistic behaviour of the investors (as well as the adverse impact of the investments on the community). We utilized various indicators related with the community's collective action, trust, and formal and informal institutions to capture the social capital of the households (annex V). Then again, financial capital is conceptualized as financial resources such as cash income and remittances, savings (in cash and in-kind), access to credit, and assets that can be easily liquidated (livestock, jewellery, etc) that enable households to pursue different livelihood strategies and improve their wealth status. This dimension of the asset was measured by indicators like total yearly income of a household, access to credit, saving, livestock (in terms of TLU[17]), and jewellery

[17] Conversion factors proposed by Storck *et al* (1991) to calculate Tropical Livestock Unit (TLU) in Ethiopian context was used to standardize the measurement of livestock. TLU is computed as (1 * the number of cow) + (1 * the number of ox) + (0.75 * the number of heifer) + (0.75 * the number of bull) + (0.2 * the number of calf) + (0.13 * the number of sheep) +

ownership (annex V). Finally, natural capital is conceptualized as farmland, forests, and water resources that people have access to and use to produce their means of living and improve the livelihoods. It is measured by land size and improved land management practices undertaken by the households to enhance the natural capital (annex V).

3.7.3.1. Asset/Wealth Index Construction

At the conceptual level, the construction of an asset index appears to be a straightforward exercise but somewhat complex in practice, requiring an answer for two main methodological questions: (a) which variables should be included? – variable decision (b) how should they be weighted? – weight decision (Wai-Poi *et al.,* 2008a). The second question has got more attention in the literature than the first, conceivably due to less reliance of the former on the theories regarding variable selection (variable selection is often based on the availability of the datasets) (Wai-Poi *et al.,* 2008a).

3.7.3.1.1. Variable selection

There is no 'one best' approach and/or practice for selecting variables which are indicators of socio-economic or wealth status of households (Montgomery *et al.,* 2001); although seminal research can assist the search for assets that are powerful determinants of wealth status of households (Howe *et al.,* 2008). Broadly speaking, wealth status is a latent multidimensional notion that can be estimated by using a set of observed asset ownership proxy indicators. Therefore, incorporation of a wide range of variables or proxies covering each of the latent asset variables is indispensable. Our questionnaire involves various question items derived from five capital assets: physical, social, human, financial, and natural (discussed above) that reflect the wealth status of a household in the study area. Based on the livelihood literature and SLF, we have tried to include a broad range of variables in order to properly capture the wealth status of households (annex V). We calculated five indices separately for each dimension based on the various asset variables and other indicators set up to measure wealth status of the households. Most of the variables were categorical (for example, has/does not have a mobile phone) and are coded as dichotomous variables.

3.7.3.1.2. Weight Allocation and Data Requirement

The literature explains various approaches regarding weight assignment to each asset component: arbitrary, price based, and statistics based. Unfortunately, none of them are adequately grounded in economic theory; they are rather arbitrary (Wai-Poi *et al.,* 2008a). One of the traditional methods to construct an index from the indicator variables is just to add

(0.13 * the number of goat) + (0.013 * the number of Poultry), other animals (such as camel, horse, and donkey) that are not found in the study are excluded from the calculation.

up the number of indicators each household possesses (Wai-Poi *et al.,* 2008a). However, the trouble here is that weights are arbitrarily assigned to all indicator variables by giving equal weight to each of them. To address this problem, the researchers have often been used prices to weight each indicator to construct an index. The price approach uses information from price to value the asset items where finally the exceptional items are received a higher weight than pervasive ones (Moratti & Natali, 2012). However, such exercises have created some difficulties in computing the index mainly due to temporal and spatial price variability of the items as well as high data collection costs and informal business activities in developing countries (Sahn & Stifel, 2003; Wai-Poi *et al.,* 2008a). Therefore, due to these difficulties, researchers have been using data-driven non-price-weighted indices, particularly using weights generated by statistical techniques such as Principal Component Analysis (PCA), Multiple Correspondence Analysis (MCA), Principal Factor Analysis (PFA), and regressions of the asset on other socio-economic position measures.

Every household is categorized by an asset index, A_i, which is a function of a set of variables a_{ij}, representing their ownership of asset *j*:

$$A_i = f(a_{ij}) = f(a_{i1},..., a_{ik})\ j=[1;k] \qquad 3.25$$

Each household asset index, A_i, can, therefore, be calculated as the sum of assets (durables or other households' capital description) owned by the household, to which a weight is assigned for each asset:

$$Ai = (v1 \times ai1) + (v2 \times ai2) + ... + (vk \times aik) \qquad 3.26$$

Principal Component Analysis (PCA) is one of the widely used statistical based techniques to construct a wealth index. It is a type of factor analysis that often used to reduce dimensions of data, or find out hidden variables, by digging out a linear combination that pre-eminently depicts the co-variance among all components (Joliffe, 2004; Abeyasekara, 2005). Construction of the index is based on the household's asset (capital) data by creating an *m* x *n* matrix, **X**, where ***n*** represents ownership of asset items (columns) to be collected from ***m*** households (rows). Next, every component of the matrix **X** is normalized by deducting the column mean from it and dividing the variations by the column standard deviation to create a new *m* x *n* matrix, **Y**. Furthermore, *n* x *n* correlation matrix, **R**, is calculated from the normalized data matrix, **Y**. Based on this, following Kabudula *et al.* (2017), an equation,

$$(R-\lambda I)V=0, \qquad 3.27$$

for λ and V can be solved. In equation (3), $\boldsymbol{\lambda}$ represents a vector of eigenvalues, ***I*** stands for an identity matrix, and ***V*** represents a matrix of eigenvectors related to the eigenvalues in $\boldsymbol{\lambda}$.

Each eigenvector will then be balanced in order that its sum of squares becomes equivalent to the total variance. Following this, the result of the normalized matrix of asset items, **Y**, and the matrix of scaled eigenvectors, V* creates a set of uncorrelated linear groupings of the asset items for every household ***j***, called principal components. The asset index is typically assumed to be the first principal component (the efficient component) that is related to the largest eigenvalue. The first principal component explains the highest variation in the original data set. It assigns the larger weights to assets that vary the most across households; hence assets found in most households receive small weights.

We considered wealth as a latent multidimensional notion that we estimated using a set of observed proxies of wealth. We are seeking out to measure this latent variable and our aim is to employ and combine what we suppose as potential dimensions of wealth in such a way that adequately capture the latent multidimensional wealth indicator. As indicated above, PCA is one of the widely and frequently used statistical techniques used for exploring this latent variable by providing weights for each dimension derived from the correlation matrix. This technique gives weights to each dimension based on the correlation matrix of all indicator variables related to the latent multidimensional variable (wealth). However, PCA is originally designed for continuous and quantitative variable and strongly demands a variable to meet multivariate normal distribution assumptions which are obviously unacceptable for binary, categorical, and ordinal variables (Kolenikov & Angeles, 2004; Wai-Poi *et al.,* 2008a). This signifies that the violation of this assumption (incorporation of dichotomous or categorical variables into the PCA model) could generate erroneous weights that would result in the computation of a biased wealth index. One of the technical solutions to address this methodological shortcoming is to apply Multiple Correspondence Analysis (MCA).

MCA is an extension of 'correspondence analysis (CA)' and 'a generalization of principal component analysis' which uses categorical variables instead of continuous ones to examine the pattern of associations of several dependent variables (Abdi & Valentin, 2007, p.1). Unlike PCA, MCA does not assume continuous and multivariate normal distribution (Wai-Poi *et al.,* 2008a); rather it uses dichotomous, ordinal, and/or categorical variables to assign weights to various dimensions of a latent variable (such as wealth) (Greenacre & Blasius, 2006; Abdi & Valentin, 2007). These features encourage many scholars such as Booysen *et al.* (2005), Burger *et al.* (2006), and Ezzrari & Verme (2012) to choose and apply MCA over PCA. In recent times, MCA has been revived for the study of multidimensional poverty (Njong & Dschang, 2008; Asselin, 2009) given that it provides a method for assigning

weights to diverse dimensions as it deals with some crucial welfare axioms (Ezzrari & Verme, 2012). Since our dataset includes categorical and ordinal variables representing diverse categories that take primary dimensions capturing the wealth status of households, PCA could not be an optimal approach to apply rather we opted to use a more proper factorial technique (i.e. MCA) to construct a composite wealth[18] index. The details and specification of MCA model are presented in annex X.

3.8. Women Empowerment Measurement

We constructed five indexes to measure women's empowerment which is conceptualized along two dimensions: cognitive (self-worth) and decision making by using PCA technique. PCA is one of the frequently used types of factor analysis that is used to reduce dimensions of data, or find out hidden variables, by digging out a linear combination that pre-eminently depicts the co-variance among all components (Abeyasekara, 2005). Intrinsically, PCA decreases the dimensionality of a dataset with a large number of correlated variables, whilst keeping as much variation as possible, by transforming to a new set of variables, the principal components, so that the first few retain most of the variation present in all of the original variables (Joliffe, 2004). Therefore, the women's self-worth and decision making indexes typically assumed to be the first principal component (the efficient component) that is related to the largest eigenvalue and explains the highest variation in the original data set. We standardized the index scores in relation to a standard normal distribution with a mean of zero and a standard deviation of one. These standardized indexes were thus used as outcome variables in the PSM model.

The subsequent chapters (principally from chapter four to nine) are based on the six papers developed in the form of articles and discuss the empirical results of the study. More specifically, the first three papers are intended to capture the first objective while chapter seven, eight, and nine are meant to address objective number two, three, and four of the dissertation, respectively.

[18] In this study wealth and asset index are used interchangeably because the assets owned by a household represent its wealth. The asset index (AI) is a composite index that comprises key asset ownership variables which is used as a proxy indicator to capture household's wealth status.

CHAPTER FOUR: HISTORY OF LARGE SCALE AGRICULTURAL INVESTMENT IN ETHIOPIA: POLICIES AND PRACTICES

Abstract

This article looks at development policies and the theories that informed three regimes – Imperial, Derg, and Ethiopian People's Revolutionary Democratic Front – in trying to modernize the country through large-scale agricultural investment. It is a literature survey article that relied on reviews of government policies and other documents on investment of large-scale agriculture over several decades. In Ethiopia, large-scale commercial farming can be considered as the result of the development policies and strategies of the regimes practiced for at least six decades in the country. The regimes had adopted idiosyncratic policies and strategies that were founded on the assorted development theories and approaches of their respective eras which led to the birth, growth, descend, and regeneration of the large-scale private commercial farming in Ethiopia. They offered various incentive packages to promote such investment in the country although the investment does not have a success history. By providing a detailed review of the policy and practices of large-scale commercial farming, this article gives insights to the ongoing policy debates in the field of agricultural investment.

Key words: Large scale, agricultural investment, Policies, Theories, Ethiopia

4.1. Introduction

This article reviews development policies and theories adopted by the three regimes - the Imperial, Derg, and Ethiopian People's Revolutionary Democratic Front (EPRDF) – in an effort to develop the country in general and bring agricultural transformation in particular in the past half-century of modern Ethiopia. Modernizing Ethiopia was one of the various functions of the Ethiopian kings since the end of the Zemene Mesafint[19] and the restoration of the monarchy in the middle of the nineteenth century. For example, Emperor Tewodros (1855–1868)[20], Yohannes IV (1872–1889)[21], and Menelik II (1889–1913)[22] had played their respective roles in creating the modern Ethiopia.

Emperor Haile Selassie I who came to power in 1930 strengthened the modernization process started during Emperor Menelik II and adopted a highly centralized governance system. He promoted national unity by modernizing the national army; expanding modern infrastructure, communications, and schools; modernizing the legal, health, and the administrative systems of the country; and a pan-Ethiopian economy (Spencer, 2006). The Emperor enacted the first written constitution in the history of Ethiopia in 1931 and revised it in 1955 (Pankhurst, 2001). The constitutions granted land holding rights and privileges to the nobility, bishops, and Orthodox Christian church (Ofcansky & Berry, 1991; Abebe, 2000). This constitution was manifested as a policy decision at the highest level for Ethiopia to become a modern state though it promoted the exploitative feudal system and absolute monarchism (Pankhurst,

[19] *Zemene Mesafint* or 'era of the princes' (1769–1855) was a time in Ethiopian history eminent for aggressive struggles amongst princes principally from Gojam, Tigray and Wollo areas who were fought for the power of Gondar, the imperial centre (Bahru, 1992).

[20] Emperor Tewodros who had a reformist tendency tried to accomplish at least two things in the process of creating modern administration. He made a start towards the creation of a national army under his command and receiving salaries from the imperial treasury (Marsden, 2007). Moreover, as he needed funds to maintain his paid army, he sought to limit the privilege of tax exemption enjoyed by the church. To achieve this purpose, he tried to undertake land reform. However, his attempt didn't bear fruit as he was opposed by different parties including the clergy due to his authoritarian leadership (Pankhurst, 2001).

[21] Emperor Yohannes IV (1872–1889), the regional King of Tigray, grew to be the first Tigrayan Emperor (Pankhurst, 2001). In contrast to Emperor Tewodros, who preferred the path of conflict with provincial powers, Yohannes IV shared power with monarchs who accepted him as 'king of kings' (Pankhurst, 2001).

[22] After the decease of Yohannes IV in 1889, Menelik II (1889–1913) (often called the father of modern Ethiopia) managed to hold the throne (Pankhurst, 2001). The Emperor followed an expansionary policy (Parker and Abraham, 1995) and extended his reign from the central highland of Ethiopia to the south and east of the country and consolidated the borders of the contemporary Ethiopian state via warfare. He introduced various modern infrastructures and services (telephone, telegram, railway, bank, postal system, electricity, motor car, plumbing, and education) and public administration. He established nine public ministries and appointed nine ministers on October 25, 1907 to implement the modern European way of administration (Pankhurst, 2001).

2001). Since then, the Imperial regime devised various laws, rules, regulations, policies, and programs to endorse the economic development of the country based on the modernization theories of that time (Dessalegn, 2009). It was within these policies, legal, and theoretical frameworks of the Imperial regime that large-scale commercial farms[23] were born in Ethiopia for the first time.

The subsequent regimes - the Derg[24] and EPRDF - adopted various development policies and strategies as a general framework and agricultural development in specific to address diverse multifaceted socio-economic circumstances of the country based on the socialist command economy and the blend of capitalist and developmental state models, respectively. In these regimes, large-scale commercial farms came to exist and operate with various shapes and forms due to variations in their theoretical perspectives.

After ousting the Haile Selassie regime in 1974, the Derg had adopted a socialist model that governed its economic principles and structure. The regime confiscated all private enterprises and nationalized productive assets such as land and almost all assets in the industrial and services sectors (Alemayehu, 2007). In line with the socialist ideological ethos, the regime introduced new legal and institutional frameworks to strengthen its economic and political control over the productive resources, agricultural outputs, and the people (Alemayehu, 2007). The Derg dismantled large-scale private commercial farms of the Imperial regime and transformed them into state and cooperative farms (Kassahun, 2013).

After removing the military regime in 1991, EPRDF held power and adopted a mixture of development policy reforms and structural adjustment programs for the purpose of improving the economic, social, and political conditions of the country. Particularly, in the early 1990s, the EPRDF developed a development strategy known as Agricultural Development Led Industrialization (ADLI) which is considered as a master plan of the country that brought agriculture and industry into a framework in which agricultural development and rural is seen as an important base for industrialization (MoFED, 2002). Against to neoliberal advice of the minimal government, ADLI promotes a strong state role and intervention in the economy in such a way that encourages the participation of private sector in the development process of the country (Mulugeta, 2013). Guided by the developmental state philosophy, the regime has

[23] The farms that comprise state and/or private commercial farms mostly set up for the intention of profit making by producing agricultural products on the large areas of land (at least 100 hectare) and selling them at local market and/or abroad. In this article, large-scale commercial farming and large-scale agricultural investment are used interchangeably.

[24] The Derg is an Amharic term that stands for the committee of soldiers - coordinating committee of the armed force, police and Territorial Army (Ofcansky and Berry 1991).

devised various development policies, strategies, and programs that opened a new chapter and pathway to large-scale agricultural investment in the country. The new government rapidly privatized collective farms and dismantled producer cooperatives of the Derg regime and facilitated the establishment of new foreign and domestic private commercial farms, especially in the lowland areas of the country.

It is within this historical background that this article reviews development policies and theories of the three regimes that promoted or discouraged large-scale agricultural investment in Ethiopia roughly over the last several decades. The rest of the article is organized into five parts. Part two highlights the approach applied in writing the paper. Part three of the article deals with the evolution of agricultural development policies and theories of the Imperial era. The fourth and fifth parts review the policies and strategies of the Derg and EPRDF regimes, respectively. The article winds up by providing the concluding remarks.

4.2. Methods and Materials

This article is based on the review method to comprehend and evaluate the policy, legal, and theoretical frameworks of the Imperial, the first, and second republic regimes. First, we used a scoping review method as groundwork to identify relevant documents and materials related to policies and practices of the large-scale commercial farming in the three regimes. We employed this approach at initial level to assess and decide upon the scope and nature of information to be included and analyzed in this manuscript. This is followed by a systematic review of the literature and documents to synthesize the policies, theories, and practices of the three regimes through narrative approach. Finally, we carried out a critical review method to evaluate the policies, theories, and practices of large-scale agricultural investment (LSAI) in the last six decades using narrative approach. This article is mainly based on the secondary data sources such as scientific journal articles; books; working papers; policy, plan, and program documents; reports of government and non-governmental organizations (both published and unpublished); archives; proclamations; relevant electronic materials and other related documents.

4.3. LSAI Policies and Theories During Imperial Regime

During the Imperial regime, agricultural sector had been the livelihood of almost all people; nearly all source of export, and a significant source of government revenue (Adams, 1970). Apart from probably Nepal, Afghanistan, Bolivia, and quite a few some small African countries (Burudi, Niger), however, Ethiopia's agricultural sector was apparently the least developed of all countries in the world (Adams, 1970) and the most overlooked sector by the

regime (Dessalegn, 2009). For example, according to Adams (1970), in the early 1950s, there were no Ethiopian agricultural technicians, veterinarians, or medics in the country. There were a few Europeans technical agricultural expertise and only five Ethiopians with agricultural college degrees all over the country (Adams, 1970). Rural education was essentially non-exist, there was no higher education in agriculture, no agricultural research facilities, no extension services, and very limited modern-input markets for agriculture and internal commercial markets for agricultural products (Adams, 1970).

To address these problems, the Imperial regime envisaged modernizing the entire economy by expanding modern education and health faculties, devising diverse socio-economic policies and strategies, developing medium term-development plans, expanding physical and social infrastructures (Alemayehu, 2007; Henze, 2000; MoI, 1973). Even though the imperial regime was characterized by absolute monarchism in the political arena, it adopted a free market capitalist system of the West in the economic sphere. The overall development approaches, policies, strategies, and practices of imperial regime were based on the development theories of the 1950s, where economic growth was assumed to be linked principally to capital accumulation so as to stimulate investment in industrial sector and created large-scale commercial farms for the purpose of feeding a growing urban labour force and generating foreign currency via agricultural commodity exports (Cohen, 1987). Among several versions of modernization theories, the imperial regime had adopted a dual economy model. This model argues that traditional agricultural sector which is characterized by smallholders and subsistence agriculture of rural economy holds no hope for agricultural growth and improvement in income, therefore, instead government should focus on modern sector (industry) that has potential to stimulate growth via instrumentality of the market, the diffusion of new technologies, and the growth of large mechanized farms (Dessalegn, 2009). The model rightly explains the reality of the Ethiopian economy which is characterized by subsistence agriculture and backward rural economy. It, however, considers agriculture sector merely as a source of raw material (resource extraction perspective) to develop non-agriculture sectors.

Modernization theory was highly promoted and supported by the United States (US) government, donor agencies, and international organizations (the World Bank) and accepted by the Imperial regime without critical analysis and contextualization (Dessalegn, 2009). The origin of modernization theory was surely linked to political events: the start of the cold war in general and President Harry S. Truman's the so-called 'point four' speech in particular

(David, 2000; Knobl, 2001; Matunhu, 2011; Rist, 2008). The speech of the president was focused almost utterly on the foreign affairs and gave the American public a vision of how underdeveloped regions in the world could thrive with the assistance of Americans technology and know-how to counteract the appeal of communist ideology (Knobl, 2001; Rist, 2008). The speech urged American planners, economists, and United Nations and its agencies to find ways to achieve this vision by which America could determine the hopes of underdeveloped nations as well as become a blueprint for the economic and political development of the world (Campbell, n.d.). The speech of the president was immediately translated to 'a point four assistance program' by the planners. Following this, Ethiopia signed point four general agreement on June 16, 1951, with the US government and swiftly received an AID to stimulate its modernization process. The aid was initially directed into three areas: agricultural education, general education, and health (Adams, 1970). It is understandable from this that modernization theories and policies of the West entered Ethiopia through AID and as a political reaction against the communist ideology of that time.

The discussion of the Imperial regime's large-scale commercial farming policy would be understandable by examining its series of national development plans implemented between 1957 and 1974 in the country. The regime had devised three successive five-year national development plans with diverse goals and key areas of concerns. These series of development plans were prepared by the assistance of various technical missions drawn from the United States of America, FAO, and Yugoslavia (Ofcansky & Berry, 1991). To coordinate the plans, the government established the National Economic Council in 1954/55 which was chaired by the Emperor.

4.3.1. The First Five-Year Plan (1957–61)

In this plan, high attention was given to build up Ethiopian's infrastructure. Priorities were given to transport, communication, energy, postal services, education, and housing (Cohen, 1987). The major goals of the first five year plan were: developing strong physical infrastructure, essentially in the areas of transportation, construction, and communications; creating the pool of skilled and semiskilled indigenous workforce that could work in processing industries; and pushing and speeding up agricultural development through the promotion of large-scale public, private, and cooperative commercial agricultural ventures (Admas, 1970; Henze, 2000; Ofcansky & Berry, 1991). The peasant sector was overlooked in the plan though little support was given to the coffee production areas and livestock breeding with the intention of enhancing country's export (Admas, 1970; Dessalegn, 2009).

The agricultural strategy of this planning period was focused on building infrastructures for the purpose of stimulating marketing for export crops (Cohen, 1987). The plan gave high emphasis to surveying the irrigation potential of Ethiopia's major rivers, developing a sugar factory, improving farm labour productivity on commercial farms, and stimulating an export-oriented livestock industry (Cohen, 1987). Lowland areas of the country (occupied by pastoralists) were considered as 'unused' or 'unoccupied' or 'unproductive' and became the target of LSAI (Dessalegn, 2009).

Between 1950 and 1960, the imperial regime endorsed legislation and employed a new policy to promote foreign investment. The policies included various incentives such as: duty free importation of tractors and plant protection chemicals; income tax relief for large agrarian investments above US$200,000 for three to five years; remittance of profit and salaries in foreign currency, and fuel tax exemptions (Cohen, 1987; Desta, 1979, Ofcansky & Berry, 1991; Samson & Tadele, 2002). As a result, the major large-scale commercial farm enterprises, such as the Tendaho Cotton Plantation (owned by the British firm Mitchell Cotts) and the Wonji Sugar Plantation (owned by HVA, a Dutch company) came to Ethiopia and obtained large tracts of land in Afar and Arsi areas and changed it into large-scale commercial farms (Ofcansky & Berry, 1991). Setit Humera farm was also established in the northwest of Ethiopia to the Sudanese borders (Dessalegn, 2009; Friew, 2015; Kassa, 1966).

At the end of the planning period, the overall achievement of the first plan was found as low and its impact on agricultural production was reported as insignificant (Cohen, 1987; Markakis, 2011). According to Adams (1970), Cohen (1987), and Dessalegn (2009), during 1950s agriculture was neglected by the Ethiopian government. For example, the sector had received less than 5% of total public investment during this period (Adams, 1970) although Dessalegn (2009) reported 8% of the total public investment. As Adams evidently argued, "agriculture was pretty much left to develop-as-it-will" (Adams, 1970:3). This indicates that during the first five year plan, the Imperial regime had adopted and implemented industry and urban biased development policies and strategies (industry-led development strategy) that were the major themes of the development thought of the 1950s and 1960s of the West. This development strategy was, however, promoted and implemented at the expense of agriculture and rural development.

4.3.2. The Second Five-Year Plan (1963 –7)

The Second Five Year plan pointed out the beginning of twenty-year program intended to transform Ethiopia's subsistence agricultural economy into an agro-industrial economy. The

major goal of the plan was to boost the country's economic growth rate through diversification of production, development of modern processing methods, and development of the economy's productive capacity (IEG, 1962). A priority was given to investment in manufacturing, mining, and electricity sectors (IEG, 1962) which were considered as 'propulsive sectors' (Dessalegn, 2009:51).

Unlike the first five year plan, the second one gave a relatively better emphasis to the agricultural sector. However, more attention was given to agricultural modernization through large-scale mechanization rather than smallholder peasant agriculture assuming that modernization is crucial to attaining high economic growth rates and fuel peasant agriculture but the goals of peasant agriculture remained modest (Dessalegn, 2009; Markakis, 2011). The aim of the plan was to enhance investments in the agricultural sector in such a way that generate foreign exchange. It also aimed at increasing local food production for the purpose of reducing food imports (Cohen, 1987). Diverse investment initiatives such as: improving the collection and analysis of agricultural data, building research stations, increasing field trials, strengthening the extension system, expanding veterinary services and establishing college-level training programs were proposed to promote agricultural production (Cohen, 1987). However, all of these proposed investments were meant to promote LSAI. For example, above half of the planned five-year investment budget was earmarked for large-scale commercial farm activities (Adams, 1970; Dessalegn, 2009) but the peasant sector received only 10% of the total budget (Dessalegn, 2009).

During the mid–1960s and since then, large-scale mechanized commercial agriculture, was expanding, and somewhat quickly ever so often, in numerous areas of the country, along with the coffee producing regions (Dessalegn, 1984). Available evidence shows that USA advisors highly influenced and shaped the thinking of policymakers of the time in favour of mechanization, large-scale agricultural investments, and American driven farm management techniques (Desta, 1979; USOME, 1955). Some institutions like Standford Research Institute (SRI) and The World Bank had also strongly supported and promoted mechanization and commercial agriculture. For example, The World Bank suggested the intensification of large–scale farms, mechanization, and irrigation to boost agricultural output (Adams, 1970).

Nevertheless, despite some success achieved in plantation and agro–industrial schemes in the Awash Valley, the imperial regime had made diminutive progress in promoting and strengthening the expansion of agricultural services (Cohen, 1987; Markakis, 2011). Even if the Imperial regime promised to solve land tenancy issues in the plan, it completely ignored it

and failed to keep its promise, a fact which essentially shows policy failure. Moreover, albeit heavy emphasis was given to commercial agriculture, merely slight consideration is being given to equity issues (Dessalegn, 2009; Ofcansky & Berry, 1991). At the end of this planning period, modernization policy of the 1950s was, however, highly criticized on both theoretical and practical ground as African's post-independent desire for an accelerated industrialization becomes ever more frustrated (Ofcansky & Berry, 1991). As a result, the main donors such as the World Bank, USA, and FAO made a substantial shift in their aid and loan polices in favouring rural and agricultural development than the urbanization and industrialization maxim of the time. Following this, they (mainly the World Bank) recommended package programs to be implemented through 'concentrated approach' which aimed at directing resources to the key potential regions of the country.

4.3.3. The Third Five-Year Plan (1968 –73)

The Third Five Year Plan envisaged boosting the country's economy by enhancing the performance of manufacturing and agro-industrial sectors. The plan was focused on directly dealing with the constraints that hampered agricultural growth in the second plan (Cohen, 1987). The plan identified two problems in the agriculture sector: the problem of production and the problem of the peasantry (IEG, 1967). To address the former problem, the regime adopted a frontier model which stretched settlement and cultivation to new lands. An attempt was also made to address the latter problem through Integrated Rural Development (IRD) Projects that tried to introduce peasants with a commercial market system, enhanced seeds & fertilizer distribution, supply of credit, distribution of improved implements, and rural health and expansion of storage facilities (Zerihun *et al.,* 2002).

In this planning period, modernization continued in influencing development discourses and approaches and was considered as a catalyst that would stimulate agricultural growth and improve the country's export performance (Dessalegn, 2009). And so, planners of the time continued to consider large commercial farms as the key to agricultural development and transformation. In contrast to the two preceding plans, the Third Five-Year Plan gave more attention to smallholder farmers without losing focus on the large-scale commercial farms (Chala & Terefe, 2015). By and large, the third five-year plan applied two approaches to accelerate the development of the agricultural sector: the package program and the development of large-scale commercial farms (Dessalegn, 2009).

In the beginning, the package program encompassed 'integrated package approach' and later 'minimum package approach' (Abebe, 2000; Cohen, 1987; Davis *et al.,* 2010; Dessalegn,

2009; Gebremedhin *et al.,* 2006). The main rationale behind the approach was that the limitations impeding peasant agricultural productivity were multifaceted and highly interlinked and so require multiple interventions (Cohen, 1987). Accordingly, the program covered large multi-purpose and integrated development projects such as Chilalo Agricultural Development Union (CADU) started with Swedish aid in 1967, the Wolaita Agricultural Development Union (WADU) started with World Bank assistance in 1970, the Ada District Development Project (ADDP) commenced with the support of USAID in 1972, Humera Agricultural Development project (HADP), Tach Adiabo and Hadekti Agricultural Development Unit (TAHADU), and Southern Regional Agricultural Development Project (SORADEP) (Dessalegn, 2009). The main purpose of the package approach was to combine investments in agricultural research and extension with initiatives to improve the distribution of seeds and fertilizer, provide credit, develop market facilities, diffuse better implements, expand storage facilities, promote rural health, and raise functional literacy (Cohen, 1987; Davis *et al.,* 2010; Dessalegn, 2009; Gebremedhin *et al.,* 2006). Yet only CADU was found as successful in achieving this purpose (Adams, 1987; Davis *et al.,* 2010; Dessalegn, 2009).

The Imperial regime continued to promote large-scale commercial farms for the purpose of further increasing gains in the agricultural output for domestic consumption, exports or imports substitution, and creating new job opportunities. Varieties of incentives indicated above were continued and accelerated the expansion of large-scale commercial farming. However, because of imprudent incentives, weak oversee institutions, capital-intensive investment, and capital flight; the large-scale commercial farms did not meet the expectations of the country (Ofcansky & Berry, 1991).

After examining imperial agricultural policies and the achievements of its series of plans Abate and Tesfaye (1979), Cohen (1987), Dessalegn (2009), and Ofcansky and Berry (1991) noted that even if imperial regime sought to stimulate agricultural growth and promote changes in peasants' agriculture via modernization approach, policies and plans adopted and implemented during that period had a little impact on transforming traditional agriculture to modern sector. Land tenure system problems; low productivity; lack of technological development; government perception and approaches of policy formulation and development planning, high dependence of the regime on the external donors were identified as the key factors that retarded the modernization process of the imperial regime (Abebe, 2000; Adams, 1970; Abate and Tesfaye, 1979; Berhanu & Poulton, 2014; Cohen, 1987; Dessalegn, 2009; Ofcansky & Berry, 1991).

In general, the regime's development planning efforts had little impact on the economy as a whole, since they were too unpretentious/modest and small in scale to influence the extremely traditional and ancient mode of peasant agronomy; and the inability of the regime to reform land. However, credit should be given to the Emperor for making a genuine effort to modernize the country by adopting the first written constitution in the history of Ethiopia, developing a series of socio-economic plans, expanding various physical and social infrastructures; and giving high attention to LSAI. It can be concluded that the poor performance of the agricultural sector during the Imperial regime is explained by policy failures.

4.4. LSAI Policies and Theories during the Derg Regime

After ousting the Imperial regime in 1974, the Derg announced an agrarian reform program. The regime promulgated a radical land reform on 4 March 1975 (via Proclamation No 31/1975) that allows all rural peasants to own farmlands which were under landlords before. This proclamation had served as the legal document by which the Derg managed all land matters. The land was redistributed for the poor and deprived peasants on an egalitarian basis which sparked the light of hope for the future of the rural poor peasants (Hussein, 2001). However, the ownership of land is transferred from private holdings of the landlords to the public under the strict control of the state (Proclamation 31/1975, Article 3). The Derg adopted a socialist economic structure and so, confiscated all private enterprises, nationalized productive assets such as land and almost all assets in the industrial and services sectors (Alemayehu, 2007). Besides, the military government started its motive to establish large-scale state farms and cooperative organizations for the purpose of improving the efficiency of agricultural production (Kassahun, 2013). In line with the socialist ideological ethos of the new regime, the government introduced new institutions of economic and political control such as peasant associations and cooperatives, marketing boards and workers' party to implement its programs of boosting agricultural production (Alemayehu, 2007).

By exterminating the free market system of the Imperial regime, the Derg intentionally repressed market forces and started its direct interventions by fixing grain prices below the market prices, enforcing limits on private inter-regional grain movements, and initiating producer grain quota for the Agricultural Marketing Corporation (AMC) (Shahidur *et. al.,* 2007). AMC was established and given the responsibility of controlling every aspect of agricultural marketing. All actions taken by AMC had depressed productivity of the

agriculture sector and the private sector's performance, and so, the overall economy of the country (EEA, 2005).

As it is articulated by article 8 and 10 of the 1975 land reform proclamation, the organization of peasants into associations was the first remedy taken by the government for the fast implementation of its socialist policies and programs. As a result, following the land reform declaration, over 60,000 students were mobilized to group peasants into associations. Every organization enclosed within an area of 800 hectares, where its members incorporated landless labourers, tenants, and landowners owning land below ten hectares (Chala & Terefe, 2015). The associations were give various responsibilities, such as the executing land use directives; resolving land disputes; undertaking water and land conservation activities; constructing schools, clinics, and cooperatives and collecting tax (Chala & Terefe, 2015). However, the effect of these practices was not successful since the approach followed top down which is mainly driven by political motives (EEA, 2005).

The government also encouraged farmers to form cooperatives for the easy implementation of development and political programs. From 1978 to 1981, a series of proclamations and directives were issued describing detail procedures for establishing service and producers' cooperatives (Chala & Terefe, 2015). Service cooperatives were promoted to provide essential services, such as the sales of farm inputs and consumer items, indoctrinate socialist philosophy to peasant members, and promote the cottage industries and small enterprises (EEA, 2005). The producers' cooperatives were also organized for the purpose of alleviating shortages of inputs and the problems of fragmented landholdings. The government promoted cooperatives on the belief that smallholder peasants are inefficient and unable to take advantage of economies of scale. The government supported these cooperatives by providing a number of incentives including credits, fertilizer, improved seed, access to consumer items, and building materials (Chala & Terefe, 2015). However, government's attempt was fruitless which led to the declaration of resettlement and villagization programmes.

By 1986, the Derg initiated a resettlement programme all over the country and about 600,000 people were resettled in different relocation areas. However, due to international disapproval and confrontation from the communities, the programme was ceased in 1987 (Chala & Terefe, 2015). The government shortly launched a relocation programme called villagization. The aims of the programme were: to encourage reasonable land use; conserve resources; provide access to clean water, health, and education services; and strengthen security (Temesgen, 2013). Although 13 million people were villagized in 1989, international

criticism, deterioration of national security, lack of resources, and an authoritarian rule of the regime led to the collapse of the program (Chala & Terefe, 2015). In October 1990, the Derg launched a new reform program and declared a mixed economy by eliminating quota and permitting the private sector to get involved in the agricultural sector (Teshome, 2009).

The development of large-scale state farms was among the major components of the Derge agricultural policy. Following the land proclamation of 1975, the regime set up large mechanized farms also known as 'state farms' by impounding the private farms of the Imperial regime based on the socialist philosophy (Friew, 2015). For example, soon after the 1975 land reform, the Derge changed a greater part of the (reported to be 75,000 hectares) large commercial farms owned by individuals and cooperatives into state farms; and not long afterward, it expanded their size to 216,000 hectares (Ofcansky & Berry, 1991). It was planned to expand the size of the state farms to 468,000 hectares by 1994 which accounts for about 6.4 per cent of the total cultivated land (Chala & Terefe, 2015). Alike the Imperial regime, the Derg considered the low land areas as 'unused' or 'unproductive' and continued intensification of state commercial farms in the areas (Makki & Geisler, 2011). Even though the economic policies of the Derg favoured mechanized state farms and collective farms, it simultaneously marginalized the effort of smallholder farmers (EEA, 2005).

For the purpose of promoting and strengthening large-scale state farms, the government gave immense support, resources, and incentives to such enterprises. For example, in 1983 state farms got 76 per cent of the total share of chemical fertilizers, 95 per cent of the enhanced seeds, and 81 per cent of the agricultural credit. State farms also received a colossal amount of money in the form of subsidies. For instance, from 1982/83 to 1985/86 different state farms received over 90 million Birr directly as subsidies (Ofcansky & Berry, 1991). However, in spite of the focus on the state farms, in 1987 state farms production comprised only 6 per cent of total agricultural output, leaving smallholder farmers to be responsible for over 90 per cent of production (*Ibid*). As a result, the performance of smallholder agriculture experienced a steady decline due to the emphasis towards collectivization at the expense of small household farms (Kassahun, 2013). The emphasis of the government on the large-scale state farms was highly criticized by Western donors, who directed their agricultural aid to the smallholder sector. These donors argued that experiences in Africa, Eastern Europe, and the Soviet Union showed the failure of state farms mentioning that they were inefficient and deplete scare resources.

There was not much success story told about the agriculture sector in general and large-scale state and cooperative farms in particular during the Derg regime, due to several reasons. EEA (2005) identified the difficulties of the policy environment and the negligence of massive peasants who were out of the mechanized state and collective farms as the major reasons for the poor performance. Others such as Ofcansky & Berry (1991) identified policies that controlled prices and prohibited free movement of agricultural products; political instability; displacement of the rural people, recruitment of young farmers to warfare; drought; land tenure difficulties and fragmentation; corruption, lack of farm equipment, better seeds, fertilizers, and skilled manpower; and the overall low level of technology as major reasons responsible for poor performance of the economy in general and agriculture in particular. Hence efforts made during the Derg regime to accelerate agricultural transformation through cooperative and large-scale state farms proved unsuccessful.

4.5. LSAI Policies and Theories during EPRDF

After defeating the military regime in 1991, the EPRDF held power and adopted a mixture of development policy reforms and structural adjustment programs for the purpose of improving the economic, social and political conditions of the country. The policy measures include the transformation of the centralized economy to market economy, devolution of political power to the lower level of government, and liberalization. Consequently, the new government rapidly privatized collective farms and dismantled producer cooperatives. The EPRDF regime has developed a development strategy known as ADLI to achieve its long-term economic and social development plan in the early 1990s. Initially, the ADLI strategy was developed within the realm of socialist ideology which before long was abandoned by the regime due to the collapse of socialism in the 1990s. However, it can be considered as the result of a blend of the Neo-liberal Washington Consensus Model and State-led developmental Model pursued by Southeast Asian countries.

ADLI is considered as a master plan of the country that brought agriculture and industry into a framework in which agricultural development and rural is seen as an important base for industrialization and considered as a source of raw material, market opportunities, surplus labour and capital accumulation (MoFED, 2002). According to government`s argument, Ethiopia is an agrarian country with low level of human development and acute shortage of necessary capital to begin an outright industrial development. Therefore, it needs to adopt a strategy that promotes the economic uses of the existing limited capital, labour, and land resources at the country`s disposal. The government believes that growth in other sectors,

particularly in trade and industry, is driven by the growth momentum initiated within the agriculture sector. Therefore, ADLI has been considered as broad-based, pro-poor, and rural-based development strategy which could be seen as an endeavour for rural transformation that leads to the ultimate goal of industrialization. The overall objective of ADLI is to reinforce the links between agriculture and industry by raising the productivity of small-scale farmers, expanding large-scale private commercial farms, and by strengthening the manufacturing sector in such a way that efficiently utilize the country's resources (MoFED, 2002). It is clear that the Ethiopian government development strategy has vigorously been favouring smallholder farmers given that the agricultural sector is dominated by such farming system. Likewise, it is also understandable that from the early inception of ADLI, LSAI has been one of the major policy priority areas of the government.

In line with the ADLI, in 2003, the government developed rural development policy and strategy which markedly considers agriculture and rural development as pillars of the economic development. Rural development policy and strategy considers smallholder farming system as a pillar of country's development and at the same time recognizes the significant role of large scale agriculture investment in the economy of the country. The document puts the role of large scale commercial investment and capitalist farming in the economy as follows:

> Experiences of developed economies clearly show that as an economy grows there is a tendency for some small farmers to quit the sector and seek employment in other sectors... This implies that there is a direct correlation between agricultural growth and the role of private investment in the sector... assuming that the objective of accelerated agricultural development is achieved; it is likely that there will be a role change. The key actors in the sector's development will be relatively large-scale private investors and not the semi subsistence small farmers (MoFED, 2003, p.52).

However, the focus of the government has been in favour of foreign investors believing that they could create jobs in the agriculture sector, expand infrastructures, improve domestic food supply, enhance access of the farmers to the market, and increase foreign exchange reserve of the country. This is explicitly stated in the document where government shows its position in favour of large-scale foreign investment in the agriculture sector. The document identifies two investment areas that appear to be suitable for foreign investment: 'unutilized or unoccupied vast land with high irrigation possibility' (the beliefs that is similar to the two foregoing regimes) and land for 'high-value agricultural products' (such as flowers, vegetables) (MoFED, 2003). The excerpt below explains how the government articulated its position supporting foreign investment in the agriculture sector.

> The country's demand for participation in both low and highland areas is immense, and assurances are given that government institutions at all levels will do their best to facilitate and assist foreign investors. … While underlying the importance of encouraging domestic private investment through well-conceived incentives, the focus of attention should be on attracting foreign investors (MoFED, 2003, p.52).

In general, despite strong critics towards government for being in favour of small-scale farming, it is clear from the rural development policy and strategy document that Ethiopian government has an unambiguous intent and standing concerning the role of LSAI in the economy of the country.

Based on ADLI, the Ethiopian government has designed and executed four generations of poverty reduction plans, programmes, and strategies. The first generation programme which is often called the Sustainable Development and Poverty Reduction Program (SDPRP) was launched in 2002/3 and ended in 2004/5. The main intention of this program was to nurture stallholder agriculture in such a way that eradicate food aid dependency, reduce poverty, and enhance economic growth (MoFED, 2002). The government has also recognized the contribution of the large-scale farming to the economic development of the country. The following excerpt from the SDPRP document explains the main intention of the government regarding large-scale commercial farming:

> The government will make every effort to enhance and buttress the contribution of the private sector to agricultural development endeavours. The federal government, in collaboration with regions, will work hard to allocate land for commercial farming, make sure that there are adequate infrastructure facilities, and streamline and make efficient land lease procedures for entrepreneurs who wish to set up large – scale commercial farms (MoFED, 2002, p.iii).

After the completion of SDPRP, the second generation of the programme called the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) was developed and executed between 2005/6 and 2009/10. The main purpose of PASDEP was to enlarge education and health care services and to keep on food security, capacity building, and decentralization programs (MoFED, 2006). The major components of PASDEP were: facilitating the commercialization of agriculture, supporting the development of large-scale commercial agriculture, and better integrating farmers with markets both locally and globally. This shows that, just like the preceding development programme and strategy, during PASDEP period government had considered large scale farming as one of the strategies for accelerating economic growth, improving food security and livelihoods of the people.

The third generation programme so-called Growth and Transformation Plan I (GTP I) was designed and executed between 2010/11 and 2014/15. The plan envisaged that agricultural production would double, food security would be achieved at the national level, and

agriculture would play a leading role in earning foreign currency. The document argued that for a country which has been known for its 'hunger and food insecurity', achieving food security and being able to sell a significant amount of agricultural products to the external market would be considered as a part of the structural change. Moreover, promoting large-scale private investment to play significant role in agricultural development was also taken as an element of structural transformation in the document. Consequently, it was envisaged that 3.3 million hectares of land would be transferred to large-scale private investment (MoFED, 2010a).

The fourth generation program called Growth and Transformation Plan II (GTP II 2015–20) was launched in 2015/16 and is still underway. This plan is mainly based on sectoral policies, strategies & programmes, lessons learned from the execution of the previous plans, and the post-2015 Sustainable Development Goals (SDGs). The overarching objective of the GTP II is to realize Ethiopia's vision of becoming a lower middle income country by 2025. According to the plan, while smallholder agriculture will continue to be the bases for improving agricultural production and productivity, increasing the share and participation of the private investment in the agricultural sector is also considered as one of the key strategic directions designed to accelerate economic growth and poverty reduction effort of the country (National Planning Commission, 2015).

From the preceding discussion, it is clear that over the past two decades, the government of Ethiopia has given high attention to large-scale agricultural investment by developing comprehensive policy framework. The emphasis of the government is seen in its legal framework that robustly focuses on promoting and attracting private investors into the agriculture sector.

The 1994's constitution of the Federal Democracy Republic of Ethiopia (FDRE) is fundamental law of the land and foundation to all laws, policies, strategies, and programmes of the country. Regarding land, the Constitution maintains Derg regime's position and explicitly states that land shall not be individual's property. It says 'the right to ownership of rural and urban land, as well as of all natural resources is exclusively vested in the state and the peoples of Ethiopia. The land... shall not be subject to sale or to other means of exchange' (Article 40 (3)). The government argues that, by retaining the land under the ownership of the state, the government can act as the guardian of the rural farmers from market forces and prevent rural peasants from landlessness and absolute poverty (Hussein, 2001; Yigremew, 2001). The constitution clearly puts the mechanisms of land acquisition stating that 'Ethiopian peasants have the right to obtain land without payment and the protection against

eviction from their possession' (Article 40(4)). Regarding the pastoralists, Article 40(5) affirms that 'Ethiopian pastoralists have the right to free land for grazing and cultivation as well as the right not to be displaced from their possession.'

Unlike farmers and pastoralist who have the right to obtain land without payment, Article 40(6) of the constitution declares that private investors may get land on the basis of payment arrangement. To protect the rights of the peasants, the Constitution guarantees them against any arbitrary eviction by the state. The Constitution explicitly states '… the government may expropriate private property for public purposes subject to payment in advance of compensation commensurate with the value of the property'(Article 40(8)). However, several studies show that large-scale commercial agricultural investments are breaching this provision of the article where the investments adversely affect local communities by displacing farmer and pastoralists, exploiting and degrading natural environment, ignoring local people's legal rights, eroding indigenous farming practices, and exacerbating food insecurity and conflict (Dessalegn, 2011; Grain, 2008; Kachika, 2010; The Oakland Institute, 2011).

The Federal Land Administration and Land use Proclamation 89/1997 is one of the legal frameworks enacted to administer rural lands. This proclamation gives the responsibility of the rural land administration to regional governments (Article 5(1)). It maintains the constitutional principles that allow peasant farmers, semi-pastoralists, and pastoralists to have free access to rural land (Article 6(1)). However, the proclamation is silent regarding how large-scale agricultural investors could acquire land. Proclamation 89/1997 was repealed and replaced by the Rural Land Administration and Land Use Proclamation No. 456/2005 which included some provisions regarding the land acquisition by the private investors. From the farmers' perspective, the aim of the proclamation is to increase tenure security, improve productivity, and avoid expectations of land redistribution. According to the proclamation, the private investor could get access to land via two sources. The first source is government where private investors get land through lease contract. The proclamation states that 'private investors that engage in agricultural development activities shall have the right to use rural land in accordance with the investment policies and laws at federal and regional levels' (Article 5(4)(a)). The second source is individual holders where private investors get access to land via lease from individual landholders. Besides, investors have a possibility to mortgage their lease right as a security to banks. Article 8(4) states that an investor who has

leased rural land may present his use right as collateral.' Nevertheless, individual landholders (farmers, semi-pastoralist, and/or pastoralist) do not have such privilege.

Various regulations with diverse incentive packages have been issued by the Council of Ministers so as to promote private investment in the country in general and agriculture sector in particular. A close examination of the regulations shows that the emphasis of the government is towards the export sector given that almost all regulations highly encourage foreign direct investment proposing various generous incentive mechanisms. The following are some of the key investment incentive packages for projects in the agricultural sector and/or areas that were adopted in the past two decades.

Article 11 of the Investment Proclamation No. 280/2002 declares the capital requirement for a foreign investor which ranges from zero (if the investor exports three fourth or more of his/her outputs or reinvest profits/dividends) (Article 11 (4) to $60,000 (foreign investors jointly investing with domestic investors) (Article 11 (2) to $100,000 (if the investment is wholly made by the foreign investor) (Article 11 (1). The proclamation gives the right to foreign investors to open and operate foreign currency accounts in authorized local banks in the country based on the directives of the National Bank of Ethiopia and the right to make remittances in respective of an approved investment in convertible foreign currency at a prevailing rate of exchange (Article 19 (2) and 20 (1)). The proclamation also gives guarantees to both domestic and foreign investors affirming that "no investment may be expropriated or nationalized except where required by the public interests and then, only in compliance with the requirements of the law. It goes on declaring that sufficient compensation shall be paid in advance for the investment expropriated or nationalized for the public interest where foreign investors have given the right to get the compensation in hard currency and to remit (Article 21 (1), (2), & (3)).

Investment Regulation No. 84/2003 provides assorted gorgeous incentives for both domestic and foreign investors. According to the proclamation, any domestic or foreign investor, who invests in the agricultural and other sectors and exports as a minimum 50 per cent of his/her products, or supplies 75 per cent of his/her outputs to an exporter as a production input, shall be qualified for income tax exemption for five years. However, the Investment Board could extend the income tax exemption for up to a seven-year period under special circumstances or for more than seven years based upon the decision of the Council of Ministers. Moreover, the proclamation makes it clear that an investor who exports less than 50 per cent of his/her products or supplies his/her products merely to the domestic market shall be eligible for

income tax exemption for only two years. Investment Board could extend the period to five years under special conditions as well as extend the tax exemption period by one additional year if the investment is carried out in relatively underdeveloped regions (low land areas) (Article, 4).

As far as customs duties are concerned, Regulation No 270/2012 spells out three types of exemptions. The first is related to the import of duty-free capital goods and construction materials required for the establishment of a new enterprise or for the expansion or upgrading of an existing enterprise (Article 13(1)). The second type is about the duty-free importation of spare parts where an eligible investor is allowed to import spare parts whose value is not more than 15 per cent of the total value of the capital goods imported within five years from the date of commissioning of his/her project (Article 13(4)). Thirdly, the regulation provides the right to import vehicles that are eligible for total or partial exemption of customs duties depending upon the type and nature of the investment projects (Article 14). Ethiopia has also signed various international agreements that strengthen investment guarantees. For example, it is one of the members of the Multilateral Investment Guarantee Agency which issues guarantees to investors against non-commercial risks such as expropriation. The country is a signatory of the Convention on the Settlement of Investment Disputes between States and Nationals. It has also concluded Bilateral Investment Treaties (BITs) and Double Taxation Treaties (DTTs) with several countries.

From the preceding discussions of policies, strategies, plans and programs, and legal frameworks, it is comprehensible that the Ethiopian government has given special attention to large-scale commercial farming over the past two decades. It is also understandable that the government of Ethiopia has adopted open door policy and offered very attractive incentive packages to attract foreign direct investment into the agriculture sector. However, whether such attempts are going to be labelled as an 'agricultural investment' or as a 'land grabbing' by some scholars and international institutions (Dessalegn, 2011; De Schutter, 2011 GRAIN, 2008) is an empirical question to be investigated.

4.6. Summary and the Way Forward

In Ethiopia, large-scale commercial farming is not a recent phenomenon rather it has been practiced for about six decades by the three regimes (Imperial, Derg, and EPRDF). These regimes had adopted idiosyncratic development policies and strategies founded on the assorted development theories and orientations of their respective eras which led to the birth, growth, descend, and regeneration of the large-scale private commercial farming in Ethiopia.

The Imperial regime envisioned to transform the country from subsistence agricultural to an agro-industrial economy based on the modernization policies and theories of the 1950s and 1960s. The regime had developed a series of development plans and programs based on these theories. The major strategic concern of the regime during the 1950s was improving productivity and reducing dependency of the economy on the agriculture sector. Agricultural mechanization, increasing investment in agro-industrial sector, and rising exports of the country were the key policy directions during the 1960s. In the 1970s, the Imperial regime shifted its strategic concern towards smallholder peasant agriculture by proposing land reform as a key policy direction. However, the regime's development policies, strategies, and theories had little impact on the modernization process of the economy in general and agricultural transformation via large-scale commercial farming in particular. The poor performance of the agricultural sector during the Imperial regime is explained by policy failure.

In the 1980s, central planning, collectivization, and the socialist agricultural development and mode of production were the main strategic concerns of the Derg regime. Land reform, large-scale states farms, nationalization of all private enterprises, control of agricultural input-output, labour, and commodity markets, and resettlement and villagization programs were adopted as the key policy directions by the regime. Alike the Imperial regime, the Derg adopted an industry-led development strategy to transform the economy. However, Derg's policies, strategies, and development model intended to advance the economy and accelerate agricultural transformation were found as unsuccessful. On the whole, similar to the Imperial regime, the poor performance of the economy in general and agricultural sector in particular during the Derg regime is explained by policy failure.

To invigorate the agriculture and rural development, EPRDF adopted ADLI strategy based on the hybrid development models (Neo-liberal) of the West and developmental state model of the Southeast Asian countries to achieve its long-term economic and social development plan in the early 1990s. Based on the ADLI, the government devised various development policies, strategies, and programmes meant to accelerate the transformation of the country's economy from predominantly agriculture to industry. From the early inception of ADLI and in the subsequent policies and strategies, LSAI has been one of the major policy priority areas of the EPRDF government. However, whether or not such investments are contributing to national economy in general and improving local people's livelihood in particular is the area of further empirical research.

CHAPTER FIVE: MAGNITUDE, TRENDS, AND ISSUES OF LARGE - SCALE AGRICULTURAL INVESTMENT IN ETHIOPIA IN THE PAST AND PRESENT

Abstract

The main aim of this article is to systematically analyze the magnitude, trends, and issues related to large-scale agricultural Investment (LSAI) in Ethiopia over the last six decades. This period coincides with the Ethiopian modern regimes of the Emperor Haile Selassie I, Derg, and the current regime. This article is based on both primary and secondary data obtained from various sources and complemented by data collected through interview. Particularly, a critical review of the pertinent literature was carried out to understand the issue at hand. LSAI was born and grew up in terms of number and size during the Imperial regime though they were smashed by the successor government that adopted a socialist development model. However, such investment is invigorated by the current government, got a new identity, and became the integral component of its economic development policies and strategies. Lowlands (peripheries) that are occupied by pastoralists and agro-pastoralists have been the focus of the three regimes wherein LSAI was used as a tool to exploit and integrate them into the center. Even if LSAI is significantly increased in terms of number, size, type, and distribution and reached at peak phase during the current regime's era, its gain to the country and local people has been an area of debate and empirical investigation. Given the growing pressure on the land and livelihood systems of the local people, encouraging pro-poor large-scale agricultural investment is critical.

Key Words: Large-scale agricultural investment, commercial farming, magnitude, trends, Ethiopia

5.1. Introduction

In Ethiopia, as it is factual in developing countries, natural capital plays a crucial role in economic growth and development of the country. Ethiopia is highly an agrarian nation (Kassahun & Poulton, 2014) and the agricultural sector which profoundly depends on this capital has been a major contributor of the Gross Domestic Product (GDP), employment, food security, and export in the country (EATA, 2016). The sector is a foundation of the Ethiopian economy and livelihoods of the people (Bereket, 2014). Amdissa clearly notes about the sector saying that "those who went to schools 50 years ago read about it, wrote about it, and the present generation does the same" (Amdissa, 2006, p.1). The implication of this account is that Ethiopia is unable to transform the sector in such a way that change the plight of its people and fundamentally contribute to the economy. Rather the country has been handing down this cliché from one generation to another and from one government to another. However, since the reign of Emperor Haile Selassie I, Ethiopia has been trying to hasten the transformation of its agricultural sector from smallholder subsistence farming to commercial based agriculture through large-scale commercial farming[25]yet with gainsay approaches of the regimes.[26]

Emperor Haile Selassie adopted a capitalist development approach that was often judged as urban-biased and gave a little attention to the agriculture sector, in spite of its significance in driving economic growth and development (Ofcansky & Berry, 1991). The Imperial regime perceived industrialization as the sole engine of high economic growth (the central thesis of the modernization theory)[27] and a short-cut pathway to bring structural and economic transformation in the country (World Bank, 2000). Economic growth was assumed to be linked principally to capital accumulation so as to stimulate investment in the industrial sector and create large-scale commercial farms for the purpose of feeding a growing urban labor force and generating foreign currency via agricultural commodity exports (Cohen, 1987). Large-scale commercial farming was, thus, became one of the pillars of the Imperial regime development policy and strategy. Accordingly, such farming took a variety of shapes

[25] In this article we have used terms like "large-scale agriculture investment" and "large scale commercial farming" interchangeably.
[26] Likewise, we have used terms "regime" and "government" interchangeably.
[27] Modernization theory argues that traditional agricultural sector which is characterized by smallholders and subsistence agriculture of rural economy holds no hope for agricultural growth and improvement in income, therefore; instead government should focus on modern sector (industry) that has potential to stimulate growth via instrumentality of the market, the diffusion of new technologies, and the growth of large mechanized farms. The model was highly promoted and supported by the US government, donor agencies, and international organizations (the World Bank) and accepted by the Imperial regime without critical analysis and contextualization (Dessalegn, 2009).

and forms in terms of structure, scale, and orientation based on the theoretical, legal, and policy changes of the regime. Particularly, during the 1960s there was a rapid expansion of private large-scale commercial farming in the lowland areas of the country, [28] mainly in the Awash Valley[29]and Setit Humera[30] (Kline & Donahue, 1969).

A military government called the 'Derg'[31] that purged the Imperial regime and took power in 1974 had reversed development policy and strategies of the ex-government. The Derg adopted an entirely the converse development approach arguing that the eradication of poverty and capitalist exploitative system can only be possible through nationalization that can be accomplished through state intervention in and control cover economic system as well as making the state an ultimate representative of the Ethiopian people (Henze, 1985). However, similar to the Imperial regime, the Derg adopted industry–led development strategy (albeit the socialist approach) that perceived the smallholder peasant agriculture as a backward, inefficient, and powerless to take advantage of economies of scale, and so, a barrier to a long run industrial development of the country. Accordingly, the Derg had created large-scale mechanized state farms through confiscation and nationalization of all private commercial farms of the Imperial regime time (Dessalegn, 2009; Firew, 2015) based on the Moscow Sovkhoz Model (Henze, 1985). Besides these farms, the regime had adopted an expansionary policy to establish new farms and considerably increased the agricultural area and a number of the state farms (Chala & Terefe, 2015). In general, by the end of the 1980s, despite a tremendous attention to and an enormous public resource injection into the state farms, almost all of them were found to be bankrupt (Dessalegn, 1984; Cohen, 1987; Girma, 1987).

The Ethiopian People's Revolutionary Democratic Front (EPRDF) led regime which has been in power since 1991 has introduced a range of political and economic reforms for the purpose of transforming economy of the country but changes in the land issue where the state retained ownership of the land (Sharp *et al.,* 2007; Dessalegn, 2009). Unlike preceding regimes, the new government has maintained a strong position in favor of smallholder agriculture by encouraging agricultural intensification in such a way that thrive smallholder farmer's

[28] During Imperial regime all laws including the constitutions of the 1931 and 1955 considered pastoralists' land (lowland areas) as 'unoccupied land' or 'no man's land' and so declared it as the property of the Imperial government (The Imperial constitution of the 1955 Article 130, sub-article 'd').

[29] The Awash Valley is an area located in northern Ethiopia Rift Valley covering a 70,000 square kilometer and comprises lowland areas below about 1,500 meters of the larger Awash River drainage basin (Kloos, 1982).

[30] This is the area located in the northwest of Ethiopia to the Sudanese borders between Setit and Angareb River (Firew, 2015).

[31] Derg is Amharic term referring to 'committee of soldiers'

productivity (Sharp *et al.,* 2007). Government's strong focus on the smallholder agriculture is unequivocally specified in its long-term development strategy known as the 'Agricultural Development Led-Industrialization (ADLI)'. The overall objective of ADLI is to reinforce the backward and forward linkages between agriculture and industry by raising the productivity of small-scale farmers, expanding large-scale private commercial farms, and by strengthening the manufacturing sector in such a way that efficiently utilize the country's socio-economic resources (MoFED, 2002). The regime has given due attention to large-scale agricultural investment since the 1990s where it devised various policy and legal frameworks as well as incentive packages to create a favorable investment climate and attract private investment into the agricultural sector (Dessalegn, 2011; MAI, 2012). Consequently, the country has leased millions of hectares of land to both domestic and foreign private investors.

It is in line with this background that this article seeks to examine the magnitude, trends, and issues of large-scale agricultural commercial farming in Ethiopia over the last six decades. We have used extensive secondary data obtained from various sources and carried out a critical review of the pertinent literature to understand and address the aim of the article. We argue that if large-scale agricultural investment is cautiously managed and integrated to smallholders farming, it is vital to modernize and transform the national economy in general and rural economy in particular. However, we also argue that even if political factor plays a key role in resource allocation, it should not be used as a controlling and an exploitation instrument to annihilate the livelihoods of the weakest segment of society by the name of the investment. This article, therefore, discusses the situation of land deals, amount of land leased, profile of investors including the number of licensed projects, and various issues related to large-scale commercial farming in the country since the reign of Emperor Haile Selassie I to the current government.

5.2. Materials and Methods

This article is based on both primary and secondary data obtained from various sources and complemented by data collected through interview. Primary data were acquired from the Ethiopian Investment Commission (EIC), Federal Horticulture and Agriculture Investment Authority (HAIA), and Oromia and Gambella regional states investment Agency authorized sources. Primary data were also acquired via interview that was held with government employees working at the Federal (six) and regional (five) levels. The data were presented using tables and figure and analyzed through descriptive method. Moreover, secondary data were acquired from a number of sources such as scientific journal articles; books; working

papers; policy, plan, and program documents; reports of government and non-governmental organizations; proclamations; electronic materials; and other related documents. We employed a systematic review of the literature and documents to synthesize the magnitude, trends, and issues related to large-scale agricultural farming in Ethiopia through a narrative approach.

5.3. Large-Scale Commercial Farming during the Imperial Regime

Since the 1950s, giant foreign investors began to take part in various investment ventures (especially, commercial farming) in Ethiopia. Besides, the Proclamation No. 5l, which was enacted in 1963 by the regime, extended incentive packages to domestic investors and encouraged new local capitalists emerging from regional nobilities, chiefly from Amhara and Tigray, as well as the family of the Afar Sultanate of the Awssa fiefdom (Kline & Donahue, 1969). These new local capitalists were often coming mostly from the educated members of the landed aristocracy who understood the benefit of commercial farming than simply collecting rents from the tenants cultivating their land. Others were urban merchants who rented land from the absentee landlords and had the capacity to reinvest their money in profitable commercial agricultural ventures (Ottaway, 1976; Desta, 1979), and those who were employed in the public administration of the regime and granted land by the Emperor (Dessalegn, 2009).

In general, Awash and Rift valley, Setit Humera basin, and Arssi province were the areas that attracted the attention and mind of both foreign and domestic investors during the 1960s (Dessalegn, 2009). Initially, high priority was given to the development of Awash Valley via mechanized agriculture due to its eminent potential for irrigated agriculture (172,000 ha of land of which 24,000 ha is found in the Upper, 78,000 in the Middle, and 70,000 in the Lower Valleys) (Addis & Hailue, n.d.); favorable location close to the major domestic markets; and transportation facilities (Kloos, 1982).

The government itself was the first participant in commencing large-scale farming where it owned pilot state and research farms based on the Yugoslavia farming model. This practice of the state had encouraged the establishment and expansion of private commercial and state farms in various areas of the country (Habekiristos, 2016). After the Imperial regime paved the way, large-scale commercial farming took a variety of shapes and forms in terms of structure, scale, and orientation based on the theoretical, legal, and policy changes of the regime. On the whole, the Imperial regime's investment policy that allowed importation of agricultural inputs, equipment, and tools such as fertilizers, pesticides, tractors, combiner,

harvesters, and fuel-free import duties had decidedly encouraged the quick growth of large-scale commercial farming in Ethiopia (Dessalegn, 2009). The Imperial regime's policies that emphasized export promotion and import substitution and, the later, the development of irrigated agriculture around Awash Valley and Tekeze River were also encouraged the expansion of large-scale commercial farming in Ethiopia (FAO, 1965; Emmanuel, 1975). Hence during the 1960s there was a rapid expansion of such investment, mainly managed by the Awash Valley Authority, Middle Awash Settlement, Tendaho Plantation Share Company, as well as Setit Humera (Kline & Donahue, 1969).

In the mid of the 1950s and beginning of the 1960s, the giant multinational companies namely the Dutch Handels Vereniging Amsterdam (HVA) and the British automotive firm Mitchell Cotts came to Ethiopia for the first time and started commercial farming in the Awash Valley by installing sugar and cotton plantations, respectively (Kline & Donahue, 1969) on the almost 44% of the total area under cultivation in the Valley (Dessalegn, 2009). The government was also involved in the Valley by establishing Middle Awash Agricultural Development Enterprise (MAADE), a large irrigated government-owned cotton farm, in Amibara district in 1969 which was later privatized due to loss-making or economic failure (Behnke & Kerven, 2013).

The Dutch HVA was the first foreign company that installed its earliest sugar plantation in 1954 in the Upper Awash at Wonji and expanded its sugar estates in 1960 and 1965 to Shoa and Metahara, respectively (Desta, 1979; Kloos, 1982; Michael & Sileshi, 2007; Asebe, 2016). The company was granted a concession of 5,000 ha of land in the Wonji plain and got extra 1,600 ha of land in Shoa, as well as acquired a concession of 11,000 ha of land in the Metahara flood Plains (Michael & Sileshi, 2007). The company had a major investment share (almost 80%) in the sugar industry in the country. The company was initially set up as a joint venture between the Imperial government and the Dutch firm although later some evidence indicated that the company was exclusively owned by the Dutch investor (Bondestam, 1975). Albeit the company introduced modern farming to the country, tried to meet ever-increasing demand of the people for sugar, and greatly reduced country's dependence on the importation of sugar, it was highly criticized for being capital intensive, capital flight, insensitive to the local employment and environment (chemical discharge to the river and air), paying extremely low wages (1-2 Birr a day – payment for survival purpose rather than labor contribution) and stagnant wage for over a decade (Bondestam, 1975). Most of all, the HVA Sugar Cane Estates were condemned for taking the grazing land of pastoralist communities

and displacing them without compensation (Kloos, 1982; Nicol *et al.,* 2000). This event mainly blocked pastoralists' access to grazing land and water points and fueled inter-conflict in the Awash Valley basin, mainly due to the scarcity of the resources during dry seasons (Nicol *et al.,* 2000).

A company called the Tendaho Plantation Share Company with a share of nearly 2.5 million dollars was established as a joint venture between the Imperial regime and a British firm called Mitchell Cotts at the end of the 1950s. The company was granted virtually 10,000 ha in the Lower Awash Valley at Dubti, Dit Bahari, and Logia areas yet it utilized only 5,800 ha of land (Nicol *et al.,* 2000). The company promised the Imperial regime to satisfy the total local demand for cotton and increased its production from 2,000 metric tons to 8,000 metric tons between 1959 and 1969 albeit the importation of the cotton continued due to high local demand for cotton consumption (Kloos, 1982). The company was one of the booming private commercial enterprises of the time (Kline & Donahue, 1969) that harvested the net profits of all but 67% of the value of the production in one, year 1973 alone (Bondestam, 1975).

The Tendaho Plantation Share Company had adopted an out-grower business model, where the smallholders in 1966 supplied roughly 30,000 quintals of raw cotton to the company (Kloos, 1982). This indicates that the company had benefited the local community (mainly the settlers) resided within the vicinity of the catchment area. The introduction of modern commercial farming in the Lower Awash Valley had also encouraged the local people (mainly the Malokti - those who have control over and access to land and water resources in Afar community) to commence and practice such farming and become capitalist farmers (Nicol *et al.,* 2000). Particularly, the Lower Awash Valley was considered as the property of the Awssa fiefdom who (the Sultan) exercised control over the land within his territory and eventually transformed himself into giant capitalist via modern commercial farming (cotton plantation) (Dessalegn, 2009). However, like the Dutch HVA, the British firm Mitchell Cotts and company paid awfully low wage (1 Birr a day) for daily laborer while remunerated the highest wage (80 Birr a day) mostly to foreigners (Bondestam, 1975).

After the Dutch and British, Italian and Israelis companies got access to the Awash Valley via concessions. In general, the Dutch, British, Italian, Israelis firms acquired 10,840, 8,200, 2,000 and 2,800 hectares, respectively of cultivated land in the Awash Valley (Desta, 1979). To administer the natural resource of the Awash Valley in general and facilitate the inflow of Foreign Direct Investment (FDI) into the agricultural sector and land allocation to investors, the Imperial regime established an institution called the Awash Valley Authority (AVA) in

1962. Following this, by 1971, the authority had managed to lease 31,000 hectares to foreign investors in the Awash Valley. However, after three years the total land leased to investors in the area reached 52,270 ha (Desalegn, 2009) whereas Markakis (2011) estimated it as 60,000 ha and Kloos (1982) as 57,500 ha. This total land was operated by 20 privately owned large commercial farms and 13 jointly owned ventures (by the Imperial government and private companies) farms (Markakis, 2011). Other sources indicated that the total amount of land cultivated in the Valley comprised medium-sized commercial farmers and out-growers (smallholder farmers) but the exact number of such farmers and their respective farm size were unidentified (Dessalegn, 2009). Nevertheless, according to some evidence, large-scale commercial enterprises held 57% of the total cultivated land, medium-sized enterprises held 10%, and the remaining 33% was held by out growers (AVA, 1971). Moreover, about 20,000 hectares of cultivated land in the Valley was controlled by the Ali Mirra of which nearly 25% comprised mechanized farms (Kloos, 1982; Dessalegn, 2009). Table 5.1 as adapted from Dessalegn (2009) based on the AVA summarizes the total area of land cultivated in the Awash Valley up to the beginning of 1970s.

Table 5.1: Area Cultivated by Investors in the Awash Valley Basin (in hectare).

Upper Valley		Middle Valley		Lower Valley	
Farm	Area	Farm	Area	Farm	Area
Wonji	7000	Abadir	2800	Logia	140
Tibila	800	Metahara	4000	Dubti	6500
Nura Era	2600	Melka Sedi		Dit Bahari	5560
Others	800	Amibara	2100	Assaita	
		Awara Melka	560	Berga	18200
		Kesem-Kenena	400	Others	810
Total	11,200	Total	9,860	Total	31,210
Grand Total (All farms)			52,270		

Source: (AVA, 1971 cited in Dessalegn, 2009, p.88)

The major types of crops produced in the Awash Valley include cotton seed and sugar cane (by large-scale mechanized farms and out- growers) and fruits, maize, and wheat (by small and medium farms). Some evidence shows that annual gross production of all operating enterprises was increased from where it was 120 million Ethiopian Birr by the beginning of the 1970s to 163 million Ethiopian Birr by the end of 1973 (Dessalegn, 2009). As far as jobs created by operating firms are concerned, Bondestam (1975) estimated that 75,000 seasonal and 50,000 permanent jobs were created in the Valley as a whole. Besides, about 20,000 highland settlers participated in the Valley's investment (mainly in the Middle and Lower Valley) as out growers, contact farmers, and tenants (Bondestam, 1975). However, almost all of the beneficiaries of employment (seasonal and permanent) came from other areas of the

country and occupants of the Awash Valley (the Afar and Kereyu) were entirely missing from the job creation schemes (Dessalegn, 2009). Furthermore, the expansion of mechanized agriculture displaced more than 20,000 pastoralists in the Awash Valley. It adversely affected the livelihoods of the inhabitant community by reducing livestock forage resources, blocking seasonal migration routes, and jamming access of the pastoralists to the livestock watering points (Kloos, 1982; Nicol *et al.,* 2000).

Large-scale commercial farming was commenced in the Awash Valley and quickly expanded in the area without the knowledge, consent, and compensation of the pastoralist community (Dessalegn, 2009). This was mainly owing to Imperial regime's denial of land ownership and rights to pastoralist community. During the Imperial regime, all laws including the constitutions of the 1931 and 1955 considered pastoralists' land as 'unoccupied land' or 'no man's land' and so declared it as the property of the Imperial government. For example, Article 130 sub-article 'd' of the 1955 constitution declare "all property not held and possessed in the name of any person, natural or legal, including all land in escheat and all abandoned properties, whether real or personal, as well as all products of the sub-soil, all forest, and all grazing lands, water resources, lakes and territorial waters, are state domain." Even if, land in highland areas of the country was considered as private property, the communal land of the pastoralists was conceived as state property showing clear discriminatory and marginalization policy of the Imperial regime. The successor regimes of the Imperial government had adopted the same policy of considering pastoral community's land as 'unoccupied' and/or 'ideal' and vastly promoted the large-scale commercial farming in these areas of the country.

In general, in the mid-1960s, the number of the large-scale commercial farming was limited and the scope was also restricted to the Awash Valley and some constricted line of Setit Humera basin around Sudanese border in Begemdir[32] (Ottaway, 1976). However, by the late 1960s and early 1970s such farming was expanded to the Rift Valley, Arissi province (Chilalo district), vicinity of Addis Ababa (such as the Ada district), and Kaffa province where coffee plantations were being changed into modern commercial enterprises (Ottaway, 1976; Dessalegn, 2009). At the end of 1974, eve of the downfall of the Imperial era, there were about five thousand large-scale commercial farms in Ethiopia, covering up three-quarter of conceivably million hectares (Ottaway, 1976).

[32] Begemdir was a province in the northwestern part of Ethiopia during the Imperial regime which became latter Gonder.

Setit Humera, which is located on the borders of Gonder, Eritrea, and Sudan, was identified as one of the most potential agricultural development areas for production of the export commodity in the early 1960s. The area comprises 782,000 ha of land (of which over half, that is, 420,000 ha was believed to be arable land) and traditionally been used by pastoralists, both native and transitory (Dessalegn, 2009). In the early 1960s, commercial farming was started and swiftly stretched in the area by mechanized farmers and smallholder ox-cultivators that came from highland areas of Gonder and Tigray. By the early of the 1970s, about 72% or 300,000 ha of the total arable land was under cultivation. Particularly, 58% (176,000) ha of cultivated land was managed by modern mechanized farmers and the remaining 42% (128,000 ha) was plowed by ox-cultivators. Majority of the land (45%) was devoted for production of the export commodity (sesame seed), 12% to cotton, and 35% to sorghum that was either consumed or locally marketed (Dessalegn, 2009). Setit Humera agricultural schemes played a major role in the country's export performance (contributed 75% of the total export). The total sesame export of the country rose from where it was 10,000 metric tons in the 1950s to 52,000 metric tons in the early 1970s. The evidence shows that except one foreigner, all of the enterprises were owned, managed, and operated by local capitalist farmers (T.A.M.S., 1974). Even though the schemes had created about 100,000 jobs in the early 1970s, the pastoralist in the neighboring areas (mostly in Wolqait and Tsegede) were not involved in any part of the agricultural investment activity. Alike Awash Valley pastoralists, the land rights of Humera pastoralist community were neglected (Dessalegn, 2009).

The Rift Valley[33] was also one of the implausible agricultural mechanization areas in the country. Some evidence shows that there were more than 150 commercial farmers of which large-scale commercial farming (both rain-fed and irrigated, state and private) was carried out on the 20,000 ha of land (Gillian, 1974). Pulses, cotton, maize, sisal, sorghum, fruits, and pepper were the main frequently produced crops in the area (Getachew, 2007; Asebe, 2016). For example, the Imperial regime established Arba Minch State farm in 1958 for cotton plantation (Asebe, 2016). However, the investment had resulted in the confiscation of Guji community from their pastoral land and displacement of some Gamo peasants from their farmland. Moreover, the farm had ignited and exacerbated inter-ethnic conflict between Guji and Gamo communities (Asebe, 2016). Overall, the Imperial regime was unable to transform

[33] Which was extended from the Meqi and Zwai areas and went through the vicinity of Shashemene and Hawass expanses, Billate river basin, and patted Arba Minch

the Ethiopian economy through large-scale commercial farming as envisaged in its policy and strategy documents (Adams, 1970; Cohen, 987; Dessalegn, 2009).

5.4. Large-Scale Commercial Farming during the *Derg* Regime

The *Derg* had launched a land reform program on March 4, 1975, by enacting a proclamation No. 51/1975 entitled 'Public Ownership of Rural Lands Proclamation' based on the Leninist slogan that says "all land to the tillers" (Henze, 1985, p.24). The reform principally abolished landlordism, where land belonged to landlords, was expropriated without compensation, eliminated all forms of tenancy, evenly distributed land to the peasants, and banned the employment of agricultural labor within the private sector (Dessalegn, 2009). The proclamation explicitly declared land as the property of the state and people. For example, article 3 of the proclamation declared that 'all rural lands shall be the collective property of the Ethiopian people'. Since the government is an administrative body within a state and run the state on the behalf of the people, this item implies that the government has an ultimate power and authority over the administration and control of the land. Except for use right or usufruct right, private ownership, sales, lease, mortgage or similar means were prohibited (Article 4). The proclamation restricted the maximum size of land holding by a household to a maximum of ten ha. In the mid of the 1970s, National Campaign for Development through Cooperation was launched to assist the implementation of rural reform and proliferate the aim of the socialist regime by deploying over 50,000 university and high school teachers and students all over the country (Henze, 1985; Dessalegn, 2009).

Following the radical land reform proclamation, the *Derg* made a vigorous attempt to set up state farms by nationalizing private commercial farms of the imperial regime based on the socialist model of the newly formed post-revolt republic. Accordingly, agricultural development strategy of the socialist regime had essentially created two agriculture sectors: State and Cooperative farms (the socialist sub-sector) – desperately prioritized by the regime and smallholder farms (the peasant sub-sector – the dominant but depressed and deserted (Dessalegn, 2009). The *Derg* argued that eradication of poverty and feudo-capitalist exploitative system can only be possible through nationalization that can be accomplished only when the state as the ultimate envoy of the Ethiopian people – representing the interest of the mass peasant and workers – unswervingly owns, manages, and controls the natural resource, financial, industrial, and commercial sectors of the country (Henze, 1985).

5.4.1. Large-Scale Mechanized Commercial State Farms

Similar to the Imperial regime, the *Derg* adopted industry-led development strategy (albeit the socialist approach) that perceived the smallholder peasant agriculture as a backward, inefficient, powerless to take advantage of economies of scale, and so, a barrier to a long run industrial development of the country. It was based on this socialist government's prejudiced attitude and the 1975's land reform proclamation that large-scale state farms born with a unique personality. The newborn large-scale mechanized state farms were created by confiscation and nationalization all private commercial farms of the Imperial regime and establishing the new ones (Dessalegn, 2009; Firew, 2015) based on the Moscow Sovkhoz Model (Henze, 1985) (that gives a new personality to formerly capitalist commercial farms). These farms were managed by different agricultural development corporations which were ruled by the Public Enterprise Proclamation No. 20/1975 and Regulation No. 5/1975 (Negarit Gazette, No. 21, 1976).

The major motivation of the *Derg* regime for favoring large-scale mechanized commercial state farms[34] include foreign currency earning via export, the supply of raw materials for industry, job creation, and addressing a continually rising local demand for food (Girma, 1987; Firew, 2015). This shows that agriculture sector was promoted for the purpose of 'resource extraction' rather than used as a prime mover of the economic development in general and rural development in particular (given that Ethiopia is dominated by agriculture and rural economy). To achieve its intentions, the *Derg* had adopted an expansionary policy and significantly increased the agricultural area operated as the state farms. For example, initially (in the mid-1970s) around 448 state farms of varied size cultivated a total of 131,000 hectares (of which 75,000 hectares were nationalized private commercial farms) (Firew, 2015) which later (in 1984) considerably augmented to 245,000 hectares (Girma, 1987). The *Derg* had a big ambition to radically increase (to double) agricultural land of state farms to about 468,000 hectares by 1994, which could account for 6.4% of the cultivated land (Chala and Terefe, 2015). State farms were producing both cash crops such as cotton, coffee, pulses, fruit, and vegetables as well as food crops including Teff, Sorghum, Millet, and leguminous crops (Girma, 1987).

Even though these farms supplied a significant part of their products to local markets and consumed a colossal amount of agricultural inputs, they on average just produced 6% of the

[34] In this article Large-Scale Mechanized Commercial State Farms refers to farming enterprises that use machineries (mechanical power) to cultivate land as a minimum of 100 hectare; controlled, owned, managed, and operated by the government; and supply their product to either local or international markets.

total agricultural output in 1978 (which was reduced to 2% at the end of 1980) on 5% of the total cultivated land in the country (Ofcansky & Berry, 1991; Habekiristos, 2016). On the other hand, from 1980 to 1982, they consumed 82% of fertilizers, 80% of the farming credit, 73% of improved seeds, and a huge amount of imported oil to supply fuel to over 3,500 tractors cultivating the land (The World Bank, 1983 as cited in Girma, 1987). This implies that the socialist sub-sector (the large-scale state farms) had enjoyed a range of incentives and subsidies at the expense of smallholder peasant sub-sector that was responsible to supply over 94% of agricultural output to continually rising urban and rural population of the country. However, the investment return of these state enterprises was found to be poor and their efficiency of improving national agricultural production was found as weak. For example, evidence shows that in 1987 state farms registered a loss of 65 million Ethiopia Birr which drastically climbed to 115 million in 1989 (Zerhun, 1995). It was also accounted that the efficiency of the socialist sub-sector is considerably lower than that of the peasant sub-sector. For instance, average coffee production per hectare of land on peasant farms was 35% higher than on state farms. The average production of state farm pulses was found as just 33% of the peasant farms production. The average production of basic food and leguminous crops were also reported as lower on state farms than on the peasant ones (Girma, 1987).

In general, by the end of the 1980s, despite a tremendous attention to and an enormous public resource injection into the state farms, almost all of them were bankrupt and their survival was entirely depended on the government that was busy in dealing with the horrendous intra-state war showing that the attempt of the *Derg* to transform the Ethiopian economy via large-scale state farms was failed (Dessalegn, 1984; Cohen, 1987; Girma, 1987). Lack of skilled manpower; corruption; lack of proper feasibility study; poor planning and groundwork; superfluous inexperienced workforce (disguised unemployment); lack of ethical workforce; inefficiency due to uneconomic use of inputs; over-mechanization; weak monitoring, follow up, and controlling system were found as the major reasons for poor performance of the state farms (Dessalegn, 1984; Cohen, 1987; Girma, 1987).

5.5. Large-Scale Commercial Farming during the EPRDF Regime

Following the fall of the *Derg* regime in 1991, the new EPRDF government had taken different measures to improve the entire economic, social, and political conditions of the country. In the economic sphere, the incumbent government had initiated a new Economic Reform Program (that coincided with the Structural Adjustment Program of the World Bank and International Monetary Fund) in 1992 to repeal previous regime's economic policy and

tackle macroeconomic, structural and non-structural economic setbacks created by the Derg (Samuel, 2003). Particularly, a free market economy, economic liberalization, and decentralization policies were adopted by the new regime. However, there was no change in land ownership system given that like the Derg regime, the new government has retained possession of the land and only transferred long-term usufruct rights to the peasants (Sharp *et al.,* 2007; Dessalegn, 2009). It was within these policy reform measures of the 1990s (which were largely driven by the Neo-liberal Washington Consensus Model) that the large-scale commercial farming was regenerated with new forms and structure.

Nevertheless, the new regime has maintained a strong position in favor of smallholder agriculture by encouraging agricultural intensification to thrive smallholder farmer's productivity (Sharp *et al.,* 2007). Government's strong focus on the smallholder agriculture is unequivocally specified in its long-term development strategy known as the 'Agricultural Development Led-Industrialization (ADLI)'. The main intention of ADLI is to promote small-scale farmers and (agro)pastoralists in such a way that use the relatively copious labor and land resources in more efficient and viable manner, increase agricultural productivity through the use of modern technologies, and adoption of agricultural extension systems (MoFED, 2003). The agricultural sector is considered as an engine of industrialization process by supplying raw materials, labor, as well as becoming a market base, and a source of capital accumulation (MoFED, 2002).

To promote, facilitate, and improve the role and participation of the private sector in the economy, the new regime had established institutions namely privatization agency and investment authority (currently upgraded to Ethiopian Investment Commission) (Proclamation No. 146/1998; Regulation No. 269/2012). Particularly, the privatization agency was given the mandate to administer the privatization process of state farms and other enterprises that were nationalized by the Derg regime. The policy measures mentioned above accompanied by the establishment of these new institutions led to re-emergence and growth of the large-scale private agricultural investment in Ethiopia (Samuel, 2003). The short-term strategy of the EPRDF government during the 1990s was to distribute some of the ex-state farms to peasants and dispose of some of them which were considered as unfeasible for technical reasons. The medium-term strategy was to privatize state farms which were judged as unbeneficial and focus on the production of non-strategic commodities. Alternatively, the long-term plan of the government was to retain some of the state farms that are found to be

having strategic significance to the economy of the country and require profound investment (Zerihun, 1995).

A new mechanized large-scale commercial agricultural investment is mainly envisaged to be promoted in the lowland areas of the country (that are considered as 'unused', or 'unoccupied' or 'idle' by the new regime) (MoFED, 2010a: 23) – the perception and attitude similar to the past regimes) with horticulture, outgrowing schemes, and labor-intensive agriculture planned to be promoted in highland areas (Dessalegn, 2011; Keeley *et al.,* 2014). In general, horticulture, plantation of cotton, palm tree, rubber tree, coffee, tea, sugarcane, oilseeds, livestock, apiculture, and high-value crops such as barley for malting were identified as priority areas for agricultural investment (EIC, 2017). This indicates that the primary purpose of large-scale commercial farming in Ethiopia is the production of high-value crops heading for export or supply of raw materials for domestic industries rather than contributing to the local food security, which is the critical problem of the country for several decades.

Besides the two institutions mentioned above, to support and facilitate the land transfer processes, a department called Agriculture Investment Support Directorate (hereafter AISD) under the Ministry of Agriculture was established in 2009 due to remarkably soared demand for large-scale agricultural land acquisition, both locally and globally (Proclamation 29/2009). The directorate was mandated to handle all matters with regard to agricultural investment and given a responsibility to administer investment land over 5,000 hectares across the country. In 2013, the government upgraded and renamed the previous directorate as the "Agricultural Investment Land Administration Agency" by the Council of Ministers Regulation No. 283/2013. The primary responsibility of the agency is to facilitate agricultural investment, land administration, and transfer processes more efficiently than before. All over again in 2017, the Agency was promoted and transformed into the Horticulture and Agricultural Investment Authority (HAIA), an institution that is directly accountable to the Prime Minister Office (Council of Ministers Regulation, No. 396/2017). Even if the government claims that such rapid institutional changes are initiated to cope up with and efficiently administer the ever-growing large-scale agricultural investment in the country, the level of their effectiveness and the need for such swift changes require a cavernous systematic empirical investigation.

5.5.1. The Supply Side of Large-Scale Farmland

Even though the Ethiopian constitution grants regional states the power and authority to administer land within their respective areas (Article 52, 2d), the Council of Ministers had enacted a proclamation (Proclamation 29/2001 Ethiopian Calendar) to centrally administer the plots of land exceeding 5,000 ha by federal authorities such as AISD (Dessalegn, 2011; Keeley *et al.,* 2014). Following this (the upward delegation), federal land bank was established based on this proclamation by focusing on the lowland areas on the ground that they lack experience and capacity to manage the investments (mostly the international ones) (Ojot, 2013; Keeley *et al.,* 2014) and are characterized by extensive rent-seeking and corruption (Abbink, 2011; Schoneveld, 2013). However, the view was highly challenged by some of the regional states such as Oromia and Amhara, which relatively have a strong management capacity. And so, regions (mainly lowland ones) were urged by the federal government to transfer all investment lands exceeding 5000 ha to the federal land bank which would soon after be administered by the central authorities on behalf of them. Subsequently, more than 3.5 million hectares of land were transferred to and registered by the federal land bank. At the start, the bank was managed by the AISD and then by Agricultural Investment Land Administration Agency (Dessalegn, 2011). Nevertheless, it was found that local government had no knowledge about the land transfer process as well as the amount of land transferred to the Federal Land Bank due to lack of local stakeholders involvement in the land identification and assessment processes (Schoneveld, 2013).

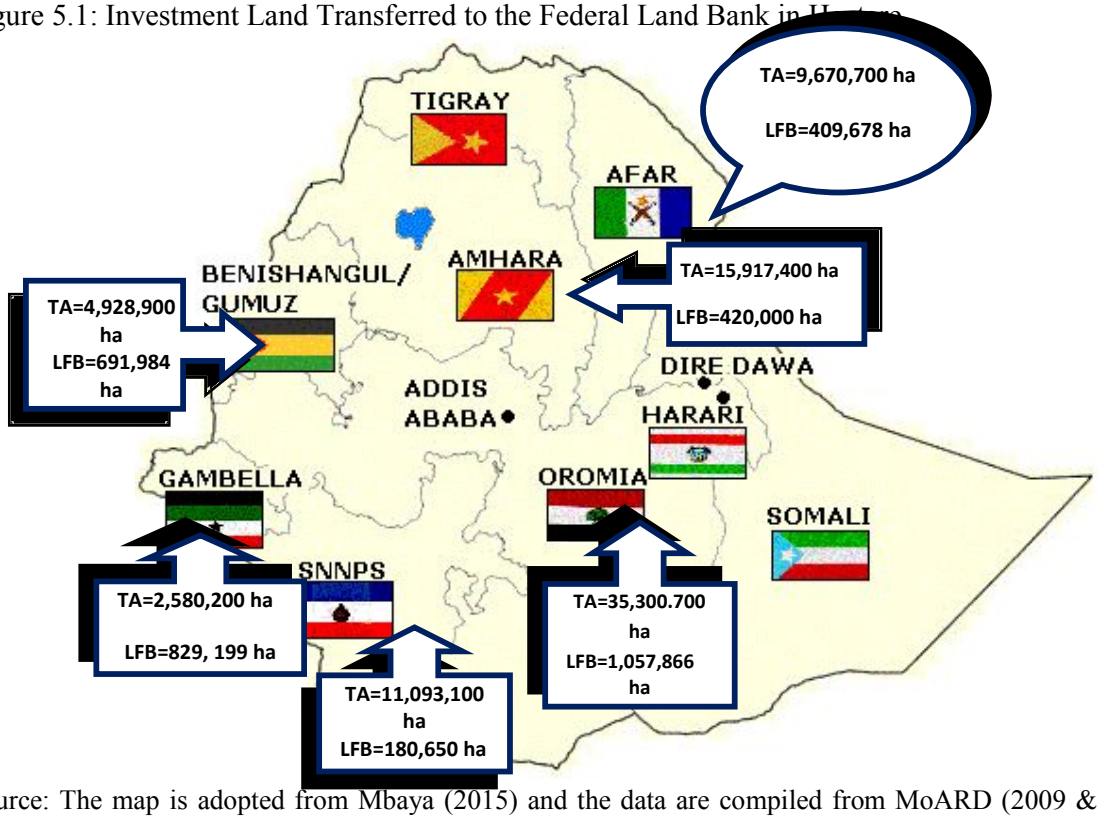
The land in each region was also identified by the satellite picturing and was thus inaccurate regarding the communities occupying the land or vital natural resources on the ground (Keeley *et al.,* 2014). This upward delegation was also greatly criticized by various scholars on the ground that it violates the principle of regional autonomy, which has been the foundation of ethnic federalism (Lavers, 2012a; Ojot, 2013). Regional governments were given a mandate to administering the farmlands below 5000 ha but the boundaries between land under the command of regional governments and that held in reserve bank by the federal government are not clear. This division of responsibility and power has also resulted in confusions, conflicts (overlaps in land allocation), and inefficiencies in the large-scale agricultural investment management (Keeley *et al.,* 2014; Maru, 2016). This indicates that the government does not only recentralize land administration responsibilities and power, but also intervenes into regional states land issue which is an overt breach of the

constitutionalism. Figure 5.1 shows the size of land affirmed to have been shifted to the federal land bank by each regional state.

As indicated in Figure 5.1, the analysis of the proportion of the total land transferred to the federal land bank across different regions shows that Oromia, Gambella, and Benishangul Gumuz regional states are the first three regions that transferred the largest land. For example, Oromia regional state had transferred a total of 1,057, 866 ha (29.5%), followed by Gambella and Benishangul Gumuz which transferred a total of 829,199 (23%) and 691,984 (19.3%) ha of land to the federal land bank, respectively. However, in terms of the proportion of total area of the region that is made available to large-scale commercial investment or transferred to federal land bank, Gambella (that transferred 32.14% of its total land size), Benishangul Gumuz (14% of its total land size), and Afar (4.2% of its total land size) ranked the first, second, and third, in that order. This evidence shows that the government has taken a grave action to realize its oratory claim that there is abundant 'unused' or 'idle' land suitable for large-scale commercial farming in pastoralist and agro-pastoralist areas of the country. However, various studies show that 'idle' land narrative of the government is a myth on the ground that lands in pastoralist areas cannot necessarily be 'empty' rather are used by the community for various economic activities such as grazing, collection of honey, food, wood or other forest products (Desalegn, 2011; Galaty 2012; Lavers 2012a; Nalepa 2013; Institute for Poverty, Land, and Agrarian Studies, 2014).

Update, accurate, complete, and relevant information is vital for making a right decision. Particularly, this is a pressing issue in the countries like Ethiopia where land tenure systems are complex and require in-depth analysis ahead of hastening to decisions that could badly affect the economy, environment, and community. In Ethiopia, there are huge inconsistencies and variations in the land-related data reported by government agencies (both intra and inter-agency data) as well as by some international organizations (such as the World Bank), indicating lack of a realistic and proper land assessment methodology in the country. For example, the document released by the Ministry of Agriculture and Rural Development (MoARD) in 2008 pointed out that the country has 74.3 million ha of arable land that is suitable for the crop production (MoARD, 2008). Another document produced by the Ministry in 2009 indicated that the country has 56 million ha of agricultural land suitable and available for crop production (MoARD, 2009).

Figure 5.1: Investment Land Transferred to the Federal Land Bank in Hectares



Source: The map is adopted from Mbaya (2015) and the data are compiled from MoARD (2009 & 2010); Dessalegn (2011); and Keeley *et al.* (2014)

Note: ***TA*** stands for 'Total Area of Land' where as ***LFB*** represents 'the Total Land Transferred to the Federal Land Bank.

The estimates of the proportion of this arable land that is actually utilized for agricultural production is reported to be 16.6 ha (MoWR, 2002) and 18 million ha (MoARD, 2009) showing the discrepancies of data among government agencies. These inconsistencies in land estimations are a robust indication of poor land data management and coordination which could lead to poor land administration and so adverse impact on the economy, environment, and society.

Data inconsistencies are also extensive within the regions between and/or among various government institutions that are responsible to administer large-scale agricultural investment. For example, in Gambella Regional State, the regional investment bureau reported that a total of 806 investors are issued project license but the Bureau for Environmental Protection and Land Use and Administration as well as Woreda[35] Agriculture and Natural Resource Development Offices reported the number as 780 and 623, respectively. Unbelievably, the Federal Investment Commission is claimed that the number of investors that issued project license in Gambella regional state is only 192 (OPM, 2017). The data reported by Woreda

[35] Woreda is the fourth tier of administration in Ethiopia (it is often equated with the district).

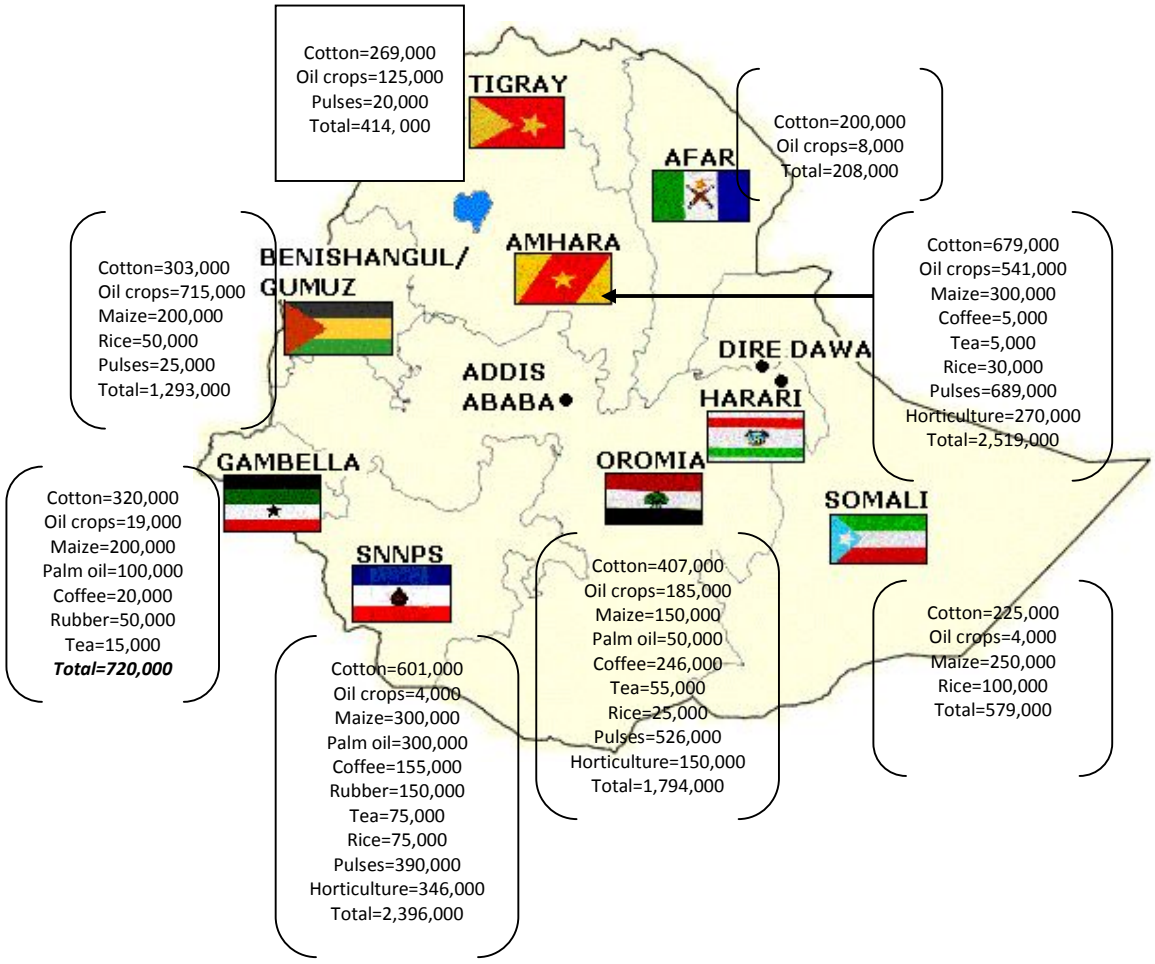
Agriculture and Natural Resource Development Offices were found to be close to reality (OPM, 2017). This is clear evidence for poor data recording and management, regrettable weak coordination and integration, skimpy monitoring and evaluation system, guesswork, and disregard of the natural resource and local community at large.

Figure 5.2 indicates land that is identified as suitable and made available for large-scale commercial investment in each regional state based on a range of crop types. It shows that a total of about 10 million ha of land in all regions of the country is available for large-scale commercial farming albeit Ethiopian Investment Agency (EIA) announced the number as 11.5 million ha (EIA, 2013). The Gambella region has actually transferred 829, 199 ha of land to the federal land bank (Figure 5.1) but only 720,000 ha is identified as suitable and available for large-scale commercial farming in the region (Figure 5.2) by the same organization (MoARD 2008, 2009). On the other hand, another promotional document released by MoARD in 2009 and destined to attract large-scale agricultural investors indicated that about 1,238,005 ha of 'idle' land is available in the Gambella regional state alone (MoARD, 2009). Some types of crop that are actually cultivated in different regions were not considered during land evaluation and estimation, as well. For example, there is no land reported as suitable and available for 'rice' crop in Gambella region (Figure, 5.2) but a company called Saudi Star Agricuture Developemnt Plc has been producing it on 10,000 ha of land since 2008. These are some of the clues for poor coordination and land-related data administration in the agriculture sector. Different government agencies (both federal and regional ones) have been acting as if they are working in different continents of the world without interaction. This problem has also led almost all researchers to report data with a huge discrepancy (both intra and inter regions).

The three relatively developed regions such as Amhara (comprises 25.4% of total suitable land), SNNPS (make ups 24.1% of total suitable land), and Oromia (comprises 18.1% of total suitable land) are identified as having the biggest land suitable and available for large-scale agricultural investment, respectively in the country, followed by Benishangul Gumuz (constitutes 13% of total suitable land), Gambella (7.3%), and Somali (5.8%) regional states (Figure 5.2). Even though the largest land suitable and available for agricultural investment is identified in the relatively developed regional states, lowland regions such as Gambella and Benishangul Gumuz have been the hot spots of the large-scale agricultural investment in the country. For example, from 2007 to 2009, 85.7%, 82.3%, and 80% of LSAI projects were issued licenses in Gambella and Benishangul Gumuz regional states (Maru, 2016) and

SNNPRS (Keeley *et al.,* 2014), respectively. This indicates that the EPRDF government that often called itself as a 'developmental state – a state that directly intervene into and lead the economy – is expanding its power, strengthening its sovereignty, and showing its hegemony through its enclave development model that transformed the conceptual mapping of abundant 'idle' land in the periphery areas of the country into a 'cartography' of commercial land use (Makki & Geisler, 2011).

Figure 5.2: Total Land Available for Investment by Crop Type.



Source: Compiled from MoARD, 2009

In terms of the proportion of total area of the region that is suitable and available to large-scale commercial investment, the largest percentage was registered in Gambella (28%), followed by the Benishangul Gumuz (26.3%), SNNPR (21.6% - where most of the land is located in lowland areas), and Amhara (15.8%), respectively. From the crop type position, the biggest share of land identified as suitable for crop production was allocated to cotton (30%), which is followed by pulses (16.6%), oil crops (16.1%), maize (14.1%), and horticulture (7.7%), in that order. Except maize (which is often used for local food), the majority of land

(85.9%) identified as suitable and available for crop production has been allocated for non-food production (cash crops plantation) (Figure 5.2) which may aggravate food insecurity by making poor farmers vulnerable to unpredictable or undesirable market conditions such as inflation and shortage of food supply. Besides, both domestic and foreign investors are gratis to decide what crops to cultivate and where to sell without any intrusion from their host regions, and vigorously supported to export most or all of their outputs (Dessalegn, 2011). This condition justified the prime interest of the government in promoting export by growing high-value export commodities than focusing on the local food security, integration of the local community into national, regional, and/or global market, and environmental annihilation issues. For example, the government of Ethiopia clearly declares its focus saying that "While supporting private investment in large-scale farms, government's focus is to ensure that the products produced from these farms are primarily for export or raw materials for domestic industries. For these reasons, emphasis will be put on cotton, date palm, tea, rubber tree and similar types of crops" (MoFED, 2010a, p.55).

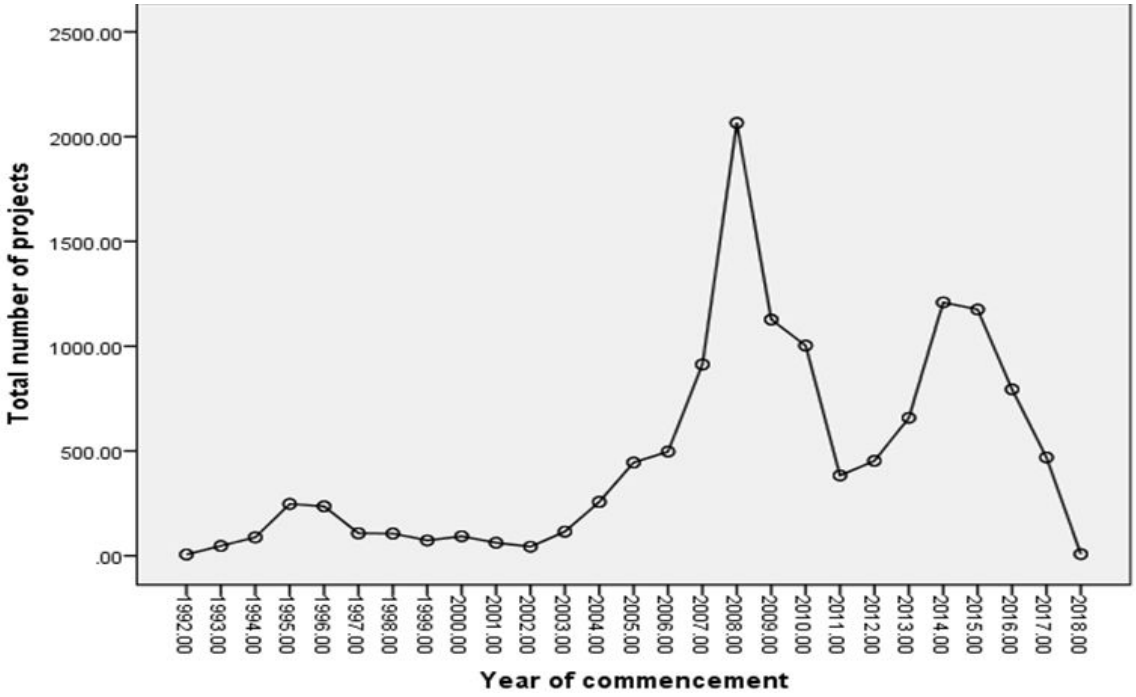
5.5.2. Demand Side of Large-Scale Investment Land

The demand for large-scale agricultural investment in Ethiopia can be exhibited through the interest or request of the investors or their expression of intent to invest in the agriculture sector of the country. Figure 5.3 shows the trend of large-scale agricultural investment flows in Ethiopia since 1992. This period coincided with the current government reform initiatives that were undertaken in the early 1990s to liberalize the economy and encourage the private sector's involvement in the economy in general and agricultural sector in particular. This period can be considered as the rebirth and burgeon moment of the private agricultural investment in the country after the Derg exterminated private enterprises initiated by the Imperial regime. The increment in the trend of agricultural investment interests or intents in the country indicates high demand for the large-scale agricultural investment land acquisitions.

The analysis of the data shows that private investment in the agriculture sector was trifling in the 1990s but displayed a dramatic increment between 2007 and 2010 showing that investment intensity was very high during these periods. A high peak in the surge of agricultural investment was seen in 2008 where the total number of projects had reached 2,066 (Figure 5.3). Correspondingly, the total investment land requested by both domestic and international investors skyrocketed from where it was one million ha in 2005 to more than 4.3 million ha in 2008 (EIA, 2011). This striking rise in investment flow was believed to

be driven by the global triple crises of food, finance, and energy which begun in 2007/08 (Görgen *et al*, 2009; Rahmato 2011; World Bank 2011; Cotula, 2012) and resulted in a surge in international large-scale agricultural investment in Africa where Ethiopia became a hotspot. It was during this time that the government started to think about the administration of such investment and established Agricultural Investment Support Directorate (AISD), the then called AILAA, and now HAIA to centrally administer the investment.

Figure 5.3: Licensed Agricultural Invesment by Year (since 1992 to March 2018).



Source: Ethiopian Investment Commission (2018)

After 2008, the flow of the investment started to decline and again rose in 2014 and 2015. Since then, however, it has been piercingly declining. This declining trend may be associated with the powerful and callous condemnations that have been blasted from the national and international activists and researchers under the umbrella of 'land grabbing' and reports on the potential danger of the investment to the natural environment and local people's livelihoods (Maru & Rutten, 2015). An improvement in global triple crises (chiefly energy and food prices), as well as political instability, observed in the country since 2016 may also be among the factors that slowed down the intensity of investment flows and activities in the country. Regions' poor investment administration (mainly of the emerging ones – Gambella and Benishangul Gumuz), poor performance of some of the giant firms (such as Karuturi Agro Products PLC, BHO Agro PLC.) and their desertion from the investment has also made the government to be very vigilant in accepting and hosting new investments. For example, rather than simply granting a bulky size of land (for instance, 100,000 ha and above) to

investors as per their request, the government has started to transfer the land on phase by phase based on the actual performance and progress of the investors (Keeley *et al.,* 2014; Maru, 2016). The federal government has also lifted its authority and responsibility of administering large-scale investment land exceeding 5000 ha of land and transferred the mandates to regional states since November 2017 (Interview with HAIA officials and experts, July 2018).

5.5.3. Actually Allocated Investment Land

A number of sources of information summarize the size of land investment in Ethiopia but to different degrees of correctness, truthfulness, and thoroughness of statistics. For example, the total amount of land transferred to diverse investors in Ethiopia varies between 603,000 ha (Cotula *et al.,* 2009) and 4.2 million ha (Getnet, 2012). Likewise, the estimated number of projects ranges from 70 (Land Matrix, 2018) to 4,698 (Maru, 2016). The Table 5.2 below summarizes some of the variations (in terms of time and size) in estimates made by various researchers and institutions.

Since 2008 there has been a hot debate about large-scale agricultural investment between proponents of 'land grabbing' that oppose such investment and 'development opportunity' that strongly encourage it. Figures indicated in Table 5.2 were often cited as evidence to support or invalidate the arguments albeit massive discrepancies. Keeley *et al.* (2014) undertook a thorough analysis regarding specific factors that lead to such huge variations.

Table 5.2: Estimates of Land Transferred in Ethiopia Reported by Different Sources**.**

Source	Time Period	Land size (>ha)	No of Projects	Total land transfer ('000 ha)
Cotula, *et al.* (2009)	2004-2009	1000	157	603
Oakland Institute (2011)	Unknown-2011	Indefinite	1,349	3,620
The World Bank (2011)	2004 – 2009	500	406	1,200
Schoneveld (2013)	2008-2012	2000	83	1,692
Getnet (2012)	1995-2011	Indefinite	1,055	4,219
Keeley, *et al.* (2014)	2005-2012	1000	131	1,060^
Maru (2016)	1992-2013	500	4,698	2,500^
Land Matrix (2018)	2000-2016	200	70	1,005
Dereje *et al.* (2016)	2007-2013	Indefinite	Indefinite	2,500

Source: Modified based on the Maru (2016)
Note^: these figures include sugar estates

The authors identified the following factors as key reasons: the figures may only be indicated in memorandum of understanding (where leases do not actually exist); figures may only be an expression of requested land (the reason mostly mentioned by some of a relatively strong

regional states)[36]; the lease may have been canceled; double counting; recording errors; delay in updating data; and cultivation of merely a small amount of land.

On the whole, in Ethiopia, the large-scale agricultural land is allocated in three major methods: by the federal authorities to private investors from the federal land bank; by regional governments to the commercial investors, and by the federal governments for state-run sugar concessions (Keeley *et al.,* 2014). Table 5.3 shows figures of land allocated/transferred to private investors from the federal land bank via HAIA (the former AILAA). The Authority has transferred a total of 587,139.3 ha of land to various domestic and foreign investors from the federal land bank (Table 5.3).

Table 5.3: Allocation of land by region from the federal land bank

Region	No of Leases	Size of Land allocated	Average Land Size	Percent of Land allocated**
Gambella	47	273,812	5,825.8	46.6
Benishangul Gumuz	72	199,485	5,115	34
SNNPS	23	96,659.3*	8,054.94	16.5
Amhara	1	6,183	6,183	1.05
Somali	2	6,000	6,000	1
Oromia	1	5,000	5,000	0.85
Total	***146***	***587,139.3***	***36,178.74***	***100***

Source: Federal HAIA, 2017

*The number does not include State Sugar Cane Plantation Estates

**The number is rounded to the nearest

In terms of the number of deals, a total of 146 private-owned projects were allocated land with a minimum of 200 ha in Benishangule Gumuz regional state and a maximum of 100,000 ha in Gambella regional state. Even if the Authority has been given a mandate of transferring land exceeding 5000 ha, it granted a land as minimum as 200 ha. For example, 88.6%, 75.5%, and 60% of the total land transferred in Benishangule Gumuz, Gambella, and SNNPR, respectively to private investors is found below the threshold of 5000 ha stated by the federal government. In terms of the share of investment lands to the total land transferred from the federal land bank in diverse regions, Gambella (46.6%), Benshanguel Gumuz (34%), and SNNPR (mainly the lowland areas) (16.5%) regional states are the first three regions where a massive proportion (97.1%) of virgin farmland was transferred to private investors from centrally administered land bank (Table 5.3). However, regional states such as Oromia (that transferred more than 1 million ha of land to federal land bank) and Amhara

[36] Interview with experts in Oromia Investment commission indicated that the number of projects and amount of land transferred to the investors reported by various researchers and institutions are based on the investors' interest expressed during the time they fill investment request forms at Federal Investment Commission. According to the interviewees, the actual amount of land transferred in the region is very small when compared to what is reported by the majority of researchers and some institutions.

(that transferred about 420,000 ha of land) have almost allocated very small amount of farmland via HAIA, showing that the target of the government is peripheral regions which could be controlled and exploited without any challenges. It also shows that relatively developed regions are autonomous in administering large-scale farmlands located within their jurisdiction.

Table 5.4 describes the magnitude of farmland that is actually allocated to investors by regional states since 1992. It shows that the largest land (more than 1.5 million ha of land) have been allocated by regional governments. Regional states land allocation shows a somewhat similar picture as that of the federal government allocations (see Table 5.3). The largest amount of land (52.2%) is allocated by the relatively less developing regions such as Gambella (26.4%) and Benishangul-Gumuz (25.8%) which is followed by SNNPR that allocated (13.8%). This implies that lowland areas have been the focus of large-scale agricultural investment in Ethiopia, the areas that are perceived as under-utilized by the government. The government of Ethiopia explicitly stated in its consecutive five plans that "Large-scale farming will be undertaken by private investors in lowland areas where abundant extensive land exists [....] The necessary arrangements will be made to increase the private investors' participation by identifying areas that are not inhabited but are suitable for agriculture" (FDRE, 2010a, p.54). However, various studies show that there is no land that could be considered as unoccupied given that land in lowland areas is often used by pastoralists and/or agro-pastoralists for a verity of purposes and forms the part of their land use systems or shifting cultivation systems (Dessalegn, 2011; Keeley *et al.,* 2014).

Table 5.4: Farmland Allocated by Regional Governments (1992-2017).

Region	Amount of Land Allocated (ha)	Regional Distribution (%)
Gambella	409,706	26.4
Benishangul-Gumuz	400,769	25.8
SNNPR	214,842	13.8
Oromia	173,128.1	11.1
Amhara	165,772	10.7
Tigray	109,318	7
Afar	54,000	3.5
Somali	26,000	1.7
Total	***1,553,535***	***100%***

Source: Keeley *et al.,* 2014; Maru, 2016; HAIA, 2017; Office Prime Minister, 2017; Oromia Region Investment Agency, 2017; Gambella Region Investment Agency, 2018

5.5.4. Large-scale Farms for Sugarcane Production

In Ethiopia, sugar cane has been the strategic crop of the government since Emperor Haile Silassie regime. The current government gives special attention to this crop and adopts a

separate land allocation system within this sub-sector. Besides fulfilling local sugar demand and broaden the export sector of the country, the government has a strong intention to produce ethanol (to at least minimize country's importation of fuel) through public investment. Accordingly, the government has been investing a huge amount of public resources in mega sugar estates across the country. Table 5.5 indicates the allocation of land for sugar production in the main sugar producing regions of the country since 1992. A total of 408,000 ha of land is allocated for the sugar plantation in six regional states. As can be seen from the Table 5.5, the largest land (175,000 or 42.9%) is allocated in SNNPR (principally in lowland areas of South Omo zone– Selamago and Gnanegatom Woredas, Bench Maji zone - Surma and Mieinitshasha Woredas, and Kaffa zone in Diecha Woreda). This is followed by Amhara regional state, Afar, and Tigray where 22.8%, 12.25%, and another 12.15% of the total land is allocated for sugar estates, respectively (Table 5.5). The government is investing in both developed and developing regions of the country due to the strategic importance of the crop to the national economy and to broadening the sugar industry sub-sector across regions – to address equity issue (Ethiopian Sugar Corporation, 2018).

A total area of land allocated to large-scale agricultural investment (to both private and public) is summarized in the Table 5.6. The current government has leased more than 2.1 million ha of land to private investors in the country from 1992 to 2017. The government itself has been investing in sugar estates on over 400,000 ha of land across six regional states since 1992. The total land allocated for both private and public large-scale agricultural investment is found to be over 2.5 million ha (Table 5.6).

Table 5.5: Allocation of Land for Sugar Production (Public Enterprises) (1992-2017).

Region	**Amount of Land Allocated (ha)**	**Regional Distribution (%)**
SNNPR	175,000	42.9
Amhara	93,000	22.8
Afar	50,000	12.25
Tigray	50,000	12.25
Benishangul-Gumuz	20,000	4.9
Oromia	20,000	4.9
Total	***408,000***	***100%***

Source: Dawit Alemu (2013); Keleey et al. (2014); Ethiopian Sugar Corporation (2018)

The total land allocated includes more than 500,000 ha from the federal land bank, managed by the HAIA; over 1.5 million ha by regional governments; and greater than 400,000 ha for state-run sugar plantations (Table 5.6). There is no land that is allocated by the federal government in Tigray regional state may be due to the earlier supremacy of the Tigray People's Liberation Front (TPLF) in the coalition EPRDF party in the country. Likewise, no land is allocated in Afar region by federal authorities perhaps because of the high risks of land conflict with pastoralist clans in the area (Keleey *et al.,* 2014).

Table 5.6: Total Large-Scale Land Allocation in Ethiopia (1992 -2017).

Region	Land Allocated by Federal Government (ha)	Land Allocated by Regional States (ha)	Land Allocated for Sugar Plantation (ha)	Total (ha)	Regional Distribution (%)
Gambella	273,812	409,706		683,518	26.9
Benishangul-Gumuz	199,485	400,769	20,000	620,254	24.3
SNNPR	96,659.3	214,842	175,000	486,502.3	19.1
Amhara	6183	165,772	93,000	264,955	10.4
Oromia	5000	173,128.1	20,000	198,128.1	7.8
Tigray		109,318	50,000	154,318	6.1
Afar		54,000	50,000	104,000	4.1
Somali	6000	26,000		32,000	1.3
Total	***587,139.3***	***1,553,535.1***	***408,000***	***2,548,674.40***	***100%***

Source: Keeley *et al.,* 2014; HAIA, 2017; Office Prime Minister, 2017; Oromia Region Investment Agency, 2017; Gambella Region Investment Agency, 2018

Table 5.7 presents the total number of projects approved by federal and regional governments. The data show that about 4839 large-scale agricultural investment projects have been issued licenses in eight regional states since 1992.

Table 5.7: Total Number of Projects by Investment Type (1992 -2017).

Region	Total No of Projects	Distribution by Investment type			
		Domestic		Foreign	
		No of Projects	Land size (ha)	No of Projects	Land size (ha)
Gambella	623	613	468,506	10	215,012
Benishangul-Gumuz	306	265	356,841	41	243,350
SNNPR	1408	1358	104,135.3	50	207,316
Oromia	751	718	147,457.22	33	30,670.88
Amhara	1290	1262	137,235	28	34,720
Tigray	397	361	52,228	36	57,030
Afar	48	40	28,850	8	25,150
Somali	16	7	6,600	9	25,400
Total	***4839***	***4624***	***1,301,852.52***	***215***	***838,649***
	Proportion (%)	***95.6***	***60.8***	***4.4***	***39.2***

Source: Maru, 2016; HAIA, 2017; OPM, 2017; Oromia Region Investment Agency, 2017; GRIA, 2018

Of the total approved projects, 95.6% of them is accounted for the domestic investments that have been undertaken by Ethiopians on the land exceeding 1.3 million ha (60.8%) of total land allocated to the large-scale agricultural investment in the country. The number of investment projects that are being undertaken by the foreign investor constituted only 4.4% yet they utilized about 39.2% of the total farmland (838,649 ha) allocated by both federal and regional governments. This number is fairly higher than the one reported by Keleey *et al.* (2014) as 594,000 ha and slightly lower than the one reported by Maru (2016) as 999,410 ha. The difference observed between our estimates and that of Maru (2016) is due to data divergence reported by regional states (mainly the Oromia region). For example, Maru (2016) indicated that foreign investors have acquired about 193,432 ha of land in Oromia regional state. However, our

recent data (2017) obtained from the Oromia Regional State Investment Agency show that only 30,670.88 ha of land is allocated to foreign investors.

5.6. Summary and the Way Forward

Ethiopia has practiced large-scale commercial farming for at least six decades to transform and modernize the agricultural sector based on the rulers' political interests and ideologies. Even if the three regimes examined in this article had adopted development approaches that are at odds, they do have a similar perception regarding lowland areas of the country. All of them perceived that the country has large areas of 'empty' or 'unused' arable land and adequate water resource to irrigate this land in periphery areas of the country. Consequently, all of them had directed large-scale commercial farming (be it state or private owned) in this areas though evidence shows that there is very little or no land and natural resources that are not being used or are unoccupied. This shows that there is a huge mismatch between governments' perception and reality on the ground that is mainly emanating from the ideological myth and short-sightedness of the regimes. All of the regimes have focused on the availability of the natural resources rather than the people (which are the ultimate and the only recipient of development results) and on the short-term aspirations (profit and foreign currency earning) rather than adopting pro-poor investment that could integrate local people and investors in such a way that contribute to the poverty reduction and national economic development. As a result, they are unable to transform and modernize the agricultural sector as per the intention of the people and development plans they wrote on the paper.

The overall picture of LSAI in three regimes shows that such investment, whether it is undertaken by the state or private sector, has been practiced across the country (mainly in lowland areas) with direct intervention of the state. The core foundation of LSAI in all three regimes seems to be related to the quest to accelerate 'economic growth' via resource extraction. This means that the regimes have focused on the transient benefits rather than sustainable development – the development that balances economical, ecological, and societal needs and focuses on inter-generational issues. Moreover, it is clear from the analysis of the three regimes practices that the contemporary global agenda of 'land grabbing' is not a new phenomena in Ethiopia, rather it has been exercised for several decades by the name of development either by the state or private sector.

Given the growing pressure on the land and livelihood systems of the local people, the government should adopt people-centered development model and encourage pro-poor large-scale agricultural investment in the country. Besides, we strongly recommend further comprehensive studies that will investigate the socio-economic returns of large-scale agricultural investment compared to other land use systems in the country.

CHAPTER SIX: SCRAMBLE FOR THE GREEN GOLD: UNDERSTANDING LARGE SCALE AGRICULTURAL INVESTMENT IN GAMBELLA REGION, ETHIOPIA

Abstract

The Ethiopia government claims that rapid agricultural transformation could be achieved through large-scale agricultural investment (LSAI), and so, it allocated millions ha of land to both domestic and foreign investors in different areas of the country, such as Gambella region. This article examines the trends, magnitude, governance, and the status of the perceived benefits of LSAI in Gambella region, based on the latest data and facts on the ground. We collected both primary and secondary data from various stakeholders at the federal, regional, local, and household levels. The government has transferred more than 680, 000 ha of fertile land to various investors in the region which significantly rose in 2008 and 2014 due to global processes and generous incentives provided by the government. The study found that government agencies lack capacity to administer investment land and projects and are characterized by weak horizontal and vertical coordination and integration. The land governance system is also found to be unresponsive, non-transparent and unaccountable, and characterized by rent seeking, corruption, and rule of man. The article concludes that despite an extensive investment practices in the region, ambition of the government to transform agriculture sector through LSAI mainly via jobs creation, better infrastructures, and technological transfers at local level is not materialized due to government failure. We, therefore, urge the government to revise the current practices of such investment in the region and adopt a holistic and an integrated approach that ensures sustainable development.

Key words: large-scale agricultural investment; trends and magnitude; land governance system; Gambella; Ethiopia

6.1. Introduction

The Gambella region - one of the nine National Regional States of Ethiopia - is richly endowed with diversified natural resources, especially vast arable land, sufficient rainfall, abundant water supplies (part of the White Nile watershed), and extensive forest resources (Tadesse, 2007; Human Right Watch, 2011). The region has a total area of 2,978,282 ha of land, of which 1.2 ha (42%) is considered as suitable for agricultural activities (Azeb, 2017). The annual rainfall of the region ranges between 800 and 1200 mm and 85% of the rainfall occurs between May and October where main agricultural activities are carried out (Samson *et al.,* 2009; Baumgartner, *et al.*, 2013). The region is crisscrossed by various rivers (such as Baro, Akobo, Alwero, and Gilo) which flow into the White, and geopolitically become the part of Nile River Basin (Cascão, 2013). In terms of water resource, the region is endowed with 26,924 million m^3 of water, of which 25,640 million m^3 is surface water and 1,284 million m^3 is ground water (Belay *et al.*, 2015). Studies show that 11,780 million m^3 of water can be utilized for irrigation and 884.2 million m^3 of water can be used for human, livestock and other animals drinking (Lorgen, 1999 cited in Belay *et al*., 2015). Generally, about 39%, 33%, 18%, and 5% of the region's land comprises woodland, grassland, forestland, and shrub, respectively (GPNRS, 2012).

In its development strategies and programs (such as ADLI, PASDEP, GTP I & II), the Ethiopia government has made it clear that rapid agricultural transformation could be achieved through LSAI and so it leased millions ha of land to both domestic and foreign investors in different parts of the country. More specifically, in spite of strong criticisms from academia, activists, practitioners, and NGOs regarding LSAI in Africa in general and Ethiopia in particular, the Ethiopian government has been promoting such investments as a key strategy to enhance livelihoods of the investment hosting community through foreign exchange earnings, increased agricultural production and productivity, and improved incomes via job creation in lowland areas of the country like Gambella (Keeley *et al.,* 2014).

In general, the general background indicated above show that Gambella region has a massive potential to produce diverse annual and perennial crops, livestock, and fishery. And so, Ethiopian government has identified Gambella as one the regions which is apt for LSAI in the country and categorized the majority areas of the region as under-utilized (Azeb, 2017). The government has identified about 1.2 million hectares of potential land, in Gambella region alone, and made it available for both domestic and foreign investors (Dessalegn, 2011). Recent studies have estimated that 683,518 hectares of land have already been allocated to

both local and foreign investors, with the intervention of federal government that allocated about 273,812 ha of land to various investors (OPM, 2017; GRIA, 2018). Despite the region is blessed with natural resources, paradoxically, it is recognized as one of the poorest (with about 35% of the people living in the lowest quintile of the nation's wealth ranking) (CSA, 2012a) and food insecure (Belay *et al.,* 2015; Maru, 2016) regions in the country. The livelihood and survival of the Gambella's indigenous people is totally depending on the natural resources where the Nuer are transhumant pastoralists, the Opo are mostly sedentary agriculturalists, the Anuak and Mejenger combine hunting and gathering with small scale agriculture (Wondwosen, 2017). However, indigenous communities of the region have been losing their farm, forest, and grazinglands and so their livelihoods due to LSAI (Maru, 2016; Azeb, 2017; Wondwosen, 2017).

We, therefore, argue that unless otherwise LSAI projects are designed and governed in such a way that protect the rights of the local people and the natural environment, such investment will result in a deterioration of livelihoods of the local people. Such investment can bring about "win-win-win" situation only when fair, inclusive, and transparent land governance system is installed; competent and corruption free government institutions are established; business models that integrate the local people into investment value chain are encouraged and practiced; and such investments generate a wide range of benefits (such as employment, technological transfer, food security, poverty reduction, infrastructure, access to market, etc) to the local people.

The purpose of this article is to examine the trends, magnitude, governance, and the status of the perceived benefits of LSAI in Gambella region based on the latest data and facts on the ground. The article tries to answer the following questions: What are the recent trends and magnitudes of LSAI in Gambella region? How agricultural land and investment projects are governed in the region (status and practices of LSAI projects, structures, institutions, and governance systems)? To what extent the envisioned benefits (such as employment, infrastructure, and technological transfer) are materialized? The remaining parts of this article are organized into three sections. Section two discusses the methods of and materials used in the study. Part three presents the results of the study. Section four provides summary and recommendations.

6.2. Methods and Materials

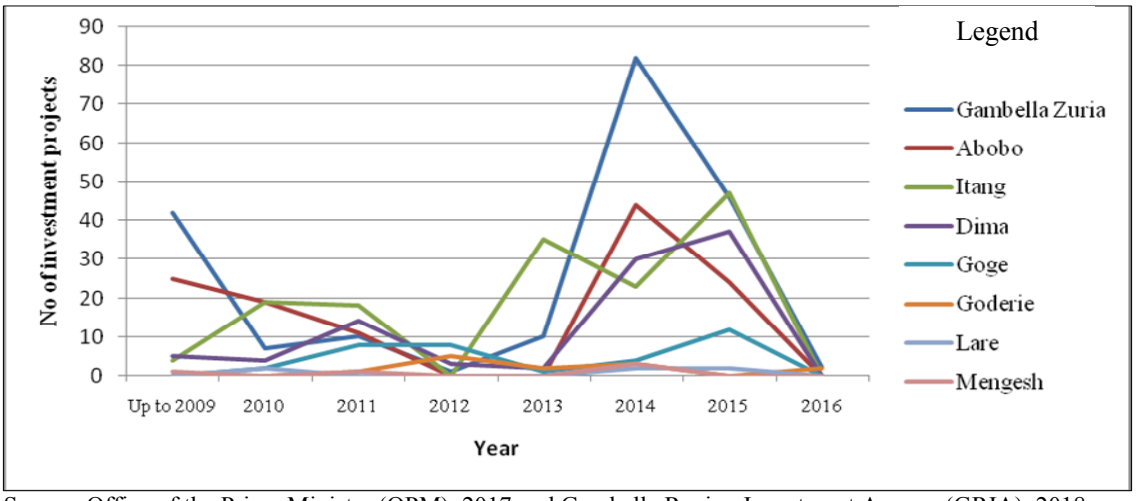
The article is based on data collected from both primary and secondary sources. Primary data were collected through survey questionnaire, interview and focus group discussion. As far as

secondary data are concerned, they were obtained from various sources such as journal articles, government records and reports, and other relevant materials. To select study areas and participant, a multi-stage sampling technique was used. First, two *woredas* namely, Abobo and Itang (see the description of study areas in section 3.1 of this dissertation) were purposively selected due to extensive practices of LSAI in the areas (Table 6.2). Secondly, five affected *kebeles*[37] were randomly selected from Abobo and Itang *woredas*. Thirdly, 227 households were selected from each affected *kebele* via systematic sampling technique. For qualitative part, 31 key informants were purposively selected from federal (6), regional (5), *woreda (11)*, and *kebele (9)*. Moreover, 9 FGDs (with 5 to 6 participants) were held at *kebele* level. Quantitative data were presented and analyzed using tables, graphs, and percentages while qualitative data were transcribed and analyzed via thematic and content analysis. Due to the sensitivity of the issue under investigation and request of the participants, a unique code was given to each key informants and focus group discussants (annex IV).

6.3. Trends of LSAI in Gambella Region

Figure 6.1 presents the total number investors actually granted land in *woredas* by year (till 2009[38] to 2016). The number of investors granted investment land was relatively high in two *woredas* (Gambella Zuria and Abobo) before and during 2009 and rose in Itang, Dima, and Goge between 2010 and 2011 (Figure 6.1).

Figure 6.1: No of Investment Project by Year and Woerda, Gambella**.**



Source: Office of the Prime Minister (OPM), 2017 and Gambella Region Investment Agency (GRIA), 2018

This time period coincides with the global rush for land and federal government's intervention into the region's land administration affairs. Except in Gambella Zuria *woreda*

[37] *Kebele* is the lowest administration tier in Ethiopia. Affected *kebeles* are those that hosted investment projects and directly affected by them.

[38] We opted to use data till 2009 due to extremely low number of investment projects before 2008 and difficulty to disaggregate data in each year.

which hitherto is dominated by domestic investors; Abobo, Itang, Dima, and Goge *woredas* were the destination of foreign investors during 2009/10. For example, Saudi Star, BHO, Karaturi, Sanatun, and Ruchi agriculture companies were granted 10,000, 27,000, 100,000, 10,000, and 25,000 ha of land in Abobo, Itang, Jikawo, Dima, and Goge *woredas*, respectively in 2009/10 (Table 6.1). The number of investors was then significantly declined in 2012 and peaked to the highest level in 2014 though the increment was still high in Itang during 2013.

Table 6.1: Profile of Some Foreign Inventors in Gambella Region**.**

Name of Project	Wereda	Country of Origin	Land Size (ha)	Land transfer year
Saudi Star	Abobo	Saudi Arabia	14,000	2009/10
Green Valley Agro Industry	Abobo	India	5,000	2009/10
BHO	Itang	India	27,000	2009/10
Karaturi	Itang	India	100,000	2009/10
Sanatuni	Dima	India	10,000	2009/10
Saber Farm	Dima	India	25,000	2010/11
G.V.L. Agro Industry	Dima	Singapore	5,000	2012/13
Ruchi	Goge	India	25,000	2009/10
Toren Agro Industry	Goge	Turkey	6,000	2011/12
Vardanta	Goderie	India	3,012	2009/10
Total			220, 012	

Source: Federal Horticulture and Agricultural Investment Authority (HAIA), 2017

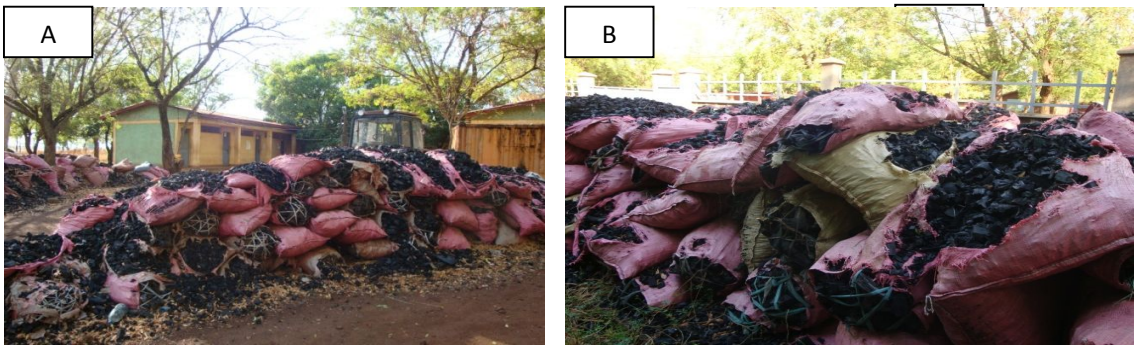
The number of investors was then drastically dropped to the lowest level in 2016 in all *woredas*. The rise in number of investors during 2014/15 is highly related to the government's attempt to incentivize the sector by facilitating special loan mechanism and actually implementing incentives pointed out in the policy and regulatory documents[39].

Almost all of the investors during the 2014 (191) and 2015 (168) were domestic ones where the majority of whom were finally found as either speculators (those who are not interested in commercial farming but leased land) or ghost investors (those who took land, cleared the forest, converted it to charcoal and sold it and finally disappeared) or pseudo-investors (those who were using their land investment licenses to secure mortgages to borrow money from the bank) (Wondwosen, 2017). This was resulted in cancelation of investment license for the majority of the domestic investors in several *woredas* and the fall of the investment flow into the region in 2016. For example, 69 investment projects were canceled in Abobo wereda alone in 2016/17 due to their failure to develop the land as per the contractual agreements.

[39] The Ethiopian government have been proving various generous investment incentives such as tax exemption, duty-free import of capital goods and construction materials, the right to make remittances, no or very low requirement for initial investment (EIC, 2017) and extremely low lease amount (which is approximately as low as US$1.08/ha/year and goes through US$8.44/ha/year to as high as US$38.17/ha/year) (Bamlaku *et al.,* 2015) among the others.

The charcoal business is mainly undertaken in concealed manner with the involvement of many informal network participants (AWANRO, O02, 2018; AWANRO, E03, 2018). The following pictures (Figure 6.2) show the charcoal (stored in the *woreda's* administration and agriculture offices) that is caught by the *woreda* after the car (big truck) that carries the charcoal got an accident.

Figure 6.2: Pictures Showing Production of Illegal Charcoal in Gambella Region.



Source: Own photo, 2019. Note: Photo 'A' shows the charcoal stored in Administrative Office whle B indicates the one that stored in Agriculture Office.

6.4. The Magnitude of Land Allocation

We analyzed data regarding the amount of land (at least 200 ha) and actually transferred to investors in Gambella region in eight *woredas* where LSAI is being undertaken (Table 6.2).

Table 6.2: Total Amount of Land Actually Allocated to Investors (in ha) in Gambella Region.

	No of Investors					Land Transferred				
	Issued by region		Issued by federal			By region		By federal gov't		
Wereda	Foreign	Local	Foreign	Local	Total	To local	To foreign	To foreign	To local	Total
Gambela Zuria	-	200	-	-	200	119,038	-	-	-	119,038
Abobo	-	121	2	-	123	74,150	-	19,000	-	93,150
Itang	-	144	2	-	146	109,664	-	127,000	-	236,664
Dima	-	57	3	37	97	54,570	-	40,000	30,800	125,370
Goge	-	33	2	-	35	31,250	-	31,000	-	62,250
Goderie	-	12	1	-	13	7,059.7	-	3,012	-	10,071.7
Lare	-	6	-	-	6	5,400	-	-	-	5,400
Mengesh	-	5	-	-	5	8,574	-	-	-	8,574
Total	**-**	**578**	**10**	**37**	**625**	**409,706**	**-**	**220,012**	**30,800**	**660,518**

Source: OPM, 2017; GRIA, 2017; HAIA, 2018.

As can be seen from the Table 6.2, the regional government of Gambella did not endorse investment projects to a single foreign investor in the region. Rather, it authorized and managed the majority (94%) of the domestic investment projects. The region has transferred 409,706 ha of land (62% of total land transferred in the region) to 578 domestic inventors since the 1990s. Three *woredas*, Gambella Zuria, Itang, and Abobo, were the largest receipts of domestic investors hosting 200, 144, and 121 domestic investment projects, respectively.

This may be due to the close proximity of the *woredas* to regional capital city and to the main transport facilities. Regional government also gave a serious political attention to manage ever increasing LSAI in the region by establishing a secretariat that was given the responsibility to lead investment land leases (Baumgartner *et al.*, 2013).

On the other hand, federal government endorsed and managed all foreign investment since it started intervention in the regional land administration affairs (in 2008/9) following the international rush for land in Africa in general and Ethiopia in particular. The Council of Ministers had enacted Proclamation No 29/2009 to centrally administer the plots of land exceeding 5,000 ha by federal authorities and established a federal land bank on the ground that the region lacks experience and capacity to manage international investment (Ojot, 2013; Keeley *et al.*, 2014). Following the promulgation of the proclamation, in 2008/9, memorandum of understanding was signed between Gambella People National Regional State and Ministry of Agriculture and Rural Development where the region has transferred more than 829,199 ha of land to the federal land bank out of which 220, 012 ha is granted to the foreign investors. More specifically, the federal large-scale agricultural investment and land administration agency (now horticulture and large-scale agricultural investment administration authority) has granted 220, 012 ha of land to 10 foreign investors who came from India (7), Saudi Arabia (1), Singapore (1), and Turkey (1) (Table 6.1).

This upward delegation is, however, highly challenged by scholars who argued that it is against federal constitution that promotes devolution of power rather than (re) centralization (Desalegn, 2011; Schoneveld, 2013). Federal government did not only approved foreign investment projects but also domestic ones. For example, it authorized and transferred 30,800 ha land to 37 domestic investors in Dima *woreda* (on average 832.4 ha land) (Table 6.2). However, its primary responsibility was to administer land size exceeding 5000 ha indicating the presence of big hands of the government in the regional affairs.

6.5. Status of Investment Projects

Even though the government of Ethiopia has given due attention to LSAI (on the paper) and granted a huge amount land to investors in the region, very small amount of land (9.7%) is actually developed (covered by crops). Out of the 660,518 ha of land transferred to both domestic and foreign investors, 68,054.31 (10.3%), 64,010.62 (9.7%), and 528,452.97 (80%) ha of land is cleared, developed, and expected to be developed (enclaved), respectively (Table 6.3). However, the status of land development is highly varied across *woredas* in the region, ranging from 5% in Goge to 84% in Mengesh (the *woreda* which hosted only 5

investment projects). The majority of the land (80%) is enclaved by the investors where local land users are either blocked or prohibited to use the land. This result is in line with the findings across Africa which reported that only 8.6% of the area under contract in Africa is being cultivated (Anseeuw *et al.,* 2013).

After acquiring the land, the majority of investors started clearing the forest to fulfil the requirements of the bank for getting loan. They are not actually investing in good faith to meet expectation of the government and their promise of job creation, technology transfer, infrastructural development, and so on. For example, key informants in Itang and Abobo *woredas* explained that even if the primary objective of the investors is profit, they are not conducting their business in such a way that benefit the local people (IWAC, O013, 2018; AWANRO, O02, 2018). Lack of strong monitoring, follow up, and evaluation system coupled with corruption has created a loophole for investors to exploit the resources. The federal government that intervened into the region's land administration affairs on the ground that it lacks capacity to manage the investment projects, itself failed to administer LSAI. For instance, Karaturi and BHO companies which granted 100,000 and 27,000 ha of land, respectively, withdrew from the investment after destroying the forest and taking the loan from the banks (OPM, 2017). This is clear indication of government failure.

Table 6.3: Status of Land Development in Gambella Region**.**

Wereda	No of investors			Land transferred			Cleared	Developed	Expected to be developed (enclave)	% Developed
	Local	Foreign	Total	Federal	Regional	Total				
Gambela Z.	200	-	200	-	119,038	119,038	30,303	14,332	74,403	12
Abobo	121	2	123	19,000	74,150	93,150	9,557.43	14,448.9	69,143.67	15.5
Itang	144	2	146	127,000	109,664	236,664	12,177	14,037	210,450	7.15
Dima	94	3	95	70,800	54,570	125,370	6,783.46	8,454.82	110,131.72	6.7
Goge	33	2	35	31,000	31,250	62,250	8,103.22	3,103.5	51,043.28	5
Goderie	12	1	13	3,012	7,059.7	10,071.7	755	1,598.2	7718.5	20.7
Lare	6	-	6	-	5,400	5,400	89	836.2	4474.8	15.5
Mengesh	5	-	5	-	8,574	8,574	286	7,200	1088	84
Total	623	10	625	250,821	409,706	660,518	68,054.31	64,010.62	528,452.97	9.7

Source: Own computation based on the OPM, 2017 and HAIA, 2017 data

Figure 6.3 shows the farm of BHO where the company cleared the forest and grazing land and changed it into bare field. The pictures also show the machineries that the company bought by loan it granted from the bank. The company left the machines (the machines used as collateral by the bank) on the farm where they are exposed to sun and rain and now changed into the rock. Furthermore, the company had left chemical fertilizer in its temporary store which is dispersed across the field. This could be perilous for the environment, cattle, and local people. All of these indicate unnecessary wastage of resources and poor investment project management practices which is resulted from poor governance (government failure). However, whatever the case may be, the Ethiopian government and other states elsewhere in

Africa, need to be aware of the risks of poor or non-performance of investment projects before they sign contracts for LSAI, in order to be proactive and promptly intervene in such a way that save the people, investors, public fund, and the natural environment before they shattered.

Figure 6.3: The Scene of BHO farmland, Machineries, and Fertilizers**.**

Source: Own photo, 2018.

Photos A and B show the land that is cleared by the company, photo C shows various machine types that the company left on the farm, and picture D shows damaged store of fertilizer and spoiled fertilizer that spreaded through out the field.

In general, there is no realistic pre-project assessment including local people's consultation and involvement in the investment land and project governance. As indicated above, forests and savanna lands are cleared and so livelihoods of the people destroyed. The government did not install a system to ensure that LSAI is taking place in proper areas in such a way that mitigate environment and livelihoods destruction and maximize benefits to the local people. Rather, the discretion is given to investors where they make decisions regarding the land that best fits their interest. Despite putting it in the contract agreement and declaring that Environmental Impact Assessments (EIAs) are carried out; neither government administrator could show a full-fledged EIA, nor did an investor have verification of a finished one (The Oakland Institute, 2011). Several studies reported that lack of accountability for the failure to

conduct EIA has caused environmental degradation and destroyed the natural resources upon which the livelihoods of the local community exclusively depend (Getnet, 2012; Desalegn, 2013; Richards, 2013).

6.6. Legal Requirements

One of the requirements to officially start investment in Ethiopia is holding an authorized land map. Table 6.4 presents the number of inventors (both domestic and foreign) who got a certified land map from the regional and federal concerned government bodies in eight *woredas* where LSAI is being carried out. Out of the total 625 investors registered in the region, 81.6% (510) held an authorized land map. More specifically, 87.5%, 74.8%, 84.2%, 83.5%, and 74.3% of investors in Gambella Zuria, Abobo, Itang, Dima, and Goge got certified land map, respectively. This shows that there are investors who are operating their investment projects without fulfilling legal requirement. This is a strong indication of poor supervision, monitoring, follow up, and evaluation system and practices of the government (government failure).

Table 6.4: No of Investors with Certified Land Map.

Wereda	No of investors with certified land map	No of investors with no certified land map	No of investors with certified land map but GCP	Total
Gambela Zuria	175	23	2	200
Abobo	92	30	1	123
Itang	123	19	4	146
Dima	81	14	2	97
Goge	26	8	1	35
Goderie	6	6	1	13
Lare	5	1	-	6
Mengesh	2	3	-	5
Total	510	104	11	625

Source: Adapted from OPM, 2017

Lack of supervision and follow up also gave courage to some of extravagant investors to go outside their land holding border line and clear forest (and promoted illegality). For example, 152 investors went beyond their field, cleared the forest, and ploughed about 4844.76 ha of land in five weredas. This illegal act was high in Abobo wereda where 67 investors went outside delineated border and ploughed 1267.15 ha of land. In Itang and Dima weredas 28 and 14 investors went beyond their boundaries and ploughed 1230 and 1120 ha of land, respectively (Table 6.5). This is a clear indication of power imbalance between investors, local government, and community. Investors show their muscles to control the natural resource and even local government in such a way that fulfil their own private interest. These muscles are created, nurtured, flourished, and fortified by the government who called itself as

'developmental state' - the state that directly intervenes into the economy and created the so called 'developmental investor' from its own elite group - by injecting and/or feeding the awfully scarce public resources to them.

Table 6.5: No of Investors Expanded Land outside their Field.

Wereda	No of investors	Land size (ha)		
		Cleared	Developed	Total
Gambela Zuria	22	-	461	461
Abobo	67	500.224	766.926	1267.15
Itang	28	-	1230	1230
Dima	14	-	1120	1120
Goge	21	374.74	391.87	766.61
Goderie	-	-	-	-
Lare	-	-	-	-
Mengesh	-	-	-	-
Total	152	874.964	3969.796	4844.76

Source: Adapted from OPM, 2017

Some of the investors rather than respecting the local people from which land is taken, they even insult them (IWAC, O013, 2018). The case in Itang special woreda can be mentioned here. According to one of our key informants "some investors insult the local people who are already angry about the resources that are taken from them without their knowledge and consent. The issue became serious and even reached Prime Minister Office; because the *woreda* and region could not manage to settle the case" (IWAC, O013, 2018).

Large-scale large governance system was also designed in such ways that exclude local government (mainly the *woreda* and *kebele*) and community from the decision making process regarding land lease issues and disempower them. All of the key informants at *woreda* level indicated that they know the arrival of the investors to their areas after everything is completed at federal and/or regional levels and when they are urged by higher level officials to show land to be transferred to the investors. Likewise, *kebele* administrators and villagers explained that they be aware of the arrival of the investors after hearing the sounds of big machineries (such as bulldozer) and during the investors started forest clearing.

6.7. Structure, Institutions, and Land Governance System

So as to promote and govern LSAI, the current government has established various public organizations (structures)[40] and institutions[41]. Initially a team was formed within the Ministry of Agriculture and Rural Development (MoARD) to support and facilitate large-scale

[40] In this article we conceptualized structure as various government agencies and organizations that are established at federal, regional, and local levels to govern large scale land and investment projects.

[41] Institutions are conceptualized as formal rules and regulations devised to govern large scale land and investment projects.

agricultural investment land transfer processes. However, in 2009 the government upgraded the team to directorate level and named it "Agricultural Investment Support Directorate (AISD)" by Proclamation 29/2001 E.C. under the MoARD. The directorate is mandated to handle all matters vis-à-vis agricultural investment, encompassing creation of favourable and gorgeous environment for investors; provision of the necessary technical and administrative assistance to investors; facilitation of the environmental and social impact assessment process; and formulation of policy and legal framework that could speed up the investment process and reduce costs of doing business (Proclamation 29/2001 E.C.). Before establishment of the directorate, these responsibilities were carried out by the regional, zonal, and *woreda* governments; the Ethiopian Investment Agency (EIA, now commission); and the Environmental Protection Agency (EPA). This directorate is primarily established to realize the intention of the government to centralize large scale agricultural land administration (plan, organize, coordinate, lead, control, and provide comprehensive technical and administrative support to investors). And so, the directorate had given the authority to manage all investment land (at least 5,000 hectare) in all regions of the country (Proclamation 29/2001 E.C.).

In 2013, the government has upgraded, reorganized, and renamed the previous directorate as the "Agricultural Investment Land Administration Agency" by the Council of Ministers Regulation No. 283/2013. The primary responsibility of the agency is to facilitate large-scale agricultural investment land administration and transfer processes more efficiently than before. All over again, in 2017/18, the agency was promoted to authority level and renamed as the "Horticulture and Agricultural Investment Authority" which is directly accountable to the Prime Minister Office. And at the present, the authority is dissolved yet again and trimmed down to a team level.

To promote and facilitate large-scale agricultural investment in the country, the government has also established an organization called investment authority (currently upgraded to Ethiopian Investment Commission) in the early years of the 1990s. Other organizations such as Ministry of Agriculture (MoA), Ethiopian Environmental Protection Authority (EPA), Ethiopian Wildlife Conservation Authority (EWCA), Ethiopian Customs Authority, and Development Bank of Ethiopia are also among the key stakeholders. However, the coordination, integration, and information sharing practices are either very weak or non-exist between and/or among all the federal organizations. In general, there is no system or framework that assists such horizontal coordination and integration at federal level (FHILAC O01, 2018; FHILAC E02, 2018; FIC E03, 2018; FPO O05, 2018; FPO E06, 2018).

At regional level, the investment agency has given the mandate to directly administer LSAI in the region. Regional Agricultural Bureau, Regional Natural Resource and Climate Change Bureau, Regional Revenue Bureau, and the Regional Administration Council are also among the key public organizations meant to promote and facilitate the proper functioning of LSAI and ensure realization of the benefits expected from the investment projects. However, similar to the federal level, horizontal coordination and integration between these organizations is found to be very weak. Due to this, there is serious confusion and overlap regarding roles and responsibilities between the regional investment agency and agricultural bureau. As one of the key informants mentioned "we do not know what to do. There is no clear demarcation between our agency's mandate regarding the administration of agricultural investment projects and that of the agriculture bureau. This creates a severe loophole that impeded us to properly carry out our duties. The regional council is informed about the issue and now working on it to harmonize the mandates" (GRIA E03, 2018). There is also huge inconsistency regarding investment projects data in the region. For example, according to the regional investment agency, a total of 806 investors have been issued license but the Bureau for Environmental Protection, Land Use, and Administration and the *Woreda* Agriculture Office reported the number as 780 and 623, respectively indicating the existence of serious information gap among the organizations.

Likewise, vertical coordination, integration, and information sharing between the regional investment agency and federal investment commission is awfully flimsy (GRIA, O02, 2018; GRIA E03, 2018; FIC E03, 2018; OPM, 2017). Consequently, there is a huge information gap between federal and regional organizations. For instance, the Federal Investment Commission claimed that the number of investors that issued project license in Gambella regional state is only 192 (OPM, 2017) though the actual one is 625. This is clear evidence for poor data recording and management, regrettable weak coordination and integration, skimpy monitoring and evaluation system and so pervasiveness of the guesswork. Moreover, the Federal Investment Commission and Horticulture and Agricultural Investment Authority (HAIA) are not providing proper technical support to the regional investment agency in such a way that fills its capacity gaps (OPM, 2017).

In general, investment land and projects are governed at the federal and regional levels. The federal government authorities such as HAIA are given the mandate to administer investment projects being undertaken on the land exceeding 5,000 ha by the Council of Ministers proclamation no 29/2001 E.C. while the region is mandated to govern the plot of land below

5,000 ha (Dessalegn, 2011; Keeley *et al.,* 2014). The focus of the federal agencies is on the foreign investment and that of the region is on the domestic ones. With regard to land governance, the federal government does not have authoritatively approved investment land survey and mapping as well as investment land transfer legal framework (OPM, 2017). Comprehensible, transparent, and accessible land governance system that would ensure accountability is also absent at both federal and regional levels (OPM, 2017). As a result, land is allocated to investors hastily without enough preparation and consultation with concerned stakeholders (mainly with the local people). Large areas of the forest, savannas, and wet lands (OPM, 2017) as well as land inside or in the vicinity of Gambella National Park have also been allocated to investors due to poor land governance system (Azeb, 2017).

The region has approved some general proclamations and regulations which are linked to the investment land administration. These include: Gambella People's National Regional State Investment Administration Establishment Proclamation no 12/1998, Gambella People's National Regional State Investment Activities and Rural Land Fee Regulation no 1998, Gambella People's National Regional State Rural Land Administration and Use Proclamation no 52/2006, Gambella People's National Regional State Revenue Tax Proclamation no 53/2006. Even though the region has approved such broad proclamations and regulation, it does not have regulations and decrees that show detailed procedures and requirements of land transfer and investment project administration (OPM, 2017). The level of stakeholders' awareness (mainly at district level) about these institutions and their enforcement is found to be very low (GRIA E03, 2018; FHILAC E02, 2018).

Above all, due to the absence of land transfer legal framework and transparent governance system at regional level, LSAI is invaded by illegal, speculation, and rent-seeking practices. For example, according to OPM (2017) land transfer is not supported by systematic study of identifying and mapping investment land ahead (before the arrival of the investors) using modern technologies (such as GPS and GIS software). Rather, it is hurriedly allocated to investors upon their arrival by using traditional methods such as toddling, conjecturing (guessing) the area of land, or using car or motor bike distance measuring gauges. And so, extensive land overlaps, allocation of forest and wet lands, and parks, as well as conflicts have been observed in most of the *woredas* (OPM, 2017; FPO E06, 2018; AWANRO, E04, 2018; IWAC, O013, 2018).

For example, out of 651 land holding certificates issued to investors by the regional natural resource, land administration, and forest development bureau, 381 (58.5%) of them

overlapped. In Itang special *woreda* in watgach *kebele* alone 31 local investors are given investment land on the land allocated to BHO (an Indian company) (OPM, 2017). Some of the land map certificates issued to investors are found to be forged, prepared by individuals without the knowledge of the authorized office, and sometimes prepared by the order of higher officials based on the informal corruption networks (OPM, 2017). This indicates the absence of formal land governance system which may be intentionally ignored or weakened due to corruption. This situation has made government experts and official as well as large scale agriculture investors less accountable, and so, obliteration of the natural resources and livelihoods of the local people.

6.8. Employment Opportunities and Farm Managers

Employment creation which is believed to be a powerful weapon to directly attack poverty and improve livelihoods of people is often cited as one of the arguments that proponents of LSAI including Ethiopian government draw on to justify the investment. Particularly, the Ethiopian government advocate that the investment could create both wage and self-employment to investment hosting community and give enormous advantages for the country. And hence, job creation is remained as a primary benefit that investment hosting communities expect from the presence of an investor in their locality. However, we argue that this positive outcome can only be achieved when the government is strong enough to govern the investment land and projects properly; urge the investors to adopt business model(s) that integrate local people to investment value chain and employ labour intensive technologies; conclude contracts that protect and ensure the rights and benefits of the local people; take care of the natural environment; and consult and involve the local people at each stage of the project cycle and land deals phases.

The evidence of this study shows that only 22.2% of investment projects had created jobs to citizens in the region (Table 6.6). In other words, out of the investment projects that are registered in the region (625), the majority 483(77.8%) did not create any job in the region (Table 6.6). Horrifying, the participation of indigenous community in the employment created by LSAI is found to be exceptionally low. As can be seen from the Table 6.6, out of the total 4776 jobs created in the region, the share of the indigenous community is terribly low, that is only 483 (10.1%). Particularly, the country does not have minimum labor and pay standard policy. This gives investors a loophole to pay extremely low wages (on average 30-35 Birr per day) and exploit the workers. Given that the country lacks minimum labor and pay standard policy, it is unlikely that these extremely low wages could increase in the future.

Furthermore, there is no clause in the contractual agreement that obliged the investors to consider local context and create jobs for the local people as well as no enforcement system that could detect and resolve the problem. This indicates that employment creation thesis of the government including the supporters of LSAI is failed to materialize on the ground.

The situation of employment has created a strong frustration and dissatisfaction among the indigenous community. Several KIIs that we contacted in Abobo and Itang districts, for example, said that majority of investors are not willing to hire indigenous people even as a daily laborer saying that they are lazy, lack skills, and are not efficient. Rather they are bringing in highlanders (mainly from the southern region of Ethiopia) for almost all types of job. One of the key informants expressed his dissatisfaction saying that "after inventors took our sole and precious resources - land, they deleted us from the menu of employment that would otherwise at least compensate the loss and enable us to improve our livelihood (AWTK, TCR012, 2018). Furthermore, the wage rate is found to be very low (on average 30 Birr per day) and seasonal (available during the labor demanding periods in the production life cycle such as weeding or harvesting). Focus group discussants also reported that they are not the part of any benefits from the investment projects except hardly any seasonal jobs with very low wage created for some youth in the village (FGD1-WAT, FGD2-M-TP1, FGD3-YAT, FGD3-YAP, FGD2-MIW, 2018). KIIs at the regional and *woreda* levels share the opinions and concerns of the local people saying that rather than linking themselves to local people via job creation, the majority of investors have brought employees (either laborers or technical experts) from the highland areas of the country. One of the regional key informants said that "even though the culture of work on the farm among the indigenous community is not as such strong, investors are not interested to hire local people claiming that they lack skills and experience" (GRAC, O01, 2018).

These results are in line with several studies conducted in Africa which documented that LSAI has created limited job opportunities that are temporary and has low quality work (Cotula*, et al.,* 2009; World Bank, 2011; Kachika, 2010) mainly due to poor governance issues (Anseeuw *et al.,* 2012). Particularly, the World Bank reported that job creation rate of the new LSAI projects in Africa is extremely limited (only 0,0005 job per ha) and will likely not create many jobs in the future (World Bank, 2011). Other scholars such as Deininger *et al.* (2011) reported that LSAI created 0.005 jobs/ha in Ethiopia and 0.006 jobs/ha in Madagascar (Andrianirina-Ratsialonana & Teyssier, 2010) indicating that the contribution of

LSAI to employment creation is tremendously stumpy in Africa in general and Ethiopia in particular.

Another point that can be made from the Table 6.6 is that only 144 (18.9%) projects have managers indicating that the majority of projects are managed in traditional way – using 'let us try-wait-and-see' approach - rather than using scientific management knowledge and skills of planning, organizing, directing, and controlling their projects. KIIs at regional, district, and *kebele* levels have confirmed this problem saying that majority of individuals who are assigned by the investors neither have knowledge and skills of managing the farm nor technical skills regarding farming techniques. The Oakland Institute (2011) also reported that many of Ethiopians local and Diaspora inventors have limited managerial and agricultural technical knowledge, skills, and experience. Moreover, no one from indigenous community is hired as a manager.

Table 6.6: Status of Job Creation by *Woreda***.**

Wereda	Job created (permanent)			No inventors created job	No investors created no jobs	Projects with managers
	Indigenous	Migrant	Total			
Gambela Z.	84	631	715	92	108	11
Abobo	174	932	1106	40	83	25
Itang	84	639	723	65	81	58
Dima	12	339	351	47	48	26
Goge	46	107	153	17	18	10
Goderie	11	132	143	11	2	8
Lare	3	26	29	2	4	2
Mengesh	69	1487	1556	5	0	4
Total	483	4293	4776	279	483	144

Source: OPM, 2017 and GRIA, 2018

The success or failure of a business depends on the competent manager (who is expected to get things done through the people), among others. In today's highly competitive, knowledge, and complex era, let alone a big farm intended to modernize the agricultural sector, decisions making by small farmers regarding what to produce? when to produce? how to produce? where to produce? to whom to produce? etc are becoming more complex. Because the farmers need to break the vicious cycle of subsistence farming and move to the virtuous cycle of commercialization and market orientation. This requires highly specialized, practical, and valid extension support including farm management. Questions indicated above are more critical to private investors who want to make their business more profitable and competitive. This, in turn, require professional manager who is able to scientifically analyze both internal and external environments (factors) and/or conduct research and use the information to plan, organize, lead, and supervise business activities in such a way that satisfy his/her customers

and excel its competitors. Therefore, lack of farm managers is one of the clear clues for the failure of LSAI to generate the expected outcomes in the region.

6.9. Infrastructural Development

Lack of infrastructure is one of the key challenges of development in Ethiopia in general and Gambella in particular. And so, improvement in social (education, health, water, etc) and physical (road, irrigation, electricity, etc) infrastructures are among the major benefits that the Ethiopian government anticipated from the LSAI. Improvement in such infrastructures in less developed regions such as Gambella could indisputably increase the likelihood of the local people to have access to market and basic social services that will enhance their livelihoods. Therefore, given a vast scale of LSAI in Gambella region as per the expectation of the government, it is likely that the investors' could contribute to assist infrastructural growth efforts either by directly developing or contributing fund to the infrastructure projects. Even though, the contractual agreement stipulates that an investor need to build infrastructure, this article found that investors did not show any commitment and attempt to develop such infrastructures. For example, sub-article 3.2 of the contract agreement signed between Karuturi Agro Products Plc. and Ministry of Agriculture and Rural Development in 2010 specifies that a lessee has a right to "build infrastructures such as dams, water boreholes, irrigation schemes, roads, bridges, fuel or power supply stations, health/hospital/dispensaries, educational facilities…" though the actual performance is awfully low on the ground. Above all, there is no enforcement mechanism that the government put in place to ensure that the inventors' are contributing to infrastructural development.

The respondents were asked to indicate whether or not they are benefited from infrastructures that the investment projects expected to provide. The majority, that is, 99.1%, 97.8%, 98.2%, 70%, and 100% of them reported that, despite empty promises by the investors and government, they did not benefit from education, health, drinking water, road, and irrigation infrastructural schemes, respectively (Table 6.7).

Table 6.7: Contribution of LSAI to Infrastructural Development.

Response	Types of Infrastructure									
	Schools		Health centres		Drinking water		Roads		Irrigation	
	Fre.	%	Fre.	%	Fre.	%	Fre.	%	Fre.	%
Yes	2	0.9	5	2.2	4	1.8	68	30	0	0
No	225	99.1	222	97.8	223	98.2	159	70	227	100
Total	227	100	227	100	227	100	227	100	227	100

Source: Own survey, 2018

All of the key informants we contacted in Abobo and FGD participants explained that majority of the investors (except Saudi Star that paved road to his farm and sometimes carried out road maintenance starting from Abobo town to his farm), rather than constructing roads (even to their own farms, let alone to community), they have been using roads constructed by the government, destroy the roads via large truck movements and interrupted transportation system which forced them to travel a long distance on foot to get market and nearby town (FGD1-WAT, FGD2, FGD1-WAP, FGD2-MAP, 2018). About 30% of the respondents who indicated that they got benefit from the road infrastructure (Table 6.7) are some of those who are located within the investment area of Saudi Star Project in Abobo *woreda* and felt that the project is different from other investors who did nothing rather than destruction.

Moreover, key informants and FGD discussants explained that the majority of the investors do not have their own water pump and often use the community's drinking water pump that is constructed by the government. The water pumps are sometimes broken due to high load and excessive utilization by the investors who even are not willing to repair the pump (FGD1-WAP, FGD2-MAP, FGD1-WIW, FGD2-MIW, 2018). Some of the Key informants and FGD participants expressed their dissatisfaction regarding investors' failure to support them saying that "we begged the nearby investors to support us in school maintenance by proving corrugated iron for covering the roof but they refused. "Can you imagine? They took our whole lot but repudiate to contribute something that is insignificant when they cooperate" (AWPK, PKA010, FGD2-M-PP1, 2018). Nevertheless, key informants and FGD discussants in *Terkudi* and *Perpengo kebekes* indicated that investors such as Saudi Star and few local ones occasionally supply eduction materials such as exercise books, pens, and pencils to students which they really appreciate.

6.10. Technological Transfers

Technology transfer from LSAI to local community in the form of providing training, sharing best farming techniques, tools, and equipments, and sharing inputs (such as seeds, agro-chemicals or fertilizers that could boost the productivity of local farmers) is one of the major anticipated LSAI outcomes. Particularly, knowledge transfer can occur through provision of formal training to local smallholder or herders, on the job-practical field training, informal discussions and meetings or via visits to the investment project sites. Furthermore, local farmers can learn new techniques of production and practical instructions for applying inputs as such the use of improved seed, fertilizer, or chemical; the right timing of planting,

weeding, and harvesting, etc in their own land (Dixie *et al*., 2016). However, the capacity of the smallholders to adapt a new technology depends on various factors. These include: the type of crop selected by the investors, compatibility of the crop type to the local livelihoods and cultivation systems, technical complexity of the technology, accessibility and affordability of the technology, etc.

Nevertheless, the evidence of this study shows that all of the survey participants (100%) indicated that they have not been introduced to new technologies as a result the investment project. Several reasons are identified for poor technology transfer. The first one is the types of crop cultivated by the investors (such as rice, cotton, soybeans, etc) are not compatible to the local subsistence cultivation systems. Another reason is technologies being used by the investors (mainly by those who employ big machineries and equipments) are not easily transferred to the local communities due to high costs of the technology and/or operational technical requirements. Focus group discussants and key informants said that they are using very antique agricultural tools (such as hoe and hand tools) to cultivate crops. Some investors (mainly the foreign ones) have been using modern machineries and tools but did not help them to learn and improve their agricultural tools. They also expressed their concern regarding the technologies saying that they never seen such machines and tools before and cannot buy and operate them (FGD1-WAT, FGD2-M-TP1, FGD1-WAP, FGD2-MAP, FGD2-M-WP1, AWTK, TDA07, AWPK, PCR011, 2018). The third reason is that, even though, the government mentioned technological transfer as a main outcome of LSAI, it failed to establish mechanisms through which such transfers to occur and improve local people's agricultural productivity. The business models (enclave ones) used by investors do not allow the local people to be integrated into the investment value chain and benefit from technological transfers, as well. Rather than adapting the business model(s), such as outgrowing and/or contract farming, that could mainstream the local people into the project value chain and bridge technical knowledge and skill as well as capital gaps, they adopted the ones that exclude the local people from the value chain.

However, key informants and FGD participants in Perpengo *kebele* indicated that Saudi Star company sometimes plough their land using tractors where the local people cover fuel costs and operators' allowance though most of the operators are highlanders. The company trains few indigenous youth to operate some machines which the local people perceived as constructive effort to be scaled up to other investors.

6.11. Modern Tools and Equipments

Investors (both domestic and foreign) who engaged in LSAI are expected to at least have some modern agricultural tools and equipment (such as tractor, modern plough, chemical sprayer, planter, harvester, rigger, and so on) which could enable them to modernize the agricultural sector and contribute to the transformation processes of the economy. However, as can be seen from the Table 6.8, majority of the investors (mainly the local ones) (63.5%) do not use modern tools and machineries and so techniques of production. In other words, majority of the investors are using traditional production tools that have been employed for several thousands of years in the country.

This finding is in line with that indicated above where majority of the investors took the land to access loan and invests the money in the areas that require less effort, skill, knowledge (building, cars, renting construction material, hotels, and so on) and harvest profit in a short period of time. Almost all of the key informants at *kebele*, *woreda*, and regional levels indicated that majority of the investors left the farm after they cleared the land and granted loan from the government and invest the money in cities (mainly Addis Ababa and regional capitals). This also shows that agricultural mechanization and technological transfer strategy of the government is failed to transpire on the ground.

Table 6.8: No of Investors Own and Use Agricultural Machineries, Equipments, and Tools.

Woreda	No of investors at least own one equipment	%	No of investors own no Equipment	%	Total No of investors
Gambela Z.	73	36.5	127	63.5	200
Abobo	38	30.9	85	69.1	123
Itang	59	40	87	60	146
Dima	35	36.1	62	63.9	97
Goge	16	45.7	19	54.3	35
Goderie	1	7.7	12	92.3	13
Lare	2	33.3	4	66.7	6
Mengesh	4	80	1	20	5
Total	228	36.5	397	63.5	625

Source: Adapted from OPM, 2017

6.12. Summary and Recommendation

The Ethiopia government argues that rapid agricultural transformation could be achieved through LSAI and so, it allocated millions ha of land to both domestic and foreign investors in different areas of the country, mainly in lowland areas such as Gambella. Gambella region has been the leading destination of domestic and foreign LSAI, has the largest number of investment land (1.2 million hectares) registered by the federal land bank in the country (Desalegn, 2011; Ojot, 2013), has the largest number of investment land (46.6%) acquired by foreign investors in the country (HAIA, 2017), and is the centre for both challenges and

opportunities of LSAI in Ethiopia (Horne, 2011; Keeley *et al.,* 2014). Particularly, the government has transferred more than 650, 000 ha of fertile land to various investors in the region which showed striking increment in 2008 and 2014 due to global processes and crises as well as generous investment incentives provided by the government.

However, despite extensive and heartbreaking practices of such investment in the region, public structures, institutions, and land governance systems are found to be awfully weak and poor. In spite of its big hands (intervention) in the regional affairs, the federal government is failed to strengthen the capacity of the regional and local administrations in such ways that govern the investment land and projects effectively and efficiently. Both horizontal and vertical coordination and integrations between and/or among regional and federal agencies are also found as weak or non-exist. Government agencies mandated to administer LSAI within the region and federal governments as well as in the country are operating as if they are in different disconnected islands where information (which is the life blood of the decision making process) is horrendously lacking among them. This situation has led to guesswork and wrong decisions that adversely affected the natural environment and the livelihoods of the local people.

Land governance system is characterized by unresponsiveness to the voices, concerns, and benefits of the local people; non-transparent and unaccountable schemes; rent seeking and corruption; rule of man; and absence of supervision and evaluation mechanisms. Consequently, the majority of the investors are found as speculator, ghost, or pseudo ones given that they focused on their short-term interest (short-cut benefit) at the expense of the natural resources and livelihoods of the local people. In general, despite allocation of huge tracks of fertile land to private investors, the ambition of the government to transform Ethiopian agricultural through LSAIs (which are expected to create jobs, improve infrastructures, and transfer technologies) at local level is not materialized in the region.

CHAPTER SEVEN: IMPACT OF LARGE SCALE AGRICULTURAL INVESTMENT ON THE LIVELIHOOD ASSETS OF LOCAL COMMUNITY IN GAMBELLA REGION, ETHIOPIA

Abstract

Since 2008 large-scale agricultural investment (LSAI) in developing countries such as Ethiopian has increased callously due to global food, energy, and financial crises. The impacts of such investment on the livelihoods of affected households in these countries, however, have become a seriously controversial issue in public and academic discourses. The Ethiopian government has been promoting LSAI in the lowland regions such as Gambella, claiming that the investment could improve the living standard (wealth) of the local people. However, studies that examined whether or not such investments are actually contributing to the improvement of local people's wealth are extremely limited. This study, therefore, intends to analyze the actual impacts of such investments on the local community's livelihood asset endowment and give insights to the ongoing debates by using Sustainable Livelihood Approach. A systematic sampling technique was used to select 505 households who participated in the study. Besides, Key Informants and Focus Group Discussants were included in the study by using a non-probability sampling technique. We constructed a wealth index based on the assorted livelihood assets using Multiple Correspondence Analysis and estimated the impacts by using Propensity Score Matching. The study finds that LSAI has a significant negative impact on the wealth status of affected households. It has been recommend that land governance system should be revised to circumvent arbitrary allocation of investment land and promote more inclusive, pro-poor, and equitable agricultural investment approaches that ensures local people's benefit and protect them against the actual and potential harms of the investment projects.

Key words: Large Scale Agricultural Investment; Livelihood; Assets; Impact; Gambella; Ethiopia; Propensity Score Matching; Multiple Correspondence Analysis

7.1. Introduction

Even though the phenomena of large-scale agricultural investments[42] (henceforth LSAIs) are not new, they are increasing in magnitude, flow, rate, and diversity since 2008 due to food, energy and arable land scarcity which eventually led to a global 'rush for land' (Deininger *et al.,* 2011; HLPE, 2011; Oxfam International, 2011). The expansion of farmland for LSAI is envisaged to persist, and in so far as two-thirds of this escalation is anticipated to occur in Sub-Saharan Africa and Latin America (Deininger *et al.,* 2011). According to Oxfam International (2011), global south countries have leased out about 227 million hectares of land to foreign investors. Africa is the major spot of these dealings accounting for 134 million hectares of the reported contracts (Anseeuw *et al.,* 2012) and comprising 50% of the confirmed land contracts (Rulli *et al.,* 2013). Particularly, Ethiopia, Sudan, Madagascar, Tanzania, Mozambique, and Cameroon have been the top investment hosting and rural land leasing/selling countries in Africa (GRID-ARENDAL, 2013). For example, in the past two decades or so, the Ethiopian government has transferred about 2.2 million hectares of land to numerous foreign and domestic investors (Keeley, *et. al.,* 2014; Maru, 2016). In Gambella region alone, the Ethiopian government has leased more than 683,518 ha of land to domestic and foreign investors (OPM, 2017; GRIA, 2017).

However, land lease and allocation practices by African government in general and Ethiopian state, in particular, have resulted in heated controversy in terms of impacts on the rights and livelihoods of investment hosting community (Keeley, *et. al.,* 2014). On one hand, proponents of LSAI (including Ethiopian government[43]) argued that such investment can benefit hosting countries by filling up capital and technological gaps encountered by the rural households which eventually boost productivity and agricultural growth and so improve their livelihoods (FAO, 2001; Amani *et al.,* 2003; and Elibariki, 2007). The investment is also claimed to create jobs, improve the capacity of local people (TeVelde, 2001; Kim, 2003; Kim 2011), improve access of the local people to market (Deininger *et al.,* 2011), enhance

[42] In this study, LSAI refers to a mechanized commercial agricultural investment being carried out on the tract of land exceeding 200 hectares granted to either foreign or domestic investor through long term leases.

[43] The Ethiopian government perceives LSAI as having several noticeable benefits such as improvement in food security, in income through foreign currency earnings and job creation, in livelihoods of the local people, in rural infrastructures and access of the local people to the market, and technological transfer (Keeley *et. al.,* 2014). And so, the government has aggressively been promoting LSAI and attracting the attention of various investors and countries across the world by proving various generous investment incentives such as tax exemption, duty-free import of capital goods and construction materials, the right to make remittances, no or very low requirement for initial investment (EIC, 2017), and extremely low lease amount (which is approximately as low as US$1.08/ha/year and goes through US$8.44/ha/year to as high as US$38.17/ha/year) (Bamlaku *et al.,* 2015) among the others.

infrastructure (Keeley *et al.,* 2014; Herrmann & Grote, 2015), expand export opportunities, and ensure energy security (Mitchell, 2011). On the contrary, opponents argued that LSAI took out the rights of the local community to control and use key natural resources whose livelihoods totally depend on and ultimately threatened the livelihood assets and food security of the local people (GRAIN, 2008; Dessalegn, 2011; Oxfam, 2011b; Steve, 2011). Some scholars such as (Aisbett & Barbanente, 2016) and empirical evidence (Deininger *et al.,* 2011), nonetheless, suggest that the benefits of LSAIs to local people through technology transfer, job creation, income, and livelihood diversification can only be materialized and sustained when the investment projects are well governed and supported by effective, efficient, and accountable government institutions that safeguard the rights of local people over the land.

Whilst the aforesaid arguments shed light on the nature and magnitude of the land deals, land administration issues, and the potential benefits or problems that LSAIs could create on local people; unfortunately, empirical studies regarding the actual impacts of such investment on the livelihood assets of local people in Africa in general and Ethiopia, in particular, is extremely limited. Hitherto, empirical studies have tried to examine the general trends, size, and implications of LSAI to the local livelihoods (Cotula *et al.,* 2009; Dessalegn, 2011; Maru, 2011; Lavers, 2012a; and Keeley *et. al.,* 2014); legal frameworks, land acquisition processes, power structure, and land tenure (Dessalegn, 2011; Getnet, 2011; Stebek, 2011; Ojot, 2013; Schoneveld, 2013); societal segregation and pressures (Hall & Paradza, 2011); various typology of land use and conversion of land (Borras & Franco, 2012); water shortage and land deals (Horne, 2011; Rulli *et al.,* 2013); and the impact of LSAI on the economy, food security, and natural environment (Fisseha, 2011; Lavers, 2012b; Baumgartner *et. al.,* 2013; Bereket, 2014; Dye, 2014; Bamlaku *et al.,* 2015; Maru, 2016; Azeb, 2017). However, except few studies (Baumgartner *et. al.,* 2013; Bamlaku *et al.,* 2015; Maru, 2016) that quantified the impact of LSAI on food security, income, and employment, majority of the studies conducted to date in Ethiopia have reported the potential impacts, risks, and implications of such investment on the economy and livelihood of local community. Most of these studies have also employed a qualitative research approach implying that there is a pressing need to analyze the actual impact of LSAI on the livelihood assets at micro (household) level using a quantitative method (Scoones *et al.,* 2013) and more significantly a mixed research approach.

The purpose of this study is, therefore, to analyze the actual impact of LSAI on the livelihood assets of the local community by using proper impact evaluation models such as Propensity Score Matching and index construction techniques such as Multiple Correspondence Analysis in such a way that contribute to fill knowledge and methodological gaps in the literature. The study addresses the key research question: 'what is the impact of LSAI on the livelihood assets/wealth status of households in Gambella regional state of Ethiopia?' The rest of the article is organized into four parts. Part two describes the conceptual framework that guides the study. Part three discusses the context of the research and methodology. Part four presents the results of the study. The final section winds up the article and provides recommendations.

7.2. Conceptual Framework

This article is guided by the Sustainable Livelihood Framework (SLF) given that the approach rightly fits the nature of the problem under investigation (i.e. understanding the impact of LSAI on the livelihood assets of affected households). Sustainable Livelihoods Approach (SLA) is a holistic, integrated, and rational approach that explains the processes by which people attain (or fail to attain) sustainable livelihoods (Scoones, 1998). The central objective of the sustainable livelihood approach is to offer a way that empowers and considers people and community based on their everyday desires, and enhances their existing livelihood strategies rather than executing top-down general interventions (such as LSAI) without recognizing various assets and capabilities that local people possess (De Haan & Zoomers, 2005) (see the details of SLF in section 2.8 of this dissertation).

The innermost idea of the Sustainable Livelihoods framework rests on the 'Pentagon of assets': Natural[44], Physical[45], Human[46], Financial[47], and Social[48] Capital (Scoones, 1998;

[44] This dimension of asset includes general physical environment and the stock of natural resources that people have access to and use to widen or improve their livelihoods (Woller, 2009). It comprises land, water, biodiversity, and forests that people use to produce their means of living (Ellis, 2000). Having control over land and water are a life and death issue for rural people. Because, land is everything - source of food, income, power, status, medication, and so on – for rural people showing that there is a direct linkage between access to natural capital and people's wealth (Degefa, 2005).

[45] This group of capital encompasses the basic economic infrastructure such as roads, transportation, energy and communication amenities, housings, irrigation schemes, etc along with households' productive and protective assets. Household's productive assets, among other things, comprise agricultural land, machinery, tools and equipments, dairy and draft animals, and rental properties. On the other hand household's protective assets include livestock, jewelry, seed or grain, held as a store of value; movable assets furniture, electronics appliances, clothing, etc. (Woller, 2009).

[46] This capital includes both tangible (knowledge and capabilities) and intangible traits (ambition, drive, persistence, conviction, etc) that households possess as well as their health conditions. Factors such as households' access to education and training, health services, sanitation, clean water, and adequate amount of nourishing food are critical in enhancing human capital (Woller, 2009).

[47] This capital includes financial resources such as savings, credit, insurance, remittances, pensions, and cash transfers from social safety net programs (Degefa, 2005) that are available to the households and enable them to pursue different livelihood strategies and improve their wellbeing.

DFID, 2000) upon which people depend for their livelihoods. Assets in livelihood framework are often called 'capital' given that households acquire basic goods and service necessary for their livelihoods from them (Degefa, 2005). In general, assets comprise the assortment of resources upon which households rely to generate income, meet their basic needs, and handle risk, stresses, and shocks (Woller, 2009). LSAI directly affects the local community by creating pressure on the natural capital, which can either be farmland, grazing, and/or forest land; upon which the local people depend for their livelihood. This asset is crucial for rural people's livelihood unless alternative livelihood strategies are made available to them. The benefit and cost of such investment, however, depend on the approach adopted by the private investors to run their projects.

When investment approach adopted and agreed upon in the contract promotes the integration of smallholder farmers/agro-pastoralists and other land users into the commercial agricultural value chain (via for example contract farming[49] or out grower) (Vermeulen & Cotula, 2010), the likelihood of LSAI to improve local people's livelihood asset could be high. On the other hand, when the investment contract promotes the short-run benefits of the investors via stripping natural resources without long-term investment (such as infrastructures) (*extraction approach*[50]*) or* taking over the land and related resources from local people (often resulted in displacement) but investors invest in social and physical infrastructures to facilitate their own commercial operations *(enclave approach*[51]*)* (Ferguson, 2006), the possibility of LSAI to deteriorate livelihood assets of the local people would be high. In general, private investors in

[48] This capital is often considered as 'glue' that binds household members, neighbours, and society together and serves as a safety net during crisis periods. It involves resources; networks; social structure; trust and reciprocity; norms; formal and informal institutions, associations and relationships; values; attitudes; feelings; knowledge sharing; rules and expectations; mutual understandings and benefits (Grootaert *et al.,* 2004).

[49] It is an approach that integrates smallholder farmers into investment value chain via contracts (Hall, 2011). It covers diverse types of contract between private investors or companies and farmers and usual includes pre-agreed supply and purchase agreements between farmers and investors, where the latter entrust to supply inputs, such as fertilizers, pesticides, seed, credit, and technical advice and training to the former (all of which may be charged from the final purchase price) and the former carries out agricultural production according to agreed upon standards and the investor commits to purchase it. The agreements typically stipulate the purchase price, or how it will be connected with existing market prices, and may also comprise terms on delivery dates, volumes and quality of the products produced by the farmers (Vermeulen & Cotula, 2010).

[50] This approach often focuses on the clearing the natural resources (such as forest) without long term investment and production and adversely affect the sustainability of the natural environment and local people's livelihoods in the long run (Ferguson, 2006; Hall, 2011). Under this approach investors simply focus on their short-term profit and exploit the natural environment (for example, making charcoal, producing agricultural products which are not environmental or societal friendly) without generating benefits that would otherwise improve the living standard of investment hosting community.

[51] In this approach, private investors (both domestic and foreign) entirely takeover local community's land and other natural resources and their investment projects are poorly linked to local community and the economy (Ferguson, 2006; Hall, 2011). Due to this, potential benefits expected from the investment such as job creation, improvement in physical and social infrastructures, technological transfers, improvement in market opportunities, income, and food supply, as well as improvement in local people's livelihoods are either non-exist or extremely weak.

agriculture sector could play 'an engine' role in the economy of the country only if they adopt an approach that integrates the local community into national and global agricultural value chain. Otherwise, they could turn out to be 'a gun machine' that would destroy the natural environment and the livelihood of the local people.

7.3. Materials and Methods

In this study, a cross-sectional research design was employed to collect data. Within the general framework of cross-section design, to examine the actual impact of LASI on the livelihood assets of the local community, a quasi–experimental research design (using PSM method) was applied to identify a comparison group that resembles the treatment group in terms of some basic socio-economic characteristics. The comparison group is frequently identified to capture the counterfactual situations i.e. what would have been the status of livelihood assets/wealth of the affected households if the intervention such as LSAI had not been introduced in the area. See section 3.4 of Chapter Three of this work for the details of research design. A multi-stage sampling method was used to select 505 households from affected and non-affected *kebeles*. Besides, 31 key informants and 45 focus group discussants were drawn from diverse categories of the communty. See the details of sampling procedures and sample size determination in section 3.5 of Chapter Three of this dissertation.

Both quantitative and qualitative types of data were collected from primary and secondary sources. The quantitative data were analyzed using a descriptive statistics (such as percentages, mean, and standard deviation), Multiple Correspondence Analysis (MCA), and Propensity Score Matching. Conversely, the qualitative data were analyzed using content and thematic approaches. See the details of sources of data, data collection and analysis techniques in sections 3.6 and 3.7 (3.7.1 & 3.7.3) of Chapter Three of this dissertation.

7.4. Results of MCA

We carried out MCA analysis in four steps. In the first step, we run a descriptive statistics (percentage, mean, and standard deviation) for each variable and excluded those with standard deviation of zero or close to zero from the analysis. In the second step, we used 'mca' command in STATA software version 13 to get weights for each asset indicator. The five main livelihood assets of the household such as physical, human, social, financial, and natural capital were included in the MCA model (annex V). We carried out MCA analysis for each of the five asset dimensions separately. Majority of the variables were categorical (for example, has/does not have a mobile phone) and are coded as dichotomous variables. Based on this initial result, we checked the consistency requirement of MCA model and made an

adjustment (either by dropping or adjusting the variables that failed to meet the requirements). In the third step, we constructed an asset index for each capital category by using weights generated by the MCA model. In the final step, we computed adjusted asset index using equation 3.33 indicated in annex X. We did MCA analysis for Anuak and Neur communities separately. These communities have different livelihood system (the former's livelihood is mainly based subsistence and forest based agriculture and the later ones is based on livestock rearing and Flood Recession Farming) and so the sets of variables intended for the construction of the asset index are expected to be different. Since the main purpose of this study is to estimate the impact of LSAI on the wealth status of households, it is imperative to construct asset index for the two communities having divergent livelihood system.

Table 7.1 presents the results of the initial MCA analysis for the Anauk and Nuer communities. The table of inertia highlights the difference between the first factorial axis and the subsequent axes (pigeonholed as dimensions or 'Dim' in the table). For the Anauk community, the first factorial axis alone explains about 58%, 77.2%, 64.7%, 76.1% and 100% of the total inertia of the cloud of physical, human, social, financial, and natural capital indicators, respectively (Table 7.1). The explanatory power was dropped to 8.2%, 3.9%, 6.9%, and 0.75% for physical, human, social, and financial capital indicators in the second factorial axis, in that order (Table 7.1). This reduction continues in subsequent axis until it reaches zero in the final dimension of the respective capital. Likewise, for the Nuer community, the first factorial axis explains 53.9% of physical capital, 70.74% of human capital, 48.14% of social capital, 58.1% of financial, and 100% of natural capital indicators. When we look at the second axis, the explanatory power was dropped to 12.3%, 3.03%, 21.7%, and 10.7% for physical, human, social, and financial capital indicators in the second factorial axis, respectively (Table 7.1). The result shows that most of the variance of the set of indicators used for both communities is explained by one axis (the first axis). Therefore, the weights generated by the first axis were used to construct the asset index for each dimension of asset.

Table 7.1: The Table of Inertia.

Indicator	Anuak				Nuer			
	Dimension	Principal inertia	Percent	Cumulative percent	Dimension	Principal inertia	Percent	Cumulative percent
Physical Capital	dim 1	.0109166	58.02	58.02	dim 1	.0185836	53.91	53.91
	dim 2	.0015378	8.17	66.19	dim 2	.0042547	12.34	66.25
	dim 3	.0009073	4.82	71.01	dim 3	.0021144	6.13	72.39
	dim 4	.0004713	2.50	73.52	dim 4	.0014194	4.12	76.50
	dim 5	.0003498	1.86	75.38	dim 5	.0004224	1.23	77.73
	dim 6	.0002179	1.16	76.54	dim 6	.0002941	0.85	78.58
	dim 7	.0001343	0.71	77.25	dim 7	.0000796	0.23	78.81
	dim 8	.0000622	0.33	77.58	dim 8	.0000263	0.08	78.89
	dim 9	.0000191	0.10	77.68	Total	.0344718	100.00	
	dim 10	.0000101	0.05	77.74				
	dim 11	3.07e-06	0.02	77.75				
Human Capital	dim 1	.0347795	77.17	77.17	dim 1	.0329331	70.74	70.74
	dim 2	.0017544	3.89	81.06	dim 2	.0014121	3.03	73.78
	dim 3	.0000994	0.22	81.28	dim 3	.0007882	1.69	75.47
	Total	.045069	100.00		dim 4	.0000656	0.14	75.61
					Total	.0465535	100.00	
Social Capital	dim 1	.0154131	64.66	64.66	dim 1	.0186892	48.14	48.14
	dim 2	.001644	6.90	71.55	dim 2	.0084226	21.69	69.83
	dim 3	.0006821	2.86	74.41	dim 3	.0012054	3.10	72.94
	dim 4	.000349	1.46	75.88	dim 4	.0000629	0.16	73.10
	dim 5	.0000184	0.08	75.96	Total	.0388241	100.00	
	Total	.0238384	100.00					
Financial Capital	dim 1	.0346787	76.12	76.12	dim 1	.0161096	58.11	58.11
	dim 2	.0003431	0.75	76.87	dim 2	.0029535	10.65	68.76
	Total	.0455578	100.00		dim 3	.0000159	0.06	68.82
					Total	.0277223	100.00	
Natural Capital	dim 1	. 0039408	100.00	100.00	dim 1	.0073184	100.00	100.00
	Total	. 0039408	100.00		Total	.0073184	100.00	

Source: Own Survey, 2018

7.5. Propensity Score Estimation

In this study, propensity scores (PS) were estimated by using a logistic model where vector of household characteristics X were regressed on (PS). The covariates included in the propensity model were classified into four main groups: household demographic characteristics, socioeconomic factors, village characteristics, and technical factors. For the household characteristics, we followed the standard approach in the literature focusing on household head sex, household head age, and household head marital status. All of these variables are exogenous with respect to the LSAI. Socioeconomic variables such as household's main occupation and livelihood diversification index were also included in the PSM model. For village characteristics variables such as distance to market, distance to main road, distance to school, distance to health centre, and distance to drinking water source were used. Among technical factors, use of improved livestock technology and source of information (agriculture and market) were used. We excluded covariates related to household socioeconomic characteristics such as household's level of education, livestock ownership, family size, dependency ratio, size of farmland, and access to credit services given that they

are used as indicators to measure human, natural, and financial capital of the households, respectively. The description of the variables used in PSM model is summarized in Table 7.2.

Table 7.2: Description and Measurement of the Variables used in PSM.

Variable	Type	Description
Dependent (treatment)LSAI	Dummy	1 if affected by investment , 0 otherwise
Outcome variables		
Physical capital index	Continuous	Composite index computed to measure physical asset
Human capital index	Continuous	Composite index computed to measure human asset
Social capital index	Continuous	Composite index computed to measure social asset
Financial capital index	Continuous	Composite index computed to measure financial asset
Natural capital index	Continuous	Composite index computed to measure natural asset
Overall index	Continuous	Average composite index computed to measure wealth status
Covariates		
Sex of household head	Nominal	1 if the head is male, and 2 if female
Marital status of household head	Nominal	1=single, 2=married, 3=widowed, 4=divorces
Age of household head	Continuous	Years
Main occupation	Nominal	1 if the head engaged in crop farming or mixed (crop farming and livestock rearing, and 2 all others
Distance to potable water points	Continuous	Walking distance in minutes from home
Distance to all weather road	Continuous	Walking distance in minutes from home
Distance to health centre	Continuous	Walking distance in minutes from home
Distance to school	Continuous	Walking distance in minutes from home
Distance to market	Continuous	Walking distance in minutes from home
Livelihood index	Continuous	Composite index
Radio as a source of information	Dummy	1 if a household use radio , 0 otherwise
Family as a source of information	Dummy	1 if a household use family , 0 otherwise
Kebele administration as a source of info	Dummy	1 if a household use Kebele admn. , 0 otherwise
DA[52] as a source of information	Dummy	1 if a household use DA , 0 otherwise
Improved livestock breeds	Dummy	1 if a household use improved seed or breeds , 0 otherwise

Source: Own survey, 2018

We estimated propensity scores by running 'pscore' command in STATA software. Even if parameter estimates of the model is not the big concern in propensity score estimation (Khandker et al., 2010), after estimating a propensity score, we checked whether or not the estimation is correct by using a Hosmer-Lemeshow test - a goodness of fit (GOF) test for logistic regression (Hosmer & Lemeshow, 1980). The test assesses how well the model fits the observed data sets by evaluating the differences between the observed number of events, the actual data, and the expected number of events from the model (Guffey, 2012) or assessing whether the model is consistent with the observed data sets. The result shows that the logistic regression model fits our data well ($p=0.9430$ for Anuak community and $p=0.7431$ for Nuer community) suggesting that the PSM model fits well our data set (the model is consistent with the observed data set) (annex XI).

[52]Development Agents (DAs) are government employees who are trained in agriculture colleges for at least 2 years in various areas of agriculture and rural development such as crop production, animal health, and natural resources management for the purpose of providing agricultural extension services for farmers.

7.6. Region of Common Support and Balancing Propensity Score

Once we completed the estimation of a propensity score for each household, we defined the region of common support to ensure that there is an adequate overlap in the range of propensity scores for treatment and comparison groups. The min and max values of common support region for Anuak community are [0.0700418 & 0.97684503] and [0.12768632 & 0.93287515] for Nuer community. We assessed the validity of common support assumption by examining a graph of propensity score for treated and comparison groups generated by using 'psgraph' command in Stata (annex XII). The graphs confirm the existence of a sufficient overlap in the distribution of the propensity scores across treatment and comparison groups (for both the Anuak and Nuer communities) suggesting the validity of the common support identification assumption.

Following evaluation of the overlap, we carried out balancing tests to check whether or not, within each quintiles of the propensity score distribution, the average propensity score and mean of covariates have a similar distribution (balance) across the treated and comparison groups. We got a rough estimation of propensity score distribution by dividing our sample by quintiles of propensity score to make sure that the mean propensity score is similar in the treated and comparison groups within each quintile. This exercise ensures that the mean propensity score is not different for the treated and comparison groups in each block (Imbens, 2004). The result shows that the mean propensity score is not different for treated and comparison groups in each block for both the Anuak and Nuer (annex XIII). This number of blocks ensures that the mean propensity score is not different for treated and comparison groups in each block.

After ensuring that the propensity score is balanced within each block across the treatment and comparison groups, we checked whether or not individual covariates are balanced across both groups within blocks of the propensity score. Imbalance in the mean of the covariates indicates the misspecification of the participation model (Khandker et al., 2010) which requires re-specification of the propensity score (Garrido *et al.,* 2014) though we did not encounter this problem in our PSM model. The result of test of balancing property of the propensity score shows all covariates are balanced in each block for both communities ($p > 0.01$) but distance to all weather road in Block 2 and 5 (with p value equal to 0.001 and 0.008) for Anuak community (annex XIII). In order to achieve good covariate balance, we dropped distance to all weather roads for the Anuak community. The result illustrates a

strong confirmation that after getting balance of propensity scores within each stratum, the covariates are balanced and attained overlap in terms of distribution (annex XIII).

7.7. Matching Algorisms

After completing the task of creating a balanced propensity score, the next key issue that we addressed before the estimation of the treatment effect is selecting proper matching strategy that could enable us to compare treatment and comparison groups based on the propensity score. There are varied mathematical algorisms and matching strategies used to handle the search for the nearest treated household to be matched to the comparison household who have the most similar propensity score (Becker & Ichino, 2002; Imbens, 2004; 2011; Dillon, 2010; Heinrich *et. al.,* 2010; Khandker *et al.,* 2010; Garrido *et al.,* 2014). Among these, we employed the most frequently applied ones such as, nearest neighbour (NN), caliper (or radius), kernel and stratified matching strategies to estimate treatment effect.

7.8. Matching Quality Evaluation

The result of the covariate balancing test before and after matching is presented in annex XIV. The two-sample t-test result shows that after matching all covariates' mean differences are insignificant suggesting that the covariates are balanced. Moreover, the average standardized bias difference for all covariates was reduced from 20.3 before matching to 4.3 after matching for the Anauk and from 21,4 to 7.6 for the Nuer. Significant percent bias reduction (*PBR*) after matching (for the majority of the covariates) was also achieved (see annex XIV). Likewise, the Pseudo- R^2 was notably dropped from 0.162 before matching to as low as 0.010 for the Anauk and from 0.177 to 0.042 for the Nuer. When we inspect the p-values of the likelihood tests, it shows that the joint significance test of covariates is not rejected before matching ($p<0.01$) but it could be rejected after matching ($p>0.05$) (see annex XIV). All of the tests suggest that the specification of the propensity score is effective in balancing the distribution of covariates between the affected and non-affected households.

7.9. Sensitivity Analysis

Sensitivity analysis was carried out by using 'Rosenbaum bounds approach' to assess the potential impact of unobserved confounders on the treatment effect. Sensitivity analysis is imperative in PSM due to some strong assumption, such as, CIA that says selection process is accounted for by observable characteristics. It is suggested that sensitivity analysis should always be carried out after impact estimation and complement propensity score analysis (Steiner & Cook, 2013). If conclusions change for critical values of gamma (Γ) is slightly

above one, the analysis signifies the existence of the high sensitivity to hidden bias (Rosenbaum, 2005). When we see the Rosenbaum bound sensitivity analysis of the result, it showed that the impact of LSAI on the wealth status of affected households is not sensitive to hidden bias (unobserved characteristics that could bias the estimated impact) (at $p<0.001$). Even when we increased the value of gamma from 1.0 to 1.5, the conclusion (there is a truly negative effect of LSAI) does not change across all outcome variables and all matching strategies used in the PSM model showing that the result is insensitivity to hidden bias (is robust) for both Anauk and Nuer (see annex XV).

7.10. Treatment Effect Estimation

Our parameter of interest is the average treatment effect on the treated (ATT), i.e., the estimation of an average effect of LSAI on the wealth status of households for those who are actually affected by the investment. Since the livelihoods of the Anuak and Nuer are considerably different from each other, LSAI would have fundamentally different impacts on each community's livelihoods. And so, the estimation of impact of LSAI on the livelihood assets was carried out for each community separately. However, before estimating the actual impact of LSAI on the wealth status of households, it is imperative to briefly examine descriptive statistics. Anuak community livelihood and identity is strongly attached to the land, forest, and rivers beside which they reside and practiced small scale traditional agriculture (every so often shifting cultivation) which is complemented by fishing, hunting, and gathering of wild food (such as roots, leaves, nuts, and fruits). On the other hand, the Nuer are agro-pastoralists whose livelihoods depend on the livestock rearing where cattle are exceptionally attached to their identity, livelihood strategy, culture, and serve as a source of food, wealth, and prestige (Human Rights Watch, 2012). The Nuer are also engaged in flood recession agriculture and fishing to supplement their livestock based livelihood system. This indicates that natural resources such as grazing land and river banks are the basic sources of the Nuer livelihood.

The standardization asset index was calculated based on the selected indicators of livelihood assets, as shown in Table 7.3. The Table presents the summary statistics of the standardized livelihood asset index. The minimum score of the index is zero and the maximum is 1 where the maximum value indicates a relatively highest level of asset endowment. The index, however, does not imply whether or not the asset is sufficient. For example, the score of 1 for physical capital just shows the highest score within the sampled households (the distribution of the asset) but not the adequacy of the asset.

In general, household total livelihood asset scores (for both communities) in the survey area were generally low (below 0.3), showing poor economic conditions, low level living standards, and limited livelihood assets. For example, the mean of overall livelihood asset index for Anuak and Nuer was 0.198 and 0.25, respectively (Table 7.3). On average, the value of natural capital was the highest (0.33) for Anuak and 0.34 for Nuer ones (Table 7.3) indicating that both communities have large stock of natural capital which is the foundation of their livelihoods and is the central target of LSAI as well.

However, the Anuak are deficient in human capital (0.05) and social capital (0.15) while the Nuer are poor in social capital (0.10) but relatively good in human capital (0.26) when compared to the Anuak (Table 7.3). Within the Anuak, the scores of physical capital (0.22) and financial capita (0.24) are higher when compared to human (0.05) and social capital (0.15) endowments. Likewise, within Nuer the values of physical capital (0.31), human capital (0.26), and financial capital (0.22) are higher than that of social capital (0.10) (Table 7.3). In general, except social capital, the Nuer possesses relatively large livelihood assets when compared to the Anuak (Table 7.3). This implies that households with different livelihood systems have different type, amount, and structure of livelihood assets. Even though the scores of each capital are found to be low, the result also indicates that the Anuak need serious attention or intervention in terms of human capital which is extremely low amongst all other livelihood assets.

Table 7.3 Summary Statistics for Outcome Variables (Asset)

Community	Variable	Total Mean	Statistics								Standardized Diff.	t-test
			Affected HH Anuak (n=157) Nuer (n=70)				Non-affected HH Anauk (n=185) Nuer (n=84)					
			Mean	SD	Min	Max	Mean	SD	Min	Max		
Anuak	Phy. capita	0.22	0.21	0.17	0	0.85	0.23	0.19	0	1	-0.125	- 1.1384
	Hum. capital	0.05	0.05	0.13	0	0.71	0.06	0.14	0	1	-0.077	- 0.6991
	Soc. capital	0.15	0.14	0.17	0	0.99	0.16	0.18	0	1	-0.093	-0.8497
	Fin. capital	0.24	0.23	0.24	0	0.97	0.25	0.27	0	1	-0.074	-0.6772
	Nat. capital	0.33	0.27	0.34	0	1	0.38	0.34	0	1	-0.326	-2.9979**
	Comp. index	0.198	0.18	0.13	0.02	0.6	0.21	0.14	0.17	0.74	-0.272	-2.4877*
Nuer	Phy. capita	0.31	0.30	0.18	0	0.82	0.33	0.21	0	1	-0.156	-0.9574
	Hum. capital	0.26	0.25	0.27	0	0.85	0.27	0.31	0	1	-0.073	-0.4459
	Soc. capital	0.10	0.08	0.13	0	0.73	0.12	0.23	0	1	-0.208	-1.2523
	Fin. capital	0.22	0.19	0.15	0	0.5	0.24	0.24	0	1	-0.263	-1.5908
	Nat. capital	0.34	0.28	0.31	0	1	0.39	0.32	0	1	-0.361	-2.2268*
	Comp. index	0.25	0.22	0.10	0.27	0.45	0.27	0.13	0.04	0.72	-0.435	- 2.6553**

+ $p< 0.10$, * $p< 0.05$, ** $p< 0.01$, *** $p< 0.001$

Source: Own survey, 2018

To scrutinize the difference in mean index between affected and non-affected households, we disaggregated livelihood asset index based on the different indicators employed to measure asset endowment of the affected households. The Anuak who are affected by the LSAI, on average, have slightly lower asset index values in all of the five dimensions of livelihood

assets when compared to non-affected ones. For example, the mean physical, human, social, financial, and natural capital of affected Anuak was 0.21, 0.05, 0.14, 0.23, and 0.27, respectively while it was 0.23, 0.06, 016, 0.25, and 0.38 for non-affected ones, in that order. However, the mean difference in all of the livelihood assets is not statistically significant except for natural capital which is significant (at $p<0.01$) (Table 7.3). In contrast, the overall aaset/wealth index (the average of five livelihood assets) was 0.18 for affected Anuak and 0.21 for non-affected ones which is statistically significant (at $p<0.05$). As far as the Nuer are concerned, the data show similar results. For instance, the affected Nuer, on average, registered the value of 0.30, 0.25, 0.08, 0.19, and 0.28 for physical, human, social, financial, and natural capital, respectively whereas the affected ones scored the value of 0.33, 0.27, 0.12, 0.24, and 0.39 for similar dimensions of the livelihood assets (Table 7.3). Nevertheless, the mean difference between affected and non-affected Nuer is not statistically significant except for natural capital which is significant (at $p<0.05$). Like the Anuak, the mean of overall livelihood asset index which was 0.22 for affected and 0.27 for non-affected Nuer is statistically significant (at $p<0.01$) indicating that there is significant difference between affected and non-affected households in terms of wealth status.

In general, simple comparisons of mean differences of affected and non-affected households could not explain the effect of other characteristics of households that may confound the impact of LSAI on wealth status of the local people. Therefore, we employed a Propensity Score Matching (PSM) model to vigilantly estimate the actual impact of LSAI on the livelihood assets of the affected households. As indicated above, we estimated the average treatment effect on the treated(ATT)- the average difference between livelihood assets of affected (treated) and non-affected (comparison) households (due to LSAI intervention) by using PSM matching techniques such as the nearest neighborhood (NN), radius, kernel, and stratification (SS) for both the Anuak and Nuer communities. Scholars have advised researchers to use a mixture of diverse matching algorithms for reaching at a reliable conclusion on the relative effect of an intervention such as LSAI on the outcome variables (Backer & Ichino, 2002). The results are summarized in Table 7.4 below.

7.10.1. Impact on the Physical Capital

By using the combination of four matching strategies indicated above, the impact of LSAI on the livelihood assets of affected Anauk households ranged from 4% to 8.4% in terms of dropping the physical capital of the affected Anauk. More specifically, on average, LSAI reduced physical capital of affected Anauk by 8.4% for NN, 4% for radius, 4.5% for kernel,

and 6% for SS matching (Table 7.4). To be precise, due to LSAI, the Anuak who are affected by the investment, on average, possess 4% to 8.4% less physical capital than those households who are not affected by the investment. The results shows that LSAI had a statistically significant negative impact on the physical capital of the affected households at either $p<0.10$ or 0.05.

Likewise, the impact of the investment on the physical capital of Nuer ranged from 0.9 to 7.2% fall. LSAI, on average, trimmed down physical capital of affected Nuer by 7.2% for NN, 6.1% for radius, 1.1% for kernel, and 0.9% for SS matching (Table 7.4). Due to LSAI, the affected Nuer, on average, own 0.9 to 7.2% less physical capital than those households who are not affected by the investment. The results shows that LSAI had a significant negative impact on the physical capital of the affected households at $p<0.10$ (only for NN matching strategy). In general, the findings of both communities indicate that LSAI has significantly reduced the physical capital of the affected households. The results obtained from the qualitative data give details on why such negative impacts are observed.

Majority of KII at *woreda* and *kebele* levels as well as FGD participants indicated that LSAI projects do not and even are not willing to incorporate local people into their projects in such a way that benefit them and enhance their income and asset. According to them, most of investors are not willing to hire indigenous people even as a daily laborer saying that they are lazy, lack skills, and are not efficient (GRWCYB O05, AWANRO, E04, FGD2-M-TP2, & FGD3-Y-TP1, 2018). Consequently, the investors are bringing in highlanders (mainly from the southern region of Ethiopia) for almost all types of job.

Table 7.4: Impacts of LSAI on the Asset Status of affected Community.

Com	Asset Indicators	Matched Sample: Matching Method[a]	Affected	Non Affected	Impact (ATT)	Standard Error[b]	t-value
Anuak	Physical capital	NN	155	76	-0.0842*	0.039	-2.169
		Radius	126	168	-0.039	0.025	-1.558
		Kernel	155	180	-0.045*	0.022	-2.080
		SS	155	180	-0.060+	0.035	-1.718
	Human capital	NN	155	76	-0.036	0.032	-1.121
		Radius	126	168	-0.018	0.022	-0.813
		Kernel	155	180	-0.030	0.027	-1.116
		SS	155	180	-0.020	0.019	-1.065
	Social capital	NN	155	76	-0.024	0.049	-0.484
		Radius	126	168	-0.036+	0.022	-1.663
		Kernel	155	180	-0.052	0.035	-1.495
		SS	155	180	-0.035	0.028	-1.235
	Financial capital	NN	155	76	0.014	0.051	0.274
		Radius	126	168	-0.048	0.030	-1.594
		Kernel	155	180	-0.036	0.036	-0.992
		SS	155	180	-0.023	0.036	-0.636
	Natural capital	NN	155	76	-0.121*	0.052	-2.338
		Radius	126	168	-0.139**	0.045	-3.115
		Kernel	155	180	-0.121**	0.044	-2.792
		SS	155	180	-0.114+	0.061	-1.868
	Overall impact	NN	155	76	-0.050+	0.027	-1.844
		Radius	126	168	-0.056***	0.016	-3.392
		Kernel	155	180	-0.057**	0.019	-2.940
		SS	155	180	-0.050*	0.023	-2.234
Nuer	Physical capital	NN	70	35	-0.072+	0.039	-1.844
		Radius	49	57	-0.061	0.051	-1.208
		Kernel	70	76	-0.011	0.033	-0.338
		SS	70	76	-0.009	0.036	-0.258
	Human capital	NN	70	35	-0.034	0.076	-0.446
		Radius	49	57	-0.030	0.066	-0.454
		Kernel	70	76	-0.028	0.067	-0.423
		SS	70	76	-0.024	0.068	-0.355
	Social capital	NN	70	35	-0.008	0.083	-0.098
		Radius	49	57	-0.033	0.040	-0.827
		Kernel	70	76	-0.074	0.071	-1.038
		SS	70	76	-0.086	0.069	-1.240
	Financial capital	NN	70	35	0.023	0.033	0.686
		Radius	49	57	-0.028	0.048	-0.583
		Kernel	70	76	-0.005	0.033	-0.165
		SS	70	76	-0.023	0.047	-0.482
	Natural capital	NN	70	35	-0.058	0.078	0.745
		Radius	49	57	-0.101	0.095	-1.066
		Kernel	70	76	-0.129*	0.058	-2.212
		SS	70	76	-0.142**	0.055	-2.603
	Overall impact	NN	70	35	-0.030	0.035	-0.849
		Radius	49	57	-0.051+	0.026	-1.940
		Kernel	70	76	-0.050+	0.029	-1.698
		SS	70	76	-0.057*	0.033	-1.737

+ $p<$ 0.10, * $p<$ 0.05, ** $p<$ 0.01, *** $p<$ 0.001; [a]Radius matching was carried out with a caliper of (0.01); [b]Bootstrapstandard error was computed based on 100 replications

Sources: Own survey data, 2018

Focus group discussants reported that they are not the part of any benefits from the investment projects except a few seasonal jobs with very low wage (on average 35 birr per day) created for some youth meant for survival purpose than to boost asset (FGD1-WAT, FGD2-M-TP1, FGD3-YAT, FGD3-YAP, FGD2-MIW, 2018). One of the key informants

said “after they took our sole and precious resources, they deleted us from the menu of employment that would otherwise at least compensate the loss and enable us to improve our living (AWTK, TCR012, 2018). Another one said “let alone having a good house, currently getting a grass and wood (to construct and maintain a house) that previously available all over the place is tricky. These resources have currently gone for once and for all” (AWPK, PCR011, IWWKR, WKCR018, 2018). Focus group discussants and key informants continued saying that “we are using very antique agricultural tools (such as hoe and hand tools) to cultivate crops which are not enable us to improve our livelihoods. The investors have been using modern machineries and tools but did not help us in improving our agricultural tools” (FGD1-WAT, FGD2-M-TP1, FGD1-WAP, FGD2-MAP, FGD2-M-WP1, AWTK, TDA07, AWPK, PCR011, 2018).

Almost all key informants in Abobo and in affected *kebeles* as well as all of FGD participants explained that majority of the investors (except Saudi Star that paved road to its farm and sometimes carried out maintenance starting from Abobo town to his farm) rather than constructing roads (even to their own farms), they have been using roads constructed by the government, destroy the roads via large truck movements and interrupted transportation system which forced the local community to travel a long distance on foot to get market and nearby town (FGD1-WAT, FGD2, FGD1-WAP, FGD2-MAP, 2018). Moreover, FGD discussants explained that majority of the investors do not have their own water pump and often use the community’s drinking water pump that was constructed by the government. The water pumps are sometimes broken due to high load and excessive utilization by the investors who even are not willing to repair the pump (FGD1-WAP, FGD2-MAP, FGD1-WIW, FGD2-MIW, 2018). All of these resulted in scarcity of water mainly during the dry season and forced women to travel a long distance to fetch water.

7.10.2. Impact on the Human Capital

In terms of human capital, the impact of LSAI on affected Anauk households ranged from 1.8% to 3.6%. On average, LSAI had reduced human capital of affected households by 3.6% for NN, 1.8% for radius, 3% for kernel, and 2% for SS matching (Table 7.4). Due to LSAI, the affected Anauk, on average, have 1.8% to 3.6% less human capital than those households who are not affected by the investment. On the other hand, the impact of the investment on the human capital of affected Nuer ranged from 2.4% to 3.4% reduction. LSAI, on average, declined human capital of affected Nuer by 3.4% for NN, 3% for radius, 2.8% for kernel, and 2.4% for SS matching strategies (Table 7.4). Despite its negative value, however, the impact

is not statistically significant for both communities implying that LSAI does not have impact on the human capital of affected households. Nevertheless, it is imperative to note that there is an overall decline in human capital of affected households due to the LSAI intervention.

It is generally found that there is a weak linkage between the investors and investment hosting communities in terms of human capital. For example, it is clear from the discussions held with FGD participants and key informants that, except rare training events initiated by the government, knowledge and skill transfers from investors that would otherwise enhance investment hosting community's human capital are lacking either in practice or in the contractual agreement. There was no training program designed and/or offered to the local community (except an attempt made by Saudi star that occasionally provided training for youth to operate machineries) to upgrade their skills. The investors who have capacity (in terms of knowledge and technology) are not sharing their knowledge, skills, and technologies mainly due to government's failure to ensure local people's benefit" (RKI 05, IWAC, O013, GRAC O01, 2018).

In focus discussion held with women and adult men, discussants indicated that rather than supporting local people, (for example, in providing drinking water), majority of the local investors are occasionally using their water installed by the government and creating water scarcity which sometimes forced them to use river water and adversely affected their health status. Key informant from one of the affected kebeles stated that "we begged the nearby investors to support us in school maintenance by providing corrugated iron for covering the roof but they refused. Imagine they took everything that we have but repudiate to contribute something that is insignificant when they cooperate" (AWPK, PKA010, FGD2-M-PP1, 2018). From the field observation, however, it is clear that there are no as such significant differences between health and education facilities of affected and non-affected communities.

7.10.3. Impact on the Social Capital

In terms of social capital, the impact of the investment on affected Anauk ranged from 2.4% to 5.2% reduction. On average, LSAI reduced social capital stock of affected Anauk by 2.4% for NN, 3.6% for radius, 5.2% for kernel, and 3.5% for SS matching (Table 7.4). The result shows that, on average, the affected Anauk have lower social capital score of 2.4% - 5.2% than their counterpart non-affected ones, which is statistically significant at $p<0.10$ only for radius matching strategy (Table 7.4). Likewise, LSAI, on average, trimmed down the social capital of affected Nuer by 0.08% for NN, 3.3% for radius, 7.4% for kernel, and 8.6% for SS matching techniques. The finding shows that, on average, the affected Nuer has lower social

capital stock of 0.08% - 8.6% than their equivalent non-affected ones. However, despite its negative value, the result is not statistically significant indicating that the investment does not have impact on the social capital of affected Nuer.

Focus group discussants in the affected Anuak kebeles mentioned their disappointment with investors saying that we do not and will not 'trust' investors that took our land and destroyed our forest which is the main source of our livelihood. According to one of the discussants "it is the government who brought such insensitive people to our land and obliterating us. Our issue is with government. Government should be accountable for all these malevolence acts. We are not the enemies of the government and investors. How we trust them?" (FGD2-M-TP2, 2018). The community came to know the investment only when the project commenced clearing the forestland which they claim as their familial land (FGD2-MAT, FGD2-MIW, FGD1-W-TP1, 2018). Almost all focus group discussants and key informants in both communities, explicitly and consistently revealed that there is no consultation with and participation of villagers regarding the investment. "We saw big machineries that we never seen before which abruptly started destroying the forest (which is our home, income, food, identity, and life). When we asked those came from the region and woreda government about what is going on, they said it is investment" (FGD2-MAT, FGD2, FGD2-MIW, & FGD3-YAT, 2018). By having tears in his eyes, one of the FGD discussants said "I remember how a military general responded to us when we challenged the destruction of the forest by taking a 'Pistol' from his bag and ordered us to keep silent saying this is government's land and now ours not your, it is investment" (FGD2-M-TP1, 2018). Since then, according to the discussants, for them investment means destruction, fear to ask rights and challenging inequity acts, and keeping silent. "Inside we are crying every day, psychologically and emotionally we are sick, we are powerless, let them do what they want" (FGD2-M-TP3, AWTK, TCR012, 2018).

7.10.4. Impact on the Financial Capital

In terms of financial capital, the impact of the investment on affected Anauk ranged from 1.4% to 4.8 % reduction. On average, LSAI reduced financial capital score of affected Anauk by 1.4% for NN, 4.8% for radius, 3.6% for kernel, and 2.3% for SS matching (Table 7.4). The result shows that, on average, the affected Anauk have lower financial capital score of 1.4% - 4.8% than their counterpart non-affected ones. Similarly, LSAI, on average, declined the financial capital of affected Nuer by 2.3% for NN, 2.8% for radius, 0.5% for kernel, and 2.3% for SS matching strategies (Table 7.4). The finding shows that, on average, the financial

capital score of affected Nuer is lower by 0.5% - 2.8 % than the score of non-affected ones. However, the result is not statistically significant for both communities (Table 7.4) indicating that the investment does not have impact on financial asset of affected households. Nevertheless, it is essential to note that there is a general decline in financial capital of affected households due to the intervention of LSAI.

Even though, the investment adversely affects natural capital base which is a prime source of income to Anuak community, due to the subsistence nature of their livelihood activities, there is no as such significant difference between total income and livestock endowment (which are the major sources of financial capital) of the affected and non-affected households. On the other hand, livelihoods of the Nuer greatly depend on cattle rearing (mostly considered as a sign of prestige, power and assets) and in most cases use communally owned grazing and savannah land and transhumant movements. Albeit, LSAI has reduced access of affected households to grazing land, they sometimes use the communal land from non-affected areas via their clan and even move to Republic of South Sudan (which is believed to be their original resident place) when they face a critical shortage of forage for their cattle. These practices somewhat eased pressure on the cattle and so negative impact on the financial capital. Access to credit services and saving practices are also found to be weak and similar in both affected and non-affected communities. One of the key informants from Anuak community said "what are we going to save, we have nothing, we are working to meet our daily needs, and we do not know what will happen in the near future" (FGD2-M-PP5, 2018). The analysis of the descriptive statistics also indicates that there is no statistically significant difference between financial capital of the affected and non-affected households of both communities (Table 7.3).

7.10.5. Impact on Natural Capital

The impact of LSAI on the natural capital of affected Anauk households ranged from 11.4% to 13.9% reduction. On average, LSAI declined natural capital of affected Anauk by 12.1% for NN, 13.9% for radius, 12.1% for kernel, and 11.4% for SS matching (Table 7.4). The result shows that, on average, the affected Anauk have natural capital stock lower by 11.4% - 13.9% than their counterpart non-affected ones, which is statistically significant at either $p<0.10$ or 0.05 or 0.01(Table 7.4). Likewise, LSAI on average reduced natural capital stock of affected Nuer by 5.8% for NN, 10.1% for radius, 12.9% for kernel, and 14.2% for SS matching strategies. The finding indicates that, on average, the affected Nuer posses a natural capital stock which is lower by 5.8%% - 14.2% than non-affected ones which is also

statistically significant at either $p<0.05$ or 0.01(Table 7.4). The results imply that the investment had a significant negative impact on the natural capital stock of the affected Anuak and Nuer. This finding is in line with the information obtained from the FGD and KII conducted with affected communities and summarised as follow.

The Anuak has adopted a natural resource based livelihood systems which Kurimoto (1996) classified them into three main categories: *'Bap'* (grassland that is flooded every rainy season); '*Wok'* (woodland); and *'Lul'* (forest). It is apparent that LSAI first and foremost directly affects local community by utilizing the natural resources, which can either be a *'Bap'*, '*Wok'*, and/or *'Lul'* land; upon which livelihood of the community entirely depend. In contrast, the livelihoods of the Nuer largely depend on cattle rearing which in turn requires secured access to and control over crucial natural resources such as grazing land and water (Wondwosen, 2017) which were eventually occupied by LSAI. For example, the government (both federal and regional) has transferred 93,140 hectare of land to 121 local and 2 foreign investors and 236,664 hectare to 144 local and 2 foreign investors in Abobo and Itang *woredas*, respectively (OPM, 2017, GRIA, 2018), without providing alternative livelihood strategies to the local community.

The Anuak and Nuer who are affected by the investment expressed their distress and disappointment saying that we lost our woodland, savanna grassland, and forest where we used to cultivate, collect wild food, house construction materials, fire woods, and feed our animals. These resources were our sources livelihoods. They were our home, income, food, identity, and life (FGD2-MAT, FGD2-MAP, & FGD2-MIW, 2018). One of the key informants said "the investors took our land and destroyed the forest that serves as a source income and assets and left us with nothing" (AWPK, PCR011, 2018). Above all, according to the participants (FGD and KII), after they lost thier precious resources (farming, forest, and grazing land) due to the project, they denied the employment that would otherwise compensate the loss and enable them to improve their livelihood. The investors and government pushed them into poverty that they never seen before (AWTK, TCR012, AWPK, PKA010, FGD2-MIW, FGD3-Y-TP1, FGD3-Y-WP2, 2018). Almost all of the key informants contacted at regional and *woreda* levels had similar view explaining that investors have destroyed the natural resource (the forest and grassland) by only focusing on their short-term benefit (profit). According to key informants, majority of the investors cleared the forest to get loan from the banks, to generate income from charcoal, and clear the forest, leave the land idle for a long period of time, and disappeared for reasons that they don't know (GRAC

O01, GRAB O04, AWANRO, O02, AWANRO, E03, IWAC, O013, & IWRO, O017, 2018). Moreover, there are no institutional and legal frameworks that protect the rights of the local people, and ensure they are vigorously incorporated into investment projects and get benefits (FPO E06, GRAC O01, IWAC, O013, 2018). Besides, there is no monitoring and evaluation system that regularly track the activities of investors in such a way that balance business (profit), economic (foreign currency earning), local (improvement in livelihoods), and environmental (not harming the natural environment) goals (OPM, 2017).

7.10.6. Overall Impact on the Livelihood Assets

By using the combination of various matching strategies, the impact of LSAI on the wealth status of affected Anauk and Nuer ranged from 5% to 5.7% and 3% to 5.7% in terms of dropping their wealth status, respectively. On average, LSAI reduced wealth status of affected Anauk by 5% for NN, 5.6% for radius, 5.7% for kernel, and 5% for SS matching (Table 7.4). Similarly, the investment, on average, reduced the wealth status of affected Nuer households by 3% for NN, 5.1% for radius, 5% for kernel, and 5.7% for SS matching techniques. In general, due to LSAI, the wealth status of affected Anuak and Nuer, on average, is lower by 5% to 5.7% and 3% to 5.7% than those households who are not affected by the investment, respectively. The results shows that LSAI had a statistically significant negative impact on the wealth status of the affected Anuak and Nuer at either $p<0.10$ or 0.05 or 0.001 (Table 7.4). The decline in overall livelihood asset index of both communities implies that LSAI considerably reduced the wealth status of the affected Anauk and Nuer.

In general, the results of this study are consistent with the ones conducted in Africa and found the possible adverse impact of LSAI on the livelihoods of the investment hosting communities (Kachika, 2010; Theting & Brekke, 2010; Robertson & Pinstrup-Andersen, 2010; De Schutter, 2011; Anseeuw *et al.,* 2012; Anseeuw *et al.,* 2013; Ferna´ndez & Schwarze, 2013; German *et al.,* 2011, 2013; Rulli *et al.,* 2013; Dye, 2014). The findings are also in line with the various studies that reported potential negative impacts of LSAI on the livelihoods of the affected community in Ethiopia (Cotula *et al.,* 2009; Dauvergne & Neville, 2010; Maru, 2011; Maru & Rutten; 2013; The Oakland Institute, 2011; Dessalegn, 2011; Oxfam International, 2011b; Lavers, 2012a; Lavers, 2012b; Baumgartner *et. al.,* 2013; De Zoysa, 2013; Bereket, 2014; Keeley *et. al.,* 2014; Barbanente & Aisbett, 2016; Dereje, 2016; Azeb, 2017).

7.11. Summary and Recommendation

This article is intended to provide empirical evidence regarding the impacts of LSAI on the livelihoods of the local community. To estimate the effect of LSAI on the livelihood asset (wealth) status of the affected community, PSM technique was employed. Unlike previous studies that adapted PCA to construct an asset index using non-continuous variables, this study used MCA to construct such index due to the nature of the dataset (categorical variables). Particularly, a mixed method approach – a method combining qualitative and quantitative data-collection tools (Creswell 2009) was employed.

The results of both quantitative and qualitative evidence provide a consistent description of the impact of LSAI on the livelihood assets of the affected community. In contrary to the proponents of LSAI and Ethiopian government who claim that large-scale land investments improves livelihoods of the local communities, this study finds that LSAI negatively affect the asset base of affected households and significantly reduced their wealth status. Even though insignificant impacts of the LSAI are observed on some livelihood assets (such as human, social (for Nuer), and financial capita), the overall direction and values of the impact were negative indicating that if business as a usual continuous and urgent measures are not taken soon, the investment will significantly reduce these categories of the asset.

The expansion of the LSAI in Gambella region ignores the land rights of the local people, botched to participate and integrate them into investment projects, and disturbed their access to fundamental natural resources such as farm and grazing land and communal forests chiefly due to hegemonic authority of the government over the community's land. These practices have eroded community's confidence and trusts, intensified sense of insecurity and powerlessness, and weaken public voice. The study finds that majority of the jobs created by LSAI projects are seasonal with very low level of indigenous community involvement and extremely low wage rates. It further finds that there are non institutional and legal frameworks that safeguard local communities against potential costs and ensure potential benefits of large scale agricultural investment are maximized. It is also found that there is no technological transfer from the investors to local communities (either due to unwillingness of investors to transfer or application of sophisticated technology that is not transferable or affordable by the local people) that would otherwise boost their productivity and so their livelihood assets via sales of surplus. In general, the overall result shows that capitalist investors (who are solely driven by short-term profit motive) have brought an adversity to the

study areas by eroding their livelihood assets and weakening their sustainable (long-term) livelihoods.

Ethiopian government should revise its land transferring practices, principles, and systems by securing communal land rights to local people and guaranteeing their access to basic natural resources before allocating land to LSAI projects. Land governance system should be revised to circumvent arbitrary allocation of investment land and facilitate more inclusive and equitable agricultural investment models. Government should design a favourable legal and policy framework that allow local people to actively participate at every stage of LSAI project life cycle; put local people interest and effort at the centre of the investment; devise and enforce contracts that integrate local people into the investment value chain. Besides allocating land for LSAI, government should look into different land use alternatives that have been tried and happened to be successful (mainly in developing countries) in benefiting both investors and the local people. For example, in region like Gambella that is rich in natural resources, government is advised to design and promote alternative development programs such as game ranching, controlled hunting, ecotourism, fishing, and improved livestock rearing that could benefit the investors, government, and the local people (create win-win-win scenario at the same time) without damaging the ecosystem, flora and fauna, and the livelihoods of the people rather conserve, enhance, and sustain them.

CHAPTER EIGHT: IMPACT OF LARGE SCALE AGRICULTURAL INVESTMENT ON THE FOOD SECURITY STATUS OF LOCAL PEOPLE IN GAMBELLA REGION, ETHIOPIA

Abstract

Food insecurity is common in Ethiopia especially in arid and semi-arid lowlands areas such as Gambela. The Ethiopian government has insistently been promoting large-scale agricultural investments (LSAI) in these areas for the purpose of accelerating commercialization process of the smallholders, improving local food security and income, and assisting the transformation process of the economy. However, studies that quantify the actual impact of such investment on the food security status of local people using multiple food security indicators and proper impact evaluation techniques are scant. The main purpose of this study is, thus, to analyse the actual impact of LSAI on the food security status of households in Gambella region. A quasi-experimental research design was employed. Data were collected from 505 households drawn through systematic sampling technique from the affected and non-affected communities. Data were analyzed using the Propensity Score Matching technique. The study finds that the transfer of land to LSAI that claimed vast tracks of the farmland, forest, and grazing land has reduced assets/capitals of the local community and subsequently worsened their food insecurity status. We argue that the developmental state of Ethiopia has failed to govern LSAI and materialize the benefits that it aspires at the local level. We, therefore, suggest that state should not promote LSAI at the expense of local people's livelihood and urge the government to reform the sector in such a way that take the local context into account and embrace local people so that they directly benefit from employment opportunities, infrastructural, and technological transfer.

Key words: Large Scale Agricultural Investment; Food security; Impact; Gambella; Ethiopia; Propensity Score Matching

8.1. Introduction

Following global triple food price (GRAIN, 2008; Deininger *et al.,* 2011; Cotula, 2012), finance (Cotula, 2012), and energy (Olanya, 2012) crises in 2007/08 and their convergence (Borras & Franco, 2012; McCarthy *et al,* 2012), there was a surge in large-scale agricultural investment[53] (LSAI) in Africa where Ethiopia became a hotspot. This phenomenon has raised profound concerns and debates over food security, livelihood, and socio-economic status of the societies where these investments transpire. The proponents of such investment argue that LSAI not only improve capital accumulation and result in increased job creation in the agricultural sector, but it also expands infrastructure, improves local food supply, enhances access to markets, and increases the foreign exchange reserve of the host country (Von Braun & Meinzen-Dick 2009; The World Bank, 2011; Keeley *et al.,* 2014). Opponents of LSAI, in contrast, argue that such investments adversely affect host countries and communities by exploiting and degrading natural environment, ignoring local people's legal rights, eroding indigenous farming practices, and exacerbating food insecurity and conflict (GRAIN, 2008; Andersen & Robertson, 2010; Theting & Brekke, 2010; Dessalegn, 2011).

Ethiopia has adopted an open door policy and welcomed LSAI on the ground that it could help the country to modernize its agricultural sector. The government claims that the country has a huge amount of 'idle' or 'unused' land (in areas such as Gambella) that can be efficiently handled by financially and technologically sound private investors, without impeding the livelihood of local people (Dessalegn, 2011). Consequently, between 1992 and 2013, about 2.2 million hectares of land have been transferred to domestic and foreign private investors (Maru, 2016) making Ethiopia among the top rural land-leasing countries in Africa (Anseeuw *et. al.,* 2012; Cotula, 2012). However, government's assertion that huge 'unused' land exists in the country is challenged by some scholars and activists (Dessalegn, 2011; Oxfam; 2011; The Oakland Institute, 2011), given that land as a natural capital in many cases, provides multiple services for local people.

Even though Ethiopia is claimed to have vast arable land and water resources, poverty remains a leading challenge for people's livelihood (The World Bank, 2016). Inadequate access to food is a defining characteristic of Ethiopian poor. Internationally, the country is recognized as one of the poorest drought and famine-prone country and is one of the 'ten largest international humanitarian assistance recipients in the world' (GHA team, 2018, p.21).

[53] In this study, LSAI is conceptualized as a mechanized commercial agricultural investment on the tract of land exceeding 200 hectares and carried out by either foreign or domestic investor.

The latest UN Office for the Coordination of Humanitarian Affairs (OCHA) estimates indicate that 8.86 million Ethiopians are in need of urgent food or cash relief which requires 1.314 Billion USD (OCHA, 2019) showing that the country is in a severe problem of food insecurity. Numerous and interrelated economic, environmental, political, and social factors (Degefa, 2005) have resulted in severe and ever rising crisis of food insecurity in Ethiopia. Food insecurity in Ethiopia is mainly attributed to poverty (GHA team, 2015), erratic rainfall patterns and the resultant frequent droughts, environmental degradation, land fragmentation, poor soil fertility, rapid population growth, poor farming technologies and extension services, improper cultivation practices, high labor wastage, pre and post harvest crop loss, mismanagement of land resource, illiteracy and poor sanitation, and poor rural social and physical infrastructures and legacies of the past policy constraints (Getachew, 1995; Berhanu, 2001; Degefa, 2005; MoARD, 2007; Bewket, 2009; Getachew *et al.,* 2018) among the others.

Particularly, Gambella region, which is endowed with fertile land and potentially irrigable water resources and hosting the majority of LSAI in the country, oddly, is one of the most food insecure areas (Belay *et al.,* 2015; Azeb, 2017) in the country where food deficit endures for 3–6 months (Maru, 2016). 19%, 24%, and 14% of childer in the region are underweighted, stunted, and wasted, respectively due to nutrition related problems with infant mortality rate of 56% (the highest figure in the country) (Alive & Thrive, 2018). The Ethiopian government has transferred about 683,518 ha of land to domestic and foreign investors in this region. However, whether or not such investment is contributing to the improvement of the food security status of the local community is highly controversial and empirical issue, which this study tries to address.

There are a number of studies on the general trend, size, and implications of LSAI to the local livelihoods (Cotula *et al.,* 2009; Dessalegn, 2011; Maru, 2011; Lavers, 2012a; and Keeley *et. al.,* 2014). Several studies have also addressed governance issues focusing on the legal frameworks, land acquisition processes, power structure, and land tenure (Dessalegn, 2011; Getnet, 2011; Stebek, 2011; Ojulu, 2013; Schoneveld, 2013). Some studies have also analyzed the impact of LSAI on the local community, economy, and environment (Fisseha, 2011; Lavers, 2012b; Baumgartner *et. al.,* 2013; Bereket, 2014; Dye, 2014; Bamlaku *et al.,* 2015; Dereje, 2016; Maru, 2016; Azeb, 2017). These studies can be taken as a leap forward in understanding the overall picture of LSAI in Ethiopia.

However, except few studies (Bamlaku *et al.,* 2015; Maru, 2016), rather than quantifying the actual impact of such investment on the food security of the local people, majority of them have reported the potential impact, risks, and implications of LSAI to the economy and local people's livelihood using qualitative approach. Studies conducted so far did not capture the four dimensions of food security, as well. This study, thus, addresses these conceptual, methodological, and empirical gaps. It contributes to the existing LSAI debate based on the primary data generated via field research on both foreign and domestic investment projects operating in Gambella region since 2008. The study addresses the following research questions: what is the status of food security of affected households in Gambella region? What is the impact of LSAI on the food security status of affected households in Gambella regional state of Ethiopia?

The rest of the article is organized into four parts. Part two describes the theoretical framework that guides the study. Part three discusses the context of the research and methodology. Part four presents the results of the study. Section five winds up the article and provides recommendations.

8.2. Theoretical Framework

To appropriately understand the impact of LSAI on the food security status of the local community, economic theories of investment such as neoclassical (Hill, 2000), dependency (Dos Santos 1970), and the integrative (Sornarajah, 1994) are found to be relevant and used. These theories mainly approach investment from different perspectives, ranging from advocating it as having unconditional benefit to host countries (neoclassical) to opposing it as having nothing rather than destructing the economies (dependency) and recognizing both potential beneficial and detrimental effects on the economies of host countries (integrative). Given their pre-eminence, these theories are found as appropriate for the purpose of guiding this study (Please, see details of these theories in section 2.2 of Chapter Two of this dissertation).

We also employed a developmental state model to guide this study. The developmental state has been a theoretical framework to explain the success and achievement of East Asian economies since the 1960s (Please, see details of this model in section 2.4 of Chapter Two of this dissertation). This study looks at how the developmental state of Ethiopia facilitated a path for LSAI to influence food security status of local community by analyzing empirical data collected from households affected by the investment.

8.3. Materials and Methods

Due to the absence of longitudinal data on the issues under investigation, a cross-sectional research design was used to collect data. Within the general framework of cross section design, a quasi-experimental research design was employed to examine the impact of LASI on the food security status of the households. For the details a quasi-experimental research design, see section 3.4 of Chapter Three of this work. Moreover, a multi-stage sampling method with the mix of probability and non-probability sampling schemes were used to select 505 households, 31 key informants, and 45 focus group discussants. See section 3.5 of this dissertation for the details of sampling procedures and sample size determination. Both quantitative and qualitative data were collected from primary and secondary sources. The qualitative data were transcribed, sorted, and analyzed via content and thematic analysis. The quantitative data were analysed by using a descriptive statistics (percentages, mean, and standard deviation) and Propensity Score Matching. Principal Component Analysis (PCA)[54] method was used to create an overall food security index[55] as suggested by some scholars such as Maxwell *et al*. (2014) (see section 3.5 of this work for the details of methods of data analysis).

The food security status of household's is used as an outcome variable we are interested to measure and notice whether or not it is impacted by the intervention variable (LSAI). In this study, food security is conceptualized as households' persistent access to adequate, safe, and nutritious food necessary for an active and healthy life (WFP, 2015). To properly capture the multi-dimensional nature of food security at household level, we further operationalized it along the four dimensions: availability, access, utilization, economic vulnerability (stability). Diverse indicators were employed to capture multi-dimensional nature of food security. See section 3.7.2 for the details of indicators used to measure four dimensions of food security. To understand the status and prevalence of food security, each indicator was converted to the four -point categorical scale, based on the cut off points proposed by various scholars and institutions (Table 8.1).

[54] Principal Component Analysis (PCA) is one of the widely used statistical based techniques to construct an index. It is a type of factor analysis that often used to reduce dimensions of data, or find out hidden variables, by digging out a linear combination that pre-eminently depicts the co-variance among all components (Joliffe, 2004; Abeyasekara, 2005). For details of the technical discussion and computation, please, see Abdi & Williams (2010).

[55] Food security index is a composite index constructed to capture the four dimensions (availability, access, utilization, and stability) of food security.

Table 8.1: Classification Systems of Food Security Measures.

Indicator	*Category Number*	*Category description*	*Range (Threshold)*
CSI[56]	1	Food secure	0-2
	2	Mildly food insecure	3-12
	3	Moderately food insecure	13-40
	4	Severely food insecure	>40
HFIAS[57]	1	Food secure	Based on algorithm classification process
	2	Mildly food insecure	
	3	Moderately food insecure	
	4	Severely food insecure	
FCS[58]	1	Acceptable	>35
	2	Borderline	21.5-35
	3	Poor	0-21
Food Energy Intake [59]	1	Food secure	>2100
	2	Mildly food insecure	1925.1-2099.9
	3	Moderately food insecure	1750.1-1925
	4	Severely food insecure	0-1750
MAHFP[60]	1	Food secure	12
	2	Mildly food insecure	10-11
	3	Moderately food insecure	8-9
	4	Severely food insecure	<=7
Food expenditure share[61]	1	Food secure	<50
	2	Mildly food insecure	50-65
	3	Moderately food insecure	65-75
	4	Severely food insecure	>75
HDDS[62]	1	Good dietary diversity	>6
	2	Medium dietary diversity	4.5-6
	3	Low dietary diversity	<4.5

8.4. Propensity Score Estimation

In this study, propensity scores (PS) were estimated by using a logistic model where the vector of household characteristics X was regressed on (PS). Covariates included in the propensity model were based on some theoretical reflections that recommend using covariates which are relatively stable over time or evidently exogenous to the treatment (Caliendo & Kopeinig, 2005; Magrini &Vigani, 2014), covariates that are potentially related to the treatment and outcome variables (Imbens 2004; Ho *et al.,* 2007; Austin, 2011) and few previous empirical studies that examined the impact of LSAI on food security status of households in Ethiopia using PSM model (Bamlaku *et al.,* 2015; Maru, 2016). The description of the variables used in PSM model is summarized in Table 8.2.

[56] Maxwell et al., 2014
[57] Coates *et al.,* 2007 and Maxwell *et al.* 2014
[58]World Food Program (2009).Comprehensive Food Security & Vulnerability Analysis Guidelines
[59] FAO 2004; WFP, 2015
[60]Namana & Souli, 2007 and Getachew *et al.,* 2018
[61]World Food Program (2015).Comprehensive Food Security & Vulnerability Analysis Guidelines
[62]IFPRI, Wiesmann *et al.,* 2009

Table 8.2: Variable Description and Measurement.

Variable	Type	Description
Dependent (treatment)LSAI	Dummy	1 if a household is affected by investment , 0 otherwise
Outcome variables		
Food energy intake	Continuous	Daily Kcal per adult equivalent
MAHFP	Continuous	Months of Food Adequacy
HDDS	Continuous	The number of food groups consumed
FCS	Continuous	A composite score
HFIAS	Continuous	HFIAS score
CSI	Continuous	A composite score
Food expenditure share	Continuous	Percentage
Covariates		
Sex of household head	Nominal	1 if the head is male, and 2 if female
Marital status of household head	Nominal	1=single, 2=married, 3=widowed, 4=divorces
Age of household head	Continuous	Years
Education level of household head	Categorical	0=illiterate, 1=read and write, 2=primary, 3=secondary, 4=Certificate after high school complete, 5=diploma and above
Main occupation	Nominal	1 if the head engaged in crop farming or mixed (crop farming and livestock rearing, and 2 all others
Family size	Continuous	Number of family members
Dependency ration	Continuous	Ratio of dependent family members to the productive age groups
Farm land size	Continuous	Size of farm land in hectares
Livestock ownership in (TLU)[63]	Continuous	Tropical Livestock Unit
Distance to potable water points	Continuous	Walking distance in minutes from home
Distance to all weather road	Continuous	Walking distance in minutes from home
Distance to health centre	Continuous	Walking distance in minutes from home
Distance to school	Continuous	Walking distance in minutes from home
Distance to market	Continuous	Walking distance in minutes from home
Livelihood index	Continuous	An index
Access to credit	Dummy	1 if a household has access , 0 otherwise
Radio as a source of information	Dummy	1 if a household use radio , 0 otherwise
Family as a source of information	Dummy	1 if a household use family , 0 otherwise
Kebele administration as a source of info	Dummy	1 if a household use *Kebele* admn. , 0 otherwise
DA[64] as a source of information	Dummy	1 if a household use DA , 0 otherwise
Improved seed or livestock breeds	Dummy	1 if a household use improved seed or breeds , 0 otherwise

After estimating a propensity score, we checked whether or not the estimation is correct by using a Hosmer-Lemeshow test - goodness of fit (GOF) test for logistic regression (Hosmer & Lemeshow, 1980). The result shows that the logistic regression model fits our data well (p=0.6317 for Anuak community and p=0.7431 for Nuer community) suggesting that the model does not have a problem of wrong functional form for the confounders (annex XVI).

[63]Conversion factors proposed by Storck *et al* (1991) to calculate Tropical Livestock Unit (TLU) in Ethiopian context was used to standardize the measurement of livestock. TLU is computed as (1 * the number of cow) + (1 * the number of ox) + (0.75 * the number of heifer) + (0.75 * the number of bull) + (0.2 * the number of calf) + (0.13 * the number of sheep) + (0.13 * the number of goat) + (0.013 * the number of Poultry), other animals (such as camel, horse, and donkey) that are not found in the study are excluded from the calculation.

[64]Development Agents (DAs) are government employees who are trained in agriculture colleges for at least 2 years in various areas of agriculture and rural development such as crop production, animal health, and natural resources management for the purpose of providing agricultural extension services for farmers.

Once we completed the estimation of a propensity score for each household, we defined the region of common support to ensure that there is an adequate overlap in the range of propensity scores for treatment and comparison groups. The min and max value of the region of common support for Anuak community was [0.09621399 and 0.99456845] while it was [0.03806964 and 0.9450837] for Nuer community. We assessed the validity of common support assumption by examining a graph of the propensity score for treated and comparison groups (annex XVII). The graph confirms the existence of a sufficient overlap in the distribution of the propensity scores across treatment and comparison groups suggesting that the fulfillment of the identification assumption of the common support.

Following evaluation of the overlap, we carried out balancing tests to check whether or not, within each quintiles of the propensity score distribution, the average propensity score and mean of covariates have a similar distribution (balance) across the treated and comparison groups. The Two-sample t-test result shows that the mean propensity score is not different for treated and comparison groups in each of the five-block. Five blocks ensure that the mean propensity score is not different for treated and comparison groups in each block (annex XVIII). After ensuring that the propensity score is balanced within each block across the treatment and comparison groups, we checked whether or not individual covariates are balanced across both groups within blocks of the propensity score. The result of the test of balancing property of the propensity score shows all covariates are balanced in each block for both communities (p-value is greater than 0.01) but the distance to all-weather road in Block 2 (with p value equal to 0.0015) for Anuak community (see annex XVIII). Generally, the result illustrates a strong confirmation that after getting the balance of propensity scores within each stratum, the covariates attain overlap in terms of distribution.

After completing the task of creating a balanced propensity score, the next key issue that we addressed before the estimation of the treatment effect, is selecting a proper matching strategy that could enable us to compare treatment and comparison groups based on the propensity score. And hence, we employed the most frequently used ones such as nearest neighbour (NN), caliper (or radius), kernel, and stratification matching strategies to estimate the impact of the investment on the food security status of households in the affected kebeles (see annex VII for details). Double checking the quality of the covariates balances using several techniques provides robust evidence for proper specification of the propensity scores (Becker & Ichino, 2002). The result of the covariate balancing test before and after matching is indcated in annex XIX. The two-sample t-test result shows that after matching all

covariates mean differences are insignificant suggesting that the covariates are balanced. Moreover, the average standardized bias difference for all covariates was reduced from 21.5 before matching to 6.5 after matching for Anauk and from 19.3 to 6.6 for Nuer. Significant percent bias reduction (*PBR*) after matching (for the majority of the covariates) was also achieved (annex XIX). Likewise, the Pseudo- R^2 was notably dropped from 0.279 before matching to as low as 0.028 for Anauk and from 0.231 to 0.037. When we inspect the p-values of the likelihood tests, it shows that the joint significance test of covariates is not rejected before matching ($p<0.01$) but it could be rejected after matching ($p>0.05$) (annex XIX). All of the tests suggest that the specification of the propensity score is effective in balancing the distribution of covariates between the affected and non-affected households.

Sensitivity analysis was also carried out by using 'Rosenbaum bounds approach' to assess the potential impact of unobserved confounders on the treatment effect. When we see the Rosenbaum bound sensitivity analysis of our result, it showed that the impact of LSAI on the food security status of affected households is not sensitive to hidden bias (unobserved characteristics that could bias the estimated impact) ($p<0.001$). Even when we increased the value of gamma from 1.0 to 2.0, the conclusion does not change across all outcome variables and all matching strategies used in the PSM model showing that the result is insensitivity to hidden bias (is robust) for both Anauk and Nuer (annex XX).

8.5. Results and Discussion

8.5.1. Descriptive Analysis

Gambella Regional State is one of a few regions of Ethiopia that is blessed with natural forests, woodlands, wetlands, extensive savanna grassland and various rivers (Maru, 2016). Areas such as Abobo-Gog, Mesengo, and Godere are estimated to have 540,000 ha of forests (Behailu *et al.,* 2011) which become a range of food sources, such as wild fruits and game meat, for the community of the region. However, these areas of the region are known for their food insecurity where food deficit endures for about 3–6 months in the region (Maru, 2016). As can be seen from the Table 8.3, the results of this study showed that the proportion of non-affected food insecure Aunak households ranged from 53 to 65% and that of affected households was between 53.5% and 76%. Likewise, 33.3 - 70% of non-affected Nuer households and 30 – 74% of affected households were food insecure. This shows that food insecurity is extensive in Gambella region albeit it is slightly higher amongst the affected community than non-affected ones. It also demonstrates that food insecurity among the Anuak is more severe than those among Nuer, almost in all of the indicators used to measure

food security (Table 8.3). We used multiple indicators to capture the multi-dimensional nature of food security and assess the effect of LSAI on these multiple dimensions.

When we disaggregate the magnitude of food insecurity based on the various indicators used to measure different dimensions of food security, somewhat similar picture can be observed. Using average daily calorie consumption, for example, 56% and 61% of affected and non-affected Anuak households were food insecure, respectively (Table 8.3). The Anuak who are affected by the LSAI, on average, consumed food items that provided 1932.86 Kcal per adult equivalent per day which is slightly below the daily caloric intake recommended (2,100 Kcal) for an individual by 8.6%. For non-affected households, it was 2119.84 Kcal per adult equivalent per day, which is a bit higher than the daily caloric intake recommended (2,100 Kcal) for an individual by 0.94% (Table 8.4).

Table 8.3: Food Security Status of the Studied Households by Community and the two Categories.

Community	Indicator	Food Security Status											
		Affected households Anauk (n=157) Nuer (n=70)						Non-affected households Anauk (n=185) Nuer (n=84)					
		Food secure		Food insecure		Total		Food secure		Food insecure		Total	
		f	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*
Anauk	FEI	69	44	88	56	157	100	72	39	113	61	185	100
	MAHFP	55	35	102	65	157	100	83	44.9	102	55.1	185	100
	HDDS	57	36.3	100	63.7	157	100	79	42.7	106	57.3	185	100
	FCS	71	45.2	86	54.8	157	100	104	56.2	81	43.8	185	100
	HFIAS	37	23.6	120	76.4	157	100	64	34.6	121	65.4	185	100
	CSI	38	24.2	119	75.8	157	100	73	39.5	112	60.5	185	100
	Food Exp.	50	31.9	107	68.1	157	100	90	48.6	95	51.4	185	100
Nuer	FEI	47	67.1	23	32.9	70	100	56	66.7	28	33.3	84	100
	MAHFP	28	40	42	60	70	100	50	59.5	34	40.5	84	100
	HDDS	41	58.6	29	41.4	70	100	50	59.5	34	40.5	84	100
	FCS	49	70	21	30	70	100	56	66.7	28	33.3	84	100
	HFIAS	18	25.7	52	74.3	70	100	27	32.1	57	67.9	84	100
	CSI	18	25.7	52	74.3	70	100	25	29.8	59	70.2	84	100
	Food Exp.	29	41.4	41	58.6	70	100	44	52.4	40	47.6	84	100

Source: Own survey data, 2018

In general, the Anuak who are affected by the LSAI consumed 9.7% fewer calories than the non-affected ones. For the Nuer, both affected and non-affected households, on average, consumed food items that provided 2916.74 and 2940.76 Kcal per adult equivalent per day, respectively, which is higher than the daily caloric intake recommended (2,100 Kcal) for an individual (Table 8.4). The result revealed that 32.9% of affected and 33.3% of non-affected Nuer households were food insecure implying that food insecurity is higher amongst the Anuak community. However, the mean difference in Kcal per adult equivalent per day between affected and non-affected households in both communities is not statistically significant (Table 8.4).

Using MAHFP indicator, the result shows that 65% of Anuak affected households and 55.1% non-affected ones were food insecure. Similarly, 60% of affected and 40.5% of the non-affected Nuer community were food insecure (Table 8.3). On average, the Anuak affected households were able to provide adequate food for their family for 8.8 months while non-affected households provided it for 9.4 months, which is 6.82% months lesser. For the Nuer community, on average, affected households were able to provide enough food to their family for 9.3 months while the non-affected ones provided it for 10 months (Table 8.4). The mean month of food adequacy for affected Nuer is 7.5% lower than that of non-affected ones. The mean difference in MAHFP between affected and non-affected households of both communities is statistically significant (at $p<0.01$) (Table 8.4). The result indicates that food insecurity is higher among affected households in both communities.

Table 8.4: Summary Statistics for Outcome Variables.

Community	Variable	Statistics								t-test
		Exposed HH Anuak (n=157) Nuer (n=70)				Unexposed HH Anauk (n=185) Nuer (n=84)				
		Mean	SD	Min	Max	Mean	SD	Min	Max	
Anuak	FEI	1932.86	1004.95	242.76	4978.85	2119.84	1350.61	243.54	15049.7	-1.4307
	MAHFP	8.80	1.88	5	12	9.4	1.38	6	12	-3.3864***
	HDDS	4.1	1.71	1	9	4.65	2.00	1	11	- 2.7825***
	FCS	33.1	12.13	6	57	36.9	14.6	8	84	-2.5670**
	HFIAS	9.40	6.89	0	21	8.72	7.75	0	26	0.8464
	CSI	30.9	23.1	0	156.5	24.7	24.1	0	125	2.4052**
	Food exp.	0.71	.222	0	1	.62	.273	0	1	-3.3974***
Nuer	FEI	2916.74	2102.46	649.3	13332.4	2940.76	1921.75	665.7	9518.2	-0.0740
	MAHFP	9.23	1.84	5	12	10.0	1.61	6	12	-2.7693***
	HDDS	5.16	2.35	0.75	11	5.41	2.56	0.75	11	-0.6221
	FCS	47.08	19.77	6	91.5	48.87	21.39	14	84.5	-0.5336
	HFIAS	12.29	8.06	0	24	10.18	8.04	0	25	1.6475*
	CSI	33.66	27.02	0	106	25.27	20.75	0	94	2.1767**
	Food exp.	0.69	.218	.179	1	0.62	.188	.226	.947	-2.0150**

*$p< 0.10$, **$p< 0.05$, ***$p< 0.01$

Source: Own survey data, 2018

HDDS and FCS were used to measure food utilization dimension of food security. Accordingly, HDDS shows that 63.7% of affected and 57.3% of non-affected Anauk and 41.4% and 40.5% of Nuers were food insecure, respectively (Table 8.3). The affected Anauk, on average, consumed 4.1varieties of food groups while the non-affected consumed about 4.65. On the other hand, the affected Nuer, on average, consumed 5.2 varieties of food groups whereas the non-affected ones consumed 5.4 (Table 8.4). FCS indicator also showed that 54.8% of affected and 43.8% of non-affected Anauk and 30% and 33.3% of affected and non-affected Nuer were food insecure, in that order (Table 8.3). The mean differences between affected and non-affected households in HDDS and FCS is statistically significant at $p<0.01$and $p<0.05$ for Anauk, respectively but not significant for Nuer community (Table

8.4) showing that the magnitude of food insecurity is higher among the affected Anauk households.

Access dimension of food security was measured using HFIAS. The HFIAS result shows the highest food insecurity incidences in both affected and non-affected communities. For example, 76.4% of affected and 65.4% of non-affected Anauk and 74.3% and 67.9% of affected and non-affected Nuer were food insecure (Table 8.3). However, the magnitude of food insecurity amongst affected Anauk and Nuer was higher by 11% and 6.4% than the magnitude of food insecurity amongst the non-affected ones, respectively. The average HFIAS scores for affected and non-affected Anauk were 9.4 and 8.7 and were 12.3 and 10.2 for Nuer ones confirming that the affected households are more food insecure than non-affected ones (the higher the HFIAS score the more a household is food insecure) (Table 8.4). However, the mean difference in HFIAS score for Anauk is not statistically significant whereas it is significant for Nuer (at p-value <10%) (Table 8.4).

Based on CSI indicator, 75.8% of affected and 60.5% of non-affected Anauk and 74.3% and 70.2% of Nuer were food insecure, in that order (Table 8.3). The magnitude of food insecurity is higher amongst the affected Anauk and Nuer by 15.3% and 4.2%, respectively. The average CSI score among the affected and non-affected Anauk was 30.9 and 24.7 and was 33.7 and 25.3 amongst the Nuer (Table 8.4). The higher the value of CSI is the more food insecure the household is. The mean difference in CSI score is statistically significant (at $p < 0.05$) for both community indicating that affected households used more severe coping strategies (more vulnerable to food insecurity) than non-affected ones (Table 8.4).

Using food expenditure share indicator, 68.1% and 51.4% of affected and non-affected Anauk were food insecure whereas 58.6% and 47.6 of affected and non-affected Nuer were food insecure, in that order (Table 8.3). Even if the spending on food is high in both treated and comparison groups, on average affected Anuak spent 71% of their income on food whereas the non-affected ones spent 62%. Similarly, the average food expenditure share of affected Nuer was 69% while that of non-affected was 62%.The difference in mean food expenditure share of affected and non-affected households is statistically significant (at $p<0.01$ for Anauk and $p<0.05$ for Nuer) indicating that affected households spent more money on food than non-affected households (Table 8.4). Food expenditure share of affected Anauk and Nuer is higher than that of non-affected ones by 12.7% and 10.1%, respectively implying that affected households are more economically vulnerable to food insecurity.

Research shows that the poor or more food insecure households spent the lion share of their money on food items (WFP, 2015; 2017).

8.5.2. Impact Estimation

Simple comparisons of mean differences of affected and non-affected households could not explain the effect of other characteristics of households that may confound the impact of LSAI on food security status. In other words, numerous factors could contribute to the status of food security in the affected and non-affected households which cannot exclusively be attributed to LSAI− Hence, for a more meticulous and actual impact estimation of LSAI on the food security, we applied a Propensity Score Matching model. The average treatment effect on the treated (ATT)- the average difference between food security status of affected (treated) and non-affected (comparison) - due to LSAI intervention was estimated by using the nearest neighborhood (NN), radius, kernel, and stratification (SS) matching strategies for both the Anuak and Nuer communities. The results are presented in Table 8.5 and 8.7.

8.5.2.1. Impact on Food Availability

Using a combination of various matching algorithms is proved to be acceptable in reaching at a consistent conclusion on the relative effect of an intervention such as LSAI on the outcome variables (Backer & Ichino, 2002). Employing the combination of four matching strategies, the impact of LSAI on the affected Anauk households ranged from 33.3 to 124.5 in terms of reducing the Kcal per adult equivalent per day. LSAI, on average, decreased average daily calorie consumption of affected Anauk households by 121.33 Kcal per adult equivalent per day for NN, 124.52 for radius, 33.3 for the kernel, and 73.22 for SS matching (Table 8.5). In other words, due to LSAI the Anuak who are affected by the investment, on average, consumed 33.3 – 124.5 less Kcal per adult equivalent per day than those households who are not affected by it though the result is not statistically significant. This shows that LSAI does not have statistically significant impact on household's daily calorie consumption. In our field work, we observed that the farming system that both affected and non-affected Anauk have been practicing is similar and is extremely subsistence that could not make significant differences in daily energy consumption. The difference in mean of total yearly production of the treated and comparison group was tested using Two-sample t-test. The result shows that there is no statistically significant difference between the average production of the two groups (p=0.2514).

Applying a combination of diverse matching algorithms, in terms of the Kcal per adult equivalent per day, the LSAI had resulted in a reduction that is ranged from 82.2 to 110 for

affected Nuer households. LSAI, on average, decreased average daily calorie consumption of affected Nuer by 109.1 Kcal per adult equivalent per day for NN, 98.1 for radius, 82.2 for kernel, and 110 for SS matching (Table 8.7). Generally, due to LSAI, the Nuer who are affected by the investment, on average, consumed 82.2 – 110 less Kcal per adult equivalent per day than those households who are not affected by it. However, the differences in average daily calorie consumption between affected and non-affected groups are not statistically significant.

The impact of LSAI on affected Anauk households ranged from 0.57 to 0.9 in terms of reducing MAHFP. LSAI, on average, reduced MAHFP by 0.632 months for NN, 0.57 for radius, 0.9 for kernel, and 0.912 months for SS matching (Table 8.5). The result indicates that LSAI had a statistically significant negative impact on MAHFP at either $p < 0.05$ or 0.01. In general, on average, LSAI increased months of food shortage of the affected Anauk by 0.57 to 0.9 months more than those who are non-affected by the investment, implying that LSAI has intensified food shortage problem of the community. When the estimated impact of LSAI on MAHFP is accounted for the affected households, 29.3% of them become food insecure due to the intervention (Table 8.6). The status of food insecurity of the affected Anauk households would have been 35.7% if they had not experienced such event, indicating that food insecurity has increased to the present 65% (Table 8.6) due to the loss of access to land and important forest resources that would otherwise serve as a vital source of consumption smoothening strategy throughout the months of food shortage.

Based on the MAHFP indicator, the impact of LSAI on affected Nuer households ranged from 1.15 – 1.4 cutbacks of months of food adequacy. LSAI, on average, reduced MAHFP by 1.33 months for NN, 1.15 for radius, 1.3 for kernel, and 1.4 months for SS matching (Table 8.7). The result also indicates that LSAI had a statistically significant negative impact on MAHFP at either $p < 0.05$ or $p<0.01$. In general, on average, LSAI decreased months of food adequacy of the affected Nuer by 1.15 to 1.4 months than those who are non-affected by the investment, implying that LSAI has intensified food shortage problem of the Nuer. Based on this indicator, 32.9% of the affected Nuer became food insecure due to the investment ((Table 8.8).

Table 8.5: Impacts of LSAI on the Food Security Status of Anauk Community.

FS indicator	Matching Method[a]	Matched Sample		Impact (ATT)	Standard error[b]	t-value
		Affected	Unaffected			
Food Energy Intake	NN	155	60	-121.33	177.99	-0.682
	Radius	114	138	-124.52	192.48	-0.647
	Kernel	155	148	-33.25	136.35	-0.244
	SS	155	148	-73.22	128.63	-0.569
MAHFP	NN	155	60	-0.632**	0.290	-2.182
	Radius	114	138	-0.570**	0.257	-2.219
	Kernel	155	148	-0.899***	0.232	-3.873
	SS	155	148	-0.912***	0.265	-3.438
HDDS	NN	155	60	-0.368	0.398	-0.925
	Radius	114	138	-0.743**	0.347	-2.139
	Kernel	155	148	-0.652*	0.367	-1.774
	SS	155	148	-0.752*	0.398	-1.888
FCS	NN	155	60	-0.744	2.647	-0.281
	Radius	114	138	-4.689**	2.232	-2.101
	Kernel	155	148	-4.939***	1.868	-2.644
	SS	155	148	-5.368**	2.170	-2.474
HFIAS	NN	155	60	0.697	1.254	0.556
	Radius	114	138	0.683	1.167	0.585
	Kernel	155	148	1.735	1.125	1.543
	SS	155	148	2.135**	1.047	2.038
CSI	NN	155	60	6.345*	3.603	1.761
	Radius	114	138	7.803**	3.794	2.057
	Kernel	155	148	10.42***	2.718	3.833
	SS	155	148	10.90***	2.943	3.703
Food Share Expenditure	NN	155	60	0.0286	0.055	0.520
	Radius	114	138	0.106***	0.041	2.621
	Kernel	155	148	0.111***	0.040	2.771
	SS	155	148	0.113**	0.046	2.423
Overall Impact (FS index)[C]	NN	155	60	-0.044	0.030	-1.479
	Radius	114	138	-0.070***	0.024	-2.901
	Kernel	155	148	-0.088***	0.026	-3.330
	SS	155	148	-0.096***	0.029	-3.363

*p< 0.10, **p< 0.05, ***p< 0.01; [a]Radius matching was carried out with a caliper of (0.01); [b]Bootstrapstandard error was computed based on 100 replications; [C]Food security index is created via Principal Component Analysis (PCA)

Sources: Own survey data, 2018

The status of food insecurity of the affected Nuer households would have been 27.1% if they had not exposed to such event, revealing that food insecurity has intensified to the present 60% (Table 8.8).

Table 8.6: Impact Attribution (the Anauk).

Indicator	Current FS level				Counterfactual FS level				Differences
	Food secure		Food insecure		Food secure		Food insecure		
	f	%	f	%	F	%	f	%	
MAHFP	55	35	102	65	101	64.3	56	35.7	29.3
HDDS	57	36.3	100	63.7	91	58	66	42	21.7
FCS	71	45.2	86	54.8	100	63.7	57	36.3	18.5
HFIAS	37	23.6	120	76.4	72	45.9	85	54.1	22.3
CSI	38	24.2	119	75.8	65	41.4	92	58.6	17.2
Food exp.	50	31.9	107	68.1	82	52.2	75	47.8	20.3

Source: Own survey, 2018

Livestock rearing is the main livelihood (a key source of food and income) for the Nuer community. The expansion of LSAI in the area evidently has decreased grazing and farming land used for livestock rearing and dry and wet seasons farming. Particularly, during the dry

season, the Nuer faces a serious scarcity of forage for their cattle which is further exacerbated by LSAI that took their grazing land and blocked free seasonal movements (KII, 2018).

8.5.2.2. Impact on Food Utilization

In terms of HDDS, the impact of LSAI on affected Anauk households ranged from 0.37 - 0.75 reduction in the number of food groups. LSAI, on average, reduced the number of food groups consumed by affected Anauk by 0.37 for NN, 0.743 for radius, 0.652 for kernel, and 0.752 for SS matching (Table 8.5). On average, the affected Anauk consumed 0.37 - 0.75 number of food groups lower than those non-affected ones, which is statistically significant at either $p<0.05$ or $p<0.10$ implying that LSAI had reduced food diversity of the affected households.When we accounted for the estimated impact of LSAI on HDDS, the result shows that 21.7% of affected Anauk households become food insecure due to the intervention. In other words, the level of food insecurity would have been 42% without LSAI showing that the magnitude of food insecurity has exacerbated to the current 63.7% (Table 8.6).

Likewise, the impact of the investment on the FCS of affected Anauk ranged from 0.744 to 5.37 reductions in values of the score. The difference in FCS between affected and non-affected households due to the investment, on average, was 0.744, 4.69, 4.94, and 5.37 for NN, radius, Kernel, and SS matching, respectively. The result shows that affected Anauk have lower FCS by a score of 0.7-5.37 than their counterpart non-affected ones, which is statistically significant at either $p<0.05$ or $p<0.01$ (Table 8.5). When the impact of LSAI is attributed, the result shows that 18.5% of affected Anauk households become food insecure due to intervention. That is, the magnitude of food insecurity would have been 36.3% without LSAI, showing that the magnitude of food insecurity has worsened to the current 54.8% (Table 8.6). The livelihoods of the Anauk community are highly dependent on the forest which becomes a source of diverse food but destroyed by the investment. For example, Maru (2016) found that (which is also confirmed by this study based on the key informant interview with women and local agricultural experts) the Anauk collects diverse fruits, seeds, and roots such as shea tree (called *Wudo* in Anauk) whose fruit and seeds are often consumed; date tree (also called *Wulemo* in Anauk), the yam, pumpkin, and fruit called *Aulemo* in Anauk from the forest to enhance their food consumption.

Based on the HDDS indicator, the impact of LSAI on affected Nuer households ranged from 0.4 - 0.7 reduction in the number of food groups. On average, LSAI reduced the number of food groups consumed by affected Nuer by 0.711 for NN, 0.4 for radius, 0.7 for kernel, and 0.6 for SS matching (Table 8.7). On average, the affected Nuer consumed 0.4 - 0.7 less

number of food groups than those non-affected ones though the result is not statistically significant. Likewise, the impact of the investment on the FCS of affected Nuer ranged from 5.2 to 6.5 reductions in values of the score. The difference in FCS between affected and non-affected Nuer households due to the investment, on average, was 6.5, 5.2, 5.3, and 6.2 for NN, radius, Kernel, and SS matching, respectively. The result shows that treated Nuer have lower FCS than their counterpart comparison group. However, these differences in FCS between the two groups are not statistically significant. This insignificant impact is mainly due to the less dependent of the Nuer on the forest resources as a source of food that could enhance their food diversity. Moreover, the research found that the expansion of LSAI in the area did not have impact on the milk productivity of the Nuer (Maru, 2016) which has a far-reaching nutritional value in the food system of the community. Though the results of HDDS and FCS are not statistically significant, using these indicators, 20% and 17.1% of the affected Nuer became food insecure due to the LSAI (Table 8.8).

8.5.2.3. Impact on Food Access

The impact of LSAI on the affected Anauk households ranged from 0.69 – 2.1 in terms of increasing HFIAS scores. The investment, on average, increased the HFIAS score of affected Anauk by 0.697, 0.683, 1.74, and 2.14 using NN, radius, Kernel, and SS matching, in that order. The HFIAS score of affected Anauk was on average higher by 0.69 – 2.1 points than non-affected households, which is statistically significant at $p<0.05$ (only for SS matching) (Table 8.5). The result indicates that affected Anauk have higher HFIAS score than their comparison (non-affected) group suggesting that the investment has reduced food access of the Anauk community. This means that affected households have higher anxiety regarding not being able to acquire adequate food, lower capacity to obtain sufficient quality food, and higher experience of an inadequate quantity of food ingestion than those non-affected ones. In general, when the estimated impact of LSAI on the affected Anauk household's HFIAS score is accounted for, 22.3% the affected households become food insecure after the intervention. That is, the status of food insecurity of the affected Anauk households would have been 54.1% if they had not experienced the intervention, indicating that food insecurity has deteriorated to the present 76.4% (Table 8.6).

The impact of LSAI on the affected Nuer households ranged from 1.6 – 3.8 in terms of increasing HFIAS scores. The investment, on average, increased the HFIAS score of affected by 2.5, 1.6, 3.6, and 3.8 using NN, radius, Kernel, and SS matching, in that order. The HFIAS score of affected Nuer was on average higher by 1.6 – 3.8 points than non-affected

households, which is statistically significant at $p<0.05$ for SS and $p<0.10$ for Kernel matching (Table 8.7). The result indicates that affected Nuer have higher HFIAS score than their comparison (non-affected) group suggesting that the investment has reduced food access of the Nuer community. Based on the HFIAS indicator, 40% of the affected households became food insecure due to the intervention. The status of food insecurity of the affected Nuer households would have been 34.3% if they had not exposed to such events indicating that food insecurity has increased to the present 74.3% (Table 8.8). This means that affected Nuer have higher anxiety about not being able to acquire adequate food, lower capacity to obtain sufficient quality food, and higher experience of an inadequate quantity of food intake than those non-affected ones.

8.5.2.4. Impact on Economic Vulnerability

The impact of LSAI on CSI ranged from 6.3 to 10.9 in terms of increasing the coping strategies adopted by the affected Anauk during food shortage event. The results indicate that LSAI, on average, increased the weighted values of coping strategies by 6.35 for NN, 7.8 for radius, 10.4 for kernel, and 10.9 for SS matching (Table 8.5). On average, the affected Anauk adopted coping strategies with weighted mean values 6.3 – 10.9 higher than those who are not affected by the investment, which is statistically significant at either $p<0.01$ or 0.05 or 0.1. On the whole, the frequency and severity level of the coping strategies is high among affected Anauk. The result suggests that the investment had augmented the magnitude of food insecurity of the affected Anauk as shown by higher CSI than their non-affected comparison group. Based on this indicator, 17.2% of affected Anauk fell into food insecurity due to LSAI, that is, the status of food insecurity of the affected Anauk would have been 58.6% if they had not affected by such event, indicating that food insecurity has increased to the present 75.8% (Table 8.6).

The impact of LSAI on CSI ranged from 7.8 to 12.7 in terms of increasing the coping strategies adapted by affected Nuer during food shortage period. The results indicate that LSAI, on average, increased the weighted values of coping strategies by 7.8 for NN, 12.7 for radius, 8.7 for kernel, and 9.5 for SS matching. On average, the affected Nuer adopted coping strategies with weighted mean higher values (7.8 - 12.7) than those who are not affected by the investment, which is statistically significant at $p<0.1$ (Table 8.7). On the whole, the frequency and severity level of the coping strategies is high among affected Nuer.

Table 8.7: Impact of LSAI on the Food Security Status of Nuer Community.

FS indicator	Matching Method[a]	Matched Sample		Impact (ATT)	Standard error[b]	t-value
		Affected	Unaffected			
Food Energy Intake (Kcal)	NN	70	26	-109.1	596.2	-0.183
	Radius	38	40	-98.06	524.2	-0.187
	Kernel	70	77	-82.17	447.4	-0.184
	SS	70	77	-110.0	440.1	-0.250
Months of Food Adequacy	NN	70	26	-1.329**	0.548	-2.423
	Radius	38	40	-1.147**	0.553	-2.076
	Kernel	70	77	-1.253***	0.433	-2.895
	SS	70	77	-1.364***	0.398	-3.426
HDDS	NN	70	26	-0.711	0.752	-0.944
	Radius	38	40	-0.382	0.657	-0.582
	Kernel	70	77	-0.679	0.550	-1.233
	SS	70	77	-0.594	0.545	-1.091
FCS	NN	70	26	-6.513	4.755	-1.370
	Radius	38	40	-5.187	6.589	-0.787
	Kernel	70	77	-5.302	4.156	-1.276
	SS	70	77	-6.162	4.227	-1.458
HFIAS	NN	70	26	2.471	2.047	1.207
	Radius	38	40	1.590	2.574	0.618
	Kernel	70	77	3.588*	1.835	1.955
	SS	70	77	3.774**	1.899	1.987
CSI	NN	70	26	7.779	5.772	1.348
	Radius	38	40	12.72*	6.817	1.867
	Kernel	70	77	8.661*	4.851	1.785
	SS	70	77	9.470*	5.736	1.651
Food Expenditure share	NN	70	26	0.163***	0.052	3.118
	Radius	38	40	0.100*	0.055	1.829
	Kernel	70	77	0.141***	0.046	3.067
	SS	70	77	0.157***	0.043	3.688
Overall Impact (FS index)[C]	NN	70	26	-0.131**	0.060	-2.174
	Radius	38	40	-0.108	0.071	-1.529
	Kernel	70	77	-0.129**	0.061	-2.210
	SS	70	77	-0.139***	0.049	-2.811

*p< 0.10, **p< 0.05, ***p< 0.01; [a]Radius matching was carried out with a caliper of (0.01); [b]Bootstrapstandard error was computed based on 100 replications; [C]Food security index is created via Principal Component Analysis (PCA)
Sources: Own survey data, 2018

The result suggests that the investment had augmented the magnitude of food insecurity of the affected Nuer as shown by higher CSI than their non-affected comparison group. Further analysis of the data shows that 17.2% of the affected household become food insecure due to the intervention. To be precise, the level of food insecurity of the affected Nuer households would have been 57.1% if they had not experienced such event, indicating that food insecurity has worsened to the present 74.3% (Table 8.8).

As far as food expenditure share is concerned, the impact of the investment on the affected Anauk ranged from 3% to 11.3% rise in household's food expenditure share. On average, LSAI increased food expenditure share of the affected households by 3% for NN, 10.6% for radius, 11.1% for kernel, and 11.3% for SS matching (Table 8.5).

Table 8.8: Impact with and without Investment (Nuer).

Indicator	Current FS level				Counterfactual FS level				Differences
	Food secure		Food insecure		Food secure		Food insecure		
	f	%	F	%	F	%	f	%	
MAHFP	28	40	42	60	51	72.9	19	27.1	32.9
HDDS	41	58.6	29	41.4	56	80	14	20	21.4
FCS	49	70	21	30	58	82.9	12	17.1	12.9
HFIAS	18	25.7	52	74.3	46	65.7	24	34.3	40
CSI	18	25.7	52	74.3	30	42.9	40	57.1	17.2
Food exp.	29	41.4	41	58.6	43	61.4	27	38.6	20

Source: Own survey, 2018

On average, affected Anuak spent more money on food (3% -11.3%) than non-affected ones, which is statistically significant at either $p<0.01$ or $p<0.05$. The impact of LSAI on food expenditure share shows that 20.3% of affected Anauk become food insecure after the intervention explaining that the investment has aggravated economic vulnerability of the Anauk. Explicitly, the magnitude of food insecurity would have been 47.8% without the intervention, showing that the scale of food insecurity has intensified to the current 68.1% (Table 8.6). When LSAI results in the loss of farm and forest land for local communities, it can have shocking effects on the targeted society, both by potentially decreasing the actual food supply and access and their livelihoods (FIAN, 2010a; Sen, 1990).

Based on the food expenditure share indicator, the impact of the investment on the affected Nuer ranged from 10 to 16.3% rise in household's food spending share. On average, LSAI increased food expenditure share of the affected households by 16.3% for NN, 10% for radius, 14.1% for kernel, and 15.7% for SS matching. On average, affected Nuer spent more money (10 – 16.3%) on food than those non-affected ones, which is statistically significant at either $p<0.01$ or $p<0.1$ (Table 8.7). In the case of this indicator, 20% of the affected household became food insecure due to LSAI. This means that the magnitude of food insecurity of the affected Nuer households would have been 38.6% if they had not experienced such events, indicating that food insecurity has enlarged to the present 58.6% and so worsened their economic vulnerability (Table 8.8).

8.5.2.5. Impact on Overall Food Secuity Status

Besides examining the impact of LSAI on various dimensions of food security via multiple indicators indicated above, we created a multi-dimensional food security index based upon these indicators through PCA. We employ principal component analysis (PCA) to construct a food security index wherein weights are objectively derived from the dataset. The result shows that the overall impact of LSAI on the food security status of the affected Anuak ranged from 4.4% to 9.7% in terms of reduction in food security. The results point out that,

on average, LSAI decreased food security status of affected Anuak by 4.4% for NN, 6.98% for radius, 8.8% for kernel, and 9.7% for SS matching (Table 8.5). This reveals that, on average, the food security status of affected Anauk is lower by 4.4 – 9.7% of those who are not affected by the investment, which is statistically significant at $p<0.01$. Similarly, LSAI has resulted in the reduction of food security status of the Nuer that ranged from 10.8% to 13.9%. The result shows that food security status of the affected Nuer is declined by 13.1% for NN, 10.8% for radius, 12.9% for Kernel, and 13.9% for SS matching strategies, which is statistically significant at either $p<0.05$ or $p< 0.01$ (Table 8.7). The decline in food security index of the both communities implies that LSAI significantly reduced food security status of the local community.

One of the reasons why LSAI has not translated into improved food security could be the low level of implementation of the projects. For example, in Gambella regional state, only 9.7% of projects are operational and developed the acquired amount of land (OPM, 2017). Majority of them cleared forest and grazing land for the purpose of getting a loan from the banks and disappeared after they attained their personal interest. A study conducted by OPM indicated that in Gambella region alone, more than 200 investors received 4.96 Billion Ethiopian Birr from Banks for various purposes but their actual performance is found as low as 9.7% (OPM, 2017). The other reason is related to employment creation that could improve income of the local people and hence enhance their access to food. The data show that investment projects have created very low jobs for the indigenous people (for instance, of the total jobs created in the region, the proportion of the indigenous local community is only 10.1%) (OPM, 2017; GRSIA, 2018). Moreover, the wage rates are very low (on average 30-35 Ethiopian Birr for an unskilled labourer) that could not enable the local people to meet the food need and contribute to improvement of their wellbeing. Furthermore, those investors who produce food crops sell their produce outside the local market (Maru, 2016) while the majority of them produce non-food agricultural commodities such as sesame and cotton. Besides, there is no provision in the contract agreement signed between the government and the investors that influence investors to adopt a business model that could integrate local people into LSAI value chain and benefit them.

The results of this study support the earlier findings of studies conduct in developing countries that reported the potential negative impact of LSAI on the food security status of local people (Robertson & Pinstrup-Andersen, 2010; Deininger, *et al.,* 2011; De Schutter, 2011), and particularly, in Africa such as FIAN International (2010a) in Kenya and

Mozambique; FIAN International (2010b) in Ghana; Aabø & Kring (2012) in Mozambique; Dye (2014) in Tanzania and Ethiopia, Twomey *et al.* (2015) in Tanzania; Yengoh & Armah (2015) in Sierra Leone; and increased the vulnerability of rural populations in south-south countries (Anseeuw *et. al.,* 2012), in Sub-Saharan Africa countries such as Ghana, Mozambique, Tanzania, & Zambia (German *et al.,* 2013; Ferna´ndez & Schwarze, 2013).

The findings are also in line with few studies that uncovered a negative effect of such investment on food security status of affected households in Ethiopia (Bamlaku *et. al.,* 2015; Maru, 2016). The findings also confirmed the assertion that LSAI has potential negative impacts on food security reported by various researchers and institutions in Ethiopia (Cotula *et al.,* 2009; Dauvergne & Neville, 2010; Fisseha, 2011; Maru, 2011; The Oakland Institute, 2011; Rahmato, 2011; Oxfam, 2011;Lavers, 2012a; Lavers, 2012b; Baumgartner, *et. al.,* 2013; De Zoysa, 2013; Ojot, 2013; Bereket, 2014; Keeley, *et. al.,* 2014; Barbanente & Aisbett, 2016; Azeb, 2017).

8.6. Summary and Recommendation

The rising global and national interests in investing in the agriculture sector could be considered as a positive movement as it has the potential to bring about required capital, technology, and infrastructure into the sector. However, these potential advantages depend upon the number of factors such as the local context, the business models adopted by LSAI, government's capacity at all levels to administer land deals and enforce contracts, and capacity of institutions to safeguard local community's interest and rights among others. However, several studies in Ethiopian indicated that land transfer to agricultural investment has been carried out hurriedly without sufficient preparation and careful identification and mapping of available land, limited or no consultation with the local community, and with limited or no environmental impact evaluations (Dessalegn, 2011; The Oakland Institute, 2011; Getnet, 2011; Ojot, 2013; Dereje, 2016; Maru, 2016; Azeb, 2017). Above all, there is no a single provision in the contracts that encourage and/or force the investor to adopt a business model (such as out-grower, contract farming, etc) that could integrate the local people into the investment streams, to transfer technology, adopt labour-intensive technology and directly contribute to income and food security (Dessalegn, 2011; Ojot, 2013). All of these factors explain the failure of 'embedded autonomy' thesis of the developmental state in Ethiopia.

The study employed multiple indicators of food security to analyze the impact of LSAI on the food security status of households in Gambella region by using PSM technique. As to our

knowledge, studies that employed multiple and multi-dimensional indicators to estimate the accrual impact of LSAI in Ethiopia in general and Africa in particular are very limited. The study finds that LSAI has a negative impact on food availability, access, and utilization dimensions. LSAI also increased economic vulnerability of the affected households which is observed through high scores of CSI and expenditure share of affected households on food items. The results estimated through food security index that capture the multi-dimension nature of food security suggest that LSAI has a significant negative impact on the food security status of affected households. The principal message emerging from these findings is the transfer of land to LSAI that claimed vast tracks of the farm, forest, and grazing land has worsened the food insecurity status of the affected households.

This study contradicts with the thesis of the neoclassical theory of investment that ignores the dark side of the investment and only advocates positive aspects. The developmental state of Ethiopia is also failed to discharge its responsibility encroached in the embedded autonomy and hence is unsuccessful in meeting the expectation that it repeatedly echoed to the public and wrote in its development policy documents. The study confirms the middle-path theory thesis that argues if LSAI is not managed properly (when the government is failed to govern and regulate), such investment has an adverse impact on the livelihoods of the local people.

In general, we urge the Ethiopian government to adopt a framework that integrates local people into the value chain of LSAI and addresses their food security needs. Such a framework should be designed in a collaborative, participatory, and transparent manner and explicitly endorse the rights of local communities to food and lands. The framework should encourage and/or compel investing companies to adopt business models that ensure mutual benefits, create alternative livelihoods, and directly contributing to food security and poverty reduction. In the framework, more attention should be given to local people's empowerment within a wider context of expanding their livelihood options and making LSAI accountable and people-centered endeavor.

CHAPTER NINE: THE IMPACT OF WOMEN'S EMPLOYMENT ON THEIR EMPOWERMENT IN GAMBELLA, ETHIOPIA

Abstract

The main purpose of this article is to examine the impact of women's access to income-earning jobs on their self-worth and decision making power (empowerment) at the household level. To address the purpose, the article uses primary data collected from 65 married women who are employed in large-scale private farms and 85 married non-income earning women. Principal Component Analysis technique was employed to construct women empowerment index which is conceptualized along two dimensions: self-worth and decision making. Following this, the impact was estimated at a household level by using Propensity Score Matching method. The article finds that consistent with the argument of the resource in culture theory, married women's employment in LSAI projects does not have impact on their empowerment level. It is, therefore, recommended that government should strengthen gender sensitization programs, ensure fair compensation for the job done, and promote women and girls schooling which could prepare them for better paying jobs in the future.

Key Words: Women empowerment; women's employment; self-worth; decision making power; index; Gambella, Ethiopia

9.1. Introduction

Large-scale land based investments by domestic and foreign investors in developing countries (mainly in Africa) have become a topic of intense debate among the researchers, academia, practitioners, policymakers, and national and international civil society organizations. Particularly, in Sub-Saharan Africa region, such investments have attracted the global attention due to governments' attempt in allocating awfully a large size of land to investors and increasing frequency and magnitude of the investments in the region (Behrman *et al.,* 2011). For example, according to Wily (2010), two-thirds of the international land under lease and eighteen out of thirty-three to forty countries leasing land to investors is in Sub-Saharan Africa. Ethiopia is one of the top farmland leasing countries in Africa (Anseeuw *et. al.,* 2012; Cotula, 2012) which has leased more than 2.2 million hectares of land to large-scale domestic and foreign private investors (Maru & Rutten, 2015).

Even though Sub-Saharan Africa becomes the hot spot of large-scale land based investments, the outcomes of such investment have been controversial issues that split intellectuals, practitioners, policymakers, and national and international institutions into two categories: those who argue for such investment and those who stand against it. Proponents of the large - scale agricultural investment (LSAI) claim that the investment could create jobs in the agricultural sector, expand infrastructure, improves local food supply, enhances access to markets, and increases the foreign currency earning of the host country (Von Braun & Meinzen-Dick 2009; The World Bank, 2011; Keeley *et al.,* 2014). On the other hand, the opponents assert that large-scale land-based investments are no longer about searching for comparative advantages in global markets rather are about ensuring food and energy security of rich countries by using the natural resources (such as land and water) of the poor nations (GRAIN 2008; United Nations 2010). However, the issue of women empowerment (that is, how LSAI empower or dis-empower the women) is very thin in the debates and discourses.

African governments have made many commitments to combating poverty, enhancing social and economic standards of people, promoting gender equality (e.g. improving women's access to decent jobs and land and land-related resources). Increasing investments in the agriculture sector in general and promoting LSAI, in particular, are considered as the mechanisms to transform the rural economy and address these problems. Particularly, they perceived that LSAI could *create job opportunities* in the agriculture sector, transfer technologies and boost agricultural productivity, expand infrastructure, and enhances access to markets and so improve local people's livelihoods. Above all, enhancing women's access

to employment, education, economic and financial resources and comprehending the resultant effects on their empowerment has been the key part of development policy in developing countries, in general and Africa, in particular (Braunstein, 2008).

The Ethiopian government has also made a serious commitment in its various policy initiatives and measures intended to fight poverty and gender inequality. One of the policy initiative areas of Ethiopian government is improving women's access to job opportunities in such a way that eradicate poverty and gender inequality at the household level and society at large (Aynalem, 2016). The main policy assumption here is that women's access to paid work could play a key role in enabling them to have access to power (within or outside side the household). LSAI, as the government often claims, is one of the agricultural sub-sectors alleged to create jobs for the local people (both men and women). In general, the participation of women in the labour market (via employment) is, thus, thought to enhance their access to resources and so improve their empowerment level in the family unit (Kabeer, 1999).

However, literature provides conflicting relationships between the participation of women in income generating activities and their empowerment level. For example, liberal and Marxist scholars, as well as feminists of both schools of thought, asserted that integration of the women into the market via paid work is the key enabling factor to their employment (Blumberg, 1991; Bergmann, 2005). Conversely, dependency theorists, radical and socialist feminists offered a more cynical account and argued in reverse direction (Elson & Pearson, 1981; Greenhalgh, 1991; Kopinak, 1995). Furthermore, the resource theory of family power argued that there is positive correlation between women's access to resources and their marital power (Blood & Wolfe) though their claims are based on the context of rich countries and ignored cultural factors (Rodman, 1972). By addressing the weaknesses of resource theory, Rodman (1972) asserted that women's access to paid job positively affect their marital power in society that relatively has normative pliability on marital power but it has insignificant effect in a society that is characterized by patriarch culture and system implying that culture plays key role in mediating the relationships. It is claimed that patriarch culture hinders the possible positive impact of women employment on their empowerment by considering women's job as an extension of their traditional role, and so underestimate their economic contributions and attainments (Erman, 2001 cited in Aynalem, 2016).

There are several studies that confirm the claims of both the resource theory of family and resource theory in cultural context. For instance, Hancock (2001), Seguino (2007), & Bhattacharyya *et al* (2011) in supporting the former theory found that women's access to paid

job authorizes their financial autonomy and so improves their martial bargaining power which ultimately provides more decision making power at home. In contrary to this claim, in taking sides with the latter theory, Greenhalgh (1991), Goetz & Gupta (1996), and (Rahman, 1999) reported that in developing countries participation of women in labor market does not have an impact on women's empowerment. Aynalem (2016) who studied the impact of women's wage and self-employment on their empowerment in Ethiopian context reported that wage employment (mainly in horticulture industry) and self-employment jobs do not have an impact on women's overall decision making power.

Nonetheless, when we narrow the discussion to women's employment in LSAI projects (private investor's companies) and its effect on their empowerment, studies in this area are extremely limited in Africa. However, there are few case studies (Daley, 2010) that have tried to capture the gender dimension of large-scale land deals where the focus was on how such deals affect women's land right. Therefore, the main purpose of this study is to analyze the impact of women's wage employment on their empowerment and contribute to filling gaps in the empirical and theoretical literature.

The rest of the article is organized into four parts. Part two describes the theoretical framework that guides the study. Part three discusses the methodology. Part four presents the results of the study. Section five winds up the article and provides recommendations.

9.2. Literature Review

Enhancing women's access to education, employment, economic and financial resources and comprehending the resultant effects on women's empowerment has been the key component of development policy (Braunstein, 2008). Because women empowerment is one of the key channels for creating favorable and fair conditions for women so that they can make decisions individually or jointly for improvement of the wellbeing of the society in general and households in particular. This study employs the definition of women empowerment as described by Kabeer (1999) where it is defined as the ability of women to make strategic decisions (choices) and control over resources. In this context, the ability to make choice represents power. Therefore, women empowerment implies enhancing women's level of martial/family decision making power on the key strategic issues, as well as their control over resources. In general, expanding employment opportunities for women in the economy of a country is one of the key instruments of achieving women empowerment.

To deeply understand the women's ability to make choice, Kabeer (1999:436) identifies three dimensions of empowerment such as "resources, agency, and achievements". According to

her, resources are pre-condition for women empowerments which include economic, social, and human resources. And so, access to such resources defines the rules and norms that govern the distribution, use, and exchange of the resources as well as the power to define priorities and enforce claims (Kabeer, 1999). Women's employment (for example, in the LSAI projects) could improve their access to resources (income, social networks…) which is believed to play a key role in facilitating their empowerment (their decision making power). It can also positively contribute to women's cognitive aspect (self-worth) by improving their socialization process outside their home (Aynalem, 2016). Kabeer labels the second dimension (agency) as 'process' – the ability to articulate own priorities, pursue and execute them (Kabeer, 1999). Agency is operationalized in social science as "decision making agency" (Kabeer, 1999, p.438) and hence in this study, we adopted such operationalization. When we narrow the concept of the agency at household level, it means who has the most power or final say in the family's decision making process. The third dimension (achievement) is related to the outcomes of empowerment (women's emancipation, egalitarian decision-making, financial autonomy, equality in marriage, etc). In line with Kabeer's conceptualization, on the theoretical ground, one can argue that the employment of women in LSAI projects would enhance their access to resources (mainly income and social networks) (resources); improve their capacity to define their goals and priories and implement them (agency); and so enable them to gain financial autonomy and make equal participation in decision making process of their household (achievements).

At the macro level, various literature suggest factors such as the level of socio-economic development (Rostow 1960; Deutsch 1964; Bell 1999); increasing gender equality attitudes and practices (Welzel, 2003; Welzel, *et al*., 2003; Inglehart & Welzel, 2005); historical bequests driving from cultural and political custom (Reynolds, 1999; Inglehart & Norris, 2003; Inglehart & Welzel, 2005); and institutional design (Kenworthy & Malami, 1999; Inglehart & Norris, 2003; Inglehart & Welzel, 2005) as the major explanations for improving women empowerment.

In general, women empowerment in this study is conceptualized along two major dimensions at micro (household) level: relational (marital decision making power) (Malhotra & Mather, 1997; Grasmuck & Espina, 2000) and cognitive (self-worth) (Mahmud *et al.,* 2012). The former dimension is women's decision making power in a family which is operationalized as the ability of wife to make a major decision or have a say in the final decision that affects her life and/or the life of household members (relational dimension). The latter one is women's

self-worth – cognitive dimension which is conceptualized as women's awareness and indulgent about the situations and causes of their subordination at the household level and makes decisions that may stand against the patriarchal cultural systems, expectations, and norms prevail in a society (e.g. the culture and practice of wife beating).

The significance of husband-wife decision making (marital/family power) is well recognized in the psychological, sociological, and marketing literature (Davis 1970; Davis and Rigaux 1974; Qualls 1981; Corfman 1991; Ford *et al.,* 1995; Kabeer, 1997). In a traditional society like Ethiopia, men have been considered as breadwinners and sole decision makers in the family while women have been a housewife - caregivers and housekeepers (Madill & Bailey, 1999). Therefore, to examine the impact of wage employment on the women's empowerment within Ethiopian context, among various socio-economic theoretical frameworks, we found resource theory of family power (Wolfe, 1960) and theory of resource in cultural context (Rodman, 1972), as relevant in guiding our study. For the details of these theories see section 2.3 of Chapter Two of this work.

Resource theory of family power has been confirmed by various empirical studies that found significant positive relationship between marital power, income, education, and organizational status in the USA (Blood & Wolfe, 1960), Japan (Blood, 1967), Germany (Lupri, 1969), Gahanna (Oppong, 1970), Denmark and USA (Kandel & Lesser, 1972), Turkey (Fox, 1973), and Mexico (Oropesa, 1997). Others also employed this theory and found a significant positive relationship between marital power, education, and job status in England (Hempel, 1975); in USA (Woodside, 1975; Rosen & Granbois (1983); marital power and social class in USA (Rigaux-Briemont, 1978); and marital power and income in USA (Green & Cunningham, 1975; Munsinger *et al.,* 1975). The general conclusions drawn from these studies can be, within the family, husband's position is positively associated with his power and wife's decision making power improves as she enters into the paid work or income earning wives have more martial power than non-income earning ones. However, the majority of empirical studies indicated above were carried out either in developed countries or urban settings of developing countries. Despite this limitation, we used this theory as a theoretical framework to examine whether or not the employment of women in LSAI projects improve their decision making power within a family unit (household).

Rodman's resource theory in cultural context is also confirmed by several empirical studies. For example, Erman *et al.* (2002) studied Turkey's rural women empowerment situation and reported that cultural and legal frameworks that favor patriarchal system were hindering

factor in improving income earning women's empowerment. Likewise, Safilios – Rothschild (1990) found that wife's access to paid work does not improve women's resource and so her decision making power and equality in the family's division of labor due to normative orientation. Some scholars such as (Goetz & Gupta, 1996; Garikipati, 2008) reported insignificant effect of women's access to resources (credit programs) in altering the prevailing cultural norms govern marital relations and governing control over resources in the family. Aynalem (2016) who studied the impact of women's wage and self-employment on their empowerment in Ethiopian context reported that wage employment and self-employment jobs do not have an impact on women's overall decision making power. She concluded that both socio-cultural and economic factors are the key to shape the effect of women's wage and self-employment on their empowerment (Aynalem, 2016).

9.3. Materials and Methods

To estimate the impact of women's wage employment on their women empowerment level, a quasi–experimental research design was employed. Data were collected from 65 married income earning (employed women) selected via census method and 85 married non-income earning women swho were selected through systematic sampling technique. Employed women were used as a treatment group in the impact estimation model while non-income earning women[65] were used as a comparison group. Besides, formal and informal interviews were carried out with ten women (six formal and four informal interviews). Both quantitative and qualitative data were collected from primary and secondary sources through structured questionnaire (Annex II), interview checklist, and document analysis. The quantitative data were analysed by using descriptive statistics (such percentages, mean, and standard deviation), Principal Component Analysis (PCA) and Propensity Score Matching (PSM). Conversely, qualitative data were analyzed by using content analysis. See the details of rsearch methodology (study area, research design, sampling procedures and size, data collection methods, tools, and analysis techniques) in chapter three of this work.

9.4. Variable definition and index construction

Albeit there is no consensus regarding the covariates to be included in the PSM model, we appealed to some of the theoretical notions that urge researchers to use covariates which are relatively stable over time or evidently exogenous to the treatment (Caliendo & Kopeinig 2005; Magrini & Vigani, 2014) and covariates that are potentially related to the outcome

[65] None-income earning women are those women who are married and not engaged in any income earning activitiy (neither hired in any farm to earn wage nor engage in any business (self-employment) that makes money.

variables (Imbens 2004; Ho *et al.,* 2007; Austin, 2011). We also selected covariates based on the empirical work such as (Aynalem, 2016) who addressed similar issues in her study. We categorized covariates into four: women individual characteristic (such as age, level of education, migration status, years spent in marriage, religion, ethnicity, access to credit, and membership in women association, *Iddir*, and *Equib*); family related characteristics (such as marital happiness index, spouse age and level of education); household attributes (such as farmland size, wealth index, family size, and dependency ratio) and village level characteristics (for instance, walking distance to school, health centers, main road, and the market in minutes). The description of the variables used in PSM model is summarized in Table 9.1.

It is vital to define some of the key variables included in the PSM model. The first category of variables used in the PSM model is the treatment ones. The treatment variable (often called intervention variable – a variable against which two groups are compared to estimate treatment effect size) used in PSM model is employment of women in LSAI projects. It is a dichotomous variable which is coded as one if a woman is presently employed in investors' farm (wage employed woman) and zero if she is non-income earning woman. Wage employment which is defined as a state in which a woman is hired in private investors' farm for which she obtains compensation in the form of money from her employer in exchange for labour. Therefore, throughout this article, employment refers to wage employment and employed woman means wage employed one. On the other hand, non-income earning women refer to a condition in which women are not taking part in any type of income generating activities (wage or self-employment). They are often judged as unpaid family worker or women who are not engaged in any kind of job to earn income. This category of women was used as a comparison group against which the outcome of the treated (employed) women is compared.

The second category of the variable used in the model is an outcome variable – a variable for which employment effect is estimated. In this study, women's level of empowerment is used as an outcome variable to examine whether or not women employment impacted it. We conceptualized and measured women empowerment level along two dimensions.

Table 9.1: Description and Measurement of the Variables used in PSM (Gender aspect).

Variable	Type	Description
Dependent (wage employment in LSAI) Treatment	Dummy	1 if a women is employed, 0 otherwise
Outcome variables		
Self-worth index	Continuous	An index computed to measure cognitive aspect of empowerment
Consumption related DM index	Continuous	An index computed to measure household's consumption related decision making (DM)
Asset realted DM index	Continuous	An index computed to measure household's asset related decision making (DM)
Health & others DM index	Continuous	An index computed to measure wife's health related and others decision making (DM)
Decision making index	Continuous	Composite index (average of the three indexex) computed to measure relational aspect of empowerment
Covariates		
Age_ wife	Continuous	Years
Age_ husband	Continuous	Years
Age_ marriage	Continuous	Years
Education_ wife	Ordinal	0=illiterate, 1=read and write, 2=primary, 3=secondary, 4=diploma and above
Education_ husband	Ordinal	0=illiterate, 1=read and write, 2=primary, 3=secondary, 4=diploma and above
Ethnicity	Nominal	1=Amhara, 2=Tigrie, 3=Oromo, 4=Wolatya, 5=Hadiya, 6=Kambata, 7=Anuak, 8=Others
Religion	Nominal	1=Muslim, 2=Orthodox Christian, 3=Protestant Christian, 4=Catholic Christian, 5=Others
Migration Status	Dummy	1 if a women is non-migrant, 0 otherwise
Family size	Continuous	Number of family members
Dependency ratio	Continuous	Ratio of dependent family members to the productive age
Farmland	Continuous	Size of farm land in hectares
Distance to school	Continuous	Walking distance in minutes from home
Distance to health centre	Continuous	Walking distance in minutes from home
Distance to market	Continuous	Walking distance in minutes from home
Distance to main road	Continuous	Walking distance in minutes from home
Access to credit	Dummy	1 if a women has access to credit, 0 otherwise
Iddir membership	Dummy	1 if a women is member, 0 otherwise
Equib membership	Dummy	1 if a women is member, 0 otherwise
Women association member	Dummy	1 if a women is member, 0 otherwise
Happiness index	Continuous	Composite index
Wealth index	Continuous	Composite index

Source: Own survey, 2018

The first dimension is women's decision making power in a family which is operationalized as the ability of women to make a major decision or have a say in the final decision that affects their life and/or the life of household members (relational dimension) (Malhotra & Mather, 1997; Grasmuck & Espina, 2000). The second one is women's self-worth – cognitive dimension - (Mahmud *et al.,* 2012) which is conceptualized as women's awareness and indulgent about the situations and causes of their subordination at the household level and makes decisions that may stand against the patriarchal cultural systems, expectations, and norms prevail in a society.

To measure women's level of self-worth, we constructed a standardized index called self-worth index following Mahmud *et al.* (2012) and Aynalem (2016) based on some five proxy indicators that examine whether or not a wife accepts or rejects if her husband beats her.

These indicators include it is justified to beat a wife if she burns food; if she argues with her husband, if she neglects children, if she refuses to have sex with him, and if she goes out without his permission. The responses for these five items are: justified which is coded as zero, indifferent coded as one, and not justified coded as two. Based on these set of items (indicators), we constructed a self-worth index by using Principal Component Analysis (PCA) technique. We check for the items internal consistency using Cronbach α which is found as 0.7. This indicates that these set of items properly measures the same construct (that is, women's self-worth) with acceptable level of internal consistency (α=0.7). In general, the higher value of self-worth index indicates the higher level of women self-worth (i.e. high rejection of wife beating practices).

As far as the second dimension of women empowerment (women's level of decision making power) is concerned, 13 decision making areas were identified and used to compute decision making index. To conspicuously examine the areas in which women vigorously involved in decision making, we disaggregated these decision making areas into three components: household consumption related decision making, household asset related decision making, and health related and others areas of decision making based on the empirical work of Aynalem (2016) with little modification. We constructed an index for each of the three dimensions derived from their respective areas of decision making by using Principal Component Analysis (PCA) technique. The likely responses in all the three components were: husband alone (coded as zero), husband and other (coded as one), joint decision (two), and wife alone (coded as three) in the original questionnaire. However, for index construction purpose, these response categories were re-coded into two main components such as wife not involved (coded as zero) and wife involved (coded as one). We merged the wife only and husband and wife jointly response categories together and re-coded them as wife involved. Likewise, we combined together husband alone and husband and others response categories and re-coded as wife not involved. In general, we constructed four indices (the fourth one is the composite index – the average of the three indices) to capture decision making power dimension of empowerment and employed all of them as outcome variables in the PSM model.

Household consumption related index measures the level of women involvement in household consumption related decision making in three areas (purchase of daily food consumption items, milk use, and crop use). Hence, this index was constructed by these three set of items. The Cronbach α for this component of the index was found to be 0.663

indicating that the internal consistency or reliability of the set of items developed to measure the index is satisfactory. The second component (asset related decision making index) captures the level of women's involvement in asset related decision in their households and is measured by a set of six decision making items: large household purchases such as furniture, electronic materials, and so on; buying and selling of livestock; land use or allocation; house construction/maintenance; renting land in/out; and borrowing money for investment. This component has a high level of internal consistency (Cronbach $\alpha = 0.823$) showing that the set of items intended to measure the index have inter-correlation and measure the same construct (i.e. asset related decision making index). The third component (i.e. health related and others index) that measures the level of women's involvement in household decisions related to wife's health and visits is captured by four set of items including wife's visit to nurse or doctor or health extension worker, family planning, visiting family or relative, and working outside the home. The measure of items internal consistency (i.e., Cronbach α) is found to be 0.834 indicating that the set of items designed to measure the index correctly measured the same construct (i.e., health related and others index). Finally, we constructed a composite index by taking the average of the three indices to measure the overall women's decision making power at the household level. The higher value of the index for all components (including composite index) indicates a high level of women's decision making power.

9.5. Estimation of the Propensity Scores

The estimation of the propensity scores was carried out by using 'pscore' command in STATA software. Table 9.2 presents the summary of the descriptive statistics of the estimated PS for both employed and non-income earning women. As expected, the result shows that women in the treated group (employed women) had a higher average PS compared to the women in a comparison group (non-income earning). For instance, the mean PS for women who were in treated group (employed) was found to be 0.54 and was 0.36 for untreated (non-income earning) ones. This implies that the probability of being employed is, on average, higher for employed women by 18% than for those who are non-income earning.

Table 9.2: Descriptive Statistics of Propensity Score.

Treatment Variable	Treated/Untreated	Obs.	Mean (SD)	Min	Max
Employed women	Treated	65	0.535(0.196)	0.052537	0.9455411
	Untreated	85	0.356(0.181)	0.0364417	0.8174682

Source: Own survey, 2018

Even though parameter estimates of the model is not the big concern in propensity score estimation (Khandker *et al.,* 2010), after estimating a propensity score, we checked whether or not the model fits the observed data set by using a Hosmer-Lemeshow test - a goodness of

fit test (Hosmer & Lemeshow, 1980). The test assesses how well the model fits the observed data sets by evaluating the differences between the observed number of events, the actual data, and the expected number of events from the model (Guffey, 2012). The data are often organized into deciles though other categorization could be employed (Guffey, 2012). The criterion here is that one need to look at the p-value produced by GOF test and if it is low (for example, less than 0.05) the model does not fit the data and vice versa (Lunt, 2014). Lack of model fit may occur because of exclusion of higher order terms of covariates, or key covariates associated to the response variables from the model (i.e. the problem related to linear component) (Lunt, 2014). We employed 'estatgof, group (10) table' command in STATA software and the outputs are presented in annex XXI. The result shows that the logistic regression model fits our data well (p=0.916) suggesting that the PSM model is consistent with the observed data set.

9.6. Checking for the Common Support Region

One of the key assumptions that must be checked before estimating employment effect is the overlap or common support assumption. There should be an adequate common support region (overlap of the estimated PS) for the treated and comparison groups. As can be seen from Table 9.2 the PS for employed women ranges from 0.052537 to 0.9455411 whereas it was between 0.0364417 and 0.8174682 for unemployed women. Following the recommendation of Caliendo and Kopeinig (2005), we employed 'minima and maxima' method where the common support region was satisfied in the range of 0. 05253699 & 0.94554108. We assessed the validity of common support assumption by examining a graph of the propensity score for treated and comparison groups generated by using 'psgraph' command in STATA. Figure in annex XXII illustrates the distribution of the PS for employed and unemployed women. The graphs confirm the existence of a sufficient overlap in the distribution of the propensity scores across treatment and comparison groups suggesting the validity of the common support identification assumption. Note that "treated: off support" at the bottom of the figure shows those observations in the employed women that do not have fitting comparison from unemployed women and so dropped from the impact estimation.

9.7. Evaluation of Matching Balance

As explained above, the main aim of PSM is to balance the observed distribution of covariates cross treated (employed women) and comparison (unemployed women). Therefore, after checking the common support region, we carried out matching balancing tests. We checked whether or not, within each quintiles of the propensity score distribution,

the average propensity score and mean of covariates have a similar distribution (balance) across the treated and comparison groups. We conducted the test by using 'pscore' command in STATA that splits the sample into quintiles and automatically carries out t-tests of the propensity score across treatment and comparison groups within each quintile and identifies the optimal number of blocks. This exercise ensures that the mean propensity score is not different for the treated and comparison groups in each block (Imbens, 2004). Accordingly, we divided our sample into five blocks and conducted the Two-sample t- test to ensure that the mean propensity score is equivalent in the treatment and comparison groups within each block. The result shows that the mean propensity score is not different for treated and comparison groups in each block (annex XXIII). This number of blocks ensures that the mean propensity score is not different for treated and comparison groups in each block.

After ensuring that the propensity score is balanced within each block across the treatment and comparison groups, we checked whether or not individual covariates are balanced across both groups within blocks of the propensity score. We did balance diagnostics test by using the same -pscore- command mentioned above to examine the balance of each covariate in each stratum and prove the efficacy of the PSM in boosting the distribution overlap between the treated and matched comparison groups. Imbalance in the mean of the covariates indicates the misspecification of the participation model (Khandker *et al.,* 2010) which requires re-specification of the propensity score (Garrido *et al.,* 2014) though we did not encounter this problem in our PSM model. The result of the test of balancing property of the propensity score shows all covariates are balanced in each block (annex XXIII). Generally, the result proves that after getting a balance of propensity scores within each stratum, the covariates attain overlap in terms of distribution.

It is also imperative to check whether or not the treatment and comparison groups are balanced in the matched samples. Double checking the quality of the covariates balances using several techniques provides robust evidence for proper specification of the propensity scores (Garrido *et al.,* 2014). The result confirms that for each matching covariates, a sufficient matching quality is attained. That is, after matching, all covariates' mean difference is not statistically significant suggesting that the systematic differences observed on some matching covariates between treated and comparison groups before matching were removed after matching (covariates are sufficiently balanced). Likewise, bias reduction for the majority of covariates after matching was below 5% indicating that the covariates are adequately balanced. Furthermore, the percent of biased reduced after matching for majority

of the covariates was sufficient (at least 80%) suggesting that bias is satisfactorily reduced. the result also shows that the average standardized bias difference for all covariates was reduced from 15.6% before matching to 5% after matching suggesting that there is no systematic difference between treated and comparison group after matching. The Pseudo- R^2 was also notably dropped from about 13.4% before matching to as low as 2.3%. The joint significance of all covariates after matching is rejected given that the p-value of livelihood ratio test is insignificant (p=1.000) (annex XXIV).

The graphic scrutiny of the standardized percentage bias indicates that the bias which was considerably scattered over a large range of values before matching is positioned around zero cross covariates after matching (annex XXV), implying that the balancing property is satisfied after matching. All of the tests suggest that the specification of the propensity score is successful in balancing the distribution of covariates between the employed and unemployed women. Besides the pictorial scrutiny of the distribution of percentage bias presented in annex XXV indicates that standardized percentage bias which was spreader across various values before matching stretchs out around zero across covariates after matching. This implies that the balancing property is satisified for all the covariates.

9.8. Sensitivity Analysis

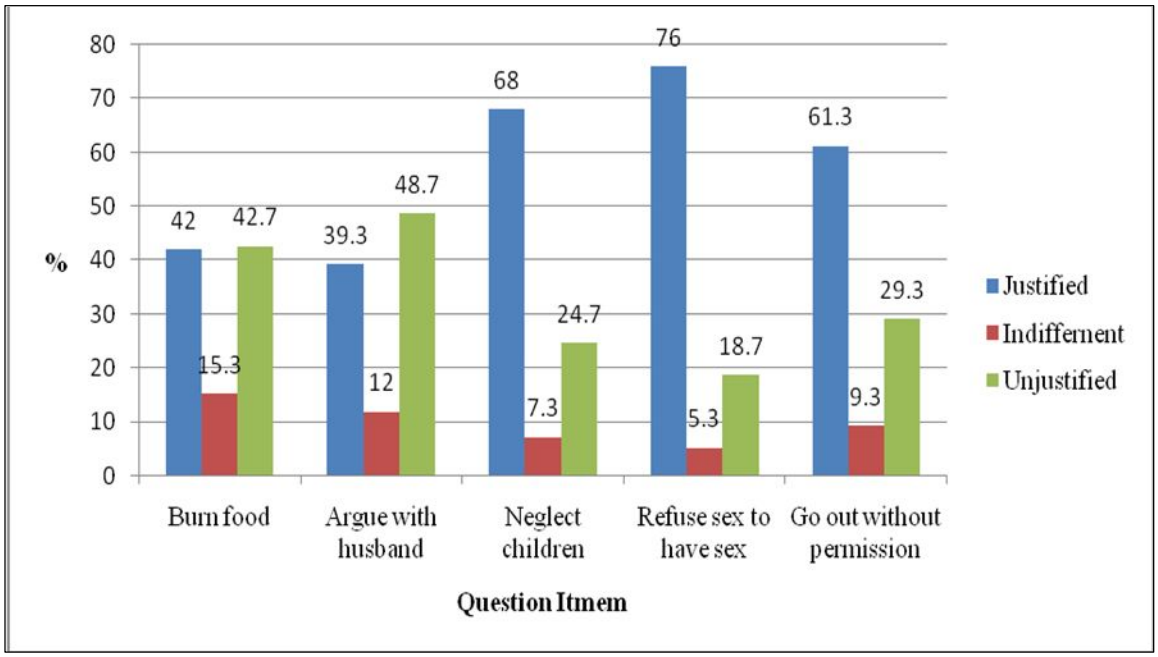
Sensitivity analysis was carried out by using 'Rosenbaum bounds approach' to assess the potential impact of unobserved confounders on the treatment effect. The result shows that the impact of employment on the empowerment level of employed women is not sensitive to hidden bias (unobserved characteristics that could bias the estimated impact) (at $p<0.001$). Even when we increased the value of gamma from 1.0 to 1.5, the conclusion does not change across all outcome variables used in the PSM model showing that the result is insensitivity to hidden bias (annex XXVI).

9.9. Estimation of the Employment Effect

Before estimating the employment effect, it is imperative to briefly pore over the descriptive statistics of the outcome variable (empowerment - which is measured by self-worth and decision making indices). First, we examined the distribution of the women's response to various question items intended to capture the self-worth dimension of the empowerment. Women were asked to indicate whether or not it is justified to beat a wife if she burns food, argues with her husband, neglects children, refuses to have sex with husband, and goes out without husband's permission. The results are given in Figure 9.1 which illustrates the percentage of women who accepted or rejected wife beating regarding the items mentioned

above. Except where the majority of women (48.7%) reject wife beating if she argues with her husband, in almost all of the other items they accept the practice of wife beating. For example, 76%, 68%, and 61% of women believe that it is justified for a husband to beat a wife if she refuses to have sex with him, neglects children, and goes out without his permission. This result shows that women, generally, have low self-worth acuity given that they approve the practice of wife beating which is common in patriarchal system subsist in developing countries like Ethiopia. The mean value for self-worth index was found to be 0.36 (Table 9.3) indicating that women level of self-worth is low. Responses of each item were re-coded so that the higher value of self-worth index indicates the higher level of women self-worth.

Figure 9.1: Percentage Distribution of wife Beating.



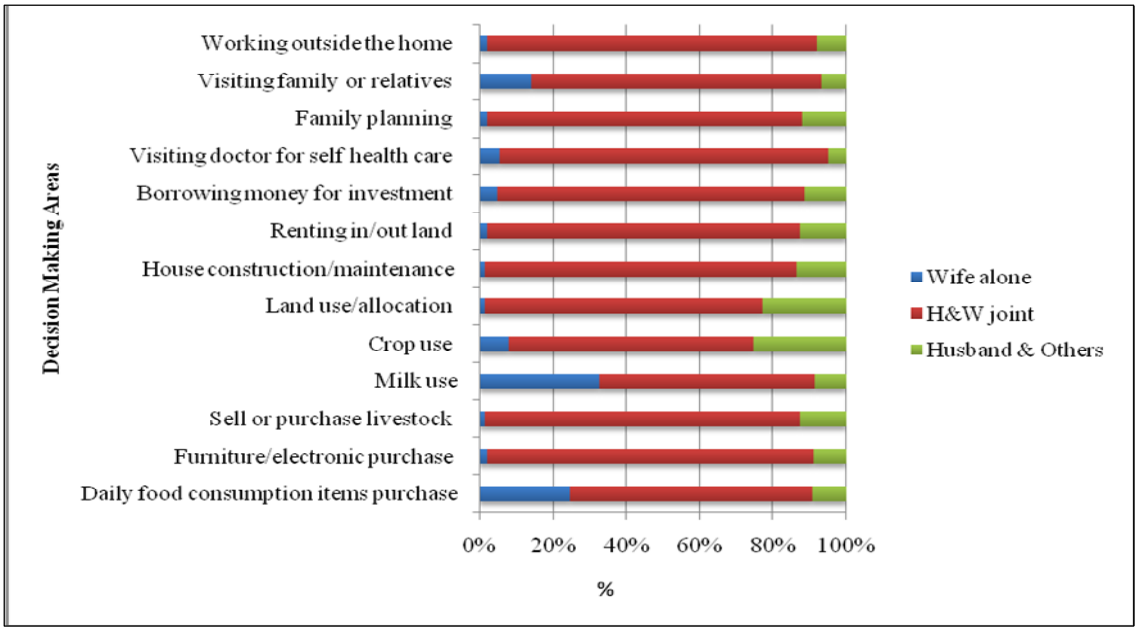
Source: Own survey, 2018

As far as the second dimension is concerned, we split women's level of decision making power into three categories. The first component (labelled as consumption related decision making) captures three decision making areas such as decision regarding daily food consumption items, milk use, and crop use. The second one (called asset related decision making) captures six areas of decision making including big purchases such as furniture, electronic materials, and so on; buying and selling of livestock; land use or allocation; house construction/maintenance; renting land in/out, and borrowing money for investment. The last component (labelled as health related and others decision making) encompasses four areas

such as visiting health workers for self-health, family planning, visiting family or relatives and working outside the home.

Figure 9.2 shows the level of women participation in different decision making areas of the household. As can be seen from the Figure, decisions in all of the areas are made by husband and wife jointly. However, about quarter (24.7%) and (32.7%) of women reported that they made decision regarding daily food consumption at home and milk use alone, respectively indicating that they relatively have a modest power in deciding on the consumption related issues and are the least sole decision makers in all other areas. In general, the finding shows that the majority of decisions regarding consumption, asset formation and/or enrichment, and women's health and other issues are made in cooperation and women had played a joint decision making role. The mean value of decision making indices; (0.87), (0.86), (0.92), and (0.89) for household consumption related decision index, asset related decision index, and health and others decision index were found to be high (Table 9.3) showing that women were joint decision makers. The variables used in index construction were re-coded where 0 represents no women involvement and 1 indicates women involvement (and so, the higher the value of the index is the higher women involvement in decision making). On the other hand, even such practices could be appreciated; the result also shows that without knowledge and approval of husband, wives do not have autonomy to make a decision even on the issues related to their personal health and/or family/relative issues alone.

Figure 9.2: Percentage Distribution by the Key Diisicion Making Areas.



Source: Own survey, 2018

Besides the descriptive statistics explained above, we constructed a standardization asset index based on the selected indicators of women empowerment and the results are given in Table 9.4. Table 9.4 presents the summary statistics of the standardized self-worth and decision making indices (the two dimensions intended to measure women empowerment).

Table 9.3: Descriptive Statistics for Different Empowerment Indices.

	Empowerment indices				
Respondent Category	Self-worth index	HH consumption DM index	HH asset DM index	Health & others DM index	Composite DM index
	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)
Employed women	0.39(0.30)	0.89(0.22)	0.87(0.25)	0.93(0.23)	0.90(0.18)
Non-income earning women	0.33(0.32)	0.86(0.28)	0.86(0.25)	0.92(0.21)	0.88(0.15)
Total Mean(SD)	0.36(0.31)	0.87(0.25)	0.86(0.25)	0.92(0.22)	0.89(0.17)

Sources: Own survey data, 2018

As indicated above, we split decision making index into three components (consumption, asset, and health related decision making indices). The min score of the self-worth index was 0 and the max was 1 for employed women and the values were the same for non-income earning women. Likewise, the min and max values of all decision making indexes for both employed and non-income earning women were 0 and 1. For the composite index, the values were 0 and 1 for employed women but were 0.37 and 1 for non-income earning women (Table 9.4). In general, the maximum values indicate the highest level of self-worth and decision making power.

Table 9.4: Summary Statistics for Outcome Variables (Women Empowerment).

Empowerment indices	Total Mean	Respondent Category								
		Wage employed Women (n=65)				Non-income earning women (n=85)				
		Mean	SD	Min	Max	Mean	SD	Min	Max	t-test
Self-worth index	0.36	0.39	0.30	0	1	0.33	0.32	0	1	1.176
HH con. DM index	0.87	0.89	0.22	0	1	0.86	0.28	0	1	0.5354
HH asset DM index	0.86	0.87	0.25	0	1	0.86	0.25	0	1	0.1735
Health DM index	0.92	0.93	0.23	0	1	0.92	0.21	0	1	0.4310
Composite index	0.89	0.90	0.18	0	1	0.88	0.15	0.37	1	0.5505

Sources: Own survey data, 2018

The wage employed women, on average, have slightly a higher self-worth index values when compared to non-income earning ones. For instance, the mean self-worth index was 0.39 for employed women whilst it was 0.33 for non-income earning ones. However, the mean difference is not statistically significant indicating that there is no significant difference between self-worth levels of employed and non-income earning women (Table 9.4). Likewise, on average, the employed women have a bit higher consumption (0.89), asset (0.87), and health related (0.93) decision making indices when compared to their counterpart non-income earning ones whose scores were (0.86), (0.86), and (0.92) for the same areas of

decision making though the results are not statistically significant. This shows that there is no difference between the levels of decision making power of the employed and non-income earning women.

However, a mere comparison of mean differences of employed and non-income earning women could not explain the impact of other characteristics of women which may confound with the actual employment effect and bias the results. Due to this, we used a Propensity Score Matching (PSM) model to correctly estimate the actual impact of employment on the women empowerment. We estimated the average treatment effect on the treated (ATT) - the average difference between empowerment level of employed (treated) and non-income earning (comparison) women by using varied PSM matching strategies such as the nearest neighborhood (NN), radius, kernel, and stratification (SS).

Table 9.5: Impact of Employment on the Empowerment Level of Employed Women.

Asset indicators	Matching Method[a]	Matched Sample		Impact (ATT)	Standard error[b]	t-value
		Employed	*Non-income Earnings*			
Self-worth index	NN	65	34	0.067	0.076	0.883
	Radius	47	67	0.062	0.075	0.824
	Kernel	65	84	0.029	0.066	0.448
	SS	65	84	0.034	0.072	0.467
HH^ consumption related DM^ index	NN	65	34	0.037	0.078	0.472
	Radius	47	67	0.022	0.060	0.363
	Kernel	65	84	0.064	0.057	1.112
	SS	65	84	0.059	0.054	1.089
HH asset related DM index	NN	65	34	0.081	0.076	1.068
	Radius	47	67	0.086	0.066	1.294
	Kernel	65	84	0.057	0.062	0.909
	SS	65	84	0.060	0.055	1.087
Health & others DM index	NN	65	34	0.043	0.054	0.750
	Radius	47	67	0.027	0.052	0.521
	Kernel	65	84	0.039	0.039	0.993
	SS	65	84	0.040	0.042	0.960
Composite DM index	NN	65	34	0.053	0.044	1.207
	Radius	47	67	0.045	0.043	1.047
	Kernel	65	84	0.053	0.033	1.605
	SS	65	84	0.053	0.039	1.358

Note: HH^ and DM^ stand for 'household' and 'decision making', respectively
+ $p<$ 0.10, * $p<$ 0.05, ** $p<$ 0.01, *** $p<$ 0.001; [a]Radius matching was carried out with a caliper of (0.01); [b]Bootstrapstandard error was computed based on 100 replications
Sources: Own survey data, 2018

Literature suggests that employing a mixture of diverse matching algorithms is crucial for reaching at a sound conclusion on the relative effect of employment on the women's empowerment level (Backer & Ichino, 2002). The results are given in Table 9.5. The table presents the mean effect size of employment in line with the two dimensions of empowerment index (self-worth and decision making – which further categorized into three components).

9.9.1. Impact on Women's Self-worth

By using the combination of matching strategies, the impact of employment on the self-worth level of employed women ranged from 3% to 6.7% in terms of improving the level of self-worth. On average, the employment of women in LSAI projects enhances their self-worth level by 6.7% for NN, 6.2% for radius, 3% for kernel, and 3.4% for SS matching (Table 9.5). In other words, due to employment, the women who are employed by the investors, on average, have 3% to 6.7% higher level of self-worth than those women who are non-incoming earning. However, the result is not statistically significant (Table 9.5) showing that employment does not have an impact on the women's self-worth. The insignificant effect of women employment on their self-worth could be due to the patriarchal culture factor as understood from the qualitative data. As it is common in patriarch society, women often accept their subordination position as a result of their family's incessant effort to socialize and accustom them to patriarchal beliefs and systems that are hand down from generation to generation. Women, thus, accepted their subordination position and took men's control over their lives and affairs for granted. These practices have forced majority of the wives to restrain themselves from directly standing against socio-culturally accepted supremacy of their husband via open altercation (Aynalem, 2016).

The majority of women whom we interviewed have accepted a husband as head of the family having a superpower in governing the family affairs. Those women, who have joined the labor market, did it by getting the approval of their husband. Even if they discuss the issue together, the final decision is made by the husband if he convinced that her job could bring in additional income to the family. Wives have joined the labor market to diversify the income of the family (especially, those households who entirely depend on rain-fed agriculture and lack other sources of income consider women's wage employment as an alternative source of income in case crop failure happens due to shortage of rain or pests attack) but not to use the income for themselves. This situation has led women to perceive their employment as an extension of the housework and undervalue their effort.

For example, Abebech, 31 year women working as a daily laborer in one of the investor farms shares her view saying that "Husband is the head of my home. He is our guardian next to God. So, how could I stand against him? He has the power to command each of us and we must abide by that." Another key informant named Birkie 29 years old engaged in the same type of job says, "Husband is God given and if someone wants to obey God she must obey her husband. Husband is everything in family life. Without him life is impossible. He is head.

Do you know head? Can you do anything without a head? No. No. No. You cannot". These stories show the resilience of the patriarchal system (mainly embedded in culture and even religion) that eventually wears away women's self-worth. The culture has made women restrain from openly challenging men's power especially during they oppress their rights (emancipation from physical and verbal hostility such as wife beating). Thus, women's engagement in paid jobs is unable to boost their level of self-worth.

9.9.2. Impact on Household Consumption Related Decision

In terms of women's involvement in daily food consumption items, the impact of employment on employed women ranged from 3.7% – 6.4% improvement in the level of decision making power. Employment in LSAI, on average, improved employed women's level of decision making power by 3.7% for NN, 2.2% for radius, 6.4% for kernel, and 5.9% for SS matching (Table 9.5). In general, on average, employed women have 3.7% – 6.4 higher decision making power than those non-income earning ones though the result is not statistically significant indicating that the mean effect size of employment is trivial.

9.9.3. Impact on Household Asset Related Decision

As far as this dimension is concerned, the impact of employment ranged from 5.7% to 8.6% improvements in values of the index. The difference in asset related decision making index between employed and non-income earning women due to employment, on average, was 8.1%, 8.6%, 5.7%, and 6% for NN, radius, Kernel, and SS matching, respectively. The result shows that employed women have higher asset related decision making power by a percentage of 5.7 to 8.6 than their counterpart non-income earning ones, which is not statistically significant (Table 9.5). This implies that employment of women in private investor farms does not have impact on their asset related decision making power even though the result shows positive contribution.

9.9.4. Impact on Women's Health Related Decision

The impact of employment on the employed women ranged from 2.7% – 4.3% in terms of enhancing employed women's health related decision making power. The employement, on average, improved the decision making power of employed women by 4.3%, 2.7%, 3.9%, and 4% using NN, radius, Kernel, and SS matching, respectively. The level of decision making power of employed women was, on average, higher by 2.7% – 4.3% than non-income earning ones but the result is not statistically significant (Table 9.5). Despite its positive sign, the result indicates that employment has insignificant impact on the women's health related decision making power.

9.9.5. Impact on the Overall Decision Making Power

Besides examining the impact of employment on the three components of decision making discussed above, we created a composite index by simply averaging the index of the components. The result indicates that the impact of employment on the overall decision making power of employed women ranged from 4.5% to 5.3% in terms of improvement in the level of decision making power. The results reveal that, on average, employment in LSAI projects enhanced decision making power of employed women by 5.3% for NN, 4.5% for radius, 5.3% for kernel, and 5.5% for SS matching (Table 9.5). The results of the four matching strategies are consistent in terms of effect sign (positive) and size showing the robustness of the results. The finding shows that, on average, the level of decision making power of employed women is higher by 4.5% to 5.3% than those who are non-income earning ones though the result is not statistically significant. In general, it is clear from the results that employment has insignificant impact on the decision making power of employed women and thus their empowerment.

The insignificant effect of women employment on all dimensions of decision making index (and hence empowerment) could be explained by the patriarchal culture explained above and wage factors. In patriarchal societies, having access to income via paid jobs does not inevitably bring autonomy given that such culture does not let women make decisions independently. In this culture, women often accept their subordination position as they are socialized to patriarchic ideologies starting from their childhood. When the marital power gap is very large in the family (i.e. when a husband is the ultimate decision maker), women and girls are taught to obey such culture and practices and are not often motivated to be autonomous (Dandona, 2015). In the study area, husband is found to the ultimate decision maker almost in all family affairs. As indicated above, without his consent a wife cannot get employed. Even a wife does not have control over her income. She is expected to bring money home and have a discussion with her husband on how the money is going to be spent. If the husband is out of the home for some time, she may spend some of the money on petty purchases such as daily consumption food items but report the expenditure after he comes back. In this regard, Siena, 22 years old daily labourer says,

> *A husband deserves respect regardless of his behaviour and action. He informed me to be employed in private investor farm which I accepted. I could not say no. He has the power to say so. His main reason was to bringing in additional income to the family. Even if, we occasionally made decisions on some key issues together, his final consent is very important. When I collected my wage, I brought it to home and discuss with him on how we will spend it and wait for his final judgment.*

Likewise, 32 years old lady called Shega explains "I joined investor farm which is close to our village. In the beginning, I was the initiator of the ideal of employment. I shared it with my husband. The first day, he did not respond. Next day, he agreed." In general, such patriarchal culture and practices are in line with what scholars labelled as 'subtle strategies' (Scheyvens, 1998) which means strategies that intended to attain beneficial changes in the lives of women (for instance, getting access to paid work outside the home) but simultaneously restrain them from challenging the prevailing culture (e.g. domination of husband).

Even though wage employed women have got an opportunity to work outside the home, their wage rate is found to be low and insufficient to boost their social status. For example, the majority of wage employed women (96.9%) were engaged in low paying jobs mainly working as a daily laborer and cleaning lady. Their average monthly salary was found to be 1090.10 or 36.34 Birr per day (1.27 USD per day). One of the key informants (who asked us not to disclose her name during the interview) says,

> *From the very beginning, I am not working for myself. I am working for my family. However, we are spending more than 8 hours a day but the wage rate is extremely low. The wage rate is not enough even to cover my food expenses. Sometimes, if non-incoming earning women ask me about my wage I keep silent and feel shame. Once upon a time, I told it to one of them who laughed at me tirelessly saying that are you mad? Instead of wasting your time and effort why not you simply stay at home? Even if the wage rate is low, the majority of us in this village are working in inventor farms due to lack of alternatives.*

Our findings are in line with several studies conducted in developing countries and found that having more access to job opportunities does not essentially bring about change in power relations in the family due to cultural factors. For example, research conducted in two areas in North India by Sharma (1991) found that even though women had access to formal education and employment, the patriarchal culture was found as a barrier in improving their empowerment. Likewise, Wolf (1992) had carried out a study in China and reported that having better access to education and employment opportunities does not automatically produce a change of marital power relations in the family. The findings of this study are also consistent with the study by Aynalem (2016) in Ethiopian and found that women's wage employment (mainly in horticulture industry) do not have an impact on their overall decision making power though she reported negative sings for the impact values. Corresponding to the theory of resource in culture (Rodman, 1997), this study concludes that access of women to employment does not have an impact on their empowerment due to socio-economic factors (patriarchy and low wages) which have been an obstacle on the way of women's empowerment.

9.10. Summary and recommendations

This study examines the impact of women's employment in LSAI projects on their empowerment in the Gambella region. The impact was estimated at a household level among married employed and non-income earning women by using PSM model. First, an index was constructed for each of women's empowerment dimension (three for decision making) and one for self-worth and then one index for overall (composite) decision making index was constructed by using PCA technique.

The study finds that, despite the positive sign of the impact values, the engagement of married women in paid work in the study area has an insignificant effect on their empowerment level in terms of both self-worth and decision making (all the three indexes and overall decision making index) dimensions. On the whole, it is concluded that consistent with the argument of the resource in culture theory and Aynalem's (2016) empirical work, married women's employment in LSAI projects does not have impact on their empowerment mainly due to the patriarchal culture prevailing in the community and low level of wages. In other words, women's access to paid employment does not improve their self-worth and decision making power (their empowerment). Therefore, given the resilience of the pervasive patriarchal structures and systems within which women work and live as well as low wage rates they earn, it is unlikely for women to gain greater control over their lives and directly challenge men's power within the household regarding decision making.

Even though breaking patriarchal attitudes and structure takes time, we suggest that government should strengthen and/or revise its existing gender sensitization programs and depart itself from ad hoc and jagged campaigns in such a way that breaks the vicious cycle of the patriarchal system. The government should promote fair labor market and employment regulations to ensure sufficient levels of wage for agricultural workers and ensure their safety in remote areas such as Gambella. In the long-run, in remote areas like Gambella, the government should promote, expand, and provide opportunities for women and girls to have schooling so that they can be eligible for better paying jobs.

CHAPTER TEN: CONCLUSIONS AND POLICY RECOMMENDATIONS

"It is in the agricultural sector that the battle for long-term economic development will be won or lost".
Gunnar Myrdal, Nobel Laureate in Economics

"The investors and government did all the malevolence things upon us to the point that no evil deed is left. However, the past is past! It is already passed! Now let them start doing the good things that could compensate the earlier period's evil and enable us to stop thinking about it" (*50 years old male interviewee).*

10.1. Introduction

The widespread of poverty and chronic food insecurity in Ethiopia and especially in arid and semi-arid lowlands areas such as Gambela demand genuine and concentrated effort and action from various sectors and actors. The current government of Ethiopia has insistently been promoting large-scale agricultural investments in these areas for the purpose of commercializing agricultural sector, improving local community's food security and livelihoods, and assisting the transformation process of the economy. This dissertation is, therefore, sought to analyze how large-scale agricultural investment has impacted the livelihoods of the local community in Gambella region, through scrutinizing the impact of the investment on the food security, livelihood assets, and women empowerment. To achieve this purpose, an extensive field work was carried out to collect data from affected and non-affected Anuak and Nuer communities and other concerned stakeholders through various instruments such as household survey questionnaire, KII, FGD, and observation checklists.

To estimate the impact of LSAI on the food security, wealth, and women empowerment, the study employed a standard impact evaluation technique such as PSM. More importantly, a mixed method was employed for triangulation purpose. The study applied Sustainable Livelihoods Approach as a conceptual framework. For the purpose of guiding the study, theoretical frameworks such as the neoclassical, dependency, middle path, agrarian political economy, developmental state, and the resource theory of family power which were drawn from tradition of interdisciplinary theories of development studies were also applied. Based on these conceptual and theoretical frameworks as well as an empirical research carried out in Gambella region, this study explicitly demonstrated the actual challenges that LSAI pose to rural based livelihood systems and contribute to bridging gaps between the theories, government perceptions, and practices on the ground. This chapter presents the synthesis of the major results of the dissertation and their policy implication for livelihoods of local people in general and food security, assets, and women empowerment in particular.

10.2. Research Outcomes

10.2.1. Understanding the context within which LSAI has been operating in Ethiopia and Gambella.

Historical account, policy and legal frameworks

It is definitely crucial to comprehend the contextual factors that are shaping LSAI and facilitating valuable or hurtful LSAI to happen. Hence, such investment must be understood as pervasive, historically and politically rooted phenomena. It is understood that rise in demand for arable land in developing countries in the last two or so decades is mainly driven by the global 'triple-F' crises of food, fuel, finance as well as environmental crisis and their convergence. Consequently, governments in the global South have granted excruciatingly a large size of land to private investors and government agencies. This phenomenon has, however, raised profound concerns and debates over food security, livelihood, and socio-economic status of the societies where these investments transpire.

The history of Ethiopia clearly shows that large-scale commercial farming is not a new phenomenon rather; it is an extension of the historical processes of modern state formation which has been practiced for about six decades or so by the three modern regimes (the Imperial, Derg, and EPRDF). These regimes had adopted distinctive development policies and strategies founded on the varied development theories and ideologies of their own eras, which led to the beginning, growth, fall, and rejuvenation of the large-scale private commercial farming in the country. All of the three regimes had offered various incentives to promote large-scale commercial farming in the country though the investment does not have a success history mainly due to policy (government) failure (Paper I and II). All of the regimes perceived that the country has large areas of 'empty' or 'unused' arable land and adequate water resource to irrigate this land in periphery areas of the country. Consequently, all of them had directed large-scale commercial farming (be it state or private owned) in these areas. Above all, the regimes had focused on the availability of the natural resources rather than the people and on the short-term aspirations (profit and foreign currency earning) rather than adopting pro-poor and environmentally sustainable investment that could integrate local people into investment projects in such a way that contribute to the poverty reduction, food security and improvement in livelihoods of the local people. As a result, they are unable to transform and modernize the agricultural sector as per the intention of the people and development plans they wrote on the paper and incessantly advocated (Paper I and II).

Gambella region is one of the lowland areas that attracted the attention of the Ethiopia government and investors for several reasons. First, the region has a massive fertile land suitable for the production of diverse annual and perennial crops with huge irrigation potential. Second, the government perceives that vast areas of land in the region are 'idle' or 'unused' or 'under-utilized' or 'undeveloped' or 'uninhabited' by ignoring customary land rights of the people though the local people use such lands for various purposes. And so, the government has identified about 1.2 million hectares of potential land for LSAI, in Gambella region alone, and made it available for both domestic and foreign investors. About 683,518 ha of land have already been allocated to both local and foreign investors with federal government intervention. Third, Ethiopian government has been using LSAI as a key policy strategy perceiving that the investment could enhance food security and livelihoods of the local people by generating foreign currency, creating jobs, transferring technology, and improving infrastructures (Paper III). However, in contrary to the government's expectation, majority of the investors have cleared forest and savanna lands, which are the source of food, income, medicine, raw materials, forage, etc and disturbed the livelihoods of the local people and the natural environment (Paper IV).

Institutions and land governance systems failed to protect local people's land rights and benefits (Paper III, IV and V). Convivial of LSAI into the agrarian economy such as Ethiopia by itself is not off beam venture because when such investments are correctly governed and employed a business model that fits local community's livelihoods, private investors (both domestic and foreign) can effectively fill capital and technological gaps (the critical challenge of developing country like Ethiopia) in such a way that benefit the economy, investors, and local community. However, this study finds that land governance system adopted by the Ethiopian government is failed to protect local people's customary land rights and benefits. Particularly, the indigenous communities of the Gambella region, such as the Anuak and Nuer among others, have never had formal title to the land they have lived on and/or used (Human Right Watch, 2012). Land is allocated to investors arbitrarily and hastily without prior land survey and mapping. Furthermore, there is no institutional, policy, and legal framework that safeguard local communities against potential costs caused by LSAI as well as ensure the potential benefits of the investment projects are maximized. Supervision, monitoring, follow up, and evaluation systems and practices are found to be extremely weak, as well. As a result, thousands of ha of forest and savanna land was either cleared or enclave by the investors though the portion of land that is actually developed (land actually covered by crops) in the

region is extremely low (Paper III). LSAI has led to the depletion of natural resources such as farmland, water, forests, and biodiversity (Azeb, 2017) and so livelihoods of the local community (Paper IV).

The hegemony of government's power over the local resources and community is epitomized by lack of community participation and consultation in land deals and investment decision making processes. Even though the participation and consultation of the local community is stipulated by the constitution, the result of this study demonstrated that affected communities were neither made aware about the investment nor involved in the decision-making on the land dealings. This is clear violation of Article 92 of the Constitution which states "citizens have the right to full consultation and to the expression of views in the planning and implementation of projects that affect them directly". The formation of the investment and land dealings were done by the government which failed to fulfil the needs of the investment hosting community except imposition of more exasperating and complex changes to the local livelihood systems and the natural environment (Paper II & III). Several studies on LSAI have also reported that meaningful consultation with local populations is almost absent in the land deals (UN, 2010; World Bank, 2010; Cotula, 2011; Dessalegn, 2011; Maru, 2016). This practice of disempowering local community via top-down approach, however, may verify perilous for investors as confrontation from local land holders and/or users emerge at any stage of the investment project cycle.

The business model promoted by the government and adopted by the investors has excluded the local people from the investment value chain and resulted in weak interaction and integration between the investment hosting community and investors (Paper III, IV & V). Due to this, the majority of the jobs created by LSAI projects are found to be seasonal with very low level of indigenous community involvement and extremely low wage rates rather than enabling the local people to improve their living. It is also found that there is no technological transfer from the investors to investment hosting communities. The contribution of LSAI to infrastructural development is extremely low in the study area (Paper III & IV). In general, capitalist investors (who are solely driven by short-term profit motive) and supported by developmental state of Ethiopia (that controls and owns the land) have brought an adversity to the local community by eroding the source of their living and threatening their sustainable (long-term) livelihoods.

10.2.2. The impact of LSAI on the livelihood assets (wealth) status of the affected households

In Ethiopia, the natural capital is a foundation of the livelihood of the local community and a source of economic growth and development. We argue that livelihoods of local community could be sustainable only if external intervention (such as LSAI) is carried out in such a way that complements the community's current livelihoods and its adaptation ability. This study, however, finds that in lowland areas such as Gambella region where almost all of the local community's livelihood depends on the natural resources such as land (and resources embedded in it) and where majority of the people are engaged in subsistence agriculture (the Anuak) and agro-pastoralist livelihood system (the Nuer), LSAI is particularly problematic and has a significant negative impact on the access to livelihood resources. Because, LSAI affects local communities by directly taking their land, which can either be a farm, grazing, and/or forest land, upon which their livelihoods entirely depend. This problem is further intensified and complicated by poor land governance systems and practices which are characterized by corruption, unresponsiveness, lack of transparency and accountability, and incompatibility of LSAI projects to local livelihood systems (Paper III).

The empirical result shows that LSAI has a significant negative impact on the natural and physical capital stock of both the Anuak and Nuer communities. It has the same impact on the social capita of the Anauk community but not of the Nuer. However, the impact of LSAI on human and financial capital is found to be insignificant for both communities though the overall direction and values of the impact were negative. This indicates that if business as a usual (the current scenario) continuous and urgent measures are not taken soon (if the current government continue to push forward its LSAI project without considering the local context and livelihoods), the investment will significantly affect these categories of the asset and worsen the livelihoods of the local people before long. In general, LSAI has a significant negative impact on the overall asset index (composite index) or wealth of both communities implies that LSAI has significantly reduced the wealth status of the affected communities (Paper V). Therefore, we conclude that LSAI has contributed to wealth loss and made investment hosting community poorer than they would have been without the investment. In other words, LSAI is doing more to worsen the livelihood assets/wealth of the investment hosting community than to improve them. We also conclude that the Ethiopian government is failed to safeguard its citizens from the actual and potential harms (loss of asset) caused by the LSAI.

10.2.3. The impact of LSAI on the food security status of the affected households

The primary objective of Ethiopian government is to ensure food self-sufficiency and food security at national and household levels, respectively via modernizing agricultural sector in such a way that improves production and productivity. In this regard, the government perceives that LSAI has several noticeable benefits such as improvement in food security, income, job creation, livelihoods of the local people, rural infrastructures, and in access of the local people to the market, and technology. However, in contrary to the government claim, this study finds that LSAI has a negative impact on food security (food availability, access, utilization, and vulnerability). For example, on average, MAHFP, HDDS, and FCS are significantly reduced due to LSAI. The investment has also, on average, increased the HFIAS scores of the affected households indicating the reduction in food access. It also increased economic vulnerability of the affected households which is observed through a high expenditure share of affected households on food items and high scores CSI. The results estimated through food security index that capture the multi-dimension nature of food security suggests that LSAI has a significant negative impact on the food security status of affected households indicating that the investment is deteriorating food security status of the investment hosting community (Paper V). The main reasons include: low level of job creation and poorly paid salary; destruction and loss of the natural resource (which has been the source of the livelihoods - food, income, home, medicine) of the local people; policy of the government – the policy that promote the production of non-food crops and high value export crops as well as the business model that exclude the local people from the benefit that they would otherwise gain from the investment (Paper V). Particularly, investment projects are poorly integrated to or isolated from the local community due to enclave business model they adopted. The message coming from these findings is that LSAI has contributed to the deterioration of livelihoods of the local people and worsened the food security status of the affected community than they would have been without the investment. We, therefore, concluded that Ethiopian government is unable to respect, protect, and fulfil food security needs of investment hosting community through LSAI.

10.2.4. The impact of women's wage employment on their empowerment

Access of women to the labour market (through employment) is thought to improve their access to resources (socioeconomic resources) and so improve their empowerment level in the family unit (Kabeer, 1999). The main assumption here is that women's access to paid work (income) could play a significant role in enabling them to have access to power (within

the household or outside side the household). LSAI, as the government frequently claims is one of the agricultural sub-sectors expected to improve access of women to labour market. This study, however, finds that women's wage employment does not have impact on the their self-worth, household consumption related decision, asset related decision making power, health related decision making power and so their overall decision making power. In general, despite the positive sign of the impact values, the participation of married women in paid work in the study area has insignificant effect on their empowerment level (Paper VI). It can, thus, be concluded that women's access to paid employment in LSAI projects does not improve their self-worth and decision making power (empowerment) mainly due patriarch culture of the community and low wages.

10.3. Theories and Empirics

In an attempt to explore the agrarian economy (mainly the interactions as well as effects of the capitalist mode of production on smallholder farming); the agrarian political economists have asked four key questions: in a given society, 'who owns what?' (the resources), who does what? (the labour), who gets what? (the distribution), and what do they do with it?' (Bernstein & Byres, 2001). In this study we focused on the two of Bernstein's key questions in agrarian political economy "who owns what" and "who gets what". The local community does not have any legal rights over land and so owns nothing (Paper IV). Following the declaration of the constitution that articulates land as property the state, the state controls and owns the land and allocates it to what it calls 'development investors' without the knowledge and consent of the local people (who owns what?). From this research it appears that the investors stand to gain the most (via land and money grabbing) from LSAI. Investors have got access to land for the cheapest price, secure loan from the banks, enjoyed various investment incentives, and so obtain greater return on their investment. Moreover, some government officials and employees (acting as the middlemen) at various levels also get short-term gains in the form of corruption (money grabbing) - revenue flows or other benefits (who gets what?). Corruption in the form of bribes and greasing are the critical problems in the LSAI sector in Gambella Region (OPM, 2017; Azeb, 2017).

The Neoclassical theory argues that LSAI is utterly and exceptionally beneficial to the investment host countries and is a prerequisite for accelerated and sustainable growth and development (Hill, 2000; Jenkins & Thomas, 2002; Sornarajah, 2010; Mohammed, 2012). It claims that such investment could contribute to national economy in general and rural development in particular by bringing in capital, technology and know-how and so improve

agricultural productivity and food security, create job opportunities, improve market access, enhance infrastructures, boost export opportunities, and increase government revenue. In doing so, the investment could improve livelihoods of the local community. However, the findings of this study empirically contradict the thesis of the neoclassical theory that only advocates positive aspects, prescribes LSAI mainly the foreign ones as a medicine for poor country's problems, and ignores the dark side of the investment.

Even though, the results of this study are in line with the arguments of dependency theory which claims that LSAI lead to expropriation and loss of land as well as forest degradation, disempowerment and dispossession of the poor, unemployment/underemployment, local food insecurity, conflict, and poverty (Seyoum, 2001; Engstöm, 2009; Von Braun & Meinzen-Dick, 2009; Robertson & PinstrupAndersen, 2010; Havnevik, 2011; Lavers, 2012b), we disagree with its alternative solution of adapting an autarky economic system and being pessimistic about LSAI. In general, our results confirm the middle-path theory thesis that argues if LSAI is not managed properly (due to government failure – weak institutions and governance system, lack of transparency and participation, corruption... as well as market failure – unregulated private investors that focus on short term profit at the expense of local people's livelihoods and natural environment), such investment has an adverse impact on the livelihoods of the local people. We argue that LSAI can contribute to the improvement of local people's livelihood only if the policy, institutional, legal, and regulatory frameworks are strong enough to properly manage such investments, protect local community from the potential and actual risks or adverse impacts, and ensure local people's rights and benefits. Besides, the contribution of such investment could be beneficial when investment hosting government uses proper business model(s) that effectively integrate local people into the investment value chain.

Within the developmental state framework, Evans came up with embedded autonomy thesis, where the state serves as a catalytic agent and leader and partners with the private sector to accelerate the development process of the country (Evans, 1995). To achieve this aspiration, four key roles of the state are pointed out in the literature: *custodian/regulatory, producer/demiurge, the midwife, and the husbandry* (Evans, 1995; Cypher & Dietz, 2009). However, the result of this study shows that the developmental state of Ethiopia is also failed to play some of these roles and thus is unsuccessful in meeting the expectation that it repeatedly promised to the public. For example, even if the government has devised various investment laws, rules, regulations, and investment contracts (custodian role), it failed to

enforcing them in such a way that safeguard local community and the natural environment from actual and potential risks and harms (food insecurity, destitution, livelihood disruption, deforestation) created by the private investors. Particularly, investment contracts are developed in favor of the investors and ignored local context, local people's voices, involvement, and benefits.

The government has been playing producer role by investing in basic social and physical infrastructures though these infrastructures are extremely meagre in the study area. It has been playing the midwifery by providing various types of incentives to attract both domestic and foreign investors (LSAI). However, inviting the investors without adequate preparation at federal, regional, and local levels (for example without installing transparent and accountable land governance systems; creating competent, effective, efficient, and responsive investment supporting institutions and personal; conducting proper investment land survey and mapping; carrying out feasibility, agro-ecological, and environment impact evaluations, deciding proper business model that could generate win-win-win situation; and consulting and involving all stakeholders and mainly investment hosting communities) is working for the failure. The government has playing limited husbandry roles due to lack of national research institutions capacity to generate knowledge (Maru, 2016) that would inform policy makers and enable them to make evidence based decisions.

With regard to intra-household power relation (gender aspect), the findings of this study are consistent with the argument of the resource in culture theory, which states that married women's employment in LSAI projects does not have impact on their empowerment mainly due to the patriarchal culture prevailing in the community and low level of wages. Grounding ourselves on rich first hand and secondary data, we generally concluded that state-led LSAI projects designed to improve the livelihoods (food security, wealth, and women empowerment) of the investment hosting community did not generate the expected outcomes and failed to benefit investment hosting community. This conclusion is in line with the report of the World Bank survey which acknowledges that many of LSAI projects in Africa did not generate expected benefits, however, indeed 'contributed to asset loss and left people worse off than they would have been without the investment' (World Bank 2010, p. 71). It confirms several case studies conducted in Sub-Saharan African (for example, in Democratic Republic of Congo, Liberia, Mozambique, Tanzania, and Zambia that concluded that LSAI are not fulfilling their promise of job creation for local people, deprived women, overlook local people's legal rights and legal procedures of getting land, and are environmentally destructive

(Scoones, 2010). The conclusion also confirms the assertion that LSAI has potential negative impacts on food security and livelihoods of the local people in Ethiopia reported by various researchers and institutions (Cotula *et al.,* 2009; Dauvergne & Neville, 2010; Fisseha, 2011; Maru, 2011; Oakland Institute, 2011; Rahmato, 2011; Oxfam, 2011;Lavers, 2012a; Lavers, 2012b; Baumgartner, *et. al.,* 2013; De Zoysa, 2013; Bereket, 2014; Keeley, *et. al.,* 2014; Bamlaku *et al,* 2015; Barbanente & Aisbett, 2016; Dereje, 2016; Maru, 2016; Azeb, 2017).

Therefore, mere transfer of the natural resources upon which the entire livelihoods of the local people depend to highly mechanized large-scale commercial farming (by the name of investment or development) without proper investment governance systems could not solve the problems of food insecurity and poverty of the investment hosting communities, rather it will deepen and make them worse. In general, this study has improved our understanding of the actual impact of LSAI on the food security, wealth, and women empowerment status in lowland areas such as Gambella. The evidence generally shows that LSAI is resulted in less favourable (disappointing) outcomes calling for all stakeholders to intervene and take quick and proper measures that would save the livelihoods of the local people and the natural environment from being perish in a little while.

10.4. Policy Recommendations

10.4.1. For the Government

- *The investment projects need to integrate socio-economic and environmental components that can maintain sustainable development of the country.* LSAI related decisions taken today will have a significant corollary on the livelihoods and food security of the local people for decades coming up. Hence, to ensure the long-term sustainability of natural environment and livelihoods of the local rural people, natural resources such as land, water, biodiversity, and other resources embedded in land need to be considered before, during, and after large-scale agricultural land is allocated to commercial farming.
- *Social and Environmental Impact Assessments should be carried out by independent body before government transfers large tracks of lands to the investors and their results should be made public.* The policy framework should be designed and/or revised in such ways that incorporate the three pillars (economic, social, and environment) of sustainability by adopting a holistic and an integrated approach that utterly considers the interests and rights of local/indigenous people.

- *Policy changes relating to the governance of land and investment projects are needed.* The government needs to reform its investment land governance systems in such a way that shun arbitrary, hasty, and sloppy appropriation of land and install more inclusive, participatory, accountable, and transparent systems. Moreover, land deals should be carried out in an open and transparent way, and their results should be made public. Besides, systems for grievance handling and redress need to be set up at federal, regional, and district levels, including for human rights violation and environmental degradation
- *Concrete information management platform and systems are needed to continually assess and supervise LSAI projects and their outcomes.* The government should set up all-inclusive, accurate, sensible, timely, transparent, and accessible data platform regarding both proposed and existing LSAI which could provide analysts, experts, policymakers, and planners with the information that they need so as to monitor, mentor, evaluate the performance and actions of the investors and take timely measures to alleviate the adverse impacts of LSAI.
- *Coordination and integration between and/or among government institutions (at federal, regional, and local levels) mandated to administer large-scale land acquisition and investment projects need to be strengthened*. The confusion observed in mandate between various government agencies should be addressed by revising the mandates of each institution.
- *It is vital to take into consideration the local context and maintain an improved balance of the privileges and benefits of the local people (who are found to be the less powerful groups) in the negotiation process with the government and private investors.* This attempt should be aligned with the broader rural development programs intended to improve the livelihoods of the investment hosting communities and offer alternative livelihood systems that are socio-economically inclusive and environmentally sustainable.
- *Investment land contracts need to be designed in a participatory manner that incorporates local people's interests, voices, and benefits.* The government should make sure that land contracts comprise unambiguous, fair, candid, and enforceable benefit-sharing systems with the local people. The government can do this by imposing compulsory requirements on investors during initial stage of the investment project proposals and contractual agreements about the possible employment opportunities to the local people, development of infrastructure in the project vicinity, technological

transfers and so contribution to the local livelihoods and food security. In the occasion when the investors failed to deliver agreed upon benefits and breach the contractual agreement terms, they must be held accountable and appropriate legal measure must be taken according to the law of the state.

- *The government should install transparent, responsive, and participatory, investment land and projects monitoring and evaluation systems and strictly adhere to them while implementing LSAI polices, projects, and contracts*. These systems need to be designed in such a way that ensures accountability and rule of law (rather than rule of man) and holds government institutions and employees liable when they failed to follow them. In addition to this, the system should allow local community to know the expected benefits and costs of the proposed LSAI projects including the details of the contracts. Particularly, to effectively monitor, mentor, and regulate the actions and behaviour of the investors, the government should build the capacity of investment supporting institutions (at the regional and district levels) so that they will be held accountable in cases they failed to discharge their duties and responsibilities
- *The local community who are more directly affected by the decision and actions related to LSAIs must have their own say in the dealings.* There is a need for inclusive discussion in investment hosting areas regarding the potential benefits and risks of the projects, land use plan and pattern, pathways of contribution to the local livelihoods, and cooperation and integration between the investors and the local people. The governments should inaugurate this consultation with all stakeholders (the public, private, and civil society sectors) before commencing investment plan, project, and actions that may affect the natural resources and so the livelihoods of the local people, where the indigenous (small farmers and agro-pastoralist communities) need to be central to it. The consultation should be carried out in reference to the principle of Free Prior and Informed Consent (FPIC) of the local people as well as their traditional rules and indigenous decision-making systems. It should allow local people to actively participate at all stages of the land transfer related decision making process and make both the government and investors accountable when they failed to do so.
- *Inclusive and fair business models that encourage a strong collaboration, integration, and synergy between the local people (farmers and herders) and the private investors are needed.* The government should encourage and insist on business models that integrate investment hosting communities and investors and develop them based on a

multi-actors participation (federal, regional, and local governments, communities, investors, and civil society organizations). The models should be leading to creation of the positive spill-over such as employment opportunities, technological transfers, and better social and physical infrastructure. Empirical literature confirms business models such as contract farming[66], outgrowing, Nucleus Estate Model[67], and/or Multipartite Model[68] (though they are not a silver bullet) that consider the local context and livelihood systems often result in positive outcomes.

- *Production of food crops is vital to reduce food insecurity of the local people.* Besides focusing on the non-food and export oriented commodities, the government need to incorporate a clause in the contractual agreement that encourage and allow the investors to cover some part of their land by food crops and supply a certain percentage of their production in the local market, at the reasonable prices. The government should be proactive regarding the contribution of LSAI to local food security, in general and ensuring market linkages between investors and the local people, in particular, rather than applying a 'try-wait-and- see' approach.
- *Government's policy measure that promote women's access to labor market need to be revisited in such a way that ensures sufficient wages and checks patriarchal culture that together weaken women-self worth and decision making power and so their empowerment.* First, the government should devise policy that ensures minimum wage levels, mainly for those citizens working in the private sector and save them from the exploitation. Then, in consultation with all concerned bodies, it should improve the wage rates that consider the location of the projects, type of work, inflation, and so on. Fair compensation could lend a hand in changing negative attitudes regarding wage employed women and improve their self-worth. In the long-run, in remote areas such as Gambella, government in collaboration with the investors and NGOs need to promote,

[66] According to Eaton & Shepherd (2001) contract farming is agricultural business model that involves concords between smallholder and/or medium farmers and downstream large-scale agricultural companies whereby the farmers agree to provide a certain quantity of agricultural commodities at a certain price. Moreover, contract farming often includes the conditions in which agricultural company provide some major inputs to farmers such as seed, fertilizer and technical advice. This type of model is intended to reduce the risk for both buyers and sellers by providing fixed prices and so a greater certainty of a return on investment.

[67] Investors have a processing or packing plant as with the centralized model, but also have a plantation managed for their plant. Contract farming is used to guarantee adequate supply for the plant.

[68] In addition to investors and farmers other organizations are involved in the project, often government agencies and grower cooperatives. Under this model investors may have little contact with individual farmers, instead farmers interact with their group or local government, often with very informal contracts, who in turn are responsible for delivering product to investors.

expand, and provide opportunities for women and girls to have schooling so that they can be eligible for better paying jobs.

- *There are alternatives that can work and complement the existing investment.* In addition to adopting the business model that integrate the local people to the investment value chains, the government need to look at other investment alternative models (that include diversified production systems of indigenous community and promote people-centred and empowerment approach) and complement the current LSAI projects. For example, in region like Gambella which is rich in natural resources, government need to design and promote alternative development initiatives such as game ranching, controlled hunting, ecotourism, fishing, and improved livestock rearing that could benefit the investors, government, and the local people without damaging the ecosystem, flora and fauna, and the livelihoods of the people rather conserve, enhance, and sustain them.
- *Even though the seven responsible agro investment principles proposed and promoted by the World Bank, FAO, IFAD, UNCTAD as well as the Voluntary Guidelines for the Governance of Tenure of Land, Fisheries and Forest developed by FAO are neither binding the states nor private actors, there is a need to consider them in investment land and project governance.* These principles urge the investment hosting governments and private investors to respect local people's land rights, their food security, consult the local community, ensure transparency and good governance, and ensure social and environmental sustainability of the projects. The government, therefore, should include these principles into its policy and legal frameworks as well as contractual agreements and enforce them.

10.4.2. For Large Scale Agriculture Investors

- Large Scale Agriculture Investors can encourage sustainable and inclusive contract schemes that enable them to win the trust of the local people, improve their relationships, enjoy better acceptability, and achieve their objectives. They can do these by recognizing and respecting local land rights, adopting proper business model that integrate the local people into their projects, supporting the local people regardless of the contractual agreement (providing training or technical advice, seeds, fertilizer, etc) – corporate social responsibility, and respecting terms and conditions indicated in the contractual agreement.
- One of the serious problems of the local community is food insecurity. Although the primary objective of investors is profit, they do have social responsibility to contribute to

local food security. The investors can contribute to local food security by allocating a certain amount of their land for food crop production and selling it in the local market at a reasonable price. They should also implement their projects in such a way that protect the natural environment by adopting sustainable farming system. The investors should also create a consultation system that facilitates their interaction and communication with the local people and strengthen their relationships. This system should include effective grievance handling mechanisms intended to address any complaints and discontents of the local people proactively.

- The investors should properly discharge their corporate social responsibility duties by respecting and executing the Seven Responsible Agro Investment Principles as well as the Voluntary Guidelines for the Governance of Tenure of Land, Fisheries, and Forest developed by the international institutions.

10.4.3. For Civil Society Organizations

- Civil society organizations do have a key role in making the government and private investors responsive and responsible for the livelihoods of the local people and the natural environment. They should establish a consultation forum or mechanism that brings all actors of LSAI together in such a way that ensures the inclusion of the local community's voices and concerns in the land deals. They should put pressure on and influence the government and private investors to adopt a proper business model, establish transparent and accountable land governance system, and respect the rights and benefits of the local people. They should also raise the awareness of the government, investors, and local people about inclusive and sustainable LSAI through campaigns and education.

10.5. Further Research

LSAI has a wide range of impacts on various components of the livelihoods. Our preliminary observation shows that majority of investors (mainly the domestic ones) are those who have direct or indirect linkage with the ruling party. Therefore, it would be worthwhile to explore the role of politics in shaping LSAI in the areas where such investments are extensively practices. Moreover, from our observation, KII, and FGD we understood that the impact of LSAI on the psychology (emotions, confidence, self-worth, trust, etc) of the investment hosting community is intense. We, therefore, urge researchers in this discipline to examine the issue in depth.

The government has been investing a huge amount of public resources in mega sugar estates across the country. Therefore, studies that carry out a comparative analysis and examine socio-economic impact of private and state large-scale agricultural farming are worthwhile. This study did not analyze the impacts LSAI on intra-household food security status. To advance our empirical and theoretical understanding regarding the impact of LSAI on the intra-household food security is, thus, valuable. Particularly, the impact of such investment on women in agriculture needs specific attention, since even access of women to a small plot of land fortifies household food and livelihood security. Therefore, studies that examine how LSAI affect access of women to land and their food and livelihood security are of the essence. This study did not capture the issue of food sovereignty and so we suggest a comprehensive study that quantifies the impact of LSAI on this aspect of food regime. Moreover, even if the calorie content of some wild food are studied, more studies are needed to look indepth into the nutritional values and contents of each forest food which are common among the Anuak community.

The current government of Ethiopia has established and re-established various institutions meant to govern LSAI. Albeit the government claims that such rapid institutional changes are initiated to cope up with and efficiently administer the ever-growing LSAI in the country, the level of their effectiveness and the need for such swift changes require a cavernous systematic empirical investigation. There is also an urgent need to pursue investment alternatives that would enhance food and livelihood security of the local people. These alternatives must be based on the empirical evidences that can inform policy makers and planners. For example, eco-tourism businesses would be suitable for regions such as Gamblella which are rich in natural resources. However, further in depth studies that investigate the cost and benefits of the industry as well as its socio-cultural, economic, and environmental impacts including feasibility study in the region, is worthwhile.

Finally, in all of the impact studies proposed above, we urge researchers who have interests in studying the impacts of LSAI to use proper impact evaluation methodologies, which will give them the power to persuade policymakers based on actual evidences on the ground. We also advise those who want to explore political, psychological, and gender issues in depth to employ appropriate methodology and generate comprehensive and reliable information that will inform policy decisions.

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Annexes

Annex I: The Household Survey Questionnaire

Addis Ababa University
College of Development Studies

Center for Rural Development
HOUSEHOLD SURVEY QUESTIONNAIRE

Dear respondent! The aim of this questionnaire is to collect data for the study entitled "The Impact of Large Scale Agricultural Investment on the Livelihood of Local People in Gambella, Ethiopia". Your household has been randomly selected to respond to the questionnaire. I would be very grateful if you would spare some time to respond to the questionnaire. The information obtained will be treated with confidentiality and only used for academic purpose. I am grateful for your time and assistance in the study!

Part I: Introductory Information

Region: Gambela				
1.1. Zone/Special woreda 1= Anuak 2=Itang				….|___|
1.2. Woreda 1= Abobo 2= Itang				….|___|
1.3. Kebele (Abobo): **With investment** 1=Perpengo 2=Chekchala 3= Pekudi 4=Chibo Kir 5=Terkudi	|___|	**Without investment** 1=Potelam 2=Tegni 3=Dumbang 4=Tiyerchru 5=Abermetti 6=Lumtak	|___|	
Kebele (Itang): 1=War 2=Achua 3=Pulkod 4= Piluwal 5=Itangkir 6=Watgach	|___|	1=Adong 2=Awagn 3=Bilijakoke 4=Drong 5=Akura 6= Baziel	|___|	
1.4. LSAI Name: 1) _____ 2) _____ 3) _____ 4) _____				
1.5. Agro-ecology type: 1=Highland 2=Midland 3=lowland				….|___|
1.6. Date of the Interview :				
1.7. Enumerator Name:_____ Signature:_____				
1.8. Date of supervisor checking |__|__| / |__|__| / 2018 Day Month				
Supervisor name _____ Signature:_____				

To be completed by Supervisor

Table 1: General Information

To be completed at the field by enumerator before the interview

Part II: Respondent Data

Table 2: Information about the Respondent (household)

S. No	Question	Response Options	Code
2.1.	Name of respondents:		
2.2.	Sex of the respondents	1=Male 2=Female	….|___|
2.3.	Household Type	1=Male head 2=Female head	….|___|
2.4.	For male head, number of wives	1=one 2=two 3=three and above	….|___|
2.5.	Ethnicity of the respondent	1= Anuak 2=Nuer 3 = Others	….|___|
2.6.	Respondent category:	1= treatment 2=comparison	….|___|

Part III: Household Size and Characteristics

Table 3: No. of household members by age and sex group

S. No	Age group	No. in the household			S. No	Age group	No. in the household		
		Boys	Girls	Total			Male	Female	Total
3.1.	<1 year				3.7	10-12 years			

3.2	1-2 years				3.8	12-14 years			
3.3.	3-5years				3.9	14-16 years			
3.4.	5-7 years				3.10	16-18 years			
3.5	7-10 years				3.11	18-30 years			
3.6	10-12 years				3.12	30-60 years			
					3.13	Above 60 years			

Part IV: Demographic characteristics

Table 4: Demographic characteristics of sample household members

S.N	Name of household members	4.1 Relation to head	4.2 Sex (Male=1, Female=2)	4.3 Age (Years)	4.4 Marital status	4.5 Religion	4.6 Highest level of education *	4.7 Main occupation
1		….|___|			…|___|	….|___|	….|___|	….|___|
2		….|___|			…|___|	….|___|	….|___|	….|___|
3		….|___|			…|___|	….|___|	….|___|	….|___|
4		….|___|			…|___|	….|___|	….|___|	….|___|
5		….|___|				….|___|	….|___|	….|___|
6		….|___|				….|___|	….|___|	….|___|
7		….|___|				….|___|	….|___|	….|___|
8		….|___|				….|___|	….|___|	….|___|
9		….|___|				….|___|	….|___|	….|___|
10		….|___|				….|___|	….|___|	….|___|
11		….|___|				….|___|	….|___|	….|___|
12		….|___|				….|___|	….|___|	….|___|

Codes for responses to Table 1

Code (4.1)	**Code (4.4)**	**Code (4.5)**	**Code (4.6)**	**Code (4.7)**
Head…..(1) Spouse....(2) Son/daughter (3) Father/Mother(4) Sister/Brother (5) Niece/nephew (6) Other relative of head or spouse...(7) Unrelated person…(8)	Single…….(1) Married…...(2) Divorced….(3) Widowed…(4) Separated (5) Polygamy(6)	Muslim….(1) Orthodox…(2) Protestant…(3) Catholic……(4) Others ……(5) (specify)_____	*Write 1-12 for grades attained (20) for certificate gained after grade 10 or 12 (30) for diploma (40) for degree and above (50) for religious school (60) – for adult education (99) – for illiterate	1= Crop farming 2= Livestock and poultary keeping 3= Trading in livestock & livestock product 4= Trading in agricultural products 5= Casual off-farm labor (paid) 6=Household/domestic/housewife(unpaid) 7=Childcare/domestic work (unpaid) 8=Artesian 9=Formal salary employees (e.g. civil servant) 10= Trading/business 11= Chief/village elder 12= Child/student 13= Retired/elderly 14= Other/specify_____

Part V. Socio-economic characteristics

5.1. Natural Capital

		Response options	Code
5.1.a	Does your household hold land?	1 = Yes → **go to table 5** 0 = No	….|___|

5.1.1. Land asset and Tenure

Table 5: Land Resource and Tenure

5.1.1b Plot No.	5.1.1c Size in ha/ Timade	5.1.1d Fertility	5.1.1e Use/cover	5.1.1f Right	5.1.1g Source	5.1.1h Investment	5.1.1i Ownership of the land
1		□.|___|	□.|___|	□.|___|	□.|___|	□.|___|	□.|___|
2		□.|___|	□.|___|	□.|___|	□.|___|	□.|___|	□.|___|
3		□.|___|	□.|___|	□.|___|	□.|___|	□.|___|	□.|___|
4		□.|___|	□.|___|	□.|___|	□.|___|	□.|___|	□.|___|
5		□.|___|	□.|___|	□.|___|	□.|___|	□.|___|	□.|___|
		(code) 1=fertile, 2=moderately fertile, 3= infertile	**(code)** 1=crop cultivation 2=grazing, 3=forest product collection 4= perennial crop production 5=homestead	**(code)** 1=own registered 2= own unregistered 3=communal land 4=open access 5=others--	(code) 1=Inherited from family/relatives 2 =gift from friend, 3=government distribution 4= purchase 5=sharecropping in 6= rent in 7=communal	**(code)** 1=irrigation 2=terraces 3 =trees 4 =fence 5=others	**(code)** 1=husband 2=wife 3=joint 4=other relative 5=others

S.No	Questions	Response options	Code
5.1.1j	How do you feel about the existing tenure/property rights system of farmland?	1=Very bad 2=Bad(sad) 3= Satisfactory 4=Good 5=Very good	□.|___|
5.1.1k	Has your landholding changed during the past five years?	1=Yes → **go to Q3.1.1l and 3.1.1m** 0= No	□.|___|
5.1.1l	How did it change?	1=Decreased 2= Increased	□.|___|
5.1.1m	Why did it change? ***(Multiple reposnse is possible)***	1=Investment acquisition → **go to 3.1.1o** 2=Redistribution 3=Inheritance 4=Rent in/out 5=Other, Specify	□.|___| □.|___| □.|___| □.|___|
5.1.1n	Do you think that your land is sufficient to your crop production?	1=Yes 0=No	□.|___|
5.1.1o	If you lost land due to investment, for what purpose did you use the land before the acquisition? ***(Multiple reposnse is possible)***	1=Crop production 2=Grazing 3=Grass land 4=Forest food 5=Source of wood fire 6=Other, specify	□.|___| □.|___| □.|___| □.|___|
5.1.1p	How far is your farmland from your homestead?	_____hour(s)/minutes	

5.1.2. Ownership and Production of perennial crops

Table 6: Ownership and Production of perennial crops from January 2016 –January 2017

S.N	5.1.2a Type of crop	5.1.2b Does your household own any of these trees? 1=Yes → **go to 5.1.2c to 5.1.2d** 0=No	5.1.2c Area cultivated (ha)	5.1.2d No. of trees owned	5.1.2e Last year, did your household produce any of these trees? 1=Yes → **go to 5.1.2f** 0=No	5.1.2f Production (qt) or Kg
1	Mango	….|___|			….|___|	
2	Banana	….|___|			….|___|	
3	Papaya	….|___|			….|___|	
4	Coffee	….|___|			….|___|	
5	Khat	….|___|			….|___|	
6	Avocado	….|___|			….|___|	
7	Guava	….|___|			….|___|	
8	Cassava	….|___|			….|___|	
9	Others specify	….|___|			….|___|	

5.1.3. Seasonal Crop production

5.1.3a	Did your household produce any crop during the last year? (January 2016 –January 2017)	1 =Yes → **go to table 7** 0 = No	….|___|

Table 7: Crop production during the last production year (January 2016 –January 2017)

S.N	5.1.3b Type of crop produced	5.1.3c Area cultivated (ha)	5.1.3d Production (qt) or Kg
1	Maize		
2	Sorghum		
3	Finger millet		
4	Teff		
5	Wheat		
6	Barely		
7	Oats/aja		
8	Groundnuts		
9	Flax *(Telba)*		
10	Sunflower (*suf*)		
11	Sesame		
12	Haricot bean/boloke		
13	Horse bean/bakela		
14	Pea/ater		
15	Lentils (misir)		
16	Fenugreek/abish		
17	Soya bean (akuri ater)		
18	Chickpea/shimbira		
19	Potato		
20	Beet roots/keysir		
21	Kale/የሀበሻ ጎመን		
22	Cabbage/Tekil gomen		
23	Onion		
24	Tomato		
25	Carrot		
26	Sweet potato		

5.2. Movable Asset Profile of Households (Physical Capital)

S.N	Type of Asset	5.2a Does your household own any of the following? 1= Yes → **go to 3.2b to 3.2d** 0= No	5.2b Number owned by husband?	5.2c Number owned by wife	5.2d Number jointly owned
01	Wrist Watches	….|___|			
02	Radios	….|___|			
03	Television	….|___|			
04	Mobile Telephone	….|___|			
05	Tape recorders	….|___|			
06	Tables	….|___|			
07	Chairs	….|___|			
08	Beds (*yeshibo*)	….|___|			
09	Bed (*yetawula*)	….|___|			
10	Jewelry (Gold)	….|___|			
11	Jewelry (bronze)	….|___|			
12	Jewelry (silver)	….|___|			
13	Stove (gas/fuel)	….|___|			
14	Other, specify	….|___|			

5.2e	Does your household own a house/dwelling?	1 =Yes → **go to questions 3.2e1-3.2e7** 0 = No	….|___|
5.2e1	Who owns it?	1=husband 2=wife 3=joint 4=others (specify)	….|___|
5.2e2	How many bed rooms + living room does your household occupy?	|__|__| Rooms	
5.3e3	How many houses do your household own?	1=one 2=two 3=three and above	….|___|

5.2e4	What is the major material of the roof of your house? *Observe and record. Ask the question if you have doubts.*	1= Thatch (grass/straw) 2 =Corrugated iron/zinc 2 =Cement/concrete 3 =Plastic 5=Other, specify_____	….|___|
5.2e5	What is the major material of the outside walls? *Observe and record. Ask the question if you have doubts.*	1 =Mud/mud bricks 2 =Wood 3 =Thatch (grass/straw) /bamboo 4 =Corrugated iron/zinc 5 =Stone/burnt bricks 6 =Cement/concrete 7 =Other, specify_____	….|___|
5.2e6	What is the major material of the floor? *Observe and record. Ask the question if you have doubts.*	1= Earth/mud 2 =Wood 3 =Stone/ bricks 4 =Cement/concrete 5 =Other. Specify:	….|___|

5.2e7	What is the main source of lighting for your house? ***Do not read all answers! Simply ask the question and write the code.*** ***(Multiple reposnse is possible)***	1 =Candle 2 =Electricity 3 =Firewood 4 =Oil lamp 5 =Pan lamp 6 =Torch light 7 =Other, specify	….|___| ….|___| ….|___| ….|___|
5.2e8	What is your main source of energy for cooking? ***Do not read all answers! Simply ask the question and write the code.*** ***(Multiple reposnse is possible)***	1 =Wood 2 =Charcoal 3 =Gas 4 =Kerosene 5 =Electricity 6 =Other. Specify: _____	….|___| ….|___| ….|___| ….|___|
5.2e9	How long does it take to go and get the source of energy for cooking and come back? *Write ZERO (00) if source is in the premise/dwelling or if sellers come to the house.*	|__|__|__|Hours/minutes	
5.2e10	What type of toilet facilities does your household use? ***Do not read all answers! Simply ask the question and write the code.*** ***(Multiple reposnse is possible)***.	1 =Flush latrine/toilet with water 2 =Traditional pit latrine (no water) 3 =Partly open pit (no roof or no wall) 4 =Communal Latrine 5 =Bush 6 =Other. Specify :_____	….|___|
5.2e11	What is the main source of drinking water for your household? ***Do not read all answers! Simply ask the question and write the code.*** ***(Multiple reposnse is possible)***.	1= Piped water (into dwelling, yard or plot) 2 =Public tap 3 =Borehole with pump 4 =Protected dug well 5 =Protected spring 6 =Rain water 7 =Unprotected well 8 =River, stream or pond 9 =Other, specify	….|___| ….|___| ….|___| ….|___|
5.2e12	Usually, how long does it take to go to the main source of water, get water and come back? *Write ZERO (000) if water is on premise.*	|__|__|__|Hours/minutes	
5.3.	How much it takes you to reach the nearby market place?	|__|__|__|Hours/minutes	
5.4.	How much it takes you to reach the nearby town?	|__|__|__|Hours/minutes	
5.5.	How much it takes you to get motorized road transport	|__|__|__|Hours/minutes	
5.6.	What means of transport you **mostly use** to visit nearby market or town?	1 =Vehicles 2=Motor cycle/Bajaj 3= Cycle 4=Animals 5=Foot 6= Other, specify	….|___|

5.7. Productive Asset Profile of the Household (Physical Capital)

S.N	Type of Asset	3.7a Do you own any of the following? 1= Yes → **go to questions 3.7b to 3.7c** 0= No	**3.7b** Number owned	3.7c Who in the household owns the item? 1=husband 2=Wife 3=Joint 4=Others
01	Plough yoke			
02	Plough beam			
03	Plough (traditional)			
04	Plough (modern)			
05	Sickle			
06	Pick axe			
07	Axe			
08	Pruning/Cutting shears			
09	Hoe			
10	Spade or shovel			
11	Whip (leather)			
12	Traditional beehive			
13	Modern Beehive			
14	Knapsack chemical sprayer			
15	Mechanical water pump			
16	Motorized water pump p(diesel)			
17	Stone grain mill			
18	Motorized grain mill (diesel)			
19	Broad bed maker (oxen-pulled)			
20	Small tractor			
21	Hand-held motorized tiller			
22	Shelf for storing goods			
23	Energy saving stove (lakech, mirt			
24	Sewing machine			

5.8. Livestock Asset of the Households

S.N	Type of Livestock	5.8a Do you own any of the following? 1=Yes → **go to questions 3.8b to 3.8c** 0= No	5.8b Number owned	5.8c Who in the household owns the item? 1=husband 2=Wife 3=Joint 4=Others
01	Oxen			
02	Bulls			
03	Young bull			
04	Local cows			
05	Crossbred Cows			
06	Local heifers			
07	Crossbred heifers			
08	Local calves			
09	Crossbred Calves			
10	Sheep			
11	Goats			
12	Donkeys			
13	Horse			
14	Mule			
15	Camel			
16	Poultry			
17	Other_____			

5.9. Social Capital of the Households

5.9.1. Community connection

S.N	Type of Organization/group	3.9.1a Have you been a member of any of the following? 1= Yes → **go to 3.9.1b -3.9.1c & 3.9.1h** 0= No	3.9.1b Who is a member of the organization/group? 1=Husband 2=Wife 3=Boys (above 18 years) 4=Boys (below 18 years) 5=Girls (above 18 years) 6= Girls (below 18 years) 7=1 and 2 8=all	3.9.1c How actively does this person participate in this group? 1=leader 2=very active member 3=somewhat active member 4=inactive member
01	Farmers' cooperative	….|___|	….|___|	….|___|
02	Trade or business association	….|___|	….|___|	….|___|
03	Religious/spiritual groups	….|___|	….|___|	….|___|
04	Political Party	….|___|	….|___|	….|___|
05	Iddir/burial society	….|___|	….|___|	….|___|
06	Equib/credit or saving group	….|___|	….|___|	….|___|
07	Debbo/work group	….|___|	….|___|	….|___|
08	School Committee	….|___|	….|___|	….|___|
9	Health Committee	….|___|	….|___|	….|___|
10	NGO (e.g. red cross society)	….|___|	….|___|	….|___|
11	Others (specify)_____	….|___|	….|___|	….|___|

3.9.1d	Do you think that by belonging to the informal institutions (Iddir, equib, debbo…) you have benefited something valuable?	1 =Yes → **go to Question 3.9.1e &3.9.1k** 0 =No	….|___|
3.9.1e	What main benefit did you get from joining this group? ***(Multiple response is possible)***	1 =Improves my household's income 2= Important in times of emergency/in future 3=Spiritual, social status, self-esteem 4 =Improves my household's access to social services 5 =Other (specify)_____	….|___| ….|___| ….|___|
3.9.1f	Do you think that by belonging to the formal institutions (cooperatives, business associations, political parties. religious rgoups…) you have benefited something valuable?	1 =Yes → **go to Question 3.9.1g & 3.9.1k** 0 =No	….|___|
3.9.1g	What main benefit did you get from joining this group? ***(Multiple response is possible)***	1 =Improves my household's income 2= Important in times of emergency/in future 3=Spiritual, social status, self-esteem 4 =Improves my household's access to social services 5 =Other (specify)_____	….|___| ….|___| ….|___|
3.9.1h	Compared to five years ago, does participation of members of your household increased or decreased or remained the same? [Enumerator: time period can be clarified by situating it before/after investment]	1 =Increased→ **go to Question 3.9.1g & 3.9.1i** 2 =Decreased→ **go to Question 3.9.1g & 3.9.1i** 3 =No change	….|___|
3.9.1i	Why did your participation increase or decrease?	1=Due to LSAI support or nuisance 2=Due to lack(support) of NGOs 3=Due to lack(support) government 4=Due to family (lack)support or interest 5=Due to village community (lack) support or interest 6= Other(specify)_____	….|___|

3.9.1k	Compared to five years ago, do you think that the benefit your household get increased or decreased or remained the same? [Enumerator: time period can be clarified by situating it before/after investment]	1 =Increased 2 =Decreased 3 =No change	….|___|
3.9.1l	Why did the benefit increased or decrease?	1=Due to LSAI support or nuisance 2=Due to NGOs lack(support) 3=Due to government lack(support) 4=Due to family (lack)support or interest 5=Due to village community (lack) support or interest 6= Other(specify)_____	….|___|

5.9.2. Collective action and Kin connections

5.9.2a	In the past 12 months, how often have you joined together with others in the village/neighborhood to challenge government officials or investors for something benefiting the community?	1 =Never 2 =Once 3 =A few times (<=5) 4 =Many times (>5)	….|___|
5.9.2b	To what extent do local government and local leaders take into account concerns voiced by you and people like you when they make decisions that affect you?	1 = Not at all 2 =A little 3 = A lot	….|___|
5.9.2c	In general, how do you rate the level of your participation in the village/neighborhood common issues?	1 =Very low 2 =Low 3 =Average 4 =High 5 =Very high	….|___|
5.9.2d	About how many close friends do you have these days? These are people you feel at ease with, can talk to about private matters, or call on for help.	_____(Number of friends)	
5.9.2e	If you suddenly needed to borrow a small amount of money, to whom you could turn and who would be willing and able to provide this money? ***(Multiple response is possible)***	1 =Relatives 2 =Neighbors 3 =Friends 4 =Religious leader or group 5= Mutual support group to which you belong 6 =Community or kebele leaders 7= Other (specify)_____ 8 =No one would help	….|___| ….|___| ….|___| ….|___| ….|___|
5.9.2f	Suppose you or your neighbor suffered an economic loss, say (crop failure), in that situation, who do you think would assist you/him/her? (financially, food, inputs, etc) ***(Multiple response is possible)***	1 =Relatives 2 =Neighbors 3 =Friends 4 =Religious leader or group 5 =Mutual support group to which you belong 6 =Community or Kebele leaders 7 =Other (specify)_____ 8 =No one would help	….|___| ….|___| ….|___| ….|___| ….|___|

5.9.3. Trust

5.9.3a	Generally speaking, do you think that in your village/neighborhood most people generally trust one another in matters of finance, family issues, etc	1=Yes 0=No	….|___|
5.9.3b	Do you think over the last few years the level of trust has gotten better, gotten worse, or stayed about the same?	1 =Worse 2 =The same 3 =Better	….|___|
5.9.3c	Please tell me your opinion based on the following points:	1=Yes 0=No	
i.	Most people in your village/neighborhood are basically honest.		….|___|
i.	Most people in your village/neighborhood can basically be trusted.		….|___|
i.	Members of your village/neighborhood are more trustworthy than others.		….|___|

v.	You feel you can trust your neighbors to look after your house or family if you are away.	….|___|
v.	If you have a problem, there is always someone to help me.	….|___|
i.	You feel accepted as a member of this village/neighborhood.	….|___|

5.9.3d	In your opinion, how honest are the officials and staff of the following agencies? Please rate them on a 1 to 5 scale, where 1 = very dishonest and 5 = very honest	1=Very dishonest 2=Dishonest 3=Neither honest nor dishonest 4=Honest 5=Very honest
i.	Federal government officials and staff	….|___|
ii.	Regional government officials and staff	….|___|
iii.	Woreda government officials and staff	….|___|
iv.	Kebele government officials and staff	….|___|
v.	Traditional village leaders	….|___|
vi.	Teachers and school officials	….|___|
vii.	Health workers	….|___|
viii.	Police, defense force, etc members and officials	….|___|
ix.	Investors and their staff	….|___|

5.10. Financial Capital of the Household

5.10.1.	Do you have access to credit services?	1 =Yes → **go to Question 3.10.2-3.10.6** 0= No→ **go to Question 3.10.10**	….|___|
5.10.2.	From where do you generally get credit services? ***(Multiple response is possible)***	1 =Relatives 2 =Friends 3 =Local money lenders 4 =Cooperatives 5 =Micro finance institutions 6 =Commercial Banks 7 =Eddir 8 =Equub 9 =Local businessmen 10 =NGOs/religion institutions 11= Other (specify)_____	….|___| ….|___| ….|___| ….|___| ….|___|
5.10.3.	In the last 12 months how much money did you borrow?	_____Birr	
5.10.4.	For what purpose did you borrow the money? ***(Multiple response is possible)***	1 =To buy food items 2 =To cover health expenses 3 =To cover education expenses 4 =To buy agricultural inputs 5 =To buy clothes 6= Other (specify)_____	….|___| ….|___| ….|___| ….|___|
5.10.5.	Does your household currently have any outstanding debt?	1 =Yes → **go to Question 3.10.6.** 0= No	….|___|
5.10.6.	How much is the debt?	_____Birr	
5.10.7.	Does your household save money?	1 =Yes → **go to Question 3.10.8. & 3.10.9** 0 =No	….|___|
5.10.8.	How do you usually save money? ***(Multiple response is possible)***	1 =Deposit in Banks 2 =Deposit Micro finance institutions 3 =Equub 4 =Cash at home 5 =With friends 6 =With religious group 7 =With relatives 8 =Buying Jewelers 9 =Other (spefify)_____	….|___| ….|___| ….|___| ….|___|
5.10.9.	How much money do you save annually?	_____Birr	

5.10.10.	If you don't have access to credit, what is your main reason? ***(Multiple response is possible)***	1 =Unavailability of credit service in the area 2=Lack of collateral 3 =Fear of indebtedness 4 =High interest rate 5 =Lack of awareness 6 =I don't need it 7 =Other (specify)_____	….|___| ….|___| ….|___| ….|___|
5.10.11.	Has your household received any money or support in kind from relatives living outside your household or others in the past 12 months?	1 =Yes→ **go to Question 3.10.12** 0 =No	….|___|
5.10.12.	How much money (in cash or kind) did your household receive in the past 12 months? ***Write the items received in kind and convert its equivalent value to Birr based on the local price.***	|__|__|__|__|**BIRR** _____**(IN KIND)** _____**(IN KIND)** _____**(IN KIND)** **EQUIVALENT VALUE IN** |__|__|__|__|**BIRR**	

5.11. Human Capital of the Household

5.11.1 .	Do you and your family members have access to education services?	1 =Yes → **go to Question 3.11.2.** 0 =No	….|___|
5.11.2	How far is the school from your village? (**in hours**)	_____hour(s)/minutes	
5.11.3	Which of the following skills do you possess? **Multiple response is possible**	1=Brickwork 2=Weaving 3=Traditional healing 4=Pottery 5=Business 6=Carpentry 7=Modern farming (row sowing, input application…) 8=Other(specify)_____	….|___| ….|___| ….|___| ….|___| ….|___|
5.11.4	Have you ever received training on livelihood skill development?	1 =Yes → **go to Question 3.11.5-3.11.6** 0 =No	….|___|
5.11.5	What type of training did you receive? **Multiple response is possible**	1 =Entrepreneurship/business related 2 =Application of modern technologies 3 =Health care and nutrition 4 =Education and communication 5 =Soil and water conservation 6=Other(specify)_____	….|___| ….|___| ….|___| ….|___|
5.11.6	Who provided the training? **Multiple response is possible**	1 Government 2 NGOs 3 Investors 4 Other (specify) _____	….|___| ….|___|
5.11.7	What is the main source of your production and agriculture related information? **Multiple response is possible**	1 =Radio 2 =Extension workers 3=Family and relatives 4=Kebele administrators 5=Investors 6=Other(specify)_____ 7= I don't have any source of information	….|___| ….|___| ….|___| ….|___|
5.11.8	Do you have access to health services?	1 =Yes → **go to Question 3.10.9** 0 =No	….|___|
5.11.9	How much it takes you to reach the nearby health center?	_____hour(s)/minutes	
5.11.10	In general, how do you describe the health status of household?	1 =Poor 2= Moderate 3 =Good	….|___|

Part VI: Livelihood Activities

Activities/sources	6.1 What are your household's main economic activities? 1=Yes 0=No	6.2 Income generated from these activities last year. [write the amount of income)	6.3 Rank these activities based on the proportion of food/income they provide for your household	6.4 Who mainly earns from this source? 1=husband 2=wife 3=joint 4=others	6.5 Who mainly controls this source? 1=husband 2=wife 3=joint 4=others
a. Farming/crop production and sales	….|___|			….|___|	….|___|
b. Livestock production and sales	….|___|			….|___|	….|___|
c. Unskilled wage employment (laborer, in construction, guards)	….|___|			….|___|	….|___|
d. Skilled non-farm work like masonry, carpentry, machine operator, flourmill operator	….|___|			….|___|	….|___|
e. Professional employment (formal employment, teacher, hurse…)	….|___|			….|___|	….|___|
f. Sales of natural resources (honey, charcoal, firewood, grass, wild foods…)	….|___|			….|___|	….|___|
g. Trading activities (retailing, small ruminants, grain, shop)	….|___|			….|___|	….|___|
h. Sale of land/other non-livestock assets	….|___|			….|___|	….|___|
i. Remittances	….|___|			….|___|	….|___|
j. Gifts/inheritance	….|___|			….|___|	….|___|
k. Sales fishing	….|___|			….|___|	….|___|
l. Sales brewing/food	….|___|			….|___|	….|___|
m. Craftsmanship/artisan work	….|___|			….|___|	….|___|
n. Government allowance (pension, disability benefits….)	….|___|			….|___|	….|___|
o. Food/cash for work	….|___|			….|___|	….|___|
p. Aid (food, material…)	….|___|			….|___|	….|___|
q. agricultural equipment/tools rent	….|___|			….|___|	….|___|
r. House rent	….|___|			….|___|	….|___|
q. Others ----------					

Part VII: Household Food Consumption Score, Dietary Diversity Score, and Sanitation

7.1. HH Food Consumption -

7.1.1. Over the past one week (7days), did you or others in your household eat any [...]?	1=Yes→ **go to** 7.1.2 to 7.1.6 0=No	7.1.2. How much in total did your household eat in the past week?		7.1.3. How much came from purchases?		7.1.4. How much did you spend on what was eaten last week?	7.1.5. How much came from own-production?		7.1.6. How much came from gifts and other sources?	
		Quantity	Unit	Quantity	Unit	Birr	Quantity	Unit	Quantity	Unit
Maize flour	….|___|									
Maize grain	….|___|									
Green maize	….|___|									
Rice	….|___|									
Sorghum or millet	….|___|									
Wheat	….|___|									
Wheat flour	….|___|									
Barley	….|___|									
Teff	….|___|									
Injera (teff, maize, wheat)	….|___|									

Bread (wheat, maize)	….|___|									
Biscuits, buns, and scones	….|___|									
Spaghetti, macaroni, pasta	….|___|									
Sambosa /pie	….|___|									
Sweet potato	….|___|									
Irish potato	….|___|									
Kocho (enset)	….|___|									
Cassava or any wild roots	….|___|									
Chickpeas	….|___|									
Horse beans	….|___|									
Vetch	….|___|									
Field peas	….|___|									
Onion	….|___|									
Gomen	….|___|									
Other green leafy vegetable	….|___|									
Gathered wild green leaves	….|___|									
Tomato	….|___|									
Green pepper	….|___|									
Garlic, ginger	….|___|									
Banana	….|___|									
Mango	….|___|									
Papaw	….|___|									
Orange	….|___|									
Sesam	….|___|									
Flax	….|___|									
Sunflower										
Meet: beef, lamb, goat, wild game, fish, chicken, or other birds	….|___|									
Eggs	….|___|									
Dairy products: milk, cheese, yogurt	….|___|									
Oil, fat, or butter	….|___|									
Sugar or honey	….|___|									
Codes for Unit 1=Kilogram 2= Gram 3= Meter 4= liter 5= Number 6= Can 7= Tea cup										

7.2. Household Dietary Diversity Score

Types of Food	7.2.1. How was this food stuff obtained (see code below)	Head of the household 7.2.2. In the last 24 hours, have you consumed 1=Yes 0=No	Female adult 7.2.3. In the last 24 hours, have you consumed 1=Yes 0=No	Children below 5 years 7.2.4. In the last 24 hours, has your child consumed 1=Yes 0=No	Children above 5 years 7.2.5. In the last 24 hours, has your child consumed 1=Yes 0=No
A. Staples or food made from staples including millet/sorghum, maize, rice, wheat, teff, barely, e.g. bread (*kitta*), *Genfo*, *injera,* Spaghetti, macaroni, pasta Biscuits, buns, and scones, or other local food		….|___|	….|___|	….|___|	….|___|
B. Potatoes, yams, cassava or *kocho* or any other foods made from roots or tubers		….|___|	….|___|	….|___|	….|___|
C. Vegetables		….|___|	….|___|	….|___|	….|___|
D. Fruits		….|___|	….|___|	….|___|	….|___|
E. Beans, peas, lentils, or nuts		….|___|	….|___|	….|___|	….|___|
F. Red meat-beef, pork, lamb, goat, wild meat, liver, kidney, heart, or other organ meats?		….|___|	….|___|	….|___|	….|___|
G. Poultry including chicken, duck, other poultry		….|___|	….|___|	….|___|	….|___|
H. Eggs		….|___|	….|___|	….|___|	….|___|
I. Fresh or dried fish or shellfish?		….|___|	….|___|	….|___|	….|___|
J. Milk, cheese, yogurt, or other milk product		….|___|	….|___|	….|___|	….|___|
K. Oils and fats		….|___|	….|___|	….|___|	….|___|
L. Sweets, sugar, honey		….|___|	….|___|	….|___|	….|___|
M. Any other foods, such as condiments, coffee, tea including milk in tea?		….|___|	….|___|	….|___|	….|___|
Codes: How was the food stuff obtained (5.2)? 1=Mainly produced, 2=Mainly purchased, 3=Gift, 4= food aid 5=Other (specify)					

7.3. Sanitation Practices					
7.3.1.	Does your family unit wash hands after using toilet?	1=Yes always	2=Yes sometimes	0=No	….|___|
7.3.2.	Does your family unit wash hands before eating food?	1=Yes always	2=Yes sometimes	0=No	….|___|
7.3.3	Does your family unit wash hands after eating food?	1=Yes always	2=Yes sometimes	0=No	….|___|

7.4. Household Food Consumption Score

Types of Food	7.4.1 How was this food stuff obtained (see code below)	Head of the household	Female adult	Children below 5 years	Children below 5 years
		7.4.2In the last 7 days, how many **times** have you consumed these? (Number of days 0-7) 0 = Not consumed 1 = One day 4 = Four days 2 = Two days 5 = Five days 3 = Three days 6 = Six days 7 = Seven days	7.4.3 In the last 7 days, how many **times** have you consumed these? (Number of days 0-7) 0 = Not consumed 1 = One day 4 = Four days 2 = Two days 5 = Five days 3 = Three days 6 = Six days 7 = Seven days	7.4.4 In the last 7 days, how many **times** has your child consumed these? (Number of days 0-7) 0 = Not consumed 1 = One day 4 = Four days 2 = Two days 5 = Five days 3 = Three days 6 = Six days 7 = Seven days	7.4.5 In the last 7 days, how many **times** has your child consumed these? (Number of days 0-7) 0 = Not consumed 1 = One day 4 = Four days 2 = Two days 5 = Five days 3 = Three days 6 = Six days 7 = Seven days
A. Staples or food made from staples including millet, sorghum, maize, rice, wheat, teff, barely, e.g. bread(*kitta*), *Genfo*, *injera,* spaghetti, macaroni, pasta, biscuits, buns, and scones, or other local food		….|___|	….|___|	….|___|	….|___|
B. Potatoes, yams, cassava or *kocho* or any other foods made from roots or tubers		….|___|	….|___|	….|___|	….|___|
C. Vegetables		….|___|	….|___|	….|___|	….|___|
D. Fruits		….|___|	….|___|	….|___|	….|___|
E. Beans, peas, lentils, or nuts		….|___|	….|___|	….|___|	….|___|
F. Red meat-beef, pork, lamb, goat, wild meat, liver, kidney, heart, or other organ meats?		….|___|	….|___|	….|___|	….|___|
G. Poultry including chicken, duck, other poultry		….|___|	….|___|	….|___|	….|___|
H. Eggs		….|___|	….|___|	….|___|	….|___|
I. Fresh or dried fish or shellfish?		….|___|	….|___|	….|___|	….|___|
J. Milk, cheese, yogurt, or other milk product		….|___|	….|___|	….|___|	….|___|
K. Oils and fats		….|___|	….|___|	….|___|	….|___|
L. Sweets, sugar, honey		….|___|	….|___|	….|___|	….|___|
M. Any other foods, such as condiments, coffee, tea including milk in tea?		….|___|	….|___|	….|___|	….|___|
Codes: How was the food stuff obtained (7.2.1) 1=Mainly produced, 2=Mainly purchased, 3=Gift, 4= food aid 5=Other (specify)					

Part VIII: Food and Non- Food Consumption Expenditure

8.1. In the past 30 days, how much money have you spent on each of the following items or services? (Write '00' if there is no expenditure).		8.2a. Expenditure in cash (Birr)	8.2b. Expenditure in credit (if any)
1. Food purchase 1=Yes 0=No			
1.1. Maize	….__|	__|__|__|__|	__|__|__|__|
1.2. Wheat/barely	….__|	__|__|__|__|	__|__|__|__|
1.3. Millet	….__|	__|__|__|__|	__|__|__|__|
1.4. Rice/paddy	….__|	__|__|__|__|	__|__|__|__|
1.5. Roots and tubers	….__|	__|__|__|__|	__|__|__|__|
1.6. Pulses/lentils	….__|	__|__|__|__|	__|__|__|__|
1.7. Vegetables	….__|	__|__|__|__|	__|__|__|__|
1.8. Milk/yogurt/milk products	….__|	__|__|__|__|	__|__|__|__|
1.9. Fresh fruits/nuts	….__|	__|__|__|__|	__|__|__|__|
1.10. Fish	….__|	__|__|__|__|	__|__|__|__|
1.11. White meat (poultry)	….__|	__|__|__|__|	__|__|__|__|
1.12. Pork	….__|	__|__|__|__|	__|__|__|__|
1.13. Red meat (beef)	….__|	__|__|__|__|	__|__|__|__|
1.14. Eggs	….__|	__|__|__|__|	__|__|__|__|
1.15. Oil/butter/fats	….__|	__|__|__|__|	__|__|__|__|
1.16. Sugar	….__|	__|__|__|__|	__|__|__|__|
1.17. Condiments (salt, spice, pepper….)	….__|	__|__|__|__|	__|__|__|__|
1.18. Other food expenditure	….__|	__|__|__|__|	__|__|__|__|
2. Non-food purchase			
2.1. Alcohol/tobacco	….__|	__|__|__|__|	__|__|__|__|
2.2. Soap	….__|	__|__|__|__|	__|__|__|__|
2.3. Transport	….__|	__|__|__|__|	__|__|__|__|
2.4. Firewood/charcoal	….__|	__|__|__|__|	__|__|__|__|
2.5. Kerosene	….__|	__|__|__|__|	__|__|__|__|
2.6. Phone charge	….__|	__|__|__|__|	__|__|__|__|
2.7. Religious/charity donations	….__|	__|__|__|__|	__|__|__|__|
2.8. Haircut/hair dress	….__|	__|__|__|__|	__|__|__|__|
2.9. Other expenses (if any)	….__|	__|__|__|__|	__|__|__|__|
8.3. In the last twelve months, how much money have you spent to acquire each of the following items or service? **(Other non-food items and services)**			
1. Hiring labor	….__|	__|__|__|__|	__|__|__|__|
2. Medical expenses, health care	….__|	__|__|__|__|	__|__|__|__|
3. Clothing, shoes	….__|	__|__|__|__|	__|__|__|__|
4. Education fees	….__|	__|__|__|__|	__|__|__|__|
5. Veterinary expenses	….__|	__|__|__|__|	__|__|__|__|
6. Celebrations: wedding, funeral, social events…	….__|	__|__|__|__|	__|__|__|__|
7. Taxes/fines	….__|	__|__|__|__|	__|__|__|__|
8. Debts	….__|	__|__|__|__|	__|__|__|__|
9. Housing (construction, house repair)	….__|	__|__|__|__|	__|__|__|__|
10. Equipment, tools (farm and non-farm)	….__|	__|__|__|__|	__|__|__|__|
11. Fishing tools	….__|	__|__|__|__|	__|__|__|__|
12. Fertilizer and Seed	….__|	__|__|__|__|	__|__|__|__|
13. Furniture and kitchen equipments	….__|	__|__|__|__|	__|__|__|__|
14. Other long term expenditure	….__|	__|__|__|__|	__|__|__|__|

Part IX: Months of Adequate Household Food Provisioning and Coping Strategies

9.1. In the last 12 months, did you have enough food (from all sources) to eat during all the months? 1=Yes 0=No → **go to Questions 9.2 & 9.3**	….|___|
9.2. Which were the months in the last 12 months that you **did not have** enough food to meet your family's needs?	Jan [ ] Feb [ ] March [ ] April [ ] May [ ] June [ ] July [ ] Aug [ ] Sept [ ] Oct [ ] Nov [ ] Dec [ ]
Please, don't read the list rather put an "X" mark in the bracket of the month mentioned by respondent.	

9.3. Food Insecurity Coping Strategies

If there have been times in the month(s) when you did not have enough food or enough money to buy food, had your household had to:	0 = Never 1 = Hardly at all (less than one times per week) 2 = Once in a while (1-2 times per week) 3 = Pretty often (3-6 times per week) 4=Always (everyday of the week)
1. Rely on less preferred and less expensive foods?	….|___|
2. Borrow food, or rely on help from a friend or relative?	….|___|
3. Purchase food on credit?	….|___|
4. Gather wild food, hunt, or harvest immature crops?	….|___|
5. Consume seed stock held for next season?	….|___|
6. Send household members to eat elsewhere?	….|___|
7. Send household members to beg?	….|___|
8. Limit portion size at mealtimes?	….|___|
9. Restrict consumption by adults in order for small children to eat?	….|___|
10. Feed working members of HH at the expense of non-working members?	….|___|
11. Reduce the number of meals eaten in a day?	….|___|
12. Skip entire days without eating?	….|___|

Part X: Household Food Insecurity Access Scale (HFIAS)

S.N.	Questions	Response options	Code
10.1	In the past one week (7 days), did worry that your household would not have enough food?	1=Yes 0= No (Skip to Q10.2)	….|___|
10.1a	If yes, how often did this happen?	1 = Rarely (once or twice in the past week) 2 = Sometimes (three to five times in the past weeks) 3 = Often (every day in the past weeks)	….|___|
10.2	In the past one week (7 days), were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	1=Yes 0= No (Skip to Q10.3)	….|___|
10.2a	If yes, how often did this happen?	1 = Rarely (once or twice in the past week) 2 = Sometimes (three to five times in the past weeks) 3 = Often (every day in the past weeks)	….|___|
10.3	In the past one week (7 days), did you or any household member have to eat a limited variety of foods due to a lack of resources?	1=Yes 0= No(Skip to Q10.4)	….|___|
10.3a	If yes, how often did this happen?	1 = Rarely (once or twice in the past week) 2 = Sometimes (three to five times in the past weeks) 3 = Often (every day in the past weeks)	….|___|
10.4	In the past one week (7 days), did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	1=Yes 0= No(Skip to Q10.5)	….|___|
10.4a	If yes, how often did this happen?	1= Rarely (once or twice in the past week) 2= Sometimes (three to five times in the past weeks) 4= Often (every day in the past weeks)	….|___|

10.5	In the past one week (7 days), did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	1=Yes 0= No(Skip to Q10.6)	….|___|
10.5a	If yes, how often did this happen?	1 = Rarely (once or twice in the past week) 2 = Sometimes (three to five times in the past weeks) 3 = Often (every day in the past weeks)	….|___|
10.6	In the past one week (7 days), did you or any other household member have to eat fewer meals in a day because there was not enough food?	1=Yes 0= No(Skip to Q10.7)	….|___|
10.6a	If yes, how often did this happen?	1 = Rarely (once or twice in the past week) 2 = Sometimes (three to five times in the past weeks) 3 = Often (every day in the past weeks)	….|___|
10.7	In the past one week (7 days), was there ever no food to eat of any kind in your household because of lack of resources to get food?	1=Yes 0= No(Skip to Q10.8)	….|___|
10.7a	If yes, how often did this happen?	1 = Rarely (once or twice in the past week) 2 = Sometimes (three to five times in the past weeks) 3 = Often (every day in the past weeks)	….|___|
10.8	In the past one week (7 days), did you or any household member go to sleep at night hungry because there was not enough food?	1=Yes 0= No(Skip to Q10.9)	….|___|
10.8a	If yes, how often did this happen?	1 = Rarely (once or twice in the past week) 2 = Sometimes (three to five times in the past weeks) 3 = Often (every day in the past weeks)	….|___|
10.9	In the past one week (7 days), did you or any household member go a whole day and night without eating anything because there was not enough food?	1=Yes 0= No	….|___|
10.9a	If yes, how often did this happen?	1 = Rarely (once or twice in the past week) 2 = Sometimes (three to five times in the past weeks) 3 = Often (every day in the past weeks)	….|___|

Part XI: Linkage between the Farm and the Surrounding Community and Benefits of LSAI

11.1.	Have you ever been consulted about the large scale Agricultural investment in your surrounding?	1 =Yes 0 =No	….|___|
11.2.	Do you have any awareness about the support that you could get from LSAI?	1 =Yes 0 =No	….|___|
11.3.	Have you ever demanded any assistance from the investors?	1= Yes 0 =No	….|___|
11.4.	Has any member of the family been employed in the investor's farm?	1 =Yes → **go to Question 11.5 and 11.6** 0= No	….|___|
11.5.	How many are employed?	M=_____ F=_____ T_____	
11.6.	In what kind of employment have your family members been engaged?	1 =Causal/daily laborer	M___ F___T___
		2= Guard	M___ F___T___
		3 =Technical operation	M___ F___T___
		4 =Food preparation	M___ F___T___
		5 =Other(specify)_____	M___ F___T___
11.7	Are you engaged in some small business as a result of the farm?	1 =Yes → **go to Question 11.8** 0 =No	….|___|

11.8	Please, indicate the type of business you are engaged in. **Multiple response is possible**	1 =Selling drinks and food to farm employees 2 =Selling merchandize products 3 =Providing cleaning service to farm workers =Other(specify)_____	….|___| ….|___| ….|___|
11.9	Do you serve as out-grower to the farm?	1=Yes → **go to Question 11.10** 0=No	….|___|
11.10	Please, describe the condition_____		
11.11	What knowledge have you acquired from the LSAI which you think you can apply to your farm? **Multiple response is possible**	1 =Training on irrigation 2 =Training on fertilizer/ improved seed use 3 =Training on pesticides and herbicides use 4 =Training on environmental conservation 5=Others, specify_____ 6= No training	….|___| ….|___| ….|___| ….|___|
11.12	What skills have you learned from the LSAI which you think you can apply to your farm? **Multiple response is possible**	1 =Irrigation skill 2 =Conservation skill 3 =Use of fertilizer/and improved seeds 4 =Pesticides and herbicides use 5=Others, specify _____ 6=No skill	….|___| ….|___| ….|___| ….|___|
11.13	What supports have you received from LSAI that can be used in farming? **Multiple response is possible**	1 =Extension training 2 =Supply of Agricultural inputs(fertilizer/improved seeds, pesticides, etc)→ **go to Question 11.14** 3 =Supply of Water for irrigation 4 =Credit service 5=Others, specify _____ 6= No support	….|___| ….|___| ….|___| ….|___|
11.14	If you get inputs from the large scale farm (fertilizer/improved seed/ pesticides and herbicides), what modality do you use? **Multiple response is possible**	1=Credit basis 2=In cash 3=In exchange for labor 4=For free 5=Other (specify)	….|___| ….|___| ….|___| ….|___|
11.15	In general, what benefits have you got due to the presence of LSAI in your locality? **Multiple response is possible**	1 =Improved markets for your products 2 =Improved access roads to markets 3 =Storage for our products 4 =Improved availability of farm workers 5=Others, specify_____ 6 =No benefits	….|___| ….|___| ….|___| ….|___|

11.16. Type of Infrastructure due to the farm (project)	12.16.1. Have you benefitted from Yes=1)→ **go to Question 11.16.1 & 11.16.3** No=0	11.16.2. How far is the nearest infrastructure from your home (km)	11.16.3. How often do you utilize the infrastructure 1=Everyday 2=Every week 3=Every month 4=Not at all 5=Other specify
Road			
Health service			
School			
Irrigation facility			
Drinking water point			

11.17	Do you purchase farm product (rice, maize) from the farm?	1 =Yes 0 =No	….|___|
11.18	Do you sell your products to the farm and farm employees?	1 =Yes 0 =No	….|___|

11.19	Besides benefits indicated above, what other positive effects do you experience due to the farm?	_____ _____ _____ _____	
11.20	What other negative effects do you experience due to the farm?	_____ _____ _____ _____ _	
11.21	Do you use fertilizer in your crop production?	1 =Yes → **go to Question 11.24** 0 =No	….|___|
11.22	Do you use improved seed in crop production?	1 =Yes → **go to Question 11.24** 0 =No	….|___|
11.23	Do you use pesticide for crop disease control?	1 =Yes → **go to Question 11.24** 0 =No	….|___|
11.24	Which type of inputs/technology did you use?		

Crop	Fertilizer type 1=Yes 0=No			Agent introduced fertilizer(multiple answer is possible) 1=Government 2=LSAI 3=Private dealers 4=NGOs	Improved seed varieties 1=Yes 0=No	Agent introduced the seed (multiple answer is possible) 1=Government 2=LSAI 3=Private dealers 4=NGOs	Pesticide 1=Yes 0=No	Agent introduced pesticide (multiple answer is possible) 1=Government 2=LSAI 3=Private dealers 4=NGOs
	DAP	Urea	Blended					
a. Maize								
b. Sorghum								
c. Ground nuts								
d. Sunflower								
e. Sesame								
f.Amula (okra)								
g. Debrgine								
h. Taro								
i. Kale								
j. Tomato								
k.Sweet potato								
l. Onion								
m. Cabbage								
n. Switchyard								
o. Paper								
p. Others (specify)								

11.25	Do you use agricultural mechanization for crop production?	1 =Yes → **go to Question 11.26** 0= No	….|___|

11.26	Machines used?	1=Yes 0=No	Agent introduced fertilizer (multiple answer is possible) 1=Government 2=LSAI 3=Private dealers 4=NGOs
a.	Tractor		
b.	Combine harvester		
c.	Trashing machine		
d.	Others (Specify)		

11.27	Do you use irrigation for crop production?	1 =Yes → **go to Question 11.28** 0 =No	….|___|
11.28	Irrigation practice and promoter of the practices		

Irrigation facilities		1= Yes 0= No	**Sources of the technologies**(multiple answer is possible) 1= Government 2= LSAI 3= NGOs 4 = Own innovation
a.	Traditionally diverted river		

b. Traditionally developed well with manual (hand) water lifting		
c. Traditionally developed well fitted with rope or manually operating pump		
d. Developed canal diverted from small stream at nearby		
e. Developed canal from large dame		
f. Deep/shallow well		

11.29	Have you ever practiced improved livestock production technologies (artificial insemination, improved bread, improved beehives, and veterinary service)?	1 Yes → **go to Question 11.30** 0 No	….|___|

12.30	Improved livestock production technologies use and its promoter

Animal type	artificial insemination 1=Yes 0=No	improved breed 1=Yes 0=No	veterinary service 1=Yes 0=No	Improved beehives 1=Yes 0=No	**Sources of the technologies** (multiple answer is possible) 1= Government 2= LSAI 3= Private dealers 4= NGOs
Cattle					
Sheep					
Goat					
Donkey					
Poultry					
Beekeeping					

11.31	Do you use improved agricultural practices for crop production?	1=Yes → **go to Question 11.32** 0=No	….|___|
11.32	Improved practices in crop production and agent introduced the practices		

Practices	1=Yeas → **go to next column** 0 =No	**Sources of the technologies** (multiple answer is possible) 1= Government 2= LSAI 3= NGOs 4 = Own innovation/experience
a. Intercropping		
b. Crop rotation		
c. Row planting		
d. Irrigation use		
e. Composting and use		
f. Minimum tillage (hoeing & planting)		
g. Residue retention on farm		
h. Planting agro forestry on farmland		
i. Split fertilizer application		
j. Point fertilizer application		
k. Repeated (timely) weeding		
l. Timely harvesting and trashing		
m. Regular pest/disease monitoring		
n. Post-harvest loss (by weevils, rodents, moister) management		
o. Engaging on improved seed (C2) production		

11.33	Do you practice improved agricultural practices for the livestock production?	1 =Yes → **go to Question 11.34** 0 =No	….|___|
11.34	Improved livestock production and agent introduced		

	1=Yes → **go**	Sources of the technologies (multiple answer is

Practices	to next column 0 =No	possible) 1= Government 2= LSAI 3= NGOs 4 = Own innovation/experience
a. Maintaining manageable livestock number		
b. Storing animal feed for dry season		
c. Pasture management through cut and carry system		
d. Pasture management through rotational grazing		
e. Developing water for the livestock (pond, well, cisterns and roof ware harvesting)		
f. Engaging on market oriented livestock types		

11.35	Have you ever involved in any of the following improved land management practices?	1=Yes→ **go to Question 11.35.1to 11.35.3** 0 =No	

Practices		1=Yes→ **go to next column** 0 =No	Sources of technologies (multiple answer is possible) 1= Government 2= LSAI 3= NGOs 4 = Own innovation/experience
11.35.1. Soil and Water Conservation on your farmlands	a. Terracing		
	a. Intercropping		
	b. Shifting cultivation		
	c. Agro forestry		
	d. Manuring		
	e. Earth dams		
	f. Others _____		
11.35.2. Draining water from farmland using BBM technology			
11.35.3. Constructing flood diverting ditch on farmlands			

Thank you very much for your time!

Annex II: Questionnaire for Married Women (Amaharic version)

ውድ ምላሽ ሰጪዎች!

የዚህ መጠይቅ ዋና አላማ “ሰፋፊ የግል የእርሻ ኢንቨስትመንቶች በጋምቤላ ክልል በሚኖሩ የሴቶች ውሳኔ ሰጪነት ሚና ላይ ያመጣው ተጽዕኖ” በሚል ርዕስ ዙሪያ ለሚደረገው ጥናት መረጃ ማሰባሰብ ነው፡፡ እርስዎ ለዚህ መጠይቅ ምላሽ እንድሰጡ በሳይንሳዊ ዘዴ የተመረጡ ስሆን ጊዜዎን በመሰዋት ትክክለኛ ምላሽ እንድሰጡ በትህትና እጠይቃለሁ፡፡ እርስዎ የሚሰጡት ምላሽ ለትምህርታዊ ዓላማ ብቻ እንደሚውል ሊያረጋግጥልዎ እወዳለሁ፡፡ በቅርሚያ ስለ ትብብርዎ ልባዊ ምስጋናዬን አቀርባለሁ፡፡

1. ግላዊ መረጃ

ጥያቄ		የመልስ አማራጮች እና ኮድ	
1.1.	ዕድሜዎ ስንት ነው?	….|___|	
1.2.	የባልዎ ዕድሜ ስንት ነው?	….|___|	
1.3.	የሚኖሩበት ቀበሌ ስም ይግለጹ		
1.4.	ካገቡ ምን ያህል አሜት ሆነዎት?		
1.5.	የትምህርት ደረጃ (የሚስት)	0=ያልተማረች 1=ማንበብና መጻፍ ብቻ 2=አንደኛ ደረጃ ያጠናቀቀች 3=ሁለተኛ ደረጃ ያጠናቀቀች 4=ዲፕሎማና ከዚያ በላይ	….|___|
1.6.	የትምህርት ደረጃ (የባል)	0=ያልተማረ 1=ማንበብና መጻፍ ብቻ 2=አንደኛ ደረጃ ያጠናቀቀ 3=ሁለተኛ ደረጃ ያጠናቀቀ 4=ዲፕሎማና ከዚያ በላይ	….|___|
1.7.	ብሔረሰብ (የሚስት)	1=አማራ 2=ትግሬ 3=ኦሮሞ 4=ወላይታ 5=ሀዲያ 6=ካምባታ 7=አኝዋ 8=ሌላ ይገለጽ----------	….|___|
1.8.	ሀይማኖት (የሚስት)	1=ሙስልም 2=ኦርቶዶክስ 3=ፕሮተስታንት 4=ካቶሊክ 5=ሌላ (ይገለጽ)----------	….|___|
1.9.	ዋና ሥራ (የሚስት)	1=በኢንቨስቴር እርሻ ተቀጣሪ 2=በማህበር የንግድ ሥራ 3=በግል የንግድ ሥራ 4=በምንም የገቢ ማስገኛ ስራ ያልተሰማራች 5=ሌላ ይገለጽ----------	….|___|
1.10.	በኢንቨስቴር እርሻ ተቀጣሪ ከሆኑ የቅጥር ሁኔታን ይግለጹ	1=ቀዋሚ 2=ጊዜያው	….|___|
1.11.	በምን ዓይነት ስራ ተቀጥረው ይሰራሉ?	1=የጽዳት ስራ 2=የቀን ስራ 3=የጥበቃ ስራ 4=የጸሐፊነት ስራ 5=የኦፕሬተርነት ስራ (ሎደር፤ ግረደር፤ ትራክቴር፤ ….) 6=የአስተዳደር ስራ 7=የኤክስፔርትነት ስራ 8=ሌላ ይገለጽ----------	….|___|
1.12.	ወርሃዊ ገቢዎ ስንት ነው? (በብር)		
1.13.	የፍልሰት ሁኔታ	1=እዚሁ (አቦቦ ወረዳ) ተወልደው ያደጉና ያገቡ 2=ከሌላ አካባቢ የመጡ	….|___|
1.14.	ከሌላ አካባቢ ከመጡ ቦታውን ይግለጹ	1. ትግራይ ክልል 2. አማራ ክልል 3. አፋር ክልል 4. ሶማሌ ክልል 5. አሮሚያ ክልል 6. ደቡብ ክልል 7. በንሻንጉል ጉሚዝ ክልል 8. ሌላ----------	….|___|

9. የቤተሰብ አባላት መረጃ

የቤተሰብ አባላት ብዛት(በዕድሜና ጾታ)

ተ.ቁ.	ዕድሜ (የህጻናት)	የቤተሰብ አባት ብዛት			ተ.ቁ.	ዕድሜ(የአዋቅዎች)	የቤተሰብ አባት ብዛት		
		ወንድ/ጉብል	ሴት/ልጃገረድ	ድምር			ወንድ	ሴት	ድምር
2.1	ከ2 ዓመት በታች				3.6	ከ18-64 ዓመት			
2.2	ከ2-5 ዓመት				3.7	ከ64 ዓመት በላይ			
2.3	ከ6-14 ዓመት					ድምር (የአዋቅዎች)			
2.4	ከ15-17 ዓመት								
	ድምር (የህጻናት)								

10. የጋብቻ ሁኔታ

ከዚህ በታች ለተዘረዘሩት የጋብቻ ሁኔታ ጥያቄዎች የደስተኝነት ደረጃዎን ይግለጹ - ምን ያህል ደስተኛ ነዎት፡-			
ተ.ቁ.	ጥያቄ	የመልስ አማራጮች እና ኮድ	ምላሽ
3.1	ባልዎ ለእርስዎ በሚሰጠው ትኩረት	1. ደስተኛ አይደለሁም 2. በመጠኑ ደስተኛ ነኝ 3. ደስተኛ ነኝ	….|___|
3.2	ባልዎ ለእርስዎ በሚሰጠው ፍቅር	1. ደስተኛ አይደለሁም 2. በመጠኑ ደስተኛ ነኝ 3. ደስተኛ ነኝ	….|___|
3.3	ባልዎ ለትዳር ባለው ታማኝነት	1. ደስተኛ አይደለሁም 2. በመጠኑ ደስተኛ ነኝ 3. ደስተኛ ነኝ	….|___|
3.4	የቤትዎ አጠቃላይ ሁኔታ (የቤት አሰራርና አቀማመጥ፤ የመኖሪያ ቤት ቦታ ስፋት፤ የቤትና ግቢ ንጽህና፤ ወዘተ)	1. ደስተኛ አይደለሁም 2. በመጠኑ ደስተኛ ነኝ 3. ደስተኛ ነኝ	….|___|
3.5	ባልዎ ለቤተሰብ ያለው የወደፍት ዕቅድና ራዕይ	**1.** ደስተኛ አይደለሁም **2.** በመጠኑ ደስተኛ ነኝ **3.** ደስተኛ ነኝ	….|___|

4. የማህበራዊና ኢኮኖሚያዊ ሁኔታ

4.1	የእረስዎ ቤተሰብ የእርሻ መሬት አለው?	1. አዎ 2. የለውም	….|___|
4.2	መልስዎ አዎ ከሆነ የእርሻ መሬቱ ስፋት ምን ያህል ነው? በሄክታር		
4.3	የትምህርት ተቀዋም ከቤትዎ ምን ያህል ይርቃል? በሰአት		
4.4	የጤና ተቀዋም ከቤትዎ ምን ያህል ይርቃል? በሰአት		
4.4	የአካባቢው ገበያ ከቤትዎ ምን ያህል ይርቃል? በሰአት		
4.5	ዋና የመኪና መንገድ ከቤትዎ ምን ያህል ይርቃል? በሰአት		
4.6	የብድር አገልግሎት ለእረስዎ ተደራሽ ነው?	1. አዎ 2. የለውም	….|___|
4.7	እርስዎ በአሁኑ ወቅት የአካባቢው ዕድር አባል ነዎት?	1. አዎ 2. አይደለሁም	….|___|
4.8	እርስዎ በአሁኑ ወቅት የአካባቢው ዕቁብ አባል ነዎት?	1. አዎ 2. አይደለሁም	….|___|
4.9	እርስዎ በአሁኑ ወቅት የሴቶች ማህበር አባል ነዎት?	1. አዎ 2. አይደለሁም	….|___|
4.10	እርስዎ በአሁኑ ወቅት የሀይማኖት ተቀዋም አባል ነዎት?	1. አዎ 2. አይደለሁም	….|___|

5. የተንቀሳቃሽ ሀብት ሁኔታ

ተ.ቁ.	የቁስ ወይም ሀብት ዓይነት	የመልስ አማራጮች እና ኮድ	ምላሽ
5.1	የእጅ ሰዓት	1. አለን 0. የለንም	….|___|
5.2	ሬዲዮ	1. አለን 0. የለንም	….|___|
5.3	ተሌቪዥን	1. አለን 0. የለንም	….|___|
5.4	የሞባይል ስልክ	1. አለን 0. የለንም	….|___|
5.5	ቴፒ ሪከርደር	1. አለን 0. የለንም	….|___|
5.6	ጠረጴዛ	1. አለን 0. የለንም	….|___|

5.7	ወንበር	1. አለን 0. የለንም	….|____|
5.8	የሸቦ አልጋ	1. አለን 0. የለንም	….|____|
5.9	የጣውላ አልጋ	1. አለን 0. የለንም	….|____|
5.10	የወርቅ ገጣጌጥ	1. አለን 0. የለንም	….|____|
5.11	የነሀስ ገጣጌጥ	1. አለን 0. የለንም	….|____|
5.12	የብር ገጣጌጥ	1. አለን 0. የለንም	….|____|
5.13	የቡታ ጋዝ	1. አለን 0. የለንም	….|____|
5.14	ዕቃ መደርደርያ ሸልፍ	1. አለን 0. የለንም	….|____|
5.15	የፎቶ ካመራ	1. አለን 0. የለንም	….|____|
5.16	የልብስ መስፊያ ማሽን. መኪና	1. አለን 0. የለንም	….|____|
5.17	ሃይል ቆጣብ ምድጃ	1. አለን 0. የለንም	….|____|
5.18	በእንስሳት የሚሳብ ጋሪ	1. አለን 0. የለንም	….|____|
5.19	ሳይክል	1. አለን 0. የለንም	….|____|
5.20	ባጃጅ ወይም ሞቴር ሳይክል	1. አለን 0. የለንም	….|____|
5.21	መኪና	1. አለን 0. የለንም	….|____|
5.21	የቤታችሁ ጣሪያ ከምንድነው የተወራው?	1. ሳር 2. ቆርቆሮ 3. ሌላ ----------	….|____|
5.22	የቤታችሁ ወለል ከምንድነው የተወራው?	1. አፈር 2. ጣውላ/ሽምበቆ 3. ስምንቶ 4. ሌላ----------	….|____|
5.23	ቤታችሁ ምን ያህል ክፍሎች አሉት?		

6. ሴቶች በቤተሰብ ውሳኔ የመስጠት አቅም (ሴቶችን የማብቃት ሁኔታ)

ተ.ቁ.	ጥያቄ	የመልስ አማራጮች እና ኮድ
6.1	አንዳንድ ጊዜ ባል ሚስቱ በሚታደርገው ነገሮች ስናደድ ይታያል:: በእርስዎ ሀሳብ/አመለካከት ሚስት የሚከተሉትን ነገሮች ስትፈጽም ባል ቢመታት/ቢደበድባት ትክክል ነው/ተቀባይነት አለው ብለው ያምናሉ?	0 = ትክክል አይደለም/ተቀባይነት የለውም 1 = እርግጠኛ አይደለሁም 2= ትክክል ነው/ተቀባይነት አለው
6.1.1	ምግብ ስትሰራ ካረረባት/ከተበላሸባት?	….|____|
6.1.2	ከባል ጋር ከተከራከረች (ምልስ ከሰጠች)	….|____|
6.1.3	ልጆችን ችላ ካለች/በአግባቡ ካልያዘች?	….|____|
6.1.4	ከእሱ ጋር አልተኛም ካለች/ከእሱ ጋር የግብረስጋ ግንኙነት ለመፈፀም እምቢ ካለች?	….|____|
6.1.5	ያለ እሱ ፈቃድ ከቤት ከወጣች?	….|____|
6.2	ከቤተሰብዎ የሚከተሉት ጉዳዮችን በተመለከተ አብዛኛውን ጊዜ ውሳኔ የሚሰጠው ማን ነው?	0 = ባል ብቻውን 1 = ባልና ሌሎች ሰዎች 2= ባልና ሚስት በጋራ 3= ሚስት ብቻዋና
6.2.1	የቤተሰብ የዕለት ፍላጎት ለሚሟላት የሚውሉ ነገሮች ግዥ ለምሳሌ ለቤት ፍጆታ የሚውል የምግብ እህል፤ አትክልት፤ ማጣፈጫ….	….|____|
6.2.2	ትላልቅ የቤት ዕቃዎች/ቁሶች ግዥ ለምሳሌ አልጋ፣ ወንበር፣ ጠረጴዛ፣ ሬድዮ፣ ሞባይል ስልክ ወዘተ	….|____|
6.2.3	የቤት እንስሳት (ለምሳሌ ላም፣ በሬ፣ በግ፣ ፍዬል፣ ወዘተ) ግዥ ወይም ሽያጭ	….|____|
6.2.4	የወተት አጠቃቀም	….|____|
6.2.5	የእርሻ ምርቶች/ሰብል አጠቃቀም	….|____|
6.2.6	የእርሻ መሬት አጠቃቀም	….|____|
6.2.7	የመኖሪያ ቤት ግንባታ ወይም ጥገና ወይም ቤት መቀየር	….|____|
6.2.8	መሬት ማከራየት/መከራየት	….|____|
6.2.9	ለተለያዩ የንግድ ስራዎች ገንዘብ መበደር	….|____|
6.2.10	የራስሽ የጤና አጠባበቅን በተመለከተ ለምሳሌ የህኪም ባለሙያ ጋ መሄድ	….|____|
6.2.11	የቤተሰብ ዕቅድ/ምጣኔን በተመለከተ	….|____|
6.2.12	ቤተሰቦችሽን ወይም ዘመዶችሽን ወይም ጓደኞችሽን መጠይቅ ስትፈልግ	….|____|
6.2.13	ከቤት ውጭ የተለያዩ የገቢ ማስገኛ ሥራዎችን ለመስራት ስትፈልግ	….|____|

በጣም እናመሰግናለን

Annex III: KII & FGD Checklist

1. Interview Guide for Government Officials and Experts (Federal)

Question
1. What is your opinion on the current LSAI in Ethiopia? Benefits, costs, purposes…..
2. In your opinion why did some investors prefer Ethiopia to other in East African countries?
3. Why is LSAI directed to and promoted in lowland regions?
4. In spite of strong criticisms from various actors, why Ethiopia government has been aggressively promoting LSAI?
5. Who does account for the majority of agricultural investments (domestic/foreign; public/private) in Ethiopia?
6. Why is federal government involved in land administration affairs of the regions? Political, economical, institutional, socio-cultural….reasons
7. How does federal government intervene to the land administration of the regions?
8. Do you think that federal government's involvement is fair enough from legal and/or political perspective? If yes, how? If not, why did government involve?
9. Who are the institutions involved in supporting the regions on LSAI?
10. What do they did and do? Plans, objectives, strategies…….
11. Where do they work? At central level, regional, zonal, woreda, or kebele, and why?
12. How do they interact with each other and other stakeholders? Cooperation, integration, any overlap?
13. How do agro-investors acquire lands? – land acquisition processes (To be supported by secondary data).
14. Who are the key groups or institutions that have influenced the issues of land acquisition processes, problems or opportunities over time? How and why do they have a particular influence?
15. Is there land transfer legal framework? (**የጸደቀ የመሬት ማስተላለፍ የህግ ማዕቀፍ**) እና **የግብርና ኢንቨስትመንት መሬት ጥናትና ልየታ ሥራ ለማከናወን የተዘጋጀ የህግ ማዕቀፍ** (**ደንብ፣ መመሪያ፣ የአፈጻጸም ማንዋል** አለ? If yes, how it is applied? If not, why not, what challenges are observed due to its absence?
16. Are there changes in institutions? How do they change and why?
17. Do you think that land administration process is established on the transparent and accountable system (federal to kebele level)? If yes, how? If not, why not?
18. What are the successes achieved so far due to the federal government intervention?
19. What are the costs incurred so far due to the federal government intervention?
20. What are the strengths and weaknesses of the institutions?
21. How do institutions promote and ensure rights and benefits of the local community?
22. How do institutions safe guard local community from the potential and actual harms of LSAI?
23. Do you think that the existing LSAI policy promotes and ensures rights and benefits of the local community? If yes, how? If not, why not?
24. Do you think that the existing LSAI policy safeguards local community from actual and potential harms? If yes, how? If not, why not?
25. Do you think that the existing LSAI legal framework promotes and ensures rights and benefits of the local community? If yes, how? If not, why?
26. Do you think that the existing LSAI legal framework safeguards local community from actual and potential harms? If yes, how? If not, why?
27. Does the national law contain any relevant provision relevant to land deals, such as environmental or social/labor standards, obligation of investors to reimburse the local community in case of displacement?
28. How are customary and traditional land rights respected, and have there been any conflicts between these rights of local people and investor's rights? Are customary laws recognized in the constitution?
29. How far along is the policy and legal framework of LSAI according to constitutional obligations?
30. Were stokeholds (public officials, concerned experts, community leaders, community representatives,

etc) consulted about the LSAI?
31. Do you know the business model adopted by the Ethiopian government and/or investors?
32. If yes, what type of business model(s) (out grower/contracting, monoculture/plantation/export oriented…) have been promoted by the government?
33. Why does the government prefer one business model over the other? Or what is the justification behind adoption of a particular model?
34. What are the precise objectives and/or benefits of promoting LSAI at national, regional, and local levels?
35. Do you think that these objectives are achieved or the benefits are materialized? If yes, how? Please, provide evidences? If not, why not?
36. Is there monitoring and evaluation framework for LSAI? If yes, who involved, what kind, how often, and what are the procedures? If not why not?
37. What measures did you take on the investors that do not meet the standard of monitoring and evaluation?
38. Have you ever received any complaint from any constituencies about the LSAI?
39. If yes, what is the content of the complaint and how did you handle it?
40. What are the key challenges that federal institutions faced in administering LSAI? How did you handle them?

2.Interview Guide for Government Officials and Experts (Regional and *woreda* leveles)

1. What is your opinion on the current LSAI in your area? Benefits, costs, purposes…..
2. Do you know the reasons why LSAI is directed to and promoted in lowland regions, such as Gambella?
3. Who does account for the majority of agricultural investments (domestic/foreign; public/private) in this area?
4. Why is federal government involved in land administration affairs of the Gambella region? Political, economical, institutional, socio-cultural….reasons
5. How does federal government intervene to the land administration of the Gambella region?
6. Do you think that federal government's involvement is fair enough from legal perspective? If yes, how? If not, why did government involve?
7. Do you think that federal government's involvement is fair enough from political perspective? If yes, how? If not, why did government involve?
8. Who are the institutions involved in supporting your region on LSAI?
9. What do they did and do? Plans, objectives, strategies…….
10. Where do they work? At central level, regional, zonal, woreda, or kebele, and why?
11. How do they interact with stakeholders at regional, zonal, or woreda levels? Cooperation, integration, any overlap?
12. How do agro-investors acquire lands? – land acquisition processes (To be supported by secondary data).
13. How do you identify and measure investment land? (GPS, car KM, other)….Who involved in these activities?
14. Who are the key groups or institutions that have influenced the issues of land acquisition processes, problems or opportunities over time in your region? How and why do they have a particular influence?
15. Are there changes in institutions? How do they change, why do they change? How do these changes affect LSAI and local community?
16.What are the successes achieved so far due to the federal government intervention in your region, zone, or woreda?
17.What are the costs incurred so far due to the federal government intervention in your region, zone, or woreda?
18.What are the strengths and weaknesses of the federal, regional, zonal, and woreda institutions?
19.How do institutions promote and ensure rights and benefits of the local community?
20.How do institutions safe guard local community from the potential and actual harms of LSAI?
21.Do you think that the existing LSAI policy (federal) promotes and ensures rights and benefits of the local community? If yes, how? If not, why not?
22.Do you think that the existing LSAI policy (federal) safeguards local community from actual and potential harms? If yes, how? If not, why not?

23.Do you think that the existing LSAI legal framework (federal) promotes and ensures rights and benefits of the local community? If yes, how? If not, why?
24.Do you think that the existing LSAI legal framework (federal) safeguards local community from actual and potential harms? If yes, how? If not, why?
25.Does Gambella region have land law (legal framework for land administration or land policy? If yes, do you think that the law or policy promotes and ensures rights and benefits of the local community or safeguards local community from actual and potential harms? If not why not? (**የጸደቀ የመሬት ማስተላለፍ የህግ ማዕቀፍ**) **እና የግብርና ኢንቨስትመንት መሬት ጥናትና ልየታ ሥራ ለማከናወን የተዘጋጀ የህግ ማዕቀፍ ደንብ፣ መመሪያ፣ የአፈጻጸም ማንዋል**) **አለ**?
26.Without land law how does the region administer LSAI? Does absence of law or policy affect the process of LSAI?
27. What is the role of regional, zonal, woreda, and kebele government in LSAI administration? Do you think that they effectively playing their respective roles? If yes, how? If not, why not?
28.Were stokeholds (public officials, concerned experts, community leaders, community representatives, etc) consulted about the LSAI in your constituency?
29.Do you think that land administration process is established on the transparent and accountable system (from federal to kebele level)? If yes, how? If not, why not?
30.Do you know the business model adopted by the Ethiopian government and/or investors? ***(For regional interviewees)***
31.If yes, what type of business model(s) (out grower/contracting, monoculture/plantation/export oriented…) have been promoted by the government?
32.Why does the government prefer one business model over the other? Or what is the justification behind adoption of a particular model?
33.What precisely are objectives and/or benefits of promoting LSAI at national, regional, and local levels? (Financial, material, institutional…)
34.Do you think that these objectives are achieved or the benefits are materialized? If yes, how? Please, provide evidences? If not, why not?
35.Is there monitoring and evaluation framework for LSAI? If yes, who involved, what kind, how often, and what are the procedures? If not why not?
36.What measures did you take on the investors that do not meet the standard of monitoring and evaluation?
37.Have you ever received any complaint from any constituencies about the LSAI?
38.If yes, what is the content of the complaint and how did you handle it?
39.What are the key challenges that regional, zonal, and woreda institutions faced in administering LSAI?

2. KII and Focus Group Discussion (FGD) Guideline

1. When did the LSAI come into this area/community?
2. Where did you live before LSAI started operating? If you came from other area, where was it? Why did you come here? Did you come voluntarily? How do you compare your former village and the current one – are you better off? If yes or no, in what ways?
3. If you came from other area, what happened to your former land? Are they taken by somebody or still unoccupied?
4. What were you doing (main livelihood activities) before the investment project started operating? (Farming, fishing, livestock rearing, hunting and gathering….)? What are you doing now? *The same activities or different?*
5. Did your community experience anything change after the LSAI? (In land size and use, livelihood activities….). If yes or no, in what ways?
6. How did you first learn about the investment? Were community members consulted about the coming investment? If yes, • Who informed you about the investment? Did community members talk to or meet the investor before the investment? What were you told about the investment? How did the investors communicate with you (when they first came/today)? How did local people respond? (Happy, complain…)
7. Do you know the nature of the contract that the government signed with the investors? If yes, explain…if not why not?
8. Were community members consulted during the negotiation stages of the contract? If yes, when and how? If not, how why not?

9. Were you and/or community members compensated for land taken for investment? If yes, was this compensation adequate, equitable and timely? If not, why?

10. How do you describe your relationship with investors? Do you trust them? If yes, how, if not, why not? Did you notice any conflict?

11. Do investors provide/supply their product to local markets? If yes, which type of crop? If not, in your opinion why not?

12. In general, what have been the expectations of the community when you first heard that large agro-investors were coming into your community? Were any of these expectations met? If yes, how? If not, why not?

13. Are community land rights affected by the operations of large investors? If yes, how?

14. Did the investors make any promises when they started operating in this community?
- o If yes, list them?
- o Through whom did they make these promises? (Regional officials, zonal officials, woreda officials, kebele officials, local chiefs, community representatives……
- o Were any of these promises fulfilled?
- o If they were never fulfilled, what reasons were given for this happening?

15. Did the government make any promises when the investment started operating in this community?
- o If yes, list them?
- o Through whom did they make these promises? (Regional officials, zonal officials, woreda officials, kebele officials, local chiefs, community representatives……
- o Were any of these promises fulfilled?
- o If they were never fulfilled, what reasons were given for this happening?

16. Which local land institutions exist in this area to regulate agricultural land transactions? Customs/traditions and institutions

17. What exact roles do these institutions play in the recent LSAI?

18. Are there any changes to these institutional structures in recent times following large land acquisition by investors?

19. Generally, how does the community of this village perceive LSAI? How do they perceive the future of these investments?

20. How do people generally protect their rights in this community?

21. How does local community respond to LSAI?

22. What is the most significant results of the investment? In terms of:

A. Living Standard

- Income – improvement or deterioration – why?
- Employment – community members hired, procedures of getting jobs, adequacy of wages, working for farms or own farms
- Agricultural output – improvement or deterioration – why?
- Health – improvement or deterioration of access– why?
- Education – improvement or deterioration of access– why?
- Food security, how do LSAI affect - (availability, access, utilization, and stability (prices) **– trend over time…?**

B. Access to resources

- Agricultural land – improvement or deterioration – why?
- Forest land – improvement or deterioration – why? Significance of forest to local people, Trees destroyed? What did investors do with the destroyed trees? ***Forest food list, their local names***
- Grazing land Significance of forest to local people – improvement or deterioration – why?
- Wild animals – improvement or deterioration – why?
- Water (for agriculture) – improvement or deterioration access – why?
- Water for family use – improvement or deterioration access – why?

- Market – improvement or deterioration access – why?
- Transport – improvement or deterioration access – why?
- Social relations and culture (capita) – improvement or deterioration access – why?
- Financial services – improvement or deterioration access – why?
- Livestock – improvement or deterioration – why?
- **Knowledge/Technology**
- Irrigation (if any) – improvement or deterioration access – why?
- **T**raining – improvement or deterioration access – why?
- Use of technology (e.g. tools and machineries) – improvement or deterioration access – why?
- Seeds/fertilizers – improvement or deterioration access – why?
- Improved Livestock - – improvement or deterioration access – why?

C. Women

- Income generation outside the home
- Access to land, education, health, market, financial services….etc
- Participation in social issues – funeral, wedding, traditional celebrations,
- Decision making – daily food purchase, big purchase such as furniture, selling or buying of livestock, land administration, crop use and/or cultivation, milk use, contraction and/or maintenance of house, taking loan, family and wife's health care, family planning, visiting friends or relatives…..

D. Risks– probe on how and why it affects (both positive and negative)

- Conflict over land and water resources**;** Displacement**;** Disease (e.g. HIV AIDS)**;** Drought – erratic rainfall**;** Wind**;** Theft **;** Price (mainly of food)**;** Food shortage – indentify months of food shortage and coping strategies …..

23. **Overall benefits and opportunities?**
24. **Over all challenges and threats?**
25. **Way forward…….**

Annex IV: List of Key Informants and FGD Participants

1. List of Key Informants

No	Institution	Interviewee code
1	Federal Horticulture and Investment Land administration Commission	FHILAC O01, 2018
2	Federal Horticulture and Investment Land administration Commission	FHILAC E02, 2018
3	Federal Investment Commission	FIC E03, 2018
4	Federal Investment Commission	FIC E04, 2018
5	Federal Prime Minister Office	FPO O05, 2018
6	Federal Prime Minister Office	FPO E06, 2018
7	Gambella region Administration council	GRAC O01, 2018
8	Gambella region investment bureau	GRIA, O02, 2018
9	Gambella region investment bureau	GRIA E03, 2018
10	Gambella region agriculture bureau	GRAB O04, 2018
11	Gambella region women, children and youth bureau	GRWCYB O05, 2018
12	Abobo woreda administration council	AWAC, O01, 2018
13	Abobo woreda agriculture and natural resource office	AWANRO, O02, 2018
14	Abobo woreda agriculture and natural resource office	AWANRO, E03, 2018
15	Abobo woreda agriculture and natural resource office	AWANRO, E04, 2018
16	Abobo woreda women, children, and youth office	AWWCYO, O05, 2018
17	Abobo woreda revenue office	AWRO, E06, 2018
18	Abobo woreda Terkudi Kebel DA	AWTK, TDA07, 2018
19	Abobo woreda Perpengo Kebel DA	AWPK, PDA08, 2018
20	Abobo woreda Terkudi Kebel Administration	AWTK, TKA09, 2018
21	Abobo woreda Perpengo kebele administration	AWPK, PKA010, 2018
22	Abobo woreda Perpengo Kebel community representative	AWPK, PCR011, 2018
23	Abobo woreda Terkudi Kebel community representative	AWTK, TCR012, 2018
24	Itang woreda administration council	IWAC, O013, 2018
25	Itang woreda agriculture and natural resource office	IWANRO, R014, 2018
26	Itang woreda agriculture and natural resource office	IWANRO, E015, 2018
27	Itang woreda women, children, and youth office	IWWCYO, EWCY16, 2018
28	Itang revenue office	IWRO, O017, 2018
29	Itang woreda Watgach Kebel community representative	IWWKR, WKCR018, 2018
30	Itang woreda Watgach Kebel DA	IWWK, DA019, 2018
31	Itang woreda Watgach Kebel Administration	IWWKA, WKA020, 2018

2. FGD participants

FGD general code for adult women participants Abobo Terkudi – FGD1-WAT, 2018		
No	Kebele	Codes
1	Terkudi	FGD1-W-TP1, 2018
2	Terkudi	FGD1-W-TP2, 2018
3	Terkudi	FGD1-W-TP3, 2018
4	Terkudi	FGD1-W-TP4, 2018
5	Terkudi	FGD1-W-TP5, 2018
FGD general code for adult men participants Abobo Terkudi – FGD2-MAT, 2018		
1	Terkudi	FGD2-M-TP1, 2018
2	Terkudi	FGD2-M-TP2, 2018
3	Terkudi	FGD2-M-TP3, 2018
4	Terkudi	FGD2-M-TP4, 2018
5	Terkudi	FGD2-M-TP5, 2018
FGD general code for youth participants Abobo Terkudi – FGD3-YAT, 2018		
1	Terkudi	FGD3-Y-TP1, 2018
2	Terkudi	FGD3-Y-TP2, 2018
3	Terkudi	FGD3-Y-TP3, 2018

4	Terkudi	FGD3-Y-TP4, 2018
5	Terkudi	FGD3-Y-TP5, 2018
FGD general code for women participants Abobo Perpengo – FGD1-WAP, 2018		
1	Perpengo	FGD1-W-PP1, 2018
2	Perpengo	FGD1-W-PP2, 2018
3	Perpengo	FGD1-W-PP3, 2018
4	Perpengo	FGD1-W-PP4, 2018
5	Perpengo	FGD1-W-PP5, 2018
FGD general code for adult men participants Abobo Perpengo – FGD2-MAP, 2018		
1	Perpengo	FGD2-M-PP1, 2018
2	Perpengo	FGD2-M-PP2, 2018
3	Perpengo	FGD2-M-PP3, 2018
4	Perpengo	FGD2-M-PP4, 2018
5	Perpengo	FGD2-M-PP5, 2018
FGD general code for youth participants Abobo Perpengo – FGD3-YAP, 2018		
1	Perpengo	FGD3-Y-PP1, 2018
2	Perpengo	FGD3-Y-PP2, 2018
3	Perpengo	FGD3-Y-PP3, 2018
4	Perpengo	FGD3-Y-PP4, 2018
5	Perpengo	FGD3-Y-PP5, 2018
FGD general code for women participants Itang Watgach – FGD1-WIW, 2018		
1	Watgach	FGD1-W-WP1, 2018
2	Watgach	FGD1-W-WP2, 2018
3	Watgach	FGD1-W-WP3, 2018
4	Watgach	FGD1-W-WP4, 2018
5	Watgach	FGD1-W-WP5, 2018
FGD general code for adult men participants Itang Watgach – FGD2-MIW, 2018		
1	Watgach	FGD2-M-WP1, 2018
2	Watgach	FGD2-M-WP2, 2018
3	Watgach	FGD2-M-WP3, 2018
4	Watgach	FGD2-M-WP4, 2018
5	Watgach	FGD2-M-WP5, 2018
FGD general code for youth participants Itang Watgach – FGD2-YIW, 2018		
1	Watgach	FGD3-Y-WP1, 2018
2	Watgach	FGD3-Y-WP2, 2018
3	Watgach	FGD3-Y-WP3, 2018
4	Watgach	FGD3-Y-WP4, 2018
5	Watgach	FGD3-Y-WP5, 2018

Annex V: Profile, Frequency and Modality of the Variables used in Asset Index

Asset	Variable	*Nuer*				*Anauk*			
		Modality	Code	No	%	Modality	Code	No	%
Physical	Watch	No	0	140	90.1	No	0	293	85.7
		Yes	1	14	9.1	Yes	1	49	14.3
	Radio	No	0	139	90.3	No	0	313	91.5
		Yes	1	15	9.7	Yes	1	29	8.5
	TV	No	0	153	99.35	No	0	342	100
		Yes	1	1	0.65	Yes	1	0	0
	Mobile	No	0	82	53.25	No	0	211	61.7
		Yes	1	72	46.75	Yes	1	131	38.3
	Tape-recorded	No	0	142	92.2	No	0	339	99.1
		Yes	1	12	7.8	Yes	1	3	0.9
	Table	No	0	62	40.3	No	0	200	58.5
		Yes	1	92	59.7	Yes	1	142	41.5
	Chair	No	0	56	36.4	No	0	127	37.1
		Yes	1	96	63.6	Yes	1	215	62.9
	Bedshibo[70]	No	0	149	96.75	No	0	342	100
		Yes	1	5	3.25	Yes	1	0	0
	Bedtawila[71]	No	0	152	98.7	No	0	339	99.1
		Yes	1	2	1.3	Yes	1	3	0.9
	Stove	No	0	150	97.4	No	0	342	100
		Yes	1	4	2.6	Yes	1	0	0
	Shelf	No	0	152	98.7	No	0	336	98.25
		Yes	1	2	1.3	Yes	1	6	1.75
	No houses	<average	0	73	47.4	<average	0	306	89.5
		>average	1	81	52.6	>average	1	36	10.5
	Roof material	Others	0	152	98.7	Others	0	312	91.2
		Corr. iron	1	2	1.3	Corr. iron	1	30	8.8
	Wall material	Others	0	153	99.35	Others	0	340	99.4
		Cement	1	1	0.65	Cement	1	2	0.6
	Floor material	Others	0	154	100	Others	0	337	98.5
		Cement	1	0	0	Cement	1	5	1.5
	Spade	No	0	107	69.5	No	0	229	67
		Yes	1	47	30.5	Yes	1	113	33
	Traditional beehive	No	0	154	100	No	0	313	91.5
		Yes	1	0	0	Yes	1	29	8.5
	Modern beehive	No	0	154	100	No	0	338	98.8
		Yes	1	0	0	Yes	1	4	1.2
	Chemical sprayer	No	0	152	98.7	No	0	342	100
		Yes	1	1	0.65	Yes	1	0	0
	Sewing M.	No	0	153	99.35	No	0	342	100
		Yes	1	1	0.65	Yes	1	0	0
	Mechanical water pump	No	0	154	100	No	0	342	100
		Yes	1	0	0	Yes	1	0	0
	Motorized water pump	No	0	154	100	No	0	342	100
		Yes	1	0	0	Yes	1	0	0
	Candle	No	0	108	70.1	No	0	301	88
		Yes	1	46	29.9	Yes	1	41	12
	Electric	No	0	154	100	No	0	342	100

[70] Bed made from metal rod
[71] Bed made from metal wood

		Yes	1	0	0	Yes	1	0	0
	Wood	No	0	69	44.8	No	0	213	62.3
		Yes	1	85	55.2	Yes	1	129	37.7
	Oil lamp	No	0	137	89	No	0	333	97.4
		Yes	1	17	11	Yes	1	9	2.6
	Pan lamp	No	0	147	95.45	No	0	323	94.4
		Yes	1	7	4.55	Yes	1	19	5.6
	Torch	No	0	33	21.4	No	0	86	25.2
		Yes	1	121	78.6	Yes	1	256	74.8
	Flush L	No	0	154	100	No	0	342	100
		Yes	1	0	0	Yes	1	0	0
	Traditional Pit	No	0	135	87.7	No	0	286	83.6
		Yes	1	19	12.3	Yes	1	56	16.4
	Open Toilet	No	0	153	99.35	No	0	331	96.8
		Yes	1	1	0.65	Yes	1	11	3.2
	Com latrine	No	0	154	100	No	0	335	98
		Yes	1	0	0	Yes	1	7	2
	Bush	No	0	2	1.3	No	0	51	14.9
		Yes	1	152	98.7	Yes	1	291	85.1
	Vehicle	No	0	33	21.4	No	0	237	69.3
		Yes	1	121	78.6	Yes	1	105	30.7
	Bajaj[72]	No	0	92	59.7	No	0	337	98.5
		Yes	1	62	40.3	Yes	1	5	1.5
	Bike	No	0	153	99.35	No	0	320	93.6
		Yes	1	1	0.65	Yes	1	22	6.4
	Foot	No	0	130	84.4	No	0	9	2.6
		Yes	1	24	15.6	Yes	1	333	97.4
	Traditional plough	No	0	154	100	No	0	314	91.8
		Yes	1	0	0	Yes	1	28	8.2
	Sickle	No	0	38	24.7	No	0	144	42.1
		Yes	1	116	75.3	Yes	1	198	57.9
	Pick axe	No	0	54	35.1	No	0	75	21.9
		Yes	1	100	64.9	Yes	1	267	78.1
	Axe	No	0	16	10.4	No	0	64	18.7
		Yes	1	138	89.6	Yes	1	278	81.3
	Hoe	No	0	48	31.2	No	0	303	88.6
		Yes	1	106	68.8	Yes	1	39	11.4
	Modern plough	No	0	153	99.35	No	0	342	100
		Yes	1	1	0.65	Yes	1	0	0
	Pruning	No	0	153	99.35	No	0	340	99.4
		Yes	1	1	0.65	Yes	1	2	0.6
	Education of household head	Illiterate	0	81	52.6	Illiterate	0	125	36.5
		Literate	1	73	47.4	Literate	1	217	63.5
	Health status	Poor	0	16	10.4	Poor	0	42	12.2
		Good	1	138	89.6	Good	1	300	87.7
	Dependency ratio	Below	0	86	55.8	Below	0	177	51.8

[72] Bajaj is a name given to one of the widely used Indian 3 wheelers vehicle in the study area

Human		average				average			
		Above average	1	68	44.2	Above average	1	165	48.2
	Family size	Below average	0	92	55.8	Below average	0	176	51.5
		Above average	1	62	44.2	Above average	1	166	48.5
	Training - livelihood	No	0	88	57.1	No	0	291	85.1
		Yes	1	66	42.9	Yes	1	51	14.9
	Training – entrepreneur	No	0	135	87.7	No	0	323	94.4
		Yes	1	19	12.3	Yes	1	19	5.6
	Training – technology	No	0	144	93.5	No	0	320	93.6
		Yes	1	10	6.5	Yes	1	22	6.4
	Training – health	No	0	106	68.8	No	0	329	96.2
		Yes	1	48	31.2	Yes	1	13	3.8
	Training - communicate	No	0	125	81.2	No	0	338	98.8
		Yes	1	29	18.8	Yes	1	4	1.2
	Training - conserve	No	0	139	90.3	No	0	332	97.1
		Yes	1	15	9.7	Yes	1	10	2.9
	Training – livestock mgt	No	0	154	100	No	0	341	99.7
		Yes	1	0	0	Yes	1	1	0.3
	Training – energy saving	No	0	154	100	No	0	341	99.7
		Yes	1	0	0	Yes	1	1	0.3
Social	Challenge government	No	0	92	59.7	No	0	241	70.9
		Yes	1	62	40.3	Yes	1	99	29.1
	People's voice	No	0	139	90.3	No	0	279	81.8
		Yes	1	15	9.7	Yes	1	62	18.2
	Participation	No	0	62	40.3	No	0	137	40.1
		Yes	1	92	59.7	Yes	1	205	59.9
	Trust	No	0	33	21.4	No	0	77	22.5
		Yes	1	121	78.6	Yes	1	265	77.5
	Coop member	No	0	143	92.9	No	0	298	87.1
		Yes	1	11	7.1	Yes	1	44	12.9
	Business member	No	0	138	90.3	No	0	333	97.4
		Yes	1	15	9.7	Yes	1	9	2.6
	Religion member	No	0	87	56.5	No	0	268	78.4
		Yes	1	67	43.5	Yes	1	74	21.6
	Political member	No	0	142	92.2	No	0	315	92.1
		Yes	1	12	7.8	Yes	1	27	7.9
	Edir[73] member	No	0	139	90.3	No	0	330	96.5
		Yes	1	15	9.7	Yes	1	12	3.5
	Equib[74] member	No	0	141	91.6	No	0	320	93.6
		Yes	1	13	8.4	Yes	1	22	6.4

[73]Eddir is one of the traditional community-based associations which is primary established by the people based on the mutual support and trust to assist each other during sickness and death events.

[74]Equib is an informal financial institution (traditional credit association) which is established by members with have common interest and/problem. It mainly provides saving service for its members from the regular contributions made by members.

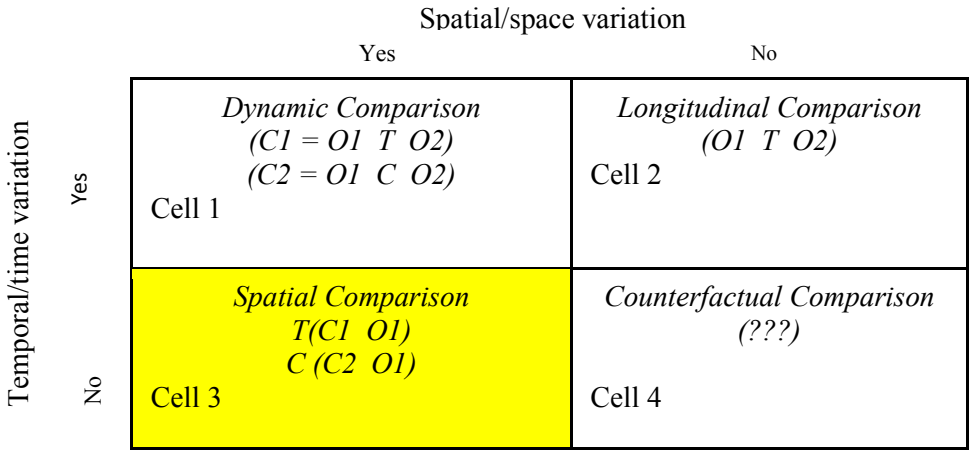
	Debbo[75] member	No	0	145	94.2	No	0	300	87.7
		Yes	1	9	5.8	Yes	1	42	12.3
	School committee	No	0	145	94.2	No	0	321	93.9
		Yes	1	9	5.8	Yes	1	21	6.1
	Health committee	No	0	141	91.6	No	0	329	96.2
		Yes	1	13	8.4	Yes	1	13	3.8
Financial	Access to credit	No	0	78	50.7	No	0	81	52.6
		Yes	1	76	49.3	Yes	1	73	47.4
	Livestock	Below average	0	93	60.4	Below average	0	264	77.2
		Above average	1	61	39.6	Above average	1	78	22.8
	Total income	Below poverty line	0	34	22.1	Below poverty line	0	182	53.2
		Above poverty line	1	120	77.9	Above poverty line	1	160	46.8
	Saving	No	0	93	60.4	No	0	240	70.2
		Yes	1	61	39.6	Yes	1	102	29.8
	Jewellery gold	No	0	148	69.1	No	0	340	99.4
		Yes	1	6	3.9	Yes	1	2	0.6
	Jewellery bronze	No	0	154	100	No	0	340	99.4
		Yes	1	0	0	Yes	1	2	0.6
	Jewellery silver	No	0	130	84.4	No	0	324	94.7
		Yes	1	24	15.6	Yes	1	18	5.3
Natural	Land size	Below average	0	113	73.4	Below average	0	198	57.9
		Above average	1	41	26.6	Above average	1	144	42.1
	Land mgt	No	0	71	46.1	No	0	251	73.4
		Yes	1	83	53.9	Yes	1	91	26.6

[75]Debbo is a traditional self-help association established by people to pool the labor and/or other resources and carry out agricultural activities together.

Annex VI: Typoplogies of Quasi - Experimental Research Design

Gerring & McDermott (2007) identified four typologies of quasi experimental design based on the two dimensions of observing causal effects: time/temporal and space/spatial (Figure 3.2). Cell 1 is labeled as 'dynamic comparison' for the reason that it captures the dynamism across both time and space. Here treated (C1) and untreated (C2) cases are observed before (baseline information) (O1) and after intervention (O2) implying that causal inferences are based on both temporal and spatial variations. Cell 2 is called a 'longitudinal (reflexive) comparison' due to the fact that it only captures temporal/time variations. In this type of design treatment groups are not accompanied by comparison group rather causal explanations are provided based on observations over time such as before and after intervention by, for example, using difference in differences (DiD) estimator (De Silva, 2012). Cell 3 is labelled as 'spatial comparison' give that it only captures spatial/space variation where outcomes (often not directly observable) of intervention are measured at some point in time (after intervention). The outcomes of two cases (C1 and C2) of treatment and comparison groups are then compared. Cell 4 is called a 'counterfactual comparison, which uses a case(s) where there is no variation in either time or space in the variable of interest. It instead depends on the imaginary intervention using some mathematical, statistical, and computer – generated models (Gerring & McDermott, 2007). For example, instrumental variable (IV) and Heckman's selection estimators fall within this category.

Figure 3.2: Types of quasi experimental design



Source: Adapted from Gerring & McDermott (2007, p.690)

Because of lack of baseline information (temporal data), we couldn't use either dynamic or longitudinal comparison; rather this study applies 'spatial comparison' typology of quasi-experimental design (cross-sectional). We did not also consider non-experimental one because of the severe difficulty in finding appropriate instruments that fulfil underlying distributional assumptions regarding unobservable covariates (De Silva, 2012) which are highly sensitive and may result in biased estimation when violated (Goldberger, 1983; Puhani, 2000). Particularly, in survey data like ours, it is a complex task to find one independent variable which determines program participation (being in investment area and affected by it) but is not itself determined by factors which affect outcome variable(s) to estimate treatment effect (De Silva, 2012). Non-experimental (instrumental variable) is feasible when researchers are unable to randomly select or identify a comparison group by using techniques such as matching (De Silva, 2012) and when hidden bias exists due to unobservable characteristics (Khandker *et al.,* 2010) which are not problems in our case.

Annex VII: Details of Matching Strategies

Nearest-neighbor matching (NN): the NN includes selection of one non-affected household or non-income earning women (n) who is closest to the respective affected household or wage employed women using propensity score method. Under the NN method, the pair can be matched with or without replacement (Smith & Todd, 2005). We used NN matching with replacement where each household or woman affected by the investment (treated) is matched to those unaffected households or women with the closest propensity score. Replacement enabled us to use unaffected households or women more than once as a match in such a way that 'increase the quality of the matches by using more information to construct the counterfactual' (Dillon, 2010, p.482). This method randomly sorts treatment cases where each affected household or employed woman *t* is matched with the unaffected household or non-income woman *c* having closest propensity score (Smith & Todd, 2005) based on the following equation:

$$|P_t - P_c| = \min_{k \in \{D=0\}} \{|P_t - P_c|\} \quad (3.12)$$

where P_t and P_c are propensity scores for the affected and unaffected households or women, respectively. NN matching algorism mainly minimizes the absolute distance between those households or women affected by the investment and those who do. Even though NN matching increases sample size and efficiency, it leads to higher bias from matches that are not as close as the first match (Dillon, 2010; Garrido *et al.,* 2014). To address this limitation and avoid the possibility of poor matches, caliper or radius matching strategy was used.

Caliper or radius matching: this strategy spells out a 'caliper' or maximum propensity score distance needed to match as many comparison cases as possible within the caliper (Heinrich *et. al.,* 2010). It matches each household or woman *i* in the treatment group with a household or woman *j* in the comparison group within a pre-specified caliper band or threshold *b* (Austin, 2011) based on the following equation:

$$|P_t - P_c| = \min_{k \in \{D=0\}} \{|P_t - P_c| < b\} \quad (3.13)$$

Rosenbaum and Rubin (1983) suggested that a priori defined calipers band *b* should at most be 0.25 of the standard deviation of the propensity scores. Later on, Austin (2011) claimed that pre specified calipers band *b* which is equal to 0.20 of the standard deviation of the logit of the estimated propensity scores is the optimal. Therefore, to reduce the possibility of having bad matches and ensure that treated and control cases are similar, following Austin (2011), a caliper equivalent to 0.2 of the standard deviation of the logit of the estimated propensity score was used. Empirical research showed that the application of calipers of 0.2 width removes about 99% of the bias attributable to a normally distributed confounding variable when estimating a linear treatment effect (Cochran & Rubin, 1973). However, this strategy increases the likelihood of sampling bias by dropping comparison units that fall outside the propensity score range (common support region) (Khandker *et al.,* 2010).

Since both nearest neighbor and radius matching signify the number of comparisons matched with observation $i \in T$ by N_i^C and define the weights $w_{ij} = \frac{1}{N_i^C}$ if $j \in C(i)$ and $w_{ij} = 0$ otherwise, the

following equation for both types of matching estimators was used to estimate ATT (Becker & Ichino, 2002):

$$ATT^M = \frac{1}{N^T}\sum_{i\in T}\left(Y_i^T - \sum_{j\in C(i)} \omega(i,j)\, Y_j^C\right) = \frac{1}{N^T}\left(\sum_{i\in T} Y_i^T - \sum_{i\in T}\sum_{j\in C(i)} \omega_{ij} Y_j^C\right)$$

$$= \frac{1}{N^T}\sum_{i\in T} Y_i^T - \frac{1}{N^T}\sum_{j\in C} \omega_j\, Y_j^C \qquad (3.14)$$

where M is either NN matching or radius matching, T is the set of treated units and C is the set of comparison units, N^T represents the number of units in the treated group, Y_i^T and Y_j^C are the observed outcomes (food security or wealth status of households or women empowerment level) of affected and unaffected households or wage employed and non-income earning women, respectively, and the notation $\omega_j = \sum_i \omega_{ij}$ defines the weights ω_i.

Kernel matching method: rather than using a direct match between treated and comparison groups and dropping unmatched observations from the comparison group (that actually reduces sample size), kernel matching (KM) strategy was used to estimate the counterfactual. KM is a non-parametric matching estimator that employs a weighted average of all units in the comparison group to create the counterfactual outcome (Austin, 2011). Weights are mainly depending on the distance of propensity score between each treated unit from the comparison group (Smith & Todd, 2005). And so, each treated household is given a weight of 1 based on the weighted composite of comparison households while comparison units are weighted by their distance in propensity score from treated units within a range, or bandwidth, of the propensity score (Garrido *et al.,* 2014). We used a bandwidth of 0.06 (i.e. propensity score between - 0.06 and +0.06) to optimize the tradeoff between variance and bias suggested in the literature (Heckman *et al.,* 1997). Following Khandker *et al.* (2010), the weights for KM are computed using the following equation:

$$\omega(i,j)_{KM} = \frac{K\left(\frac{P_j - P_i}{a_n}\right)}{\sum_{j\in C} K\left(\frac{P_k - P_i}{a_n}\right)} \qquad 3.15$$

where P_i denotes the propensity score for affected household or employed woman *i,* P_j represents the propensity score for unaffected household or non-income earning woman *j,* K(·) is a kernel function, a_n is a bandwidth parameter, and other notations are described in equation 3.14.

After matching exercise is completed, Kernel weights were used to compute average treatment effect on the treated. This method places the highest weight on those cases with scores closest to treated households or women by making comparison between the outcomes of each treated household or woman to a weighted average of the outcome of all untreated households or women (Heinrich, *et. al.,* 2010). And thus, pursuing the notations in equations 3.14 and 3.15, KM ATT was calculated by using the following equation (Becker & Ichino, 2002):

$$ATT^K = \frac{1}{N^T}\sum_{i\in T}\left\{Y_i^T - \frac{\sum_{j\in C} Y_j^C\, K\left(\frac{P_j - P_i}{a_n}\right)}{\sum_{j\in C} K\left(\frac{P_k - P_i}{a_n}\right)}\right\} \qquad 3.16$$

Becker & Ichino (2002) have shown that under standard conditions on the bandwidth and kernel, equation $\frac{\sum_{j\in C} Y_j^C K\left(\frac{P_j - P_i}{a_n}\right)}{\sum_{j\in C} K\left(\frac{P_k - P_j}{a_n}\right)}$ is a reliable estimator of the counterfactual outcome Y_{0i}.

Stratification matching: this method is used to estimate the impact of LSAI on the outcome variable by splitting the common support into five strata or blocks and compute the impact within each stratum/block. The treatment effect is thus taken as the mean difference between outcome variables of affected households or wage employed women and unaffected or non-income earning ones within each block. This strategy is based on the same stratification process employed in estimating the propensity score where the covariates are balanced across treated and comparison groups. Following Becker & Ichino (2002), ATT was estimated based on the Stratification strategy by using the following equation:

$$ATT_q^S = \frac{\sum_{i\in I(q)} Y_i^T}{N_q^T} - \frac{\sum_{j\in I(q)} Y_j^C}{N_q^C} \qquad 3.17$$

where *S* is stratification matching, *I*(*q*) represents the set of observations in stratum *q*, N_q^T and N_q^C are the number of affected and unaffected households or employed and non-income earning women in stratum *q*, and other notations are indicated in equation 3.14.

In the STATA software programs such as attnd.ado, attr.ado, attk.ado, and atts.ado were used to estimate ATT and obtain standard errors using NN, Radius, Kernel, and Stratification matching strategies, respectively. Moreover, pursuing the notations in equations 3.14, 3.15, and 3.16, standard errors are obtained analytically or by applying bootstrap option based upon the following formula (Becker & Ichino, 2002):

$$Var(ATT^{NRK}) = \frac{1}{(N^T)^2}\left\{\sum_{i\in T} Var(Y_i^T) + \sum_{j\in C}(\omega_j)^2 Var(Y_i^C)\right\} = \frac{1}{(N^T)^2}\left\{N^T Var(Y_i^T) + \sum_{j\in C}(\omega_j)^2 Var(Y_i^C)\right\}$$
$$= \frac{1}{N^T} Var(Y_i^T) + \frac{1}{(N^T)^2}\sum_{j\in C}(\omega_j)^2 Var(Y_i^C) \qquad 3.18$$

where *NRT* stands for nn, radius, and kernel matching, respectively and *Var* denotes variances of these matching estimators. Likewise, the following formula was used to obtain the standard and bootstrap errors for stratification matching:

$$Var(ATT^S) = \frac{1}{N^T}\left\{Var(Y_i^T) + \sum_{q=1}^{Q}\frac{N_q^T}{N^T}\frac{N_q^T}{N_q^C} Var(Y_j^C)\right\} \qquad 3.19$$

where Q is the number of blocks. The computation of the variances of the estimators requires some assumptions, such as the weights are assumed as fixed and outcomes are assumed as independent across observations (Becker & Ichino, 2002). Bootstrap standard error was used for the reason that the estimators are asymptotically linear and yield valid standard errors and confidence intervals (Imbens, 2004). In this study, bootstrapping is done with 100 replications.

Annex VIII: Test for heteroskedasticity

```
Command used in STATA: hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of treatment
         chi2(1)      =     2.20
         Prob > chi2  =   0.1381
```

Annex IX: Coping Strategy Weights

Anuak Community

Category	Coping strategy	Weight for severity scores							Consensus ranking	Severity level
		FGD 1	FGD 2	FGD 3	FGD 4	FGD 5	FGD 6	Ave.		
Dietary Change	Rely on less preferred and less expensive foods (CS1)	1	1	1	1	1	1	1	1	Least
Increase household short term food availability	Borrow food, or rely on help from a friend or relative (CS2)	1	1	2	1	2	1	1.3	1	Least
	Purchase food on credit (CS3)	2	2	3	1	2	2	2	2	Moderate
	Gather wild food, hunt, or harvest immature crops (CS4)	1	1	1	2	1	1	1.17	1	Least
	Consume seed stock held for next season (CS5)	3	3	3	4	3	3	3.17	3	Severe
Reduce number of people	Send household members to eat elsewhere (CS6)	3	2	2	2	3	2	2.3	2	Moderate
	Send household members to beg (CS7)	4	4	4	4	4	4	4	4	Most
Rationing strategies	Limit portion size at mealtimes (CS8)	2	2	2	3	2	2	2.17	2	Moderate
	Restrict consumption by adults in order for small children to eat (CS9)	4	3	2	3	3	3	3	3	Severe
	Feed working members of HH at the expense of non-working members (CS10)	3	3	3	3	3	3	3	3	Severe
	Reduce the number of meals eaten in a day (CS11)	2	2	2	2	2	2	2	2	Moderate
	Skip entire days without eating (CS12)	4	4	4	4	4	4	4	4	Most
	Gender of FGD participants	F	F	M&F	F	M	M			

Source: Own Data based on FGD participants' view

Nuer Community

Category	Coping strategy	Weight for severity scores							Consensus ranking	Severity level
		FGD 1	FGD 2	FGD3	FGD 4	FGD 5	FGD 6	Ave.		
Dietary Change	Rely on less preferred and less expensive foods	1	1	1	1	1	1	1	1	Least
Increase household short term food availability	Borrow food, or rely on help from a friend or relative	1	1	1	1	2	1	1	1	Least
	Purchase food on credit	2	2	3	1	2	2	2	2	Moderate
	Gather wild food, hunt, or harvest immature crops	3	4	3	2	3	3	3	3	Severe
	Consume seed stock held for next season	4	4	4	4	4	3	3.8	4	Most
Reduce number of people	Send household members to eat elsewhere	2	2	2	2	2	2	2	2	Moderate
	Send household members to beg	4	4	4	4	4	4	4	4	Most
Rationing strategies	Limit portion size at mealtimes	2	2	2	2	2	2	2	2	Moderate
	Restrict consumption by adults in order for small children to eat	4	3	3	3	3	3	3.17	3	Severe
	Feed working members of HH at the expense of non-working members	2	2	2	2	2	2	2	2	Moderate
	Reduce the number of meals eaten in a day	2	2	2	2	2	2	2	2	Moderate
	Skip entire days without eating	4	4	4	4	4	4	4	4	Most
	Gender of FGD participants	F	F	M&F	F	M	M			

Source: Own Data based on FGD participants' view

Annex X: MCA model specification

In addition to its aptness for categorical data, at least two computational properties in using MCA for index construction are indicated in the literature (Asselin, 2009). The first property is that MCA assigns a high weight to indicators with a lesser number of hits (marginal categories) within each primary indicator given that since the covariance is identical for both categories (Asselin, 2009). The second property is called 'bi-additivity or duality' (Asselin & Anh, 2008, p. 84) which asserts that the composite asset score of an individual is the simple average of the factorial weights of the asset categories and the weight of a given dimension of asset is the simple average of the composite asset scores of the population units that belong to the given dimension (Ezzrari & Verme, 2012). The duality property of MCA (Asselin & Anh, 2008) can be expressed as:

$$F_{\alpha}^{i} = \frac{1}{K} \sum_{K=1}^{K} \sum_{j_k=1}^{J_k} \frac{W_{j_k}^{\alpha,k}}{\lambda_{\alpha}} I_{i,jk}^{k} \qquad 3.28$$

where K is the number of categorical indicators, j_k is the number of categories for indicator k, $W_{j_k}^{\alpha,k}$ is the score of category j_k on the factor axis α (non-normalized), $I_{i,jk}^{k}$ is the binary variable (0, 1) taking the value 1 when the household i has the category j_k, F_{α}^{i} is the score (non-normalized) of observation on the factor axis α and reciprocally it is expressed as:

$$W_{j_k}^{\alpha,k} = \frac{\sum_{i=1}^{N_{jk}} F_{\alpha}^{i}}{N_{jk}^{k}} \qquad 3.29$$

The second property is mainly vital to understand the axiomatic requirements of the MCA model (Asselin, 2009) as discussed below.

Having these properties in mind, following Asselin (2009), the technique for constructing the asset index (AI) using MCA is carried out as follows: let us consider K primary indicators representing the number of dimensions (variables) (various asset categories of a household such as a watch, mobile phone, beehive, etc). The fundamental idea here is to recap the information obtained from these qualitative indicators into a single composite index AI_i. The composite indicator can thus be written in the general form as follows:

$$AI_i = \sum_{j=1}^{K} \gamma_i I_{ij} \qquad 3.30$$

where I_{ij} represents the primary indicator j (1……K) for a household *i* (*i* = 1…..n); γ_i is the weight assigned to the indicator j in the construction of asset index (AI) of a household i. Thus, the functional form of the Composite Asset Indicator (CAI) can be expressed as:

$$AI_i = \frac{1}{K}\sum_{K=1}^{K}\sum_{J_k=1}^{J_k} W_{jk}^{k} I_{jk}^{k} \qquad 3.31$$

where *K* is the number of dimensions (variables) with *k = (1, 2, ..., K)*; J represents the number of categories (modalities) for each dimension k with *j* = (*1,2,...J*$_k$); *I* is binary (0/1) indicator of each modality taking the value 1 when a household has the category I_k; *W* is the weight $(\frac{Scores}{\sqrt{\lambda_1}})$ (normalized first axis score) of category I_k determined by MCA, and λ_1 is the first eigenvalue. In general, weights generated by the MCA stand for the normalized first axis scores on the first factorial axis (Asselin, 2009). We used equation 3.31 to calculate asset (wealth) index for each asset category separately and finally combined them to create an overall average composite index representing the wealth status of households.

For MCA model to generate valid and consistent asset composite index, Asselin (2009) proposes a two-steps procedure to simplify the axiomatic requirements of the model. For the first step, the computation of a composite indicator C from K ordinal categorical indicators I_K, at least meets the following requirement: 1) *Monotonicity Axiom*[76] which states that the composite indicator must be monotonically increasing in each of the primary indicators. It means that if any household improves his/her situation in relation for a given primary indicator I_K, then his/her composite asset value should improve (*Ceteris paribus*). It means that if we aim to capture the first factorial component F_1 as the composite wealth/asset indicator *AI*, from equation 3.31 above, the expression would then be:

$$C_i = F_1^i = \frac{1}{K}\sum_{K=1}^{K}\sum_{J_k=1}^{J_k} \frac{W_{j_k}^{1,k}}{\lambda_1} I_{i,jk}^{k} \qquad 3.32$$

[76] We assume that the sign of the composite indicator is selected in such a way that a larger value means wealth improvement and that the ordering relation A < B between two categories A and B of the same indicator means that B is preferable to A. We reversed the horizontal dimension (axis) by multiplying all coordinates by -1 following the suggestion of Greenacre who notes that to facilitate the interpretation "it is always possible to reverse an axis (that is, multiply all coordinates by −1)" (Greenacre, 2007, p.138-140).

The key concern here is that $C = F_1$ can be taken as a composite asset index only if the monotonicity axiom is met after ultimately changing the sign of F_1 when <w is equivalent to >k for all indicators (Asselin, 2009). This axiom indicates two requirements: a) First Axis Ordering Consistency (FAOC-I) which states that for any indicator I_K, there should be "an ordinal consistency between the ordering of categories and the ordering of weights across categories, either increasing or decreasing order" (Ezzrari & Verme, 2012, p.6) ; b) Global First Axis Ordering Consistency (FAOC-G), which states that, for all indicators I_K, the FAOC-I is fulfilled with the same orientation, either declining or rising for all (Asselin, 2009). Consistency (FAOC-I) is always met with binary indicators (i.e. if one of the two categories of the binary indicator is empty – have or not have some asset items (Ezzrari & Verme, 2012). However, sometimes multinomial indicators may not fulfil FAOC-I. During this time one can reorganized these categories in such a way that satisfy the property, for example by transforming the multinomial variable into a binomial one (Asselin, 2009). Likewise, if FAOC-G requirement is not met one need to re-elaborate the variable or to eliminate it by carefully examine the impact of information loss due to indicator removal. If the loss of information is too high, as proposed by Asselin (2009) one need to follow a research strategy that goes beyond the first axis and explores further axes though this alternative is not employed in our study with our dataset.

It is clear that, the weights that generated from the MCA procedure can have positive or negative values with zero average. However, to facilitate the interpretation and comparability of the index, it is imperative to positively rescale or adjust the weights so that the poorest category of the households would have zero index value and the composite index could be greater or equal to zero (the result falls in the range of 0 and 1). We adjusted all weights for each asset or capital by using the similar procedure used by (Hahn *et al.,* 2009; Liu *et al.,* 2018). For each indicator, *k*, the adjusted index for *i* household was calculated by using the following formula:

$$\text{Adjusted Asset Index} = \frac{\text{Observed value of indicator k} - \text{minimum value of indicator k}}{\text{Maximum value of indicator k} - \text{minimum value of indicator k}} \qquad 3.33$$

Annex XI: Logistic Model for Treatment, Goodness-of-Fit Test (asset/wealth component)

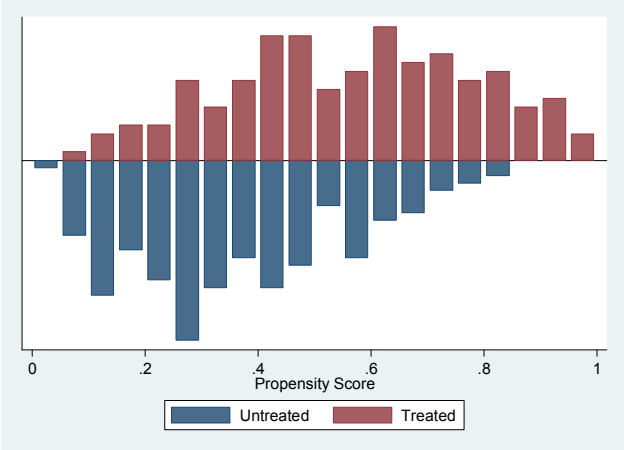
Anauk							Nuer						
Group	Prob.	Obs_1	Exp_1	Obs_0	Exp_0	Total	Group	Prob.	Obs_1	Exp_1	Obs_0	Exp_0	Total
1	0.1518	4	3.7	30	30.3	34	1	0.1073	1	1.0	15	15.0	16
2	0.2468	8	7	26	27	34	2	0.1858	1	2.2	14	12.8	15
3	0.2999	9	9.5	25	24.5	34	3	0.2630	3	3.7	13	12.3	16
4	0.3774	11	11.5	23	22.5	34	4	0.3450	5	4.6	10	10.4	15
5	0.4387	13	14	21	20	34	5	0.4319	8	5.9	7	9.1	15
6	0.4963	18	15.8	16	18.2	34	6	0.5368	6	7.5	10	8.5	16
7	0.5895	16	18.5	18	15.5	34	7	0.6168	9	8.8	6	6.2	15
8	0.6689	22	21.4	12	12.6	34	8	0.7397	12	11.0	4	5.0	16
9	0.7713	23	24.4	11	9.6	34	9	0.8387	13	11.9	2	3.1	15
10	0.9768	31	29.1	3	4.9	34	10	0.9586	12	13.5	3	1.5	15

Number of observations = 340
Number of groups = 10
Hosmer-Lemeshow chi2(8) = 2.86
Prob > chi2 = 0.9430

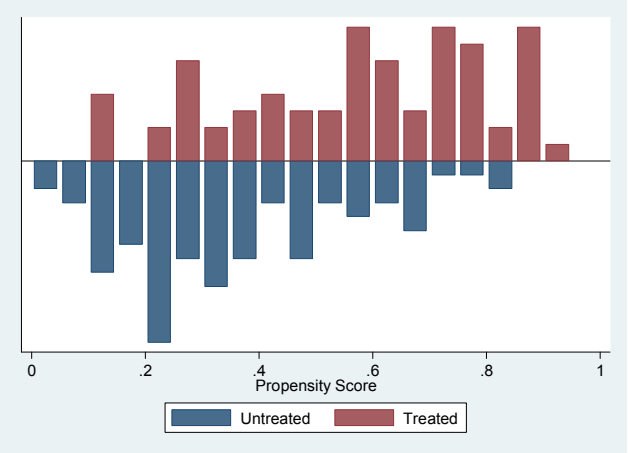
Number of observations = 154
Number of groups = 10
Hosmer-Lemeshow chi2(8) = 5.13
Prob > chi2 = 0.7431

Source: Own survey, 2018

Annex XII: Distribution of Propensity Score across Treatment and Comparison Groups (Asset component)



Anuak



Nuer

Source: Own survey, 2018

Annex XIII: Test of Propensity Score and Covariate Balance (Asset component)

Test of Propensity Score Balance

Community	Block of the pscore	Comparison group(n)	Treatment group(n)	Total (n)	t-test for matched
Anuak	1	36	8	44	0.5124
	2	70	28	98	0.3059
	3	50	46	96	0.9701
	4	22	47	69	0.4192
	5	2	26	28	0.2781
	Total (n)	180	155	335	
Nuer	1	11	4	15	0.1090
	2	36	13	49	0.6561
	3	17	18	35	0.3840
	4	10	24	34	0.0854
	5	2	11	13	0.1764
	Total (n)	76	70	146	

Note: The last column reports the p value of the mean propensity score for each block between treatment and comparison groups.
Source: Own survey, 2018

Test of Covariate Balance

Variables	t-test for matched									
	Anuak Block ID					Nuer Block ID				
	1	2	3	4	5	1	2	3	4	5
Sex	0.6542	0.7404	0.9171	0.2708	0.5662	0.0905	0.5340	0.3844	0.5943	0.3678
Marital status	0.8181	0.6914	0.7320	0.2500	0.6267	0.0905	0.5919	0.3445	0.8230	0.6887
Age	0.5393	0.3721	0.7649	0.4573	0.9118	0.3542	0.1158	0.4136	0.1556	0.5466
Occupation	0.5064	0.8547	0.2722	0.2486	.a	0.1130	0.9438	0.1663	.	.
Distance water point	0.1525	0.4736	0.6608	0.2567	0.7288	0.5705	0.3874	0.3126	0.3531	0.5827
Distance to road	0.6709	*0.0001(NB)*	0.0172	0.0926	*0.0084(NB)*	0.2061	0.1890	0.2948	0.6154	0.6593
Distance to education	0.2747	0.4668	0.7547	0.6297	0.0923	0.2320	0.5148	0.9910	0.3239	0.4008
Distance to health	0.2279	0.3968	0.1774	0.6518	0.2290	0.8621	0.3054	0.6623	0.3476	0.9532
Distance to market	0.5181	0.5610	0.1596	0.1182	0.4798	0.1488	0.7359	0.8717	0.4317	0.8012
Livelihood index	0.3744	0.0664	0.4026	0.5045	0.2551	0.4568	0.3600	0.4126	0.5003	0.4460
Radio as info source	0.2734	0.3905	0.1999	0.7699	0.6972	0.5661	0.6945	.	.	.
Ext. as info source	0.7815	0.2399	0.3537	0.6519	0.0966	0.9359	0.7353	0.3306	0.8230	.
Family as info source	0.8692	0.0454	0.4813	0.2603	0.9201	0.7895	0.3676	0.8941	0.2414	0.3466
Admin as info source	0.2734	0.4019	0.7949	0.9355	0.4157	0.2478	0.2345	0.2541	0.8309	0.7424
Livestock tech. use						.	0.4386	0.5351	0.7637	0.9150

Note: The table reports the *p* value of each variable for each stratum between households affected by the investment (treated) and those not affected by the investment (matched comparison) groups; .[a] Covariates with equal mean and zero standard deviation; *NB*: Not balanced
Source: Own Survey, 2018

Annex XIV: Matching Quality Evaluation Results (Asset component)

		Anauk							Nuer					
Variable	U^ M^	Mean Treated	Mean Control	% bias	% reduct [bias]	t-test t	t-test p >|t|	U M	Mean Treated	Mean Control	% bias	% reduct [bias]	t-test t	t-test p >|t|
	U	1.3097	1.3081	0.3		0.03	0.975	U	1.2857	1.3214	-7.7		-0.48	0.634
Sex	M	1.3097	1.2723	8.1	-2284.4	0.72	0.470	M	1.2857	1.2657	4.3	44.0	0.26	0.793
Marital	U	2.3355	2.4108	-11.2		-1.03	0.305	U	2.2143	2.3452	-25.6		-1.56	0.120
status	M	2.3355	2.3032	4.8	57.2	0.45	0.652	M	2.2143	2.2086	1.1	95.6	0.08	0.940
	U	39.187	41.389	-20.9		-1.90	0.058	U	40.129	41.119	-9.5		-0.59	0.558
Age	M	39.187	39.034	1.5	93.0	0.14	0.888	M	40.129	43.763	-34.7	-266.9	-2.10	0.038
	U	1.0774	1.0649	4.9		0.45	0.654	U	1.0429	1.1071	-24.4		-1.48	0.140
Occupation	M	1.0774	1.08	-1.0	79.4	-0.08	0.933	M	1.0429	1.0429	0.0	100.0	-0.00	1.000
Distance to	U	6.0452	6.2595	-2.4		-0.22	0.823	U	13.4	15.024	-9.2		-0.57	0.573
water point	M	6.0452	5.271	8.7	-261.3	0.83	0.405	M	13.4	13.751	-2.0	78.4	-0.11	0.910
Distance to	U							U	14.2	14.905	-3.0		-0.18	0.854
main road	M							M	14.2	15.583	-5.9	-96.2	-0.34	0.734
Distance to	U	7.6129	11.389	-34.8		-3.18	0.002	U	16.886	21.893	-21.6		-1.32	0.188
school	M	7.6129	7.9135	-2.8	92.0	-0.30	0.764	M	16.886	16.934	-0.2	99.0	-0.01	0.988
Distance to	U	29.284	17.859	27.3		2.55	0.011	U	56.457	37.607	45.4		2.83	0.005
health	M	29.284	29.988	-1.7	93.8	-0.12	0.901	M	56.457	59.711	-7.8	82.7	-0.43	0.669
Distance to	U	197.32	254.76	-50.7		-4.64	0.000	U	67.129	42.714	47.8		2.97	0.003
market	M	197.32	203.63	-5.6	89.0	-0.54	0.592	M	67.129	69.066	-3.8	92.1	-0.20	0.843
Livelihood	U	.28966	-.24148	53.7		5.04	0.000	U	.1324	.10431	23.6		1.49	0.139
index	M	.28966	.16014	13.1	75.6	1.02	0.309	M	.1324	.10763	10.7	11.8	1.18	0.239
Radio info	U	.11613	.11351	0.8		0.08	0.940	U	.02857	.07143	-19.6		-1.19	0.235
source	M	.11613	.12516	-2.8	-245.3	-0.24	0.808	M	.02857	.03143	-1.3	93.3	0.10	0.922
DA info	U	.60645	.61622	-2.0		-0.18	0.855	U	.82857	.75	19.2		1.18	0.239
source	M	.60645	.62452	-3.7	-85.0	-0.33	0.745	M	.82857	.84857	-4.9	74.5	-0.32	0.750
Family info	U	.33548	.26486	15.4		1.42	0.157	U	.37143	.30952	13.0		0.81	0.422
source	M	.33548	.3471	-2.5	83.6	-0.21	0.830	M	.37143	.34857	4.8	63.1	0.28	0.780
Admin info	U	.37419	.21081	36.4		3.37	0.001	U	.41429	.34524	14.2		0.88	0.382
source	M	.37419	.36387	2.3	93.7	0.19	0.851	M	.41429	.48571	-14.7	-3.4	-0.85	0.399
Livestock	U							U	.34286	.17857	37.8		2.36	0.019
tech use	M							M	.34286	.31429	6.6	82.6	0.36	0.721

Community	Sample	Ps R^2	LR chi2	p>chi2	Mean Bias	Med Bias
Anuak	U	0.162	75.92	0.000	20.3	18.1
	M	0.010	4.30	0.993	4.3	2.8
Nuer	U	0.177	37.57	0.001	21.4	19.6
	M	0.042	8.10	0.920	7.5	4.8

U^ stands for Unmatched sample and M^ stands for matched sample

Source: Own survey, 2018

Annex XV: Sensitivity Analysis Results (Asset/wealth component)

Gamma[77]	Anuak[78]					Nuer				
	Phy.	Hum.	Social	Fian.	Nat.	Phy.	Hum.	Social	Fian.	Nat.
Γ=1	0	0	0	0	0	0	0	0	0	0
Γ=1.1	0	0	0	0	0	0	0	0	0	0
Γ=1.2	0	0	0	0	0	0	0	0	0	0
Γ=1.3	0	0	0	0	0	0	0	0	0	0
Γ=1.4	0	0	0	0	0	0	0	0	0	0
Γ=1.5	0	0	0	0	0	0	0	0	6.7e-16	0
Γ=1.6	0	0	0	0	0	0	1.1e-16	0	6.1e-15	0
Γ=1.7	0	0	0	0	0	1.1e-16	1.0e-15	1.1e-16	4.6e-14	0
Γ=1.8	0	0	0	0	0	5.6e-16	6.3e-15	4.4e-16	2.7e-13	2.2e-16
Γ=1.9	0	0	0	0	0	3.0e-15	3.4e-14	2.2e-15	1.3e-12	1.3e-15
Γ=2.0	0	0	0	0	0	1.4e-14	1.5e-13	1.1e-14	5.7e-12	6.3e-15

Source: Own Survey, 2018

[77] log odds of differential assignment due to unobserved factors

[78] Figures presented in the column indicate upper bound significance level, for lower bound it is '0' for both communities.

Annex XVI: Logistic model for treatment, goodness-of-fit test (Food Security)

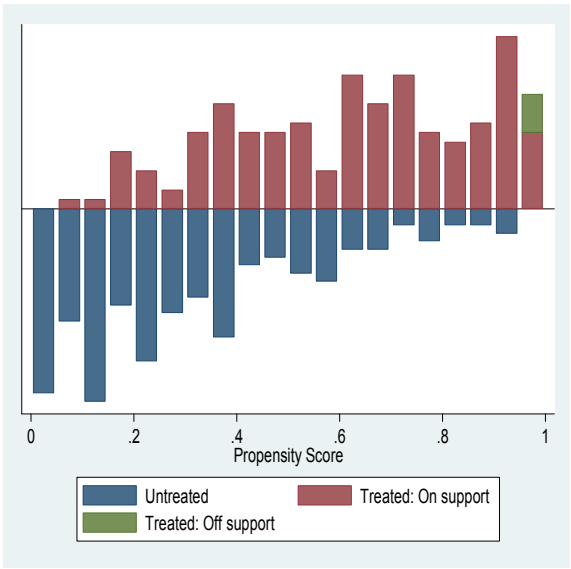
	Anauk						Nuer					
Group	Prob.	Obs_1	Exp_1	Obs_0	Exp_0	Total	Group	Prob.	Obs_1	Exp_1	Obs_0	Exp_0	Total
1	0.0839	0	1.3	34	32.7	34	1	0.1073	1	1.0	15	15.0	16
2	0.1714	5	4.3	29	29.7	34	2	0.1858	1	2.2	14	12.8	15
3	0.2471	7	7.2	27	26.8	34	3	0.2630	3	3.7	13	12.3	16
4	0.3375	10	10.0	24	24.0	34	4	0.3450	5	4.6	10	10.4	15
5	0.4141	13	12.9	21	21.1	34	5	0.4319	8	5.9	7	9.1	15
6	0.5307	20	16.1	14	17.9	34	6	0.5368	6	7.5	10	8.5	16
7	0.6373	18	19.9	16	14.1	34	7	0.6168	9	8.8	6	6.2	15
8	0.7449	25	23.6	9	10.4	34	8	0.7397	12	11.0	4	5.0	16
9	0.8894	27	27.8	7	6.2	34	9	0.8387	13	11.9	2	3.1	15
10	0.9946	30	31.9	4	2.1	34	10	0.9586	12	13.5	3	1.5	15

Number of observations = 340
Number of groups = 10
Hosmer-Lemeshow chi2(8) = 6.14
Prob > chi2 = 0.6317

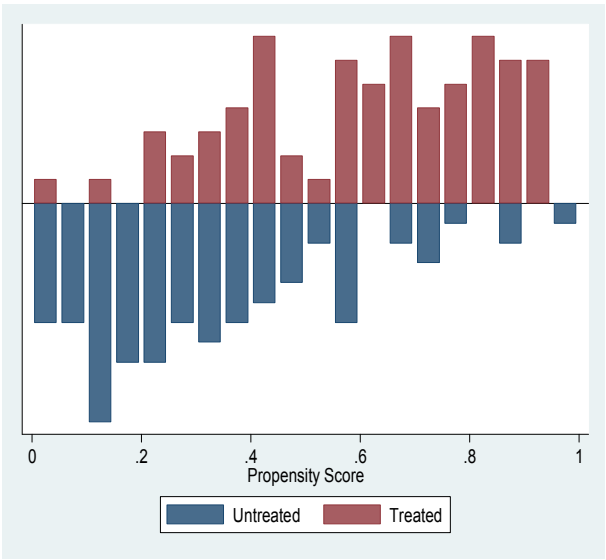
Number of observations = 154
Number of groups = 10
Hosmer-Lemeshow chi2(8) = 5.13
Prob > chi2 = 0.7431

Source: Own Survey, 2018

Annex XVII: Distribution of Propensity Score across Treatment and Comparison Groups (FS aspect)



Anuak



Nuer

Source: Own Survey, 2018

Annex XVIII: Test of propensity score and covariate balance (Food security component)

Test of propensity score Balance.

Community	Block of the pscore	Comparison group(n)	Treatment group(n)	Total (n)	t-test for matched
Anuak	1	36	8	44	0.2053
	2	59	25	84	0.0239
	3	30	29	59	0.3128
	4	16	47	63	0.7094
	5	7	46	53	0.1938
	Total (n)	148	155	303[a]	
Nuer	1	25	2	27	0.1240
	2	27	12	39	0.3721
	3	17	16	33	0.8407
	4	6	21	27	0.4182
	5	2	19	21	0.9544
	Total (n)	77	70	147[a]	

Note: The last column reports the p value of the mean propensity score for each block between treatment and comparison groups. [a]For Anuak, 2 affected and 37 non-affected totally 39 households were found out of the common support areas. Likewise, for Nuer community, 7 non-affected households were found outside the common support areas.

Source: Own survey data, 2018

Test of Covariate Balance (Food Security)

Variables	t-test for matched									
	Anuak					Nuer				
	Block ID					Block ID				
	1	2	3	4	5	1	2	3	4	5
Sex	0.8692	0.2764	0.3632	0.9255	0.5794	0.3595	1.0000	0.7844	0.1081	0.5054
Marital status	0.8135	0.1206	0.1537	0.9321	0.2720	0.4041	0.9673	0.9245	0.2637	0.6498
Age	0.6959	0.8943	0.7704	0.1739	0.8333	0.5335	0.9118	0.5627	0.4322	0.8381
Education	0.9118	0.5269	0.5838	0.5163	0.2263	0.6969	0.6043	0.1526	0.6984	0.4537
Occupation	0.5064	0.6108	0.0727	0.0897	0.4961	0.5025	0.1363	0.1668	.	.
Family size	0.7543	0.2214	0.5528	0.6012	0.7237	0.5855	0.9253	0.9965	0.6518	1.0000
Dependency ratio	0.4582	0.7340	0.7469	0.3517	0.5850	0.8692	0.5701	0.6898	0.4989	0.7737
Land size	0.7578	0.6698	0.2469	0.5430	0.1275	0.8067	0.9823	0.8529	0.8993	0.6107
Livestock (TLU)	0.2249	0.6256	0.7002	0.5680	0.7612	0.1710	0.1709	0.0194	0.7260	0.8905
Distance water point	0.0655	0.7668	0.7695	0.7358	0.3668	0.0267	0.5666	0.9429	0.5061	0.4168
Distance to road	0.5922	0.0015	0.0576	0.7689	0.0211	0.5157	0.1014	0.3024	0.5527	0.7102
Distance to education	0.7237	0.3610	0.8598	0.8377	0.2676	0.2418	0.7892	0.9205	0.9157	0.9706
Distance to health	0.1028	0.2388	0.8855	0.7561	0.8138	0.7264	0.9487	0.5449	0.9898	0.5104
Distance to market	0.3303	0.8451	0.4276	0.1426	0.1374	0.5461	0.2094	0.1220	0.7110	0.8248
Livelihood index	0.4645	0.4892	0.6999	0.6885	0.1887	0.7376	0.5959	0.4742	0.0808	0.4644
Radio as info source	0.5064	0.3137	0.9726	0.4818	0.2940	0.5579	.[a]	0.9661	0.6028	.
Ext. as info source	0.6271	0.9720	0.3757	0.5743	0.8925	0.3595	0.7009	0.3987	0.8996	.
Family as info source	0.3784	0.2261	0.8105	0.7266	0.2991	0.5025	0.7906	0.1714	0.5526	0.2655
Admin as info source	0.9134	0.9407	0.5334	0.6096	0.2148	0.4041	0.3364	0.8354	0.6171	0.9469
Access to credit	0.1313	0.2987	0.9099	0.9494	0.8545	0.5025	0.5690	0.8857	0.7672	0.7318
Improved seed use	0.2810	0.1238	0.9327	0.8395	0.6737					
Livestock tech. use						0.6916	0.8862	0.4906	0.7672	0.9469

Note: The table reports the *p* value of each covariate for each stratum cross affected (treated) and unaffected households (matched comparison) groups.

.[a] Covariates with equivalent mean for treated and comparison group and zero standard deviation

Source: Own Survey, 2018

Annex XIX: Matching Quality Evaluation Results (Food Security)

Variable	Anauk							Nuer					
	U/M	Mean		% bias	% reduct [bias]	t-test		U/M	Mean		% bias	% reduct [bias]	t-test	
		Treated	Control			t	p>|t|		Treated	Control			t	p>|t|
	U	1.3097	1.3081	0.3		0.03	0.975	U	1.2857	1.3214	-7.7		-0.48	0.634
Sex	M	1.292	1.3456	-11.6	-3318.7	-0.95	0.342	M	1.2857	1.3486	-13.6	-76.0	-0.79	0.428
Marital	U	2.3355	2.4108	-11.2		-1.03	0.305	U	1.2143	1.3452	-25.6		-1.56	0.120
status	M	2.3066	2.3343	-4.1	63.2	-0.37	0.710	M	1.2143	1.2154	-0.2	99.1	-0.02	0.988
	U	39.187	41.389	-20.9		-1.90	**0.058**	U	40.129	41.119	-9.5		-0.59	0.558
Age	M	39.562	38.063	14.2	31.9	1.25	0.214	M	40.129	41.76	-15.6	-64.7	-0.97	0.335
	U	1.9935	1.5189	31.9		2.93	**0.004**	U	1.6	1.7976	-10.8		-0.67	0.505
Education	M	1.9343	1.9058	1.9	94.0	0.15	0.877	M	1.6	1.3274	14.9	-38.0	0.94	0.346
	U	1.0774	1.0649	4.9		0.45	0.654	U	1.0429	1.1071	-24.4		-1.48	0.140
Occupation	M	1.0876	1.0978	-4.0	18.6	-0.29	0.772	M	1.0429	1.0418	0.4	98.3	0.03	0.975
	U	6.0581	5.5135	22.3		2.05	**0.041**	U	6.7	6.1667	23.1		1.44	0.151
Family size	M	5.9343	5.9011	1.4	93.9	0.12	0.905	M	6.7	6.7004	-0.0	99.9	-0.00	0.999
Dependency	U	106.39	94.115	13.4		1.23	0.219	U	124.18	137.73	-12.9		-0.80	0.426
ratio	M	101.47	99.371	2.3	82.9	0.20	0.845	M	124.18	118.89	5.0	61.1	0.34	0.738
	U	1.2268	1.6273	-45.8		-4.16	**0.000**	U	1.1357	1.2619	-11.9		-0.73	0.466
Land size	M	1.2602	1.2466	1.6	96.6	0.15	0.881	M	1.1357	1.0774	5.5	53.8	0.38	0.705
Livestock	U	1.2268	.12501	21.2		1.96	**0.051**	U	20.253	21.1	-5.9		-0.37	0.711
(TLU)	M	1.2602	.20886	-13.3	37.4	-1.04	0.301	M	20.253	19.352	6.3	-6.4	0.37	0.709
Distance to	U	6.0452	6.2595	-2.4		-0.22	0.823	U	13.4	15.024	-9.2		-0.57	0.573
water point	M	5.8248	4.9745	9.6	-296.8	0.85	0.397	M	13.4	14.633	-6.9	24.1	-0.39	0.695
Distance to	U	19.29	9.1189	40.5		3.74	**0.000**	U	14.2	14.905	-3.0		-0.18	0.854
main road	M	17.102	22.847	-22.9	43.5	-1.28	0.201	M	14.2	15.927	-7.3	-145.0	-0.40	0.689
Distance to	U	7.6129	11.389	-34.8		-3.18	**0.002**	U	16.886	21.893	-21.6		-1.32	0.188
school	M	8.0803	8.6234	-5.0	85.6	-0.48	0.632	M	16.886	17.889	-4.3	80.0	-0.29	0.771
Distance to	U	29.284	17.859	27.3		2.55	**0.011**	U	56.457	37.607	45.4		2.83	**0.005**
health	M	26.752	27.608	-2.0	92.5	-0.15	0.883	M	56.457	57.971	-3.6	92.0	-0.20	0.840
Distance to	U	197.32	254.76	-50.7		-4.64	**0.000**	U	67.129	42.714	47.8		2.97	**0.003**
market	M	200.11	202.56	-2.2	95.7	-0.19	0.851	M	67.129	63.467	7.2	85.0	0.37	0.709
Livelihood	U	.28966	-.24148	53.7		5.04	**0.000**	U	.13083	-.10902	23.6		1.49	0.139
index	M	.14065	.05648	8.5	84.2	0.74	0.459	M	.13083	.02194	10.7	54.6	0.53	0.594
Radio info	U	.11613	.11351	0.8		0.08	0.940	U	.02857	.07143	-19.6		-1.19	0.235
source	M	.10219	.09635	1.8	-123.3	0.16	0.872	M	.02857	.01908	4.3	77.9	0.37	0.715
DA info	U	.60645	.61622	-2.0		-0.18	0.855	U	.82857	.75	19.2		1.18	0.239
source	M	.59124	.61825	-5.5	-176.6	-0.46	0.649	M	.82857	-2.4	-2.4	87.3	-0.16	0.875
Family info	U	.33548	.26486	15.4		1.42	0.157	U	.37143	.30952	13.0		0.81	0.422
source	M	.30657	.26533	9.0	41.6	0.75	0.452	M	.37143	.30864	13.2	-1.4	0.78	0.437
Admin info	U	.37419	.21081	36.4		3.37	**0.001**	U	.41429	.34524	14.2		0.88	0.382
source	M	.30657	.24781	13.1	64.0	1.08	0.279	M	.41429	.4575	-8.9	37.4	-0.51	0.609
Access to	U	.43226	.42703	1.1		0.10	0.923	U	.52857	.42857	20.0		1.24	0.219
credit	M	.42336	.40547	3.6	-241.9	0.30	0.765	M	.52857	.54914	-4.1	79.4	-0.24	0.809
Improved	U	.34194	.27568	14.3		1.32	0.188	U						
seed use	M	.32117	.32117	0.0	100.0	-0.00	1.000	M						
Livestock	U							U	.34286	.17857	37.8		2.36	**0.019**
tech use	M							M	.34286	.35243	-2.2	94.2	-0.12	0.906

Community	Sample	Ps R^2	LR chi2	p>chi2	Mean Bias	Med Bias
Anuak	Unmatched	0.279	130.78	0.000	21.5	20.9
	Matched	0.028	10.67	0.969	6.5	4.1
Nuer	Unmatched	0.231	49.05	0.001	19.3	18.5
	Matched	0.037	7.16	0.999	6.6	5.9

Source: Own survey, 2018

Note: U stands for unmatched sample whereas M represents matched sample.

Annex XX: Sensitivity Analysis Results of Rosenbaum Bounding Approach (Food Security)

gamma[79]	Anuak[80]								Nuer							
	Kcal	MAHFP	HDDS	FCS	HFIAS	CSI	FE	Index	Kcal	MAHFP	HDDS	FCS	HFIAS	CSI	FE	Index
Γ=1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Γ=1.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Γ=1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Γ=1.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Γ=1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Γ=1.5	0	0	0	0	0	0	0	0	0	0	0	0	1.1e-16	0	0	0
Γ=1.6	0	0	0	0	0	0	0	0	0	0	0	0	5.6e-16	1.1e-16	0	0
Γ=1.7	0	0	0	0	0	0	0	0	1.1e-16	0	1.1e-16	1.1e-16	3.6e-15	5.6e-16	1.1e-16	1.1e-16
Γ=1.8	0	0	0	0	0	0	0	0	5.6e-16	3.3e-16	4.4e-16	5.6e-16	2.0e-14	3.3e-15	5.6e-16	5.6e-16
Γ=1.9	0	0	0	0	0	0	0	0	2.9e-15	2.1e-15	2.7e-15	2.9e-15	9.0e-14	1.7e-14	2.9e-15	2.8e-15
Γ=2.0	0	0	0	0	0	0	0	0	1.4e-14	1.0e-14	1.3e-14	1.4e-14	3.6e-13	7.2e-14	1.4e-14	1.3e-14

Source: Own Survey, 2018

[79] log odds of differential assignment due to unobserved factors

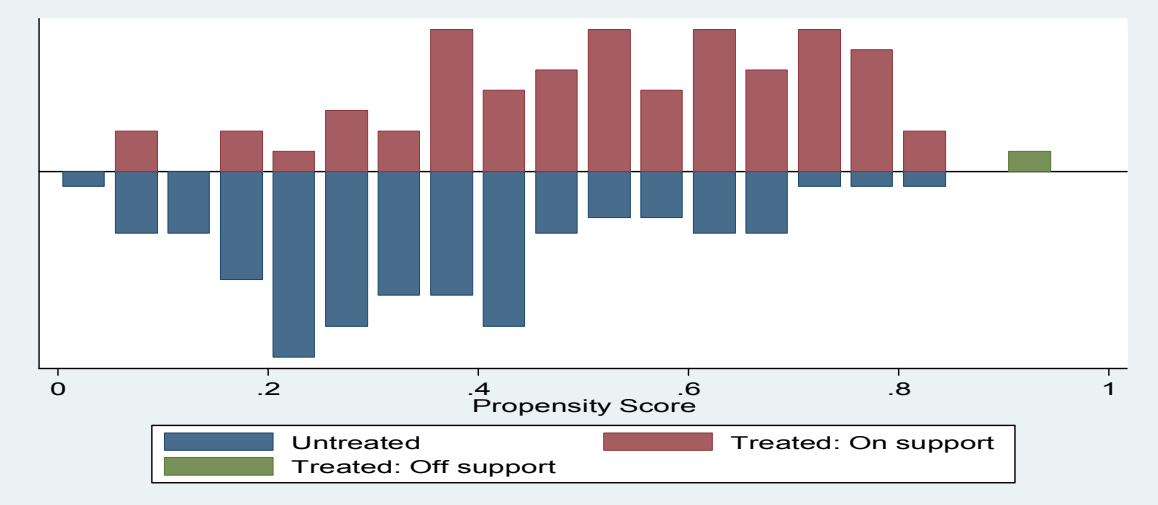
[80] Figures presented in the column indicate upper bound significance level. For the lower bound significant level is '0' for both communities.

Annex XXI: Logistic Model for Treatment, Goodness-of-Fit Test (women aspect).

Group	Prob.	Obs_1	Exp_1	Obs_0	Exp_0	Total
1	0.1768	3	1.6	12	13.4	15
2	0.2423	2	3.2	13	11.8	15
3	0.2979	3	3.9	12	11.1	15
4	0.3699	4	5.1	11	9.9	15
5	0.4153	6	5.8	9	9.2	15
6	0.4717	7	6.6	8	8.4	15
7	0.5628	8	7.7	7	7.3	15
8	0.6315	9	9.0	6	6.0	15
9	0.7297	10	10.2	5	4.8	15
10	0.9455	13	11.8	2	3.2	15

Number of observations = 150
Number of groups = 10
Hosmer-Lemeshow chi2(8) = 3.27
Prob > chi2 = 0.9165
Source: Own survey, 2018

Annex XXII: Distribution of Propensity Score across Treatment and Comparison Groups (Women aspect)



Source: Own survey, 2018

Annex XXIII: Test of Propensity Score and Covariate Balance (women)

Test of Propensity Score Balance

Block of the pscore	Comparison group(n)	Treatment group(n)	Total (n)	t-test for matched
1	15	4	19	0.7304
2	38	13	51	0.0557
3	20	20	40	0.2280
4	10	25	35	0.3065
5	1	3	4	.a
Total (n)	84	65	149	

Note: The last column reports the p value of the mean propensity score for each block between treatment and comparison groups. .a Only one observation (in comparison group) is found in block five and so the software couldn't compute standard error, standard deviation, and lastly p value.

Source: Own survey, 2018

Test of Covariate Balance

Variables	t-test for matched				
	Block ID				
	1	2	3	4	[a]5
Age_ wife	0.8026	0.4786	0.1666	0.1846	.
Age_ husband	0.6387	0.5601	0.1540	0.0765	.
Age_ marriage	0.8046	0.7789	0.0716	0.0728	.
Education_ wife	0.9069	0.9295	0.5145	0.3162	.
Education_ husband	0.6337	0.5682	0.2988	0.1008	.
Ethnicity	0.6196	0.0350	1.0000	0.4655	.
Religion	[b].	0.7982	1.0000	1.0000	.
Migration	0.3574	0.7217	0.5027	0.2335	.
Family size	0.5545	0.3765	0.2242	0.3543	.
Dependency ratio	0.8357	0.9825	0.1359	0.1396	.
Land size	0.4980	0.8866	0.5670	0.9867	.
Distance school	0.8951	0.1028	0.9897	0.1325	.
Distance to health	0.1142	0.3358	0.2413	0.4594	.
Distance to market	0.7087	0.6208	0.5391	1.0000	.
Distance to road	0.8327	0.2264	0.8701	0.4973	.
Access to credit	0.2496	0.0546	0.6867	0.9116	.
Iddir member	0.5946	0.5639	0.3236	[b].	
Equib member	0.4637	0.2339	1.0000	0.4072	
Women association	0.2356	0.5842	0.5309	0.6638	
Happiness index	0.3595	0.6984	0.8908	0.8711	
Wealth index	0.4531	0.2132	0.5655	0.5867	

Note: [a]5 only one observation (in comparison group) is found in block five and so the software couldn't compute standard error, standard deviation, and lastly p value.

[b]. Covariates with equal mean and zero standard deviation.

Source: Own survey, 2018

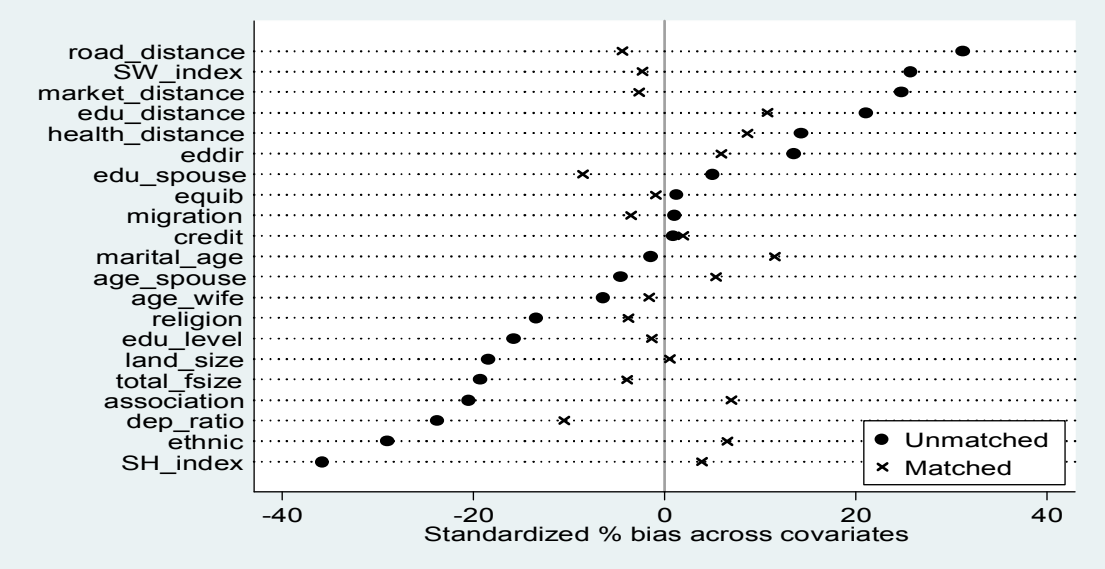
Annex XXIV: Matching Quality Evaluation Results (Women)

Covariate	Un matched Matched	Mean Treated	Control	% bias	% reduct [bias]	t-test t	p >|t|
Age_ wife	U	30.646	31.047	-6.5		-0.39	0.695
	M	30.578	30.678	-1.6	75.0	-0.09	0.926
Age_ husband	U	38.585	38.894	-4.6		-0.28	0.779
	M	38.484	38.127	5.4	-15.5	0.32	0.747
Age_ marriage	U	13.6	13.694	-1.5		-0.09	0.928
	M	13.547	12.814	11.5	-678.2	0.66	0.509
Education_ wife	U	0.69231	0.81176	-15.8		-0.95	0.345
	M	0.67188	0.68209	-1.4	91.4	-0.08	0.937
Education_ husband	U	1.2308	1.1765	5.0		0.30	0.763
	M	1.25	1.3426	-8.5	-70.5	-0.46	0.646
Ethnicity	U	5.2154	5.5765	-29.1		-1.79	0.075
	M	5.2031	5.1217	6.5	77.5	0.32	0.753
Religion	U	2.8923	2.9412	-13.5		-0.83	0.409
	M	2.8906	2.9045	-3.8	71.6	-0.22	0.830
Migration	U	1.7692	1.7647	1.1		0.06	0.949
	M	1.7656	1.7807	-3.5	-233.7	-0.20	0.840
Family size	U	5.3385	5.6941	-19.3		-1.15	0.252
	M	5.3594	5.4317	-3.9	79.7	-0.24	0.813
Dependency ratio	U	83.22	100.36	-23.8		-1.42	0.156
	M	83.999	91.584	-10.5	55.8	-0.62	0.535
Land size	U	1.3769	1.5618	-18.4		-1.12	0.266
	M	1.3828	1.3778	0.5	97.3	0.03	0.976
Distance school	U	29.092	26.365	21.1		1.30	0.196
	M	29.234	27.85	10.7	49.3	0.62	0.534
Distance health	U	24.046	22.482	14.3		0.89	0.373
	M	23.484	22.537	8.6	39.4	0.51	0.614
Distance market	U	67.892	63.953	24.8		1.55	0.123
	M	68.016	68.446	-2.7	89.1	-0.13	0.894
Distance road	U	9.4769	6.8	31.2		1.97	0.051
	M	8.6875	9.0662	-4.4	85.9	-0.27	0.788
Access to credit	U	0.21538	0.21176	0.9		0.05	0.958
	M	0.21875	0.2108	1.9	-119.5	0.11	0.914
Iddir member	U	0.96923	0.94118	13.5		0.80	0.423
	M	0.98438	0.97217	5.9	56.5	0.47	0.639
Equib member	U	0.47692	0.47059	1.3		0.08	0.939
	M	0.46875	0.47364	-1.0	22.8	-0.05	0.956
Women association	U	0.41538	0.51765	-20.5		-1.24	0.217
	M	0.42188	0.38713	7.0	66.0	0.40	0.692
Happiness index	U	0.85554	0.92529	-35.8		-2.22	0.028
	M	0.86891	0.8613	3.9	89.1	0.21	0.893
Wealth index	U	0.61215	0.55706	25.7		1.55	0.123
	M	0.61234	0.6174	-2.4	90.8	-0.13	0.893

Sample	Ps R^2	LR chi2	Mean Bias
Unmatched	0.134	27.56	15.6
Matched	0.023	4.06	5.0

Source: Own survey, 2018

Annex XXV: Percentage Standardized Bias across Covariates



Source: Own survey, 2018

Annex XXVI: Rosenbaum bounds Sensitivity Test (Women)

	Empowerment index[81]				
Gamma[82]	**Self-worth index**	**HH^ consumption related DM^ index**	**HH asset related DM index**	**Health & others DM index**	**Composite DM index**
1	0	0	0	0	0
1.1	0	0	0	0	0
1.2	0	0	0	0	0
1.3	0	0	0	0	0
1.4	0	0	0	0	0
1.5	0	0	0	0	0
1.6	1.1e-16	0	0	0	0
1.7	5.6e-16	0	0	0	1.1e-16
1.8	3.7e-15	0	2.2e-16	0	4.4e-16
1.9	1.8e-14	3.3e-16	1.1e-15	1.1e-16	2.8e-15
2	7.9e-14	1.8e-15	5.4e-15	3.3e-16	1.3e-14

Note: HH^ and DM^ stand for 'household' and 'decision making', respectively; N = 150 matched pairs
Source: Own survey, 2018

[81] Figures presented in the column indicate upper bound significance level. The lower bound significant level is '0' for all indexes.
[82] log odds of differential assignment due to unobserved factors