Addis Ababa University
አዲስ፡አበባ፡ዩኒቨርሲቲ
SEEK WISDOM, ELEVATE YOUR INTELLECT AND SERVE HUMANITY !

Addis Ababa University
School of Graduate Studies
College of Development Studies (CDS)
(Centre for Rural Development)

Impact of Large-Scale Agricultural Investment: Case Studies on Dispossession, Livelihood, Food Security and Environment from Shashamane Rural District of Oromia Region, Ethiopia

Yideg Alemu Tareke

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
December, 2023

Addis Ababa University
School of Graduate Studies
College of Development Studies

Impact of Large-Scale Agricultural Investment: Case Studies on Dispossession, Livelihood, Food Security and Environment from Shashamane Rural District of Oromia Region, Ethiopia

Yideg Alemu Tareke

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

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

Major Advisor: Degefa Tolossa (Professor)

Addis Ababa University

Addis Ababa, Ethiopia

December, 2023

Dissertation Approval

College of Development Studies

Center for Rural Development

School of Graduate Studies

This is to certify that the thesis prepared by Yideg Alemu entitled *"Impact of Large-Scale Agricultural Investment: Case Studies on Dispossession, Livelihood, Food Security, and the Environment from Shashamane Rural District of Oromia Region, Ethiopia"* and submitted to the Center for Rural Development in fulfillment of the requirements for the Degree of Doctor of Philosophy in Development Studies (Rural Development) complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

Signed by examining committee:

_____	_____	_____
Chairperson, Examining committee	Signature	Date
_____	_____	_____
External examiner	Signature	Date
_____	_____	_____
Internal examiner	Signature	Date
_____	_____	_____
Major Advisor	Signature	Date

_____

Chair of Department or Graduate Program coordinator

Declaration

I, the undersigned, declare that this is my original work, has never been presented 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

Supervisor Name _____

Signature_____

Date _____

Place_____

Date of submission _____

ABSTRACT

After the 2007–2008 global triple crisis of finance, food, and energy, Ethiopia has strongly promoted Large-Scale Agricultural Investment (LSAI) as a policy instrument and strategy to increase Foreign Direct Investment (FDI) and sustain agricultural productivity. E*vidence also indicated that LSAI are increasing over time and are likely to continue in the future in the country. In this vein, the study elucidates the process and progress, follow-up, and harmony of various stakeholders in the governance of large-scale agriculture in the historical context of large-scale agricultural investment (LSAI) initiatives, drivers, and institutions. Further, it is essential to take into account their possible consequences on the local community's livelihood, food security, and environment and employ sustainable methods to reduce these effects. The state of Oromia is a prominent regional state in Ethiopia that has actively sought large-scale agricultural investment (LSAI). Government documents reveal that Oromia alone leased 1.0 million hectares of potential land to both domestic and foreign investors for up to 99 years. Since 2008, among zones of Oromia, the Shashaman rural district was predominantly chosen as a practical intervention area of LSAIs due to the availability of fertile land and freshwater, proximity to the capital city of the nation, lower labor costs, and an abundance of "communal" or "underutilized lands. Existing studies on LSAI in Oromia have focused on FDIs, loan misuse, limited rural employment, technology transfer, infrastructure, job creation, food security and livelihoods. Since previous studies have shed light on certain aspects of LSAI in Oromia, there is a pressing need to expand research efforts to explore the multifaceted negative effects of these investments. Therefore, this study was conducted to investigate the impact of LSAI on dispossession, local people's livelihood, food security, and the environment in Ethiopia, particularly in Oromia National Regional State, Shashamane Rural District. Further, the study also examined the integration of the three key stakeholders (State, private sector, and affected and interested local people) and looked at how LSAI's multiple benefits were shared among the three key actors. Because one theory could not adequately address the complex and all-encompassing problem of LSAI, the study also used a variety of analytical underpinnings. This study looked at the broader political ecology approach, investment policy that supports FDI in large-scale agriculture and public-private partnership (PPP) and associated economic theory as guiding frameworks to the study. The Aestin ladder of involvement, the Sustainable Livelihood Framework (SLF), food security theories and the four pillars, and the Driver-Pressure-State-*

Impact-Response (DPSIR) framework are also used as lenses to analyze the empirical results. Among various impact evaluation approaches, this study used a pseudo-randomization or quasi-experimental treatment/control procedure to answer a specific cause-and-effect question. The study used a combination of data sources and techniques, inviting multi-method qualitative and quantitative data collection tools. The study obtained data through surveys, key and in-depth informant interviews, focus group discussions (FGD), field visits, and direct observations. Secondary data and statistics were obtained from various sources, including Ethiopia's Investment Commission (EIC), Bureau of Investment and Industry of the Oromia Region, the West Arsi zone, and the Shashemene district Investment and Industry Office. Documents from NGOs (GIZ) and Civil Society organizations were also consulted and assessed. Additionally, the study used Principal Component Analysis (PCA) and Propensity Score Matching (PSM) economic model to build the index and examine the impact. Data were analyzed using Statistical Package for Social Scientists (SPSS) 24 for Windows and Stata Version 13. T-test and $\chi 2$ were employed to test the significance of differences between groups for continuous and discrete variables, respectively. The results revealed that 86.6% of respondents expressed that both government and proponents were not taking their concerns into account during the consultation process. Lack of free, prior, and informed consent (FPIC) reduces local people's sense of recognition and status. The study found that the livelihood component's average treatment effect on treated (ATT) results indicate that the treated households' natural, human, and financial capital was lower than that of control families at -0.91, -0.81 and -0.15, respectively. The loss of household livelihoods has deepened and exacerbated local poverty. The study also found that LSAI has no positive or significant impact on local community food security status. Most of the local communities with LSAI and without LSAI were food insecure by all four pillars of food security measures. LSAI-affected households were more susceptible to environmental risk exposure, had higher levels of land degradation, and had lower levels of resilience than LSAI-unaffected households. The outcome of the sensitivity analysis demonstrated that the impact (negative) results predicted by this study were an accurate reflection of the local effects of LSAI. Despite the project's failure to mechanize and regulate substantial areas of the land, local farmers have operated on them and used the vacant land. The main adverse effects of LSAI are threats to the official recognition of local people and their sense of ownership of their customary lands, eviction from farmland, resident grazing land, inadequate compensation, a lack of

transparency and accountability, improvised local people's livelihood capital and food security, and accelerated local environmental degradation. The core argument of this thesis is that the government's vigorous promotion of LSAI has failed to deliver the multiple benefits it promised for significant stakeholders. Since LSAI involves interdependent issues that call for collaboration across multiple actors and sectors, there was little engagement and consultation with stakeholders. In addition, civil society organizations and academia did not participate as much, which hindered the development of consensus and solutions that benefited all parties. Despite the investment's appeal, it fails to address food insecurity, safeguard dispossession persons, or improve local livelihoods and environment. Inadequate stakeholder involvement and malpractice exacerbate the land problem, increase firm risk, and diminish overall benefits. Mitigating the adverse impacts on livelihood resources, implementing effective monitoring, and restoring the local natural environment are urgently needed. Developing corrective institutional arrangements is not just an option; it is an imperative. Making responsible investments and achieving multiple benefits require learning from past mistakes and understanding stakeholder interests, responsibilities, and priorities. The study also offers suggestions for minimizing negative effects while maximizing positive effects.

Keywords: Dispossession, Large-Scale Agricultural Investment (LSAI), Livelihood, Food Security, Environmental, Propensity Scores Matching (PSM), Ethiopia, Oromia.

ACKNOWLEDGEMENTS

Through this dissertation, I had able to learn about and understand the global land deal (the large-scale agricultural investment) the philosophical foundations and theoretical pillars, empirical literature and the methods. Also, it allowed me to connect and acquire knowledge from people with a variety of academic and life experiences. The current dissertation would not have been accomplished without the help of my academic and emotional advisor, as well as my family, friends, and colleagues, all of whom I would like to thank. Indeed, many people who have assisted me in one way or another throughout my education deserve to be recognized. I am unable to name and thank everyone who helped me along the long path of my academic journey both personally and institutionally. I am grateful to everyone who assisted me in whatever way during my education. Nevertheless, I would want to take this chance to express my sincere gratitude to the people and institutions that made a substantial contribution to the successful completion of the dissertation. Frist, I want to express my sincere appreciation to the College of Development Studies Center for Rural Development Studies for offering me a wonderful educational experience that has aided me in developing my research skill and realizing a lifelong dream of getting an education. My second sincere thanks and gratitude go to my major adviser, Degefa Tolossa (Professor), for his helpful comments and ideas from the proposal's inception to the final writing-up of the thesis, without whom my research would have been unattainable. Your enthusiastic thoughts and useful suggestions allowed for the realization of my dissertation. Your trustworthiness, openness, and cordial relationship were tremendous assets to me. I found the perspective and constructive advice, valuable suggestion, ideas, and concepts to be of great use. This to chances helped to stimulate future academic interaction and collaboration I want further capitalize on the opportunities that emerged. My third acknowledgment and appreciation go to the Department of Agricultural Economics at Hawassa University's College of Agriculture, Faculty of Environment, Development, and Gender Studies for granting me a study leave and sponsoring this research. Forth, I benefited a lot from the comments, ideas, and recommendations provided by my Ph.D. proposal examiners, Abrham Seyoum (Ph.D.) and Messay Mulugeta (Ph.D.) they all provided feedback and helped to shape it. Also, I would like to thank Esubalew Abate (Ph.D.) for sharing his project document and providing assistance in developing the concept note. Moreover, my thanks go to Professor Mirgissa Kaba of Addis Ababa University's Department of Public Health for his general guidance on the Ph.D.

dissertation, as well as Dr. Delelegn Abera of Hawassa College of Agriculture's Faculty of Environment, Gender, and Development Studies. I am extremely indebted to all those colleagues and friends at Addis Ababa University, Hawassa University, and elsewhere. They are always the sources of my courage and motivation. They have shaped my ideas and offered support over the last six years. Further, my deep appreciation and acknowledgment go to the six anonymous reviewers of the first draft for their in-depth comments, which have helped me a lot to improve the research report. I am, however responsible for any errors and shortcomings in this report. Fifth, this dissertation would not be attainable without the genuine financial and material, administrative support of various organizations. I sincerely thank the One-health-project at the College of Health Sciences and College of Development Studies and Hawassa University (NORAD project office) for financially supporting this study, Administration Officers, sector office heads, agricultural experts in Shashaman rural and Shala district, and *Kebele* administrators all deserve my thanks for their help in providing valuable information and data. I also would like to thank all the data collectors, who helped me in gathering and compiling various documents, and the enumerators who spent days interviewing participants in the household survey. I am very grateful to the ≈ 350 respondents who took the time to answer our questions. There are many administration heads, farmers, and experts whose names cannot be listed here for lack of space to whom I wish to convey my thanks and appreciation. I thank all interviewees, focus group discussants, and key informants very much for the information and life story they shared with me. Last but not least, I would like to express my sincere gratitude to you, my beloved wife Mrs. Abebech Niguse, as well as to my son and daughters for their support and best wishes, particularly during the final stages of completing my Ph.D. dissertation.

Yideg Alemu

Addis Ababa, December, 2023

List of Published and Unpublished Papers

The dissertation contains two articles published in reputed journals, one of which is 'accepted for publication' and one of which is published as a book.

Paper I. Published as Alemu, Y.; Tolossa, D. Consultation and Dispossession[1] in Large-Scale Agriculture Investment: Evidence from Oromia Region's Shashamane Rural District. Land 2022, 11, 1384. https://doi.org/ 10.3390/land11091384

Paper II. Published as: Alemu, Y.; Tolossa, D. Livelihood Impacts of Large-Scale Agricultural Investments Using Empirical Evidence from Shashamane Rural District of Oromia Region, Ethiopia. Sustainability 2022, 14, 9082. https://doi.org/10.3390/ su14159082

Paper III. Under Review as Yideg A. and Degefa T. 2022. Large-Scale Agricultural Investments Impact on Food Security: Evidence from Ethiopia's Shashamane Rural District, Oromia Regional State. --Manuscript Draft-- FOSE-D-22-00166-*Journal of springer nature food security*

Paper IV. Published as a book Yideg Alemun and Degefa Tolossa, 2022. Environmental Impacts of Large-Scale Agricultural Investments: Empirical Evidence from the Great Rift Valley of Ethiopia ELIVA PRESS e-version ISBN: 978-99949-8-064-2 © Eliva Press Global Ltd. part of Eliva Press S.R.L., 2022 © Yideg Alemu, Degefa Tolossa Eliva Press S.R.L. Publishing Group address is: Bulevardul Moscova 21, Chisinau, Moldova, Europe Website: www.elivapress.com

[1] In this thesis, the term "Displacement" was replaced with "Dispossession," whereas in the publication, it was retained in its original form.

TABLE OF CONTENTS

CONTENTS **PAGE**

LIST OF FIGURES

Page

LIST OF TABLES

Page

LIST OF ACRONYMS

ADLI	Agricultural Development Led Industrialization
AILAA	Agricultural Investment Land Administration Agency
AISD	Agricultural Investment Support Directorate
ATU	Average treatment effects on the untreated
ATE	The average treatment effect (ATE)
ATT	Average Treatment Effect On Treated
CSOs	Civil Society Organizations
CIA	Conditional Independence Assumption
CA	Conservation Agriculture
CSI	Coping Strategies Index
COREQ	Consolidated Criteria for Reporting Qualitative Studies Principles
CSA	Central Statistical Agency
DFID	Department for International Development
GIZ	Deutsche Gesellschaft Für Internationale Zusammenarbeit
DA	Development Agent
DIPSRI	Driver-Pressure-State-Impact-Response Framework
EDI	Environmental Degradation Index,
EIA,	Environment Impact Assessment
EVS	Environmental Vulnerability Standard
EPRA	Ethiopian Privatization Agency
EIC	Ethiopia's Investment Commission
EVI	Environmental Vulnerability Index
EPA	Environment Protection Authority
FDRE	Federal Democratic Republic Of Ethiopia
FDREHPR,	Federal Democratic Republic Of Ethiopia House of People Representatives
BMZ	Federal Ministry for Economic Cooperation and Development
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
FEI	Food Energy Index

FES	Food Share Expenditure
F	Foreign Direct Investment
FPIC	Free, Prior and Informed Consent
FA	Food Availability
FA	Food access
FU	Food Utilization
GDP	Gross Domestic Product
GoE	Government of Ethiopia
GoF	Goodness of Fit
FGD,	Group Discussions
GTP	Growth and Transformation Plan
HDDS	Household Dietary Diversity Score
HFIAS	Household Food Insecurity Access Scale
IFAD	International Fund for Agricultural Development
ID	Identification Number
IFAD	International Fund for Agricultural Development
ILO	International Labour Organization
IMF	International Monetary Fund
IRI	Intrinsic Resilience Index.
IPM	Integrated Pest Management
IPCC	Intergovernmental Panel on Climate Change
KM	Kernel Matching
KIF	Key Informant Interviews
L	Litter
LSLM	Large-Scale Agricultural Mechanization
LSAI	Large-Scale Agricultural Investment:
MEDIC	Ministry of Economic Development and Cooperation
MoARD	Ministry of Agriculture and Rural Development
MoFED	Ministry of Finance and Economic Development
MIDROC,	Mohammad International Development Research Organization Company
MAHFP	Months of Adequate Household Food Provisioning

NGO	Non-Government Organizations
OECD	Organization Economic Cooperation and Development
ODA	Official Development Assistance
ONRS	Oromia National Regional State
OXFAM	Oxford Committee for Famine Relief
PLC	Public limited company
PCA	Principal Component Analysis
PSM	Propensity Score Matching
PPS	Proportional to Size
PPP	Public-Private Partnership
RI	Responsible Investment
REI	Risk Exposure Index,
SNNPRP	Southern Nations, Nationalities, and People's Region
SES	Socioeconomic and Environmental
SOPAC	South Pacific Applied Geosciences Commission Version
SB	Standardized Bias
SS	Sub-Saharan Africa
SPSS	Statistical Package for Social Scientists
SLF	Sustainable Livelihood Framework
TLU	Total Livestock Unit),
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs.
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UN	United Nations,
WAZF and EDO	West Arsi Zone Finance and Economic Development Office
WB	World Bank

CHAPTER ONE

1. General Introduction

"Setting of policy is courtship,
Implementation is marriage"
(Chinua Achebe, 1983)

1.1. Overview of LSAIS from Global to National and Regional Context

Archaeological analysis reveals that Earth's early transition was fueled by land usage and the development of massive undertakings. The most recent interglacial period, which occurred around 12,000 years ago, saw the rise of agricultural cultivation and the birth of large-scale urbanization (Stephens et al., 2019). Despite several claims that agriculture includes destroying the natural environment to build an artificial habitat in which humans can produce the plants and stock the animals they desire (Ponting, 1991), agriculture continues to be the cornerstone of human civilization (Markowitz, 2013), and will almost undoubtedly keep being critical to economic development, poverty reduction, food security in subsistence contexts, and environmental sustainability in twenty-first-century (Deininger et al., 2011; Smith et al.,1998; Tilman et al.,2011). Even nowadays smallholder farmers continue to dominate agriculture and generate a substantial amount of agricultural goods today, producing roughly one-third of the world's food (Fana and Chan-Kang, 2005; Jayne et al., 2010; Lowder et al., 2021). Besides, there are emerging competing interests on land that aggravate the pressure on the farmland. A global observatory has documented the magnitude of large-scale agricultural investments (LSAIs)[2] since 2008/9, and these investments have grown in pattern and trend over time (Nolte et al., 2016). Land purchase and the right to use it, either temporarily or permanently, through leasing, are referred to as LSAI (Jayne et al., 2010; Lowder et al., 2021).This type of investment can take many forms, including the acquisition of farmland, the construction of irrigation systems, the

[2]Large-Scale Agricultural Investments (LSAIs) are large-scale investments in agricultural land made by corporations, governments, and private individuals in this study (Kugelmanand Levenstein, 2009). Hallam (2009) suggests that investments are frequently made to enhance agricultural output, promote food security, generate employment, and earn profits. Nonetheless, such investments are just one of several types of investment flows that have diverse motives, whether realized or intended. Conversely, LSAI is considered a land grab by Cotula et al. (2009). This trend illustrates foreign governments, corporations, and investors purchasing significant areas of land in developing nations for food security and speculative purposes (Borras and Franco, 2012).

implementation of modern agricultural techniques, and the development of new technologies for the sector (Deininger et al., 2011; Larson et al., 2014). In fact, the simultaneous food, energy, and financial crises of 2007-2008[3] created a climate that drew a lot of investor interest in agriculture and agricultural commodities (Depledge, 2008; Montilla Fernández and Schwarze, 2013; Onoja and Achike, 2015; Yang, 2021). As a result, tens of millions of hectares were leased in the Global South within a few years (De Zoysa, 2013; Müller et al., 2021). In addition to the 2007/2008 global agricultural commodities crises, several other factors have contributed to the increase in demand for agricultural land. Rapid population growth has led to an increase in global nutrition demand (Godfray et al., 2010), and provision for consumption has become an issue across many regions of the world (Alamirew, 2014; Guyalo et al., 2019). Natural resources have also grown to be an issue (Hamilton, 2009), and many investors see land investment as a lucrative opportunity for sustainable agriculture and anticipate high land prices in the future (Vhugen, 2012). As a result, there are now more established and up-and-coming players competing for resources globally (Sosa and Gras, 2021). There has been a shift in diet (Liu et al., 2008) and a rural structural economic transformation. Climate change (Breu et al., 2016), the huge demand for biofuel production (Deininger et al., 2011; Lunstrum, 2016), and export restrictions imposed by major producers have also contributed to the increase in demand for agricultural land. Countries that are rich in oil money but poor in arable land, such as Saudi Arabia and other Gulf States, heavily depend on food imports (Rice, 2009; Rosenberg, 2011). Saudi Arabia, China, Libya, India, and South Korea have also invested in agricultural land as a result of political instability due to volatile food imports (Allan et al., 2015). Increased oil prices in 2007 as well as changes to US bioethanol policy (Kretschmer, 2012; Rulli, 2013) and the Renewable Energy Directive of the European Union have all increased agriculture land demand

[3] It was sometimes referred to as the worldwide recession of 2008–2009 and had a significant effect on the financial markets and the world economy. There were significant mass unemployment, GDP decreases, and other severe economic effects in many nations, making it one of the worst economic downturns since the Great Depression of the 1930s (Obstfeld, and Rogoff, 2010). In this dissertation, the term "LSAI" refers to land investments that span more than 200 ha for a variety of purposes, including agriculture, conservation, forestry, industry, renewable energy, and tourism, between 2007/2008 and 2022 (Cotula et al., 2009; Borras and Franco, 2012; Yang, 2021). However, recently the speed and scale at which LSAI is occurring today make it one of the most pressing issues (German et al., 2013; Anseeuw, 2013; Schoneveld 2017; Mechiche-Alami et al.,2021). Whereas smallholder farmers refer to working on less than two hectares of land (Burkitbayeva, and Swinnen, 2018). Most developing and emerging economies produce a significant portion of their food from small-scale farms, though regional differences exist in the ratio of small-scale to large-scale farms (in fact, the definition of scale varies by location, production method, and market) (Proctor and Lucchesi,2012).

.

(EU, 2009). The human demand on the world's freshwater and land resources has increased as a result of this improved future, though (Alexandratos, 1995; Shittu, 2013; Baudrona and Giller, 2014). As with the financial and economic crisis, others see the slowdown as an opportunity to attract foreign direct investment (FDI) [4] by making use of abundant land and declining official development assistance (ODA) countries (Khan, 2007).

By 2050, the world population is expected to increase by 3 billion people, along with an increase in global income and per capita consumption, agriculture investment is also under tremendous pressure to provide the world with more food, fiber, and fuel (Godfray et al., 2010; Garnett et.al, 2013). Global agriculture will face enormous challenges in the ensuing decades, both as a source of food and, more broadly, as a catalyst for economic growth in developing nations (Shittu, 2013). Developing countries need to sustain and increase investment, including in agriculture, in order to meet economic, social, and environmental challenges (World Bank, 2010). UNCTAD reports that approximately USD 250 billion will be invested annually by 2030 (UNCTAD, 2014). Approximately USD 209 billion in annual investments will be needed to meet future food demands in 2050, including efforts to alleviate hunger, poverty, and malnutrition (FAO, 2012a). Accounting for land transactions, however, remains challenging and controversial due to a lack openness regarding transaction scope, ownership, jurisdiction, utilization, and terms of use (Scoones, 2009; Deininger and Byerlee, 2011; Borras et al., 2011; Anseeuw et al., 2011). Reporting on land deals is a highly contentious topic since certain parties are interested in exaggerating the numbers while others want to keep them secret (Wolford et al., 2013). As a result, estimates of the quantity of land that is changing hands differ. For example, the Land Matrix Initiative claims that over 1500 large-scale land acquisitions (LSLAs) involving more than 42 million hectares (an area twice the size of the UK) have been made by transnational investors alone in low- and middle-income countries (Lavers, 2012). The World Bank's estimate

[4] FDI denotes investments made by a firm, individual, or corporation headquartered in one nation into a company or entity based in another. It entails acquiring a controlling stake in a foreign company or launching a new venture. FDI can take many forms, such as purchasing shares or real estate or building a new factory. It is a long-term investment made to access new markets, technologies, or resources. FDI is an important source of capital inflows for emerging nations, fueling economic growth and employment creation. FDI is defined by the IMF as cross-border investments in which a person residing in one economy exerts control over or a significant amount of influence over the management of a company residing in another. Having a significant amount of influence is defined as holding 10% or more of the voting power (World Bank Group, 2005).

varies from 56.6 million hectares (World Bank, 2010a) to 227 million hectares, according to Oxfam (Geary, 2012), though the methodology used to arrive at these estimates isn't always clear. A more conservative estimate is that between 2007 and 2012, at least 21.8 million hectares of land were acquired, or 9.9% of the subcontinent's yearly harvested area (Schoneveld, 2011). Large-scale land investments undoubtedly cover millions of hectares worldwide, and the number is still growing, especially in the wake of the COVID-19 crisis (Petrescu-Mag et al., 2019; Ley et al., 2021). However, it is difficult to estimate the exact amount of land area involved. Few details about these deals are made public, and the global land surge has been characterized by a lack of openness, engagement, and respect for the rights of nearby populations that depend on the land (Ansoms, 2013; Oberlack et al., 2016; MacNeill, 2017).

Consequently, the critical press and academic literature have thus frequently given this unprecedented rise in international land acquisitions different names[5]. While some argue that foreign investment in developing economies could have positive effects, such as increased investment in poor countries, domestic investment in agriculture has stagnated or decreased, indicating a need for foreign investment in low- and middle-income countries (Heumesser and Schmid, 2012; Azadi et al., 2013; Breslin, 2013; Hallam, 2011; Liu, 2014). Investment in agriculture would effectively boost economic growth and reduce poverty, inequality, and hunger, especially in nations with an abundance of underused arable land and inexpensive labor (World Bank, 2007; FAO, 2012; Liu, 2014). Significant agricultural investments have been made in Ethiopia, Sudan, Mali, Ghana, Madagascar, Kenya, Tanzania, the Philippines, Cambodia, Indonesia, India, Papua New Guinea, Brazil, Argentina, Ukraine, and Uruguay (Von Braun and Meinzen-Dick, 2009; HLPE, 2011, Jurayevich and Bulturbayevich, 2020).

Scholars like Chen et al. (2017) argue that detrimental outcomes developed as LSAI was led by efforts to solve the 2007/8 triple crises of finance, food, and energy as a solution. Among the negative outcome that LSAI results ware dispossession and exacerbating power imbalances between winners and losers. Food security and the environment are often impacted by LSAI,

[5] Such as "land grabbing" and "neo-colonialism" (The Economist, May 21, 2009; Hall, 2011; Rulli and D'Odorico, 2013; Mora, 2022). Further, terms like "global land rush," "global scramble for farmland," "large-scale agricultural farming," "land-based investment in agriculture," "large-scale land acquisition," and "Carbon sinks-carbon market" (Daniel, 2011; Coscieme et al. 2016; Warikandwa, and Nhemachena,2017), etc. are used to describe the type of farming done by private businesses and/or governmental organizations (Cotula,2011; Lisk,2013;Ross,2014; Chen et al., 2017).

which frequently involves unfair livelihood scarcity. This procedure thus results in the loss of control over important assets and the removal of assets like land without permission or just recompense (Cotula, 2011). Rulli and D'Odorico (2013) highlights that LSAI frequently lack consultation and compensation, raising questions about benefits for locals and venture sustainability. Communities involved in LSAI-driven agriculture suffer reduced food production due to natural resource dependence, pushing them to exploit resources for survival. Despite the negative effects, there is few evidence that LSAI has improved food security, livelihoods, and the environment (FAO, 2010). LSAI's mixed impact underscores the need to consider its implications and long-term viability carefully. Appendix Figure C1 shows food price spikes and their relevance as a source of political and social conflict, illustrative of one of the reasons of recent LSAIs, which is associated political stability and food production. Figures C2 and C3 depict, respectively, the locations of significant land acquisitions and the types and status of land transactions globally. Ethiopia had a significant increase in LSAIs during the 2007-2008 spike in global food prices, as previously described in the literature (Bickel and Breuer, 2009; Abbink, 2011; Baumgartner et al., 2015; De Juan et al., 2022; Sullivan et al., 2022). It is important to note that while creating LSAI rules is the first step, implementing them effectively is the actual challenge, as the saying goes, "Policy setting is courtship, implementation is marriage" (Chinua, 1983:). The section that follows (1.1.1) will provide an overview of the research on Ethiopia, a country that has leased a significant piece of its arable farmland to global multinational firms and a few local investors, and has sparked considerable scholarly interest. Largely, a multidimensional analysis of LSAI's impact on the rural Shashamane district is the aim of this study. Both private investors and the state targeted this area for LSAIs in order to produce surplus agricultural products and promote local development.A private LSAI project called Shalo-Melge began operating in 2008 in the Shashamane district, encompassing crop production, road construction, crop storage facilities, and irrigation development over an area of approximately 24,710.51 acres. In the context of the Oromia regional state and Shashamane rural district, however, there has been limited attention paid to understanding the overall effects of large-scale agriculture investment.

1.1.1. LSAI in Ethiopia's: A General Overview

It is vital to comprehend Ethiopia's historical agricultural and LSAI accounts in order to correctly examine the country's present LSAI trend. This part provides an overview of Ethiopia's agricultural sector trends, including large-scale agricultural investments (LSAI), as well as its importance in the country's social and economic development (Geda, 2006). It also provides historical context, beginning with Emperor Haile Selassie I and on to the communist military state and the EPRDF's subsequent supremacy until 2018, followed by the current reformist Abyi Ahmed administration. In addition, this section examines numerous turning points, including the creation of the first Ethiopian constitution, socioeconomic policies, medium-term planning, and infrastructure growth involving gateways, buildings, power, transportation, and other facilities (Henze, 2000; Kefale, 2009). During the imperial era, large-scale mechanized agriculture was seen as essential for rural transformation in Ethiopia, but the constitutional monarchy downplayed the worth of smallholder agriculture to the economy (Kebede, 2002). The imperial regime supported agricultural institutes for scientific advancement and acknowledged the presence of small family farms, despite their low production and primitive methods (Henze, 2000). As a result, the government encouraged the creation of huge commercial farms owned by foreigners as well as small family farms to boost productivity in order to modernize and reorganize the agricultural sector (Lavers, 2012). To raise the foreign resources required to import capital goods foreign direct investment was also encouraged (Kline, et.al., 1969).

The area which most attracted the attention of local investors, as well as foreign capitals, were Arissi province, the Rift and Awash valley, and the Setit Humera basin. In addition, there were pockets of large-scale mechanized farms in Bala, Harar, Kaffa, and Wollega provinces, and in the vicinity of Addis Ababa (mainly in Ada district) (Dessalegn, 1984). Yet, the Derg (literally, "a committee of soldiers") military regime made socialism the cornerstone of its guiding principles.

After seizing power in 1974, the military nationalized all privately owned businesses, including foreign-owned commercial farms (Tiruneh, 1991). They favored state-owned large farms and restrained private investment while instituting land and economic policy reforms (Negarit Gazette, No. 22, 1975; Proclamation No. 26/1975; Henze, 2000). Since then, the government has owned all significant agricultural assets, which have been managed by agricultural development

businesses in accordance with the Public businesses Proclamation and Regulations (Negarit Gazette, No. 21, 1976). However, certain activities like mining, food processing, and significant construction projects were permitted to include foreign investors (Henze, 2000). The Ethiopian Privatization Agency (EPRA) was founded in 1994 after the EPRDF administration introduced economic reforms in 1991 to move the country from a command economy to one that is more market-oriented (MoFED, 2003; Persson, 2016). The agenda for economic reform by the regime has a focus on privatization and promotes involvement by the private sector (Leykun, 2013; Wodajo and Senbet, 2017). The Investment Proclamations and Regulations, Agricultural Investment, and Land Lease Implementation Directive are only a few of the organizations the government set up to manage the investment program (Stebek, 2011). The growth of large-scale commercial agriculture in Ethiopia is broken down into three periods by Rahmato (2014). Small-scale farms and regional investors were involved in the initial phase (mid-1990s to 2000). The second phase (2001–2007) saw a spike in the horticulture sector and greater engagement of international and diaspora investors, with different land sizes transferred. Investors rushed to purchase land during the third phase (2008–2011), with larger purchases attracting more attention. A fourth phase, the post-2012 period and Proclamation No. 769/2012 (Negarit Gazette, No. 63, 2012), could then be added. During this phase, new regulations restricting foreign investment and mega agreements lead to an increase in small and medium-sized deals and the reemergence of domestic and diaspora investors (Dejene and Cochrane, 2021).

The government's Growth and Transformation Plan (GTP I and II), which was put into effect from 2005 to 2010 and from 2010 to 2015 respectively, placed a strong emphasis on the transition to commercial farming and gave the development of biofuels top priority (Abbink, 2011; Chamberlin and Schmidt, 2012). The Agricultural Investment Support Directorate (AISD), now known as the Agricultural Investment Land Administration Agency (AILAA), facilitates significant agricultural investments in Ethiopia and is a division of the Ministry of Agriculture. A decree from the federal government's council of ministers in 2010 sought to consolidate the procedure for awarding large-scale land leases of more than 5000 ha (Rahmato,2014). Thus, the Ethiopian government has created a variety of legal frameworks and policy tools to safeguard the rights of regional populations (Chamberlin and Schmidt, 2012).

For investors in Ethiopia during the triple crisis of 2007–2008, all of these policy changes contributed to a positive legal and regulatory environment (Amis et al., 2017). The Ethiopian

government, under the direction of the Prime Minister, actively encourages agricultural investment and provides incentives, including low lease prices, lowered contractual obligations, exemption from custom duty and import taxes for capital goods, machinery, and more (The Oakland Institute, 2011; Locher, 2015). According to the government, increasing commercial farming would not have a negative impact on residents' ability to support themselves (Narula, 2013), underlining the part played by African governments in approving the purchase of property by multinational firms.

However, as investment grows, developing countries gain significantly from it since investors contribute capital, know-how, access to markets, and expertise to land acquisition negotiations, which may be a catalyst for transformation in rural economies (Graham et al., 2010). Additionally, this will boost tax revenues, quicken economic expansion, generate jobs, make it easier to access essential infrastructure, and raise the level of living in the area (Deininger and Byerlee, 2010). Emerging nations are therefore making an effort to industrialize their operations by converting small-scale farming into more productive farming outputs through the construction of rural infrastructure, storage facilities, and distribution networks (Panel, 2018).

More knowledge is gained through research to enhance crop varieties and breeding programs to boost animal husbandry output (Bindraban et.al., 2009). Nonetheless, several commentators argue that the Ethiopian government's shift of focus away from smallholder farming has increased vulnerability and dominating official interests (Dejene and Cochrane, 2021). Glover and Jones (2019) further argue that the EPRDF first prioritized smallholder agriculture intensification as a workable path for economic growth after Derg's downfall. However, the approach fell short of the country's goals for food security, economic progress, and poverty alleviation (Abbink, 2011). Multiple factors made the transfer of millions of hectares of land for agricultural growth after the triple crisis possible (Lavers, 2016). According to several estimations (Dessalegn, 2011; Cochrane and Legault, 2020), it is still unclear how often land sales are in Ethiopia. While different sources give different estimates, the Ethiopian government has leased out at least 3 to 3.6 million hectares of land since 2008 to foreign and domestic investors, and the land deals were opaque, and there was little oversight of their execution (MoARD, 2010; Dessalegn, 2011; Tura, 2017). According to some, Ethiopia's million hectares of arable land are only marginally significant and are primarily used for small-scale agriculture (Nalepa et al., 2017). As a result, the Ethiopian government canceled land leases for a number of

investors, including Saudi billionaire Mohamed Hussein al-Amoudi, who is of Ethiopian descent, and Indian business Karuturi Global, whose 300,000 hectare agriculture project contract was eventually terminated (Luursema, 2022). This was done because investors failed to keep their promise of creating jobs for young people and assisting the country's development. The Ethiopian government, however, seems to have changed its mind and provided a fresh license for 15,000 hectares when the Indian government interfered diplomatically and the corporation started legal action (*Hindu Business Line,* 2019). This investment in farmland can be between 100 and 300,000 hectares in size (Karaturi), and it is typically made with little to no proof that the investors can operate them profitably (Dessalegn, 2014). The current Prime Minister Abyi administration recently decided to rebrand Ethiopia because it believed that the country's previous development model had reached its limits. As a result, the country now has a "renewed vision" for the country and is urgently requesting more investment in the face of high external debt (estimated at $30 billion and more than 40% of GDP) (IMF, 2018). Further, the appointment of PM Abiy Ahmed in April 2018 acknowledges the significant role of the agricultural sector in Ethiopia's economic development and its major contribution to the country's GDP, in addition to reforms like the privatization of State-Owned Enterprises in industries like aviation, logistics, and telecom (Mokkadem, 2019). Ethiopia[6] aggressively promotes agricultural investment in Africa and is a top beneficiary of FDI in this area (Dheressa, 2013). As a result, Ethiopia is a crucial nation for researching the effects of large-scale agricultural investments (LSAI), with many active large-scale farms especially in the regions of Oromia, Benishangul, SNNPRS, and Gambella.

[6] Accounding to UNCTAD (2017) report Ethiopia economy has seen a 46% growth in FDI inflows, making it one of Africa's most dynamic and significant FDI recipients.

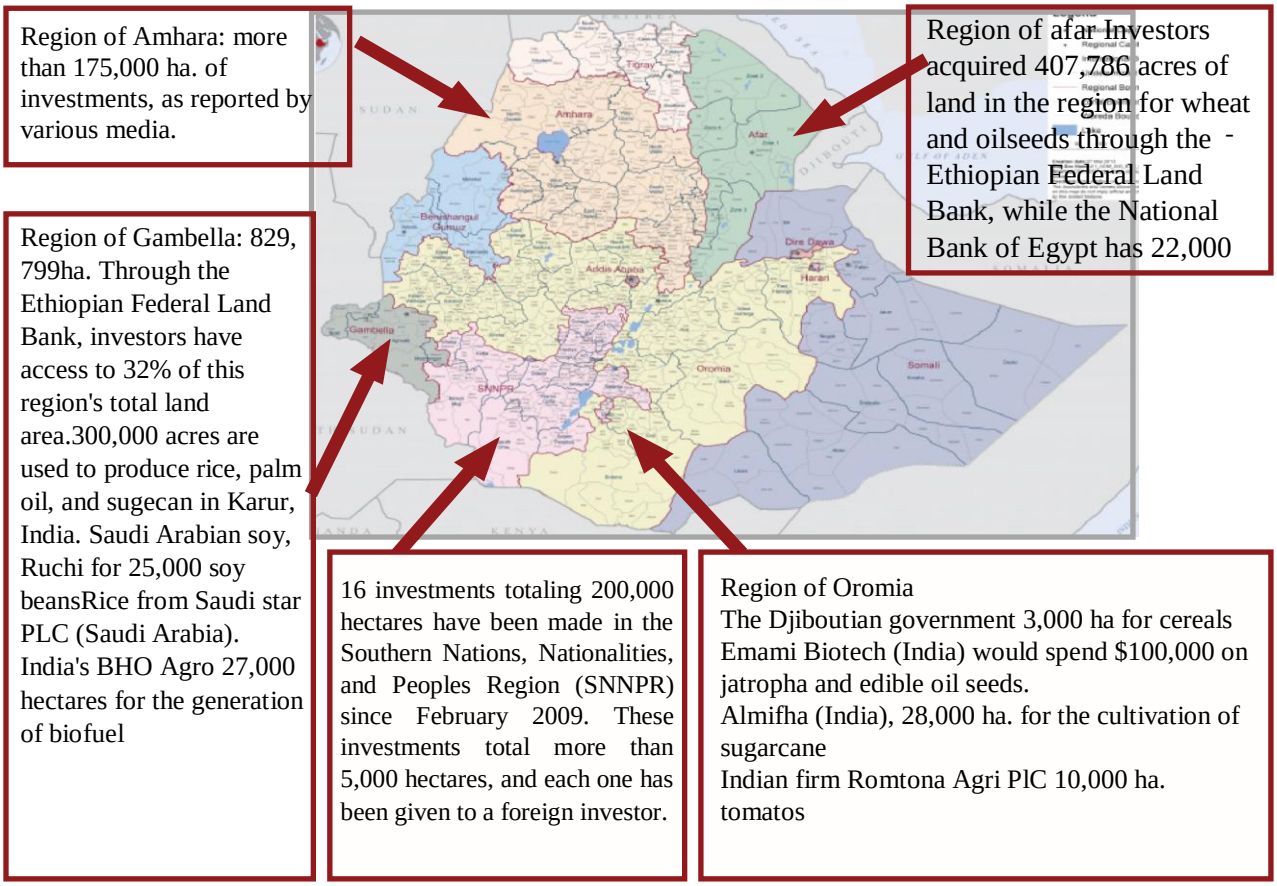

Figure 1.1. LSAI investor and investment in Ethiopia. (Source: Horne and Mousseau, 2011).

1.1.2 LSAI in Oromia Regional State: An Overview

Oromia accounts for roughly one-third of the country's territory (363.346 square kilometers) and has an estimated 35 million (considering population growth of approximately 1.1 million per year) of the country's 105 million people (ONRS, 2015). 89.5% of the state's population lives in rural areas (GoE, 2014). Administratively, it is organized into 17 zones, each of which is further subdivided into districts), followed by kebeles (i.e. municipalities). There were 301 districts in the area (262 rural districts and 39 urban centers under reform) and about 6630 Peasant and Urban Dwellers Associations/Gandas (CSA, 2007). The region's astronomical boundaries are 3024'20" North to 10023'26" North latitudes (about 7° north to south) and 34007'37" East to 42058'51" East longitudes (roughly 9° west to east). Geographically, the area consists of chilly highland parts, fertile plains, and densely forested areas with abundant rainfall. In addition to providing major hydroelectric and agro-industrial power, the River Awash flows through the

area, and several lakes and rift lakes offer recreational options and fishing development potential (GoE,2014; Amare, 2015). The Awash and Bale Mountains National Parks, together with the lakes in the Rift Valley, all draw tourists to the area. Over 800 different bird species and more than 100 different wild animals may be found in the area, which has a high biodiversity (GoE, 2014). These include indigenous wild animals found in the Bale Mountains National Park, such as the mountain Nyala, Semien Red Fox, and Menelik Bushbuck. Most people have relied mostly on agriculture for their means of subsistence. Due to this, the regional government prioritized rural poverty reduction by strengthening smallholder agriculture (Amare, 2015). Smallholdings of slightly more than a hectare and the sparing use of inputs like fertilizers, herbicides, improved seeds, and machinery set apart crop production. Furthermore, a heavy reliance on rain-fed crops (with little or no irrigation) is a major component of smallholding peasant farming in Oromia (GoE, 2014). Smallholder farmers mostly grow maize, teff, wheat, barley, peas, beans, and several kinds of oil seeds. As a result, the yield per hectare has remained incredibly low and the expansion of output has been slow. The average yield is 12.49 quintals per hectare, much below the potential yields of up to 80 quintals for maize and up to 50 quintals for wheat when a range of inputs are employed (World Bank, 2021). Coffee is the area's main cash crop. Furthermore, the area generates 51.2% of Ethiopia's crops, 45.1% of the country's temporary crop land, and 44% of all animals in the country (World Bank, 2021). Importantly, multinational investors are increasingly interested in acquiring land for large-scale agricultural projects in Oromia. There are already around 761 investment projects in the region, with a large majority of them in agricultural and mining (Ethiopian Government, 2014). In Oromia alone, more over one million hectares of land have been leased to investors, mostly for food and agro-fuel production for the export market (Dheressa, 2013; Tura, 2017). Therefore, the regional State is Ethiopia's top recipient of foreign direct investment. Further, according to the Federal Property Bank Reserve, which analyzes international land purchases, it is the third-largest land acquisition by investors since 2000 (Rahmato, 2014, Tura, 2017). Local and domestic investors, in addition to those from abroad, have just gained significance as a result of governmental functionaries setting up their plantations. As a result, land agreements are mostly concentrated in natural resource-rich areas with an abundance of readily available fertile soil, inexpensive labor, devoted and strong policy attention from the government, and a spectacular climate suited for the development of high-quality agricultural lands. Historically, agro-processing has been centered

in the area around Addis Abeba for logistical and infrastructure reasons (ONRS, 2015). However, recent swiftly infrastructural expansion and the accessibility of cheap labor and land are opening up new chances to increase output and generate new investment. Investors typically searched for land to plant three different types of crops: first, food for export, specifically rice, and then, second, biofuel crops, such as castor beans, oil palm, and jatropha, and third, industrial crops, such as sugar cane and cotton for the textile and sugar industries, respectively. As a result, the region's environment, which is conducive to the cultivation of a wide range of crops, drew additional investors (Ramato, 2014). Additionally, the area has plenty of water resources, human resources, and a labor force that is reasonably priced. Furthermore, the state has the most contractually leased land for agricultural investment, with Oromia ranking among the top three (Beni Shangul Gumuz (1.1 million hecatr of land), Gambella (1.2 million hecatr of land), and Oromia (1 million hecatr of land) of all regions in terms of land leased (Dheressa, 2013; Ramato, 2019). However, LSAI has been the topic of public controversy and recurring protests in the region, which have sometimes become violent (Human Rights 2016). Protests have frequently focused on land rights, benefit sharing, and the failure of enterprises to get free, prior, and informed permission from local people and community leaders (Murombedzi, 2014). Furthermore, LSAI has been chastised for providing inadequate employment opportunities and exploiting a deficient rural and communal land registration and certification program, which resulted in 2006 public rallies seeking greater rights and riots by local communities (Gilfoy, 2015; Human Rights Watch, 2016a). Additionally, the Oromia Investment and Industry Bureau is now negotiating a land deal that will offer overseas companies, governments, and other organizations many hectares of new land over the coming years to increase food production and improve the effectiveness of the agricultural sector (Wayessa, 2020).This will double the existing area covered by large-scale farms and increase total production. This implies that the Oromia region has become a significant investment target during the previous 10 years and offers a favorable investment prospect moving forward, making it imperative to do research.

1.2. Closing the Knowledge Gap in Land Deals: A Research Perspective

EU, East Asian, and Arab investors are becoming increasingly interested in agricultural ventures in Sub-Saharan Africa (SSA) and Asia, including Ethiopia, Mozambique, Sudan, Uganda, Zambia, the Philippines, and Kenya. Cotula et al. (2009), Spieldoch and Murphy (2009), Von-Braun and Meinzen-Dick (2009), Brandt (2017), and Jurkevics (2022) have all reported on this

pattern. Ethiopia has been particularly proactive in attracting a diverse range of investors and investment types. The government views the LSAI as a means of driving positive economic, social, and environmental development in the country. Gebeyehu and Abbink (2022) discuss the Ethiopian government's official efforts to encourage and facilitate such investment. The east African country is the most favorable place in the world for agricultural production due to its abundance of arable land, water resources, and favorable weather (Abesha, 2022).Therefore, Ethiopia mainstreamed LSAI in its Growth and Transformation Plan (GTP), with the goal enhancing rural communities, improving food security, and becoming a middle-income country by 2025. Further, the government has launched agricultural investment to increase and sustain agricultural productivity in the country through the plan of Agricultural Development Led Industrialization (ADLI) (MoFED, 2006; MoARD, 2010; MoFED 2006; FDRE, 2012). Furthermore, according to Deininger and Byerlee (2011), Investments in large-scale agriculture may be seen as opportunities for long-term agricultural expansion as well as opportunities for general development.

Nevertheless, ten years after the surge and impacts of LSAI, the current signals indicate a possible new land rush (Lay, et al. 2021). Davis et al. (2014) stress the need of taking the larger impact of land transfers into account. For inclusive and sustainable outcomes for all stakeholders, including local residents and investors, focusing on rural communities and the environment is essential.

Angola, Ethiopia, Indonesia, Kenya, the Democratic Republic of Congo, Madagascar, Mali, Mongolia, Mozambique, Zambia, (southern) Sudan, Tanzania, and the are among the African countries most affected by LSAI (Lay et al., 2018). The poorest and least well-governed nations typically suffer the greatest effects. Several Asian nations, including Cambodia, Indonesia, Laos, Myanmar (Burma), the Philippines, and Vietnam, have suffered substantial consequences as a result of large-scale land deals. It is crucial to keep in mind that these land agreements have quite different effects in different nations. Brazil and Ukraine have also encountered similar issues as a result of such land agreements (Lay et al., 2021). The current projected worldwide LSAI risk population is 12.1 million, with two-thirds of them residing in Africa (Davis et al., 2014).

Additionally, recent studies by Hindeya (2018), Kebede et al. 2021, and Talleh et al. 2022, among others, discovered that substantial investments in agriculture rob the local community of its means of subsistence. These investments aggravate food insecurity and cause income losses

for residents, though these effects were not quantified. Similar studies by Oxfam International (2011), Lavers (2012), and Busscher et al. (2020) found that the expropriation of land resources by investors presents significant difficulties for the local population in Ethiopia. A number of case studies focused on investments (Aab and Kring, 2012) as well as publications on job creation (Philipp et al., 2015; Ali et al., 2017). Large data sets from comparative studies have been used to evaluate the effects of agricultural investment (LSAI), taking into account elements like crop variety and investor type. Liu, P. (2014) and Guyalo et al. (2021) performed surveys in developing countries and the Gambella area of Ethiopia, respectively. Their findings found that farmers in LSAI-affected regions faced poorer yields, restricted agricultural land for food production, and damaged local people's livelihood.

Dheressa (2013) and Jiao et al. (2015) conducted in-depth studies on the environmental effects of large-scale agricultural investments (LSAI) in Bako Tibe Woreda, Ethiopia, and Cambodia, respectively. However, their studies lacked quantification of the impact. The study offered in-depth perceptions on the detrimental effects of LSAI, such as lower incomes, arable land, and animal holdings for neighborhood residents. Bottazzi et al. (2018) used data from 600 randomly chosen impacted and non-affected households, applying the Poor Environment Network approach and Propensity Score Matching (PSM). Their study revealed the negative impact of LSAI on local lives, highlighting decreased wages, arable land, and animal holdings. The analysis revealed that LSAI fails to deliver on its promises of job development and improved livelihoods. Poor families that depend significantly on their land and other natural resources are those who are most affected by these consequences. According to Edafe et al. 2021, Large Scale Agricultural Investment-Impacted Communities observed a rise in overall monetary earnings, improved livelihood, and greater food consumption spending. They thus conclude that LSAI has a positive effect on rural household livelihoods.

Future, Guyalo et al. (2021) and their research highlighted the importance of considering how large-scale agricultural investment will affect the affected community's food security in the Gambella region. As a result, they concluded that LSAI has a detrimental effect on the food security status of affected households and deteriorates their asset base.

Other meaningful evaluations of the impact of LSAI on household incomes and local people's food security situation have been conducted by Shete and Rutten (2015), and their findings

revealed that LSLA reduces food security by 20-26% (US$0.88-5.05) and income by 15-24% (US$162-262) among local people. Additionally, their research showed that LSAI has lowered land access and surface farming. As a result, there are fewer cattle, less money, and less money is spent on food. Moreover, according to other studies like Alamirew et al (2015), large-scale investment in agriculture deprives local communities of their livelihood, worsens their food insecurity status, and brings loss of income for local people. Based on Bottazzi et al. (2018) research in Sierra Leone, LSAI caused a decline in yields in the impacted villages. In a more recent study, Santan-gelo (2018) investigated how foreign direct investment (FDI), sometimes known as "land grabbing," affects the food security of the host nation.

Another comprehensive study by Fitawek and Hendriks (2020) utilized control/treatment and propensity score matching (PSM) to examine the effects of large-scale agribusinesses on household food security in two specific locations in Madagascar. The findings of the study clearly indicate that households involved in employment with agribusinesses exhibited improved food quality, enhanced food security, and increased adaptability. Contracted households also demonstrated lower levels of food volatility compared to engaged and non-engaged households. When compared to earlier investigations (Alamirew et al, 2015; Shete and Rutten, 2015; Bottazzi et al., 2018, Santan-gelo 2018; Guyalo et al. 2021), consequently, there was no consensus among the findings or a clear answer. Liao et al. (2020) examined the geographical patterns of large-scale land transactions in Cambodia, Ethiopia, Liberia, and Peru. Add, Liao et al. (2020) emphasize the need for a thorough examination of large-scale agriculture's environmental impact, as well as incorporating socio-economic factors for holistic analysis. Different contexts reveal intricate variations in impact (Mapuranga and Majoni, (2022). Borras, and Franco (2014), Wiegink, (2020), Mapuranga and Majoni, (2022) also reported and criticized land deals that have been undergone with a lack of transparency and consultation with impacted communities, resulting in land dispossession, displacement, and environmental damage in different regions of the world, but they did not measure the degree of participation, and sense of ownership of local people. Nevertheless, much of the influence of LSAI on the natural environment did not receive a fair share of attention from Ethiopian academics and policymakers, and GRAIN (2008) claims that the evidence on the impact of agricultural investment undertaken thus far in Ethiopia is unclear, missing the scientific foundation to provide feedback to farmers, development practitioners, and/or policymakers. In fact, disputed evidence regarding the advantages and

disadvantages of land sale continues to be under question today. This study was motivated by a number of research gaps in the literature, the first of which is the lack of a clear agreement about the impacts of LSLAI and the paucity of research on the effects of LSAI by actors. This study aims to address these gaps in the literature. Furthermore, the extent to which LSAIs keep their promises is highly contested and under-explored, because possible effects of LSAI are various, especially in the Oromia region—more specifically, the South-East part—which has also been a key target for investors, providing a chance to perform case study control/treatment assessments about the distinctive features of investments to explore their diverse consequences. The second, main impetus for conducting this research was the limited empirical evidence in the existing literature regarding the impact of Large-Scale Agricultural Investments (LSAIs) on various aspects such as the natural environment, the right to be consulted, application of Free, Prior and Informed Consent (FPIC), livelihood, and food security in the host communities of LSAIs, particularly in the Shashamane rural district of the Oromia region. Hence, land deals often have a significant impact outside of the immediate area including dispossession (Davis et al., 2014). To benefit all stakeholders, including local communities, investors, and the environment, it is critical to prioritize rural communities and the environment. It is also critical to design sustainable and equitable land deals that protect natural resources. The third is that, despite the expanding trend of LSAIs in Ethiopia, there is little concrete evidence from a multidimensional perspective. This study therefore aims to fill this gap by providing original and additional empirical evidence for the multifaceted impact of LSAI in the rural Shashamane district of Oromia Region, Ethiopia. The outcomes of this study are anticipated to improve our understanding of how large-scale agricultural investments (LSAIs) affect local communities and the environment, as well as offer substantial evidence to guide policy and decision-making processes involving LSAIs in Ethiopia's Oromia Regional State, specifically in the Shashamane rural district. This study may also help policymakers, investors, and other stakeholders establish better plans that promote sustainable and equitable development, giving responsible investment (RI) priority in order to reduce negative effects on local populations and the environment. Additionally, the study will contribute to the existing literature on the topic and serve as a resource for future research.

1.3. Objective of the Study

This study investigate how large-scale agricultural investment has impacted rural areas of Shashamane, Oromia Region, Ethiopia. The ultimate goal is to provide the crucial understanding of the prospective various negative effects, how to enhance positive effects, and necessary for further research and development activity. This study may play a significant role in bringing Oromia regional state LSAI to the attention of researchers, civil society, and non-governmental organizations and policymakers. The research includes the following components:

- To explore stakeholder consultation, application of FPIC, and local community dispossession and measures of enhancement in Large-Scale Agriculture Investment where LSAI operation in Shashamane district, Oromia Region, Ethiopia (Paper I)[7].
- To estimate the impact of large-scale agricultural investments on the livelihood improvement, of the local people in the Shashamane rural district of Oromia Regional State of Ethiopia (Paper II)[8].
- To examine the impact of large-scale agricultural investments on food security, for the local people in Shashamane district, in the Shashamane rural district Oromia Regional State of Ethiopia. This component also studied how LSAI has affected food security pillars in the research area, such as changes in food production and availability, accessibility, usage, and stability (Paper III)[9].
- Impacts of large-scale agricultural investments on the environment in the Great Rift Valley of Ethiopia: Empirical Evidence (Paper IV)[10].

[7] See see Chapter Two
[8] See see Chapter Three
[9] See see Chapter Four
[10] See see Chapter Five

1.4. Research Question

The following research questions will be addressed in this investigation:

1. How does lack of transparency, lack of right to consult, FPIC, and unequal distribution of benefits impact the compensation of people by large-scale agricultural investments in the Shashamane rural district of the Oromia region, and what are the policy implications of these findings? (Paper I)
2. How livelihoods of rural communities in Shashamane district, Oromia Region, Ethiopia impacted by large-Scale land deal? (Paper II)
3. What are the multiple impacts on food security of large-scale agricultural investments in Shashamane District, Oromia Region, Ethiopia? (Paper III)
4. How does LSAI impact local land degradation, exposure, and resilience in Ethiopia's Great Rift Valley Region? (Paper IV)

1.5. Philosophical Underpinning of the Problem

The philosophical underpinnings of LSAI or land deal are complex and multifaceted. LSAI has been understood and approached and linked to the active promotion of Public Private Partnership (PPP), Foreign Direct Investment (FDI), land tenure practices, property rights, respect for human rights, and stakeholder participation in numerous studies (German, 2011; Harvey, and Pilgrim 2011; Scoones, 2013; Persson, 2016; Jurkevics, 2022). Consequently, it is essential to comprehend the theoretical foundations of PPP, FDI land tenure, human rights and stakeholder participation, and other related perspectives. Land tenure, human rights, and stakeholder participation, research favors social constructivism, which is related to interpretivism (Roux and Barry, 2009). PPP and FDI, on the other hand, had a variety of philosophical foundations. However, the theory of mercantilism, classical economic liberalism, neoliberalism, institutionalism, firm, trade, organization, and location are just a few of the many theoretical approaches from which both FDI and PPP share and draw their philosophical foundations (Cleeve, 2009; Rugman, 2010; Cohn, and Hira, 2020).

In addition, LSAIs are taking place at a time when social science disciplines are becoming more diverse but also more advanced, and their methodological and epistemological approaches overlap. Additionally, the era is marked by improved technological advancements that make it easier to exploit natural resources (Singh, 2022). Furthermore, LSAls have been investigated

from the world views of political ecology, political economy, and agricultural development (Keene, 2015; Magliocca et.al, 2022). The global north is described as being "resource-rich, financially haves," whereas the global south is described as being "resource-poor, financially have-nots" (Lambin and Meyfroidt, 2011). Others employ case studies to separate LSLA situations from their origins and consequences at various policy and geographic levels (Behrman, 2012). Eventually, the principles, beliefs, and values that underlie land deals can vary depending on one's perspective and priorities, the specific context, the actors involved, and the goals of the transaction. In conclusion, the large-scale agricultural investment (LSLA) or land deal's principles, beliefs, and values are based on a variety of philosophical, economic, and political ideologies, including:

1 Neoliberalism: Neoliberalism encourages the use of free markets and little government involvement in order to grow the economy. It encourages large-scale agriculture investment (LSAI) to increase productivity and efficiency (Tamanaha, 2008; Wolford et al., 2013; Desmond, 2021).

2 Development State: this advocator's look at land deals can be crucial in the context of developing states for fostering economic growth and enhancing citizen welfare. To build new infrastructure, such as roads, airports, or homes, the government can, for instance, sell or lease land to a developer (Deininger, and Byerlee, 2011). This can increase communities' access to fundamental services, draw new enterprises, and create jobs (Borras et.al., 2013)

3 Utilitarianism: This philosophical viewpoint places an emphasis on improving society as a whole to its full potential, frequently at the expense of individual rights and interests (Harsanyi, 1977). Utilitarians may back LSLA if it is seen as helping the greater good by providing benefits like food security (Alden, 2012).

4 Rights of People: Local communities' human rights to food, housing, and property, according to some, may be violated by LSLA. In the context of LSLA, advocates of this perspective may advocate for a stronger defense of these rights (Cismas, and Paramita, 2015).

5 Environmental Sustainability and Land Use: Because it frequently involves the conversion of natural habitats into agricultural lands, some people believe that LSLA poses a threat to the environment (Daly and Cobb, 1989). Defenders of this viewpoint might call for supportable land use rehearses and more prominent security of the climate with regards to

LSLA. In addition, the advocates' point of view asserts that ensuring that the land is utilized in a way that is long-term sustainable, taking into account both economic and environmental factors, is essential (Wisborg, 2013).

6 Reliability: ensuring that all parties involved are treated fairly throughout the land acquisition procedure (Ade, and Malicia, 2018).

7 Rights: ensuring a fair distribution of the land deal's benefits and drawbacks among various groups, including the government and local communities. Upholding the rule of law: ensuring that the procedure for acquiring land complies with international and national laws and regulations (United Nations, 2012; Oxfam, 2020).

8 Relationship and partnership: fostering partnerships and collaboration among the various parties involved in the land deal, including investors, local communities, and the government (FAO, 2015).

The critical realist paradigm, which combines positivism with social constructivism, is found to be the most appropriate after this study examines the contributions of several paradigms to LSAI (Denzin and Lincoln, 2005; Lang et al., 2021) It is possible to completely examine and comprehend reality. For PPP, FDI, land tenure, human rights, land use, environmental sustainability, and transparency, the critical realist paradigm is relevant (McWilliam, 2012; Jourdan et al., 2021). It aids in the analysis of challenging land governance issues and the comprehension of social, economic, and political variables (Staddon and Scoones, 2013). Positive thinking, which is "value-free," enables quantitative research and the creation of objective information (Robson, 2002). Because it can be used to both social world and quasi-experimental designs, the positivist framework is perfect for this topic (Pereira, 2021). Healy and Perry (2000) assert that a knowledge claim is produced by social, economic, ethnic, political, cultural, gender and other values and is based on personal experience. Social constructivism, in contrast to post-positivism, emphasizes the plurality of viewpoints rather than limiting meaning to a small number of concepts or categories, and this paradigm view that people want to know more about the world in which they work and live and things or objects that people come across are given subjective meanings. Yet, social constructivism is centered on definitions of what it means to be "value-laden," and the researcher must study the variety of viewpoints rather than limiting interpretations to a few categories or conceptions because there are so many different ways to interpret nearly identical phenomena. According to Roux and Barry (2009), it has a

strong connection to interpretivism, which holds that a knowledge claim is based on subjective experience. In order to gather material for this research work, primary sources such as Ethiopian investment policies, recent studies, and industry-specific regulations and legislation were predominantly used. These sources, however, do not take into account social constructivism or the individuals' subjective viewpoints. To assure replication, empirical facts and supported hypotheses are sought, showing that this research cannot rely exclusively on one paradigm. Critical realism was chosen as the philosophical foundation for this study due to its adequacy in ontological, epistemological, and methodological dimensions (Persson, 2016).

i. Ontological appropriateness: The ultimate objective is to offer the essential knowledge of potential different negative effects, how to enhance positive effects, and required for further research and development activity. This study logically and firmly stands on the truth that can be discovered by objective measurement because the Oromia Regional State in Ethiopia is a popular location for major investments but little is known through "objective measurement"(White, 2012). It also admits the idea of a single reality or numerous realities that may be experimentally studied (Creswell et al.,2011). Truth and reality are therefore divided metaphysical conceptions dependent on socially created ideas and practices, claims Yin (1994). Smallholder farmers and local communities are most affected by the negative economic, social, and environmental effects of LSAI in Ethiopia. It is also condemned for uprooting smallholder farmers from their agricultural holdings, depriving them access to natural resources, and igniting social unrest. Additionally, LSAI has accelerated environmental deterioration, particularly in regions with fragile ecosystems or scarce natural resources (Adugna and Alemu, 2020). It encompasses intricate political, economic, social, and environmental (SEE) events and includes a sizable number of individuals (White, 2012).

ii. Epistemological appropriateness: The study's guiding principle was "the researcher has a neutral stance gathering new knowledge through an objective." The investigation uses a variety of parties, including residents, the government, financiers, and researchers to collect data. It acknowledges the value of incorporating other viewpoints into the research methods of choice. Because each participant's viewpoint helps to triangulate a complete understanding of reality, the study is neither impartial nor prejudiced but rather accepts values (Denzin and Lincoln, 2005; Healy and Perry, 2000).

iii. Methodological appropriateness: Once objective data had been gathered, the study was examined using the methodological strategy that would best address the issue under investigation (Tashakkori and Teddlie, 1998). It frequently uses a variety of methodologies (Maxcy 2003; Creswell and Plano Clark, 2004; Biesta, 2010; Teddlie and Tashakkori 2009; Tucker, et.al. 2020; Kwanya, 2022). For instance, according to Felder et.al. (2022), how can each layer of a research problem be measured or observed? Certainly, employing a variety of approaches, measures, researchers, and points of view is an important inquiry strategy. However, this ought to be done in a practically and reasonably (Patton, 2002). Greene and Caracelli (2003) and Murphy et.al (2021) established that pragmatism assumes method independence as a paradigmatic position in which researchers are not required to adhere to a specific research strategy (Corr, 2020). Numerous methodological combinations, including interviewing, observation, and document analysis, are used in studies to answer the research questions. Some studies favor interviews over observations, while others do the opposite. Studies that combine qualitative and quantitative data can more effectively answer research questions (Teddlie and Tashakkori (2011). According to Taskakkori and Teddlie (1998) and Kaushik and Walsh, (2019) the majority of researchers who are committed to conducting an in-depth study of a research problem place less importance on the method than they do on the research question itself. Additionally, the underlying worldview barely makes an appearance at all, if at all (in the most abstract sense). To put it another way, Maxcy (2003) says that methodologists have begun to use pragmatism as a justification for their move toward method acceptability. The study used a case study and mixed research methods using analytical and methodological tools aligned with critical realism, which increased the reliability and quality of the investigation.

The researchers utilized various methodological approaches, including surveys, interviews, checklists and guided observation, and document analysis, ensuring a comprehensive investigation of the subject matter. As a result, the research's verification dictates the validity of its methodology (Scoones, 2011). According to Sterns et al. (1998), an exemplary case study presents compelling evidence in a judicious and effective manner, allowing readers to make independent judgments about the analysis. However, it's important to note that this approach should be approached with caution as it may not be generalizable to other situations, both

positive and negative (Hall and Scoones, 2011). Field-based studies provide insight into the micro-level mechanisms affecting LSLA results (Hall and Scoones, 2014; Van Assche and Zoomers, 2022). The variability of LSLA affects needs to be taken into account (Suhardiman, 2015). Comprehending the socio-ecological system is critical for comprehending SEE consequences (Visser et al., 2012).The outcomes of LSLAs are influenced, according to (McKeon, 2015) by micro developments at local levels and their interactions with larger dynamics. Even though micro-level studies of LSLA may be useful for providing meta-analyses with data that is more accurate and reliable, they are still incomplete. In addition, this research has provided support for documents regarding Ethiopia's motive for LSAI, FDI in large-scale agriculture, and public-private partnerships for the growth of agribusiness. Considering the importance to consider these diverse perspectives when evaluating the impacts and ethical implications of LSLA, this study critically examined the impacts of LSAI on dispossession the livelihoods of locals, food security, and the natural environment.

1.6. Analytical and Theory Framework

In broad terms, this research used a political ecology approach, which offers a useful theoretical framework and methodology for performing analyses of large-scale land acquisitions (Borras et al. 2012; Fairhead et al., 2012; Hall et al., 2015). It also seeks to comprehend how political and economic processes, environmental changes, and social inequalities are related (Robbins, 2012). The approach also helps in the understanding and examineing LSAI from an interdisciplinary, and the social and power ties that influence land governance, as well as the effects of land agreements on local residents, the environment, nature and more general patterns of socioeconomic growth in the context of large-scale land transactions. As a result, political decisions made by governments and other political actors frequently influence large-scale land transactions (Yang, 2021). These transactions may be motivated by economic considerations, such as the need to attract foreign investment or increase land revenues, but ultimately form them by political actors and institutions. However, because marginalized communities and other groups may fight back against social injustices, the political consequences of large-scale land transactions may be inferred from their economic effects (Borras et al., 2012). Political ecology may assist in determining the beneficiaries and losers of land deals as well as the root causes of the underlying inequalities by investigating the dynamics of power. Furthermore, political

ecology emphasizes the importance of analyzing the broader political and economic context of land negotiations (McCarthy et al., 2011). These include the role of global markets and institutions in shaping land use and governance and the historical and cultural factors influencing land ownership and property rights (Fairhead et al., 2012). In this way, political ecology uncovers the causes of large-scale land deals and their impact on land use, livelihoods, and the environment. It should also be noted that political ecology highlights the social and environmental impacts of large-scale land negotiations, particularly in marginalized communities (Borras et al., 2012; Hall et al., 2015). Additionally, Fairhead (2012) has argued that political ecology provides an important perspective for assessing the social and environmental feasibility of large-scale land transfers and identifying the most effective approaches to creating more equitable and sustainable land management. Besides, the study in large-scale land transactions required a more specific theoretical approach and concept for specific issues, to address specific objectives and research questions, and used multiple theoretical perspectives as a resale, but because one theory could not adequately solve complex and comprehensive LSAI problems, the study used various analytical foundations. In actuality, this dissertation examined the broader investment policy that encourages FDI in large-scale agriculture and public-private partnerships (PPP), as well as related economic policy and theory, and connections of these theories with the rural people and natural environment that they are those most affected by land deals (Lunstrum, 2016). To answer each question mentioned in section 1.4 more thoroughly. The Sustainable Livelihood Framework (SLF), different food security theories that define food security in four ways (availability, access, utilization, and stability), and the Driver-Pressure-State-Impact-Response Framework (DPSIR) were used as lenses and guidelines to assess the empirical findings in the current dissertation.

1.6.1 Participation of Stakeholders

Using Sherry R. Arnstein's Ladder of Citizen Participation as a theoretical framework, this study effectively measured the level of local community engagement in decision-making processes affecting large-scale agricultural investments. This method substantially aided in the study and evaluation of the extent to which local people were involved (i.e. for part of research question 1). While it was developed to analyses citizen participation which is technically speaking not the case in the investment projects I examined in Shashamana rural district, I argue it may

nonetheless be applied to local community and to the case studies I investigated. Moreover, this framework can help to identify power imbalances, facilitate the evaluation of local involvement, enhance accountability and transparency, ultimately leading to improved decision-making and building trust between citizens and decision-makers. Although, this theoretical framework that describes several levels of engagement in decision-making; the levels of the ladder indicate the rising level of power and influence people have, from complete non-participation towards full control (Arnstein, 1969; Choguill, 1996; Nolte, 2014). Citizens who do not participate have no say or influence in decision-making processes and their needs and interests cannot be taken into account. On the other hand, citizen control means that citizens have the greatest power and influence in decision-making processes, and that their demands and interests take precedence. This might result in more democratic, egalitarian, and fruitful outcomes (Choguill, 1996). Due to its ability to thoroughly integrate essential elements of involvement, such as policies resulting in sizable land deals, Arnstein's Ladder of Citizen involvement has been used as the study's analytical framework. This theoretical framework offers a wealth of advantages for examining citizen engagement in decision-making processes by giving a thorough grasp of these components. Particularly, the Sherry R. Arnstein's Ladder of Citizen Participation as theoretical framework was pertinent for research questions focusing on the case studies (research questions 1) and for the related publications (Research Papers I), that Paper I, which highlights local people's engagement on the land deals process.

1.6.2. Sustainable Livelihoods Framework (SLF)

The Sustainable Livelihoods Framework (SLF) is a comprehensive analytical framework and theory widely recognized for its applicability in addressing poverty, food insecurity and supporting sustainable development in diverse contexts (DFID, 1999; Scoones, 2015; Hossain et al., 2021). The Sustainable Livelihoods Approach (SLA) was initially developed by Chambers and Conway in 1992 and later improved by the UK Department for International Development (DfID). SLF emphasizes the value of considering livelihoods as dynamic and complex systems that require careful consideration of the institutional, social, economic and environmental factors affecting people's ability to support themselves (Serrat, 2017). Carney et al. (1998) entail livelihood as "a way of life involving the accumulation of abilities, possessions, and interests required to support a particular lifestyle." It places individuals and families at the center of their

own means of subsistence, stressing their active participation in poverty reduction programs. They oppose the main views of dependency, neo-Marxism and modernization theories (Ellis, 1999). The SLF also backs sustainable development strategies that emphasize a long-term, holistic viewpoint (Solesbury, 2005). The framework for sustainable livelihoods consists of five connected elements: capital assets, the current environment, mediating processes, activities, and strategy. Five categories of capital can be used to categorize livelihood assets: The five sorts of capital incorporate natural capital (such as land and water), social capital (which envelops systems, bunch participations, trust-based connections, and get to societal education), human capital (counting aptitudes, information, great wellbeing, and work capacity), physical capital (enveloping generation gear, transportation, protect, water supply, vitality, and communication), and monetary capital (comprising reserve funds, credit sources, and normal settlements or benefits) (Degefa, 2005; Little, 2007). Food security refers to the availability of sufficient quantities of wholesome foods for everyone to eat in order to maintain an active and healthy lifestyle (FAO, 2001). It has four components: food availability, access, utilization, and stability, which are all critical elements in assessing food security (FAO, 2006). The Food Availability Decline Approach and Food Entitlement Decline are related to food availability and access, respectively, and can assist in identifying the precise factors influencing food security (Le Moul and Forslund 2017). The Pressure and Release Model can also help in figuring out what causes food insecurity in the first place. This theory contends that underlying social, economic, and environmental factors are what lead to vulnerabilities to catastrophes and other shocks. Genially, livelihood, and food security/insecurity issues are interconnected and can have a mutually beneficial relationship. The unfavorable livelihood outcomes of SLF (Sustainable Livelihood Framework) include persistent food insecurity and impoverishment. The application of SLF to land agreements has huge benefits that can support the sustainable development of affected rural communities (Bekele et al., 2021). One of the advantage is SLF enables a comprehensive analysis of the impacts of land transactions on the means of subsistence by taking into account the economic, social, environmental land institutional factors that affect the ability of people to survive (Hossain et al. 2021). In order to recognize and handle the benefits and problems of land trade, a complete knowledge of the possible influence of land trade on all aspects of livelihood is required (Fiala, 2018; Hossain et al., 2021; Tienhaara, 2021). Hence, land transactions have a significant and lasting impact on local communities and the SLF provides a framework for

understanding these impacts and ensuring that they are managed in a sustainable way over time (Hossain et al., 2021). The objective is to maximize the beneficial benefits of land transactions while limiting their negative consequences (Scoones, 2015; Cotula, 2018). To do this, one must take into account economic considerations in addition to social, environmental, and institutional issues. By using this framework, analysts can identify the different factors that contribute to impoverish and food insecurity and how they are affected by land deals (Wisner et al.,2004; FAO, 2006). In addition, the establishment of SLF can lead to more effective and sustainable outcomes (Scoones, 2015; Heeks, 2019; Vermeulen et al., 2019; Brimblecombe et al. 2020; Hossainand et al.,2020; Liuand et al. 2020; Pironand et al.,2021), so that most of the research questions for the case study (especially research questions 2-3) were assisted by the SLF.

1.6.3. Driver-Pressure-State-Impact-Response Framework (DPSIR)

Driver-Pressure-State-Impact-Response Framework (DPSIR) is a well-known theoretical and analytical framework that has been applied to many environmental issues, including Agricultural intensification (Eurostat, 2013; Akrivos et al., 2018; De Stefano et al., 2019). Jha and Setty (2018) explain that DPSIR offers a comprehensive and organized methodology for understanding driver, pressure, and state, impact, and response relationships. With this strategy, stakeholders can develop powerful plans for fixing environmental problems. Many studies have emphasized the advantages of employing DPSIR for significant agricultural. In the first place, it assists in the identification of fundamental causes of environmental challenges, allowing for more focused and efficient responses (EC, 2003; De Stefano et al., 2019). For instance, the DPSIR framework was applied to a study conducted in Southern Italy to identify the factors driving ecological change, such as urbanization and agricultural intensification, and their effects on soil degradation, biodiversity loss, and water pollution (De Stefano et al. 2019). Second, because the DPSIR framework is flexible and adaptable, it may be tailored to the particular scenario and analytical objectives (EEA, 2010; Eurostat, 2013). Because they are more adaptive, stakeholders are better suited to tackle the unique possibilities and challenges that come with large-scale land transactions, such as combining environmental preservation with economic development (Akrivos et al., 2018). In addition, DPSIR encourages a systemic perspective and incorporates a range of stakeholders, enabling a more thorough and integrated approach to environmental challenges (Jha and Setty, 2018; De Stefano et al., 2019). Consequently, the entire

research question 4 (publication 4) of this dissertation was framed by the Driver-Pressure-State-Impact-Response Framework (DPSIR).

1.7 Methodology and Study Area Setting

1.7.1. Research Area and Development of Elfora Agro-Industries Shalo-Melge Farm

Evidence from 1,096 deals signed foreign land transactions in the Land Matrix database shows that six farms have been leased or transferred to Mohammad International Development Research Organization Company (MIDROC[11]), a company owned by Mohammad Hussein al Amoudi, a Saudi citizen who was born in Ethiopia but later became a Saudi investor in Ethiopia (Land Matrix, 2020). With $8.1 billion in wealth, MIDROC and other companies have invested in agriculture in Ethiopia. To meet Saudi Arabia's demand for national staple crops, MIDROC rents more than a million acres in Ethiopia (Yeboua, and Cilliers, 2021). These LSAI farms produce rice, vegetables, and other exportable goods (Rice, 2009). MIDROC's Agricultural and Agro-processing Cluster has 12 agro-processing companies. One of these businesses is Elfora Agro-Industries' Shalo-Melge farm[12], which spans 10,000 hectares and produces high-value cash crops using drip irrigation. Elfora plans to cultivate vegetables and meat products for domestic and international markets and intends to expand by upgrading and expanding feedlots, ranches, and quarantines. However, there are concerns about the effects of Elfora's investments on local people's livelihood, and violence broke out in April 2012 due to these worries. The farm is located in the Oromia Region's Shashemene Rural District, which is primarily home to small-scale farmers who rely on household farming as their main source of income. Local farmers engage in mixed farming. Previously, the area was utilized for common activities including farming and grazing. However, access to the Tikur Wuha River, which was formerly utilized for

[11] Founded in 1994, MIDROC Ethiopia Investment Group is a significant player in the Ethiopian economy, along with its affiliate companies and technology group companies. According to estimates from 2013 (Negash, 2013; Sutton & Kellow, 2010), the total value of investments made by all MIDROC enterprises was between $1 and $4 billion, or 2 and 11% of Ethiopia's GDP for that year.

[12] Elfora Agro-Industries' Shalo-Melge farm has been a significant source of employment for the local community, providing over a hundred jobs primarily for administrative employees such as the farm manager, as well as temporary and seasonal positions. In addition to creating employment opportunities, Elfora Agro-Industries has also contributed to the development of the local community by constructing the Elfora Agro-primary School and supplying animal feed. Such investments align with the government's vision of promoting local investment in commercial farming, which is expected to create jobs and promote economic growth. The wage system at the Shalo-Melega farm is based on a price rate.

irrigation, has been curtailed as a result of the project. The adjacent Shale area acts as a comparable control group in terms of environment, agricultural, and way of life.

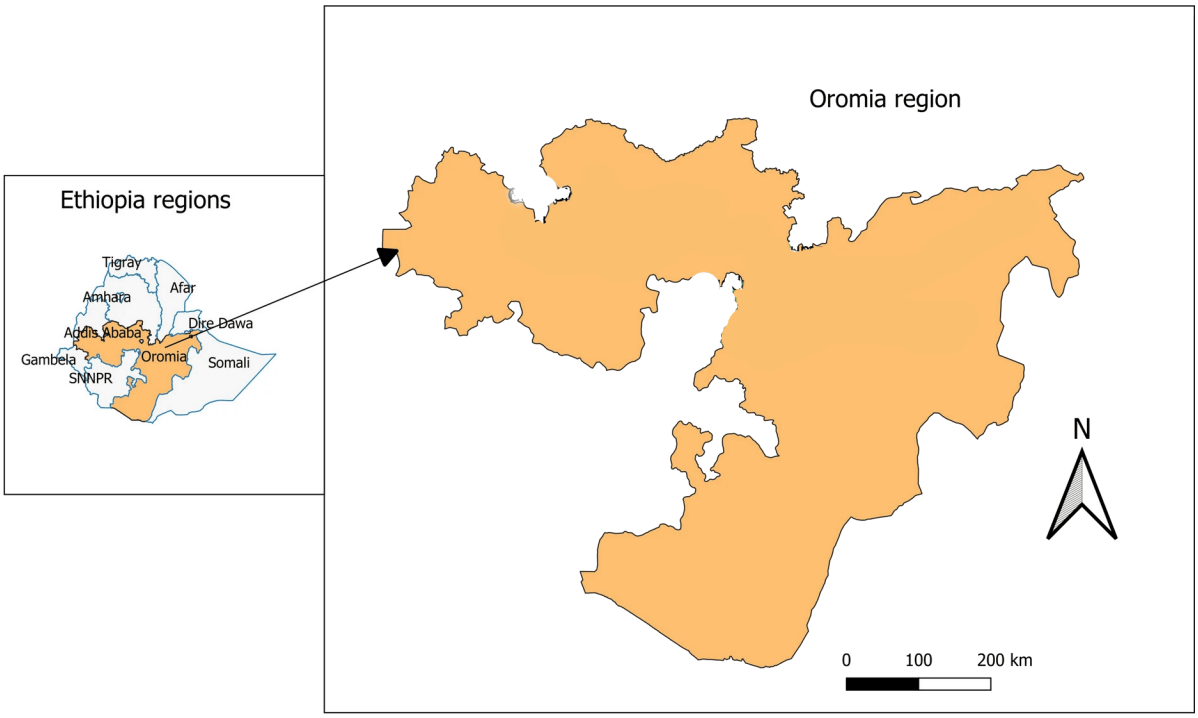

Figure 1.2. Map of the study region: Oromia Regional State.

1.7.2 Research Design

The case study research method, which entails conducting an extensive examination of a specific phenomenon or event within its natural setting, was generally used in this study's research. This approach is very adaptable and can be customized to the specific research question and the available data, enabling researchers to use a variety of data collection techniques. Through this approach, the researchers can generate novel insights and add to the body of knowledge about the subject. Paper I followed an exploratory and descriptive design, while papers II, III, and IV adopted an explanation-oriented design.

1.7.3 Research Approach

This study employed mixed-methods research, which combines the gathering and analysis of both quantitative and qualitative data, to successfully answer the research topic and generate reliable outcomes. Further, within each chapter, the specific study approach is presented in detail. This section provides a brief explanation of the research approach and method followed, hence "method as a theoretical bridge connecting the research problems with the research

techniques" (Hesse-Biber 2010:11). Further, mixed-method techniques are employed in order to let several viewpoints shed light on an issue (Creswell, 2003; Olsen, 2004). These strategies augment empirical data with definitions, explanations, and examples and supplement it with quantitative data from mixed-and cross-sectional survey research designs (Onwuegbuzie, 2004; Hahn et al., 2021). Due to the complexity of the issue at hand, relying solely on quantitative or qualitative methods may not be adequate for accurately measuring and interpreting it. Therefore, this study employed a mixed approach to offer a more comprehensive and structured understanding of the complex events. This calls for the analysis of consultation and FPIC, livelihood, food security, and environment using mixed methods research that helps to integrate insight and procedures for both qualitative and quantitative methods and draw on the comparative advantage of these methods (Bennett, 2004). We collected data from primary and secondary sources, using various methods such as surveys, interviews, FDG, observation and related literature reviews. Hence, the study used mixed methods research to achieve all four objectives. Moreover, we applied the typology of mixed methods by Leeche and Onwuegbuzie (2009) to select the research areas and determine the research design. More specifically, to attain objective one (Chapter 2 of the study), exploratory and descriptive approach was adopted. Whereas to achieve objectives 3, 4, and 5 (Chapters 3, 4, and 5), a quasi-experimental (semi-experimental) design with explanatory design approach based cross-sectional survey research design was implemented (Campbell, and Cook 1979; Hahn, 2021). Due to the impossibility or inappropriateness nature of performing a true experiment, the study employed quasi-experimental designs. In the social sciences, for example, researchers have to employed quasi-experimental methods to explore how interventions or policy changes affect real-world populations (Hahn, et.al., 2021). In addition, for objective one (Chapter 2 of the study), we employed an embedded Exploratory and descriptive design Qual-quan, in which qualitative dominated. While for Objective 2, 3, 4, (Chapters 3, 4, and 5) Explanatory design (mixed data source) Quan-Qual (quantitative and-qualitative) quantitative and qualitative components to complement and support one another. Therefore, it was important to triangulate the findings and increase the overall validity and reliability of the results by looking at the study topic from multiple angles. Quan-Qual designs provide a more thorough understanding of the research topic than would be possible with only one type of data, as well as answering equally critical research questions (Hahn, 2021). By combining quantitative and qualitative data, researchers can gain a

deeper understanding of complex phenomena and explore the relationships between different variables in greater detail (Bennett, 2004). As was already mentioned, Ethiopia is endowed with a wide variety of agro-ecologies and socioeconomic conditions that support agricultural production and productivity in different ways. The tremendous diversity of natural occurrences across relatively small distances allows for the cultivation of a variety of different crops. Before, the country focused on smallholder agricultural growth; but, since 2008, the government has actively promoted large-scale land investments to optimize agricultural production, increase food security, and reduce rural poverty (Rahmato 2011; Lavers 2012). As a result, Ethiopia, namely the Oromia regional State Shashamane rural district, is a popular investment destination. Elfora Agro-Industries PLC's LSAI farm is one of the large farms that recently began operating and is relevant to this study.

1.7.3.1. Sampling Techniques and Sample Size

The optimal research sample size depends on the research approach, level of precision, population variability and statistical analysis method used (Vasileiou et al., 2018). It is more acceptable to rely on primary and relative data from a bigger sample size to develop and obtain more accurate and reliable results (Kotrlik, and Higgins, 2001). In light of this, the study employed stepwise, multi-stage sampling techniques and statistical sample size formulas. In the first stage, the West Arsi Zone LSAI was divided into operational and non-operational categories, and subsequently into the other two categories (i.e stratum one $\geq 2{,}000$ hectare, and stratum two $\leq 2{,}000$ hectare). Accordingly, Shashamane Rural District and Elfora-Agro-industrial P.L.C. of Shalo-Melega Farm and Jittu Horticultural P.L.C. (Tikur woha Farm), meet stratification standards, whereas other districts in West Arsi Zone and private (domestic or overseas) or public are not selected since they do not meet stratification standards. As a final step, households[13] from chosen districts and Elfora Agro-Industries Private Limited Company (P.L.C) were selected through systematic random sampling and a lottery method respectively. The first objective (paper I) involved 134 households chosen using a simple random sampling technique in three treatment *kebeles*, or Shashamane district; as a result, neither the comparison group households or *kebele* from Shala district were not involved. The precise sample size was

[13] In this study households used as a unit of analysis, and refers to comprising the household head, spouse(s), children and other members who depends on the household livelihood which is mixed farming

calculated using the formulas of Cochran and Banner (1977) and Robert (1986) (more detail is found in chapter two). Objectives two, three, and four (Papers II, III, and VI) were achieved by selecting 300 samples through simple random sampling. Among them, 134 households were from the LSAI area as the treatment group Shashamane district), and 166 households were from non-LSAI areas as the comparison group (counterfactual or shala districts). Cochran's approach (1977) was used to ensure a representative sample. Using the Proportional to Size (PPS) formula 300 samples were proportionally distributed among the six *kebele* (For more details about the sampling producer of Paper II, II, and IV) of the thesis, see Appendix B, Table B3).

1.7.3.2. Data Source

Four datasets—FPIC and dispossession livelihood, food security, and environment—were investigated for the study. Cross-sectional household surveys with structured questions were used to gather the data. In addition to the surveys, 28 in-depth interviews with key informants (government officials, community leaders, and investors), 35 interviews (local community) , six focus group discussions (FGDs) (composed of 6 to 10 persons, 1 per *kebela*) guided by a 32-item checklist COREQ (Consolidated standards for Reporting Qualitative research), and observation were conducted. Focus Group Discussions (FDGs) were therefore held for a number of purposes. First, they allowed us to evaluate community views on large-scale agricultural investments, including rights to consultation, social dynamics, and the environment. Secondly, they helped us develop several recommendations, particularly for Paper I and IV. Third, any conflicts between investors and the community were also noted by the FDGs, along with preventative and remedial measures. Ultimately, FDGs were also used to track the execution of investments and assess their fit with community needs. All things considered, these six FDGs provided a clear picture of the state of affairs.

To determine the questionnaire's effectiveness and make any required adjustments, 25 individuals took part in a pilot test (Ackerman and Lohnes, 1981; Brink and Wood, 1983; Burns and Grove, 1987; Lieswiadomy, 1987; Polit and Hungler, 1987). In order to detect design faults, improve data collecting and analysis strategies, enlighten the research team, examine the recruitment procedures, and acquire vital data on participant, pilot studies are carried out (Doody and Doody, 2015). They also serve to evaluate procedures, methodologies, questionnaires, and interviews. Additionally, pilot studies are suggested in the literature as a way to lessen potential

risks connected to research design, sample size, sample selection, data collection, management, and analysis (Moore et al., 2011; Moore, Prescott, and Soeken, 1989; Lieswiadomy, 1987). Further, the questionnaire underwent face validity and reliability evaluation, and Cronbach's alpha (= 0.79) revealed a trustworthy coefficient range. The Bureau of Investment and Industry of the Oromia Region, the West Arsi zone, and the Shashemene district Investment and Industry Office were just a few of the organizations that were contacted. The Federal Ministry for Economic Cooperation and Development (BMZ), as well as Civil Society groups working in the research region, provided papers that were assessed together with other pertinent secondary data and information.

1.7.4 Data Analysis and Techniques

Key variables were selected, and descriptive statistics was employed to examine the data gathered in order to answer the first study question. To assure result validity and gain a better knowledge of the research phenomena, triangulation was used. Both primary and secondary data were used to achieve a comprehensive understanding and obtain meaningful results. The livelihood capital in DFID, PCA, and PSM approaches were employed to assess research question two. The third question focused on food security and employed several indicators, as well as the PCA and PPP statistical techniques. The fourth question concerned the environmental impact of large agricultural investments using the Environmental Vulnerability Index (EVI), variable sub-indices, PCA and PSM methods. The data underwent analysis using three widely used software packages in social sciences, namely Microsoft Excel 2016, Stata Version 13 and the Statistical Package for Social Scientists (SPSS) 24 for Windows. T-tests were utilized for continuous variables to determine significant differences between groups, while $\chi 2$ tests were employed for discrete variables to test the independence of two categorical variables. T-tests are employed for comparing the means of two groups, while $\chi 2$ tests provide insights into any significant differences between the groups being studied. These tests enabled us to examine the data thoroughly and gain valuable insights into the differences between the groups under study. The next section discusses the steps used by the PSM model to compare the treatment and control groups.

1.7.4.1 Propensity Score Matching (PSM): Estimate the Causal Effect of a Treatment

The Propensity Score Matching Model (PSM), which establishes similar features between the treatment and comparison groups, lessens selection bias (Austin, 2011). In order to improve treatment effect estimates, PSM calculates treatment assignment probabilities and pairs subjects with comparable propensity scores. It offers trustworthy impact evaluations for policy evaluation (Smith, 2000), doesn't demand baseline data, doesn't prioritize shared advocacy, and doesn't rely on formal functional assumptions (Sjölander and Rubin, 2019). According to Rosenbaum and Rubin (1983), the PSM provides for causal explanations and assesses effects in quasi-experimental designs, making it a good choice for contrasting program participants and non-participants in a real-world experiment (Figure 1.3).

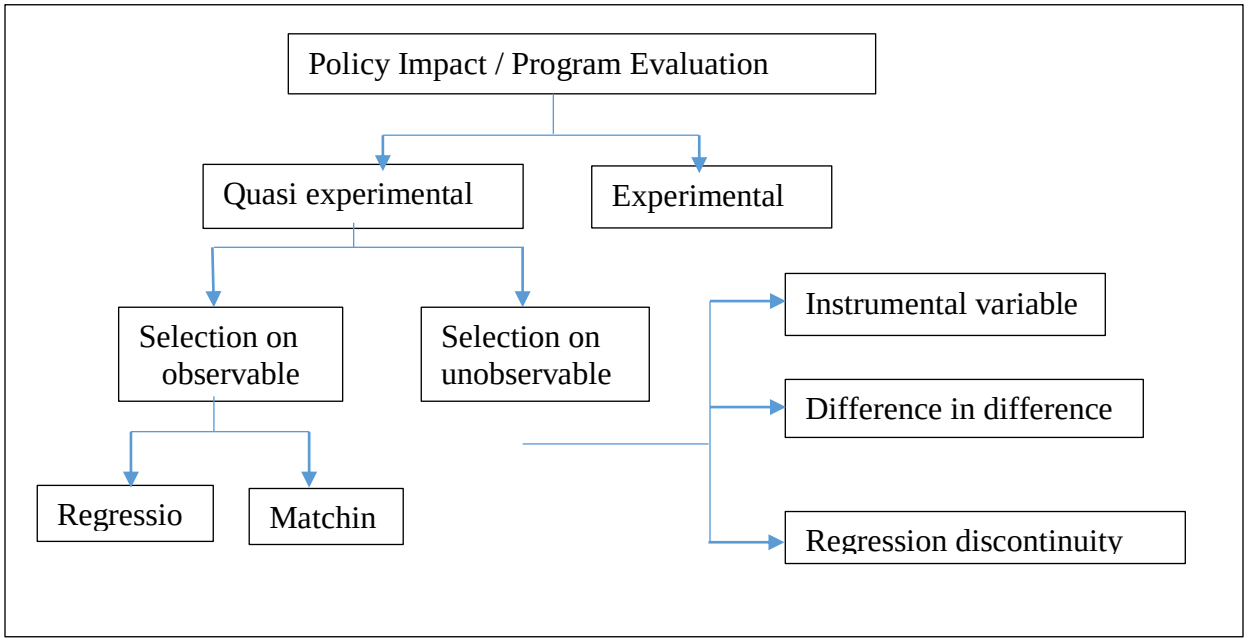

Figure 1.3. Application of PSM in the quasi-experimental design or "natural experiments"

Data gathering, propensity score estimate, matching algorithm selection, common support condit ion verification, and matching quality evaluation are the five PSM processes proposed by Calien do and Kopeinig (2005) (Figure 1.4).

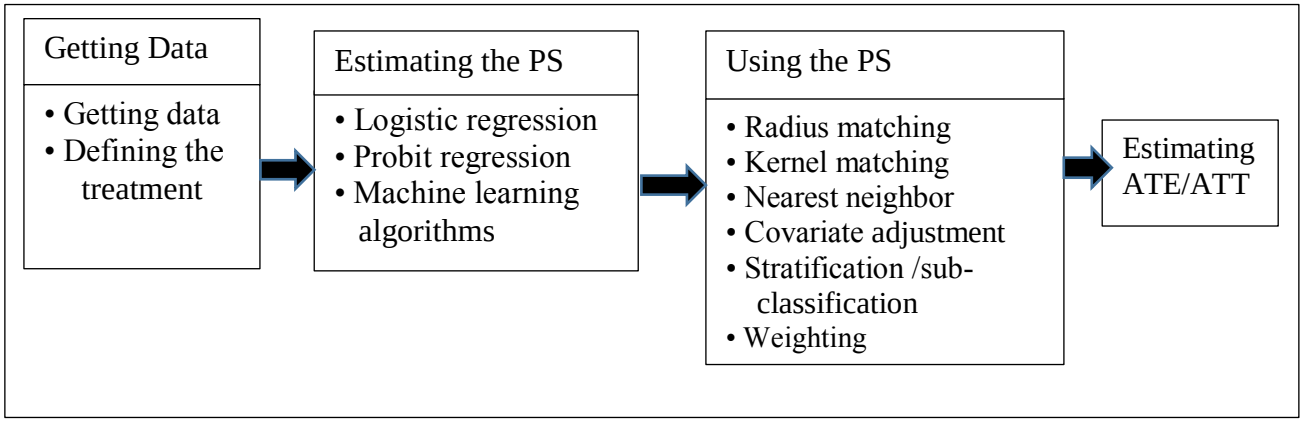

Figure 1.4. Propensity Score Matching (PSM) Model steps.

A) Getting data and defining the treatment: A summary of data about those who were treated as well as those not treated, together with factors related to treatment participation and outcomes, is shown in Table 1.1.

Table 1.1. Summary of study region, investment location and both treated and untreated groups, along with the relevant characteristics pertaining to treatment participation and outcomes (Chapters 3, 4, and 5).

	Livelihood	Food Security	Local Environment
Region	Region of Oromia	Region of Oromia	Region of Oromia
Area of study	Shashamane Rural (intervention and ShalA District	Shashamane (intervention) and Shala Rural District	Shashamane (intervention) Shala Rural District
Total number of LSAI in the District	Jittu Horticlurle P.L.C (Tikur woha Farm) And Shalo-Melega Farm's Elfora-Agro-industrial P.L.C.	Jittu Horticlurle P.L.C (Tikur woha Farm) And Shalo-Melega Farm's Elfora-Agro-industrial P.L.C.	Jittu Horticlurle P.L.C (Tikur woha Farm) And Shalo-Melega Farm's Elfora-Agro-industrial P.L.C.
Sample size	300	300	300
Individual characteristics	Respondents' gender (dummy) Respondents' average age (continuous) Level of education (Ordered) Family size as a whole (continuous) Ratio of Dependence (Continuous) Size of Farmland (Continuous) Amount of livestock (Continuous) Aid perception (dummy) Distance to the nearest source of drinkable water (Continued) All-weather road accessibility (Dummy) Locating the closest medical facility (Dummy)	Respondents' gender (dummy) Respondents' average age (continuous) Level of education (Ordered) Family size as a whole (continuous) Ratio of Dependence (Continuous) Size of Farmland (Continuous) Amount of livestock (Continuous) Aid perception (dummy) Distance to the nearest source of drinkable water (Continued) All-weather road accessibility (Dummy) Locating the closest medical facility (Dummy)	Respondents' gender (dummy) Respondents' average age (continuous) Level of education (Ordered) Family size as a whole (continuous) Ratio of Dependence (Continuous) Size of Farmland (Continuous) Amount of livestock (Continuous) Aid perception (dummy) Distance to the nearest source of drinkable water (Continued) All-weather road

	The presence of the closest market (Dummy) Agriculture technology education (dummy)	The presence of the closest market (Dummy) Agriculture technology education (dummy)	accessibility (Dummy) Locating the closest medical facility (Dummy) The presence of the closest market (Dummy) Agriculture technology education (dummy)
Dependent variables	LSAI	LSAI	LSAI
Independent variables	See Table 1.2	See Table 1.2	See Table 1.2
Outcome variable	Improved livelihood capital/assate	Food security/insecurity	ERI IRI EDI

B) The propensity score estimation:

The first step in the PSM method is estimating propensity scores (Caliendo and Kopeinig, 2008). P(X) represents the probability of local community within LSAI, conditional on X. If outcomes without the intervention are independent of participation given X, they are also independent of participation given P(X) (Caliendo and Kopeinig, 2008). Matching can be performed by conditioning on P(X) alone, reducing a multidimensional matching problem to one-dimensional (Caliendo and Kopeinig, 2008). Propensity scores were estimated using a composite of pre-intervention characteristics of sampled households (Rosenbaum and Rubin, 1983). The logit model estimated the probability of the local community with LSAI as the dependent variable (Rosenbaum and Rubin, 1983).

$P_i = \left(Yi = \frac{1}{X}\right) = 1/(1 + e^{\beta o + \beta 1 + xi})$ this equation can be written as: $P_i = 1/1 + e^{-Zi}$ (1)

Where P_i is the probability of with LSAI and represents the base of the natural logarithm (2.718) and Z_i is the function of explanatory variables (x)

$P_i = 1/(1 + e^{Zi})$ is the probability of without LSAI (2)

Then, the odds ratio in favor of using LSAI is given by P_i /1- P_i By taking the natural log of the equation we get the following

$L_i = \ln[P_i/1 - P_i] = Z$ With the error term incorporated, the logit model has the following form: = z

$= \beta 0 + \beta 1\, X1 + \beta 2X2 + \beta 3X3 \ldots\ldots\ldots \beta nXn + U$

Where x1, x2, x3 + ….x are the explanatory variables of the model, ß0 is the intercept ß2 ß3…… ßn1, ß are the coefficients to be estimated in the model and U is the error term

C) Choosing a matching algorithm/ matching estimators:

Depending on the propensity score, several matching criteria may be employed to divide participants into nonparticipants, such as nearest neighbor matching, caliper and radius matching, stratification and interval matching, and kernel and local linear matching (Caliendo & Kopeinig, 2008). Matching balance, pseudo-R2 value, and sample size were considered while choosing a matching estimator, according to Dehejia and Wahba's (2002) criteria. With 232 matched samples, a pseudo-R2 of 0.176, and good results in balancing tests, the selected matching estimator was chosen (see detail in Appendix B, Table B8.)

D) Examining a typical support condition: Observations outside of the common support zone, as described by Caliendo and Kopeinig (2005), are not included in the study to guarantee comparability. The households' propensity ratings for the treatment group are included in this region. The average treatment effects (ATT) parameter cannot be estimated if there is no overlap between the treatment and control groups. By quantifying the separation between the marginal distributions of the X variables, the standardized bias (SB), first developed by Rosenbaum and Rubin (1985), is used to evaluate the accuracy of matching. Between the treatment and control groups, the bias is measured. For each variable and propensity score, the standardized bias is determined both before and after matching:

$$SB(X) = 100 * \frac{X_1 - X_0}{0.5\sqrt{((V_1(X) + V_0(X))}} \quad (3)$$

Where and are the sample means for the treatment and control groups, V1 and

V2 (x) are the corresponding variances

The bias reduction (BR) also can be computed as:

$$BR = 100\left(1 - \frac{B(X)after}{B(X)before}\right) \quad (4)$$

E) Treatment effect on the treated: To estimate the effect of LSAI to a given outcome (Y) is specified as:

$$tATT = Yi\ (Di = 1) - (D = 0) \quad (5)$$

i.e t*ii* is the treatment effect (the result of the LSAI intervention), and Yi is the result for the household and environmental variables. If a home and environment have LSAI, then i, D indicates whether or not that variable has received therapy. According to Caliendo and Kopeinig (2005), the first one is the Average Treatment Effect (ATE), which is merely the difference between the predicted results:

$\Delta Y\,ATE = E(\Delta Y) = E(Y1) - E(Y0i)$ (6)

The evaluation of the outcome of treating homes and the environment at random. However, because this assessment takes into account unintended consequences, policymakers might not find it useful. The Average Treatment Effect on the Treated (ATT) is a critical evaluative criterion. It only focuses on the outcomes that individuals who received the program or intervention saw. It establishes the effectiveness of the LSAI intervention by evaluating families with LSAI. This is how the ATT is determined:

$tATT = E(t/D = 1) = E(Y1/D = 1) - E(Y/D = 1)$ (7)

The distinction between the results of treatment (E(Y1/D=1)) and untreated (E(Y0/D=1)) groups is not easily evident. The counterfactual mean for treated people (E(Y0/D=1)) is replaced with the mean result of comparison individuals and the local environment (E(Y0/D=0)) in order to solve this problem while taking selection effects into consideration. Thus obtain the definition for Average Treatment Effect on the Treated (ATT) by rearranging the equation and removing E(Y00/D=0) from both sides. Utilizing the Conditional Independence Assumption (CIA) and the common support or overlap requirement, PSM approach is used.

A) Conditional Independence Assumption (CIA): CIA is given as: $y_o \perp D/x$.

Where - is indicates independence, X is observable characteristics and is non-user.

B) Common support: This assumption rules out the perfect predictability of D given X. That is: $0 < P(D = 1| X) < 1$. This assumption ensures that the same X values have positive probabilities of being both participants and non-participants. Given the above two assumptions, the PSM estimators of ATT can be written as:

$$tATT = E(Y1 - Y0/D = 0, P(X)) = E(Y1/D = 1, P(X)) - E(Y0/D = 0, P(X)) \quad (9)$$

A large quantity of literature was discussed in order to produce explanatory components for the data analysis (see Table 1.2).

Table 1.2. Descriptions of the variables, the measurement's unit, and expected signs.

Name of variable	Type of Variable type	Measurement Scale	Assumed sign
Respondents' sex	Dummy	1, if male, 0 if female	+
Respondents' age	Continuous	Years	+
Education Level	Ordered	Grade level in formal schooling	+
Number of families Reliance ratio	Continuous	Number	+
Opinion of help	Continuous	Number	-

Farm Land size	Continuous	Hectare	+
Livestock numbers	Continuous	TLU[14]	+
Distance to places with potable water	Dummy	1, if take aid, 0 if not	-
Access to all-weather roads	Continuous	Walking distance in minutes from home	+
Location of the closest medical facility	Dummy	1, if Yes, 0 if Otherwise	+
The location of the closest market	Dummy	1, if Yes, 0 if Otherwise	+
Agriculture technology education	Dummy	1, if Yes, 0 if Otherwise	+
Credit access	Dummy	1, if Yes, 0 if Otherwise	+

1.8. Scope, Limitation and Significance of the Study

The type of investment described in this thesis is an investment in large-scale agricultural farming, which is transferred from the government to domestic and foreign investors to improve local people's livelihoods and food security, boost food production and enhance the efficiency of the agricultural sector in Ethiopia in general, and in Shashamane rural in District, Oromia Regional State in particular. This kind of investment can take many different forms, such as the purchase of farmland, the installation of irrigation systems, the adoption of contemporary agricultural methods, and the creation of new technology for the industry. This research also looked at the advantages of promoting LSAI and presented those justifications. But this study does not address other investments. The thesis also focuses entirely on LSAI and the involvement of locals in the transaction, the usage of FIPC, dispossession and its implications on locals' livelihoods, food security, and the local natural environment. The following methodological, spatial, and temporal details are provided:

1.8.1. Methodological Scope

To assess the impact of an LSAI, this study used quasi-experimental techniques such as regression and propensity score matching (PSM). Despite the fact that randomized control trials are regarded as important for evaluating impact, this study concentrated on quasi-experimental designs because of methodological limitations. Limitations including model misspecification and sample size requirements were addressed using PSM along with sensitivity testing and

[14].Using the Tropical livestock unit (TLU) conversion factor developed by Jahnke and Jahnke in 1982, measurements of cattle in Ethiopia were standardized. Following is how TLU is calculated: 1* the number of cows, 1* the number of oxen, 1* the number of heifers, 0.75* the number of bulls, 0.70* the number of donkeys, 1* the number of calves, 0.13* the number of sheep, 0.13* the number of goats, and 0.01* the number of chickens, excluding other animals (such as camels) that are absent from the study area.

imputation techniques. The majority of the work that is currently available on the effects of LSAI uses qualitative or descriptive quantitative methodologies, meta-analyses, or macroeconomic data. Researchers like (Alamirew et al., 2015; Jiao et al., 2015; Shete and Rutten, 2015; Herrmann, 2017; Fitawek et al., 2020; Guyalo et al., 2021 and Bekele et al.,2021) have carried out a small number of high-standard impact evaluations and case studies. To examine the effects of LSAI on eviction, local livelihoods, food security, and the environment, this study fills a gap by using a comprehensive methodology using recognized indicators. Despite its limitations, it offers insightful data through a complete composite indicator system, helping to determine how effectively an intervention works to enhance community well-being.

1.8.2. Spatial Scope

The Shalo-Melge Farm is a prominent large-scale agricultural venture that has been in operation since 2008 and is located in the Shashemen Adjacent District of the Oromia Regional State. This farm, which covers a sizable area of 10,000 hectares, is recognized under Ethiopian Investment Proclamation No. 37/1996 and has the Project ID 1241 from Land Matrix. Its agricultural operations include the production of several crops, including soya beans, white beans, haricot bean varieties like Nassri and Awassa Dume, commercial maize varieties like BH661 and BH546, wheat, and soya bean. The farm mostly supplies local consumers, including well-known businesses like the Sheraton Addis, Hilton Hotel, Ethiopian Airlines, universities and colleges (Addis Ababa, Haremaya, Awassa), hospitals, supermarkets, and even the Ministry of Defense. Additionally, it produces crops for export, mostly to countries in Africa, like Egypt, Congo Brazzaville, and Cote d'Ivoire, and the Middle East (notably Saudi Arabia, Yemen, and the United Arab Emirates).

1.8.3. Temporal Scope

This dissertation provides a historical overview of Ethiopia's large-scale agricultural mechanization before focusing on a particular time frame that saw considerable large-scale agricultural land investments. The interest-bearing period starts following the 2007–2008 global financial, energy, and food crises and lasts until 2022. A number of crises with broad repercussions marked this time period. With a focus on the Elfora agro-industries Shalo-Melge large-scale agriculture investment project, the paper specifically examines the effects of the rapid expansion of large-scale agricultural investments on is possession, livelihoods, food security, and

environmental sustainability in the Oromia regional state. The phrase "large-scale land acquisitions" is used frequently throughout the dissertation to refer to the purchase of sizable land tracts (at least 200 hectares) by domestic, international, or joint companies involved in commercial farming operations (Borras and Franco, 2012).

1.8.4. Significance of the Study

LSAI has gained popularity in Africa, especially in Ethiopia's Oromia region and Shashamane rural area, since 2008/9, as a policy instrument and approach to increase agricultural output, reduce poverty, and address chronic and short-term food insecurity. However, credible design and assessment approaches are still needed to evaluate the efficacy of these interventions accurately. Accurate impact evaluations can significantly improve development efficacy, making them crucial information for LSAI implementation and sustainability. Such assessments are necessary to support the investment of resources in interventions and ascertain whether the desired impact is achieved. National and international efforts have been made to better understand impact evaluation, which has been useful in measuring intervention effectiveness. The research findings from this study are critical for generating evidence to support policy and program design, as well as providing relevant knowledge from development operations to enhance policies. Moreover, natural resource managers, development agents, funders, and environmentalists need this information to ensure proper environmental development and protection. Local communities and governments will benefit the most from this study as it uses current, real-world data.

1.9. Outline of the Study

The preceding chapter sought to present a thorough review of significant land investments made around the world, with a special emphasis on the Ethiopian area of Oromia. The study consulted authoritative sources such the World Bank, Oxfam International, and the Transnational Land Matrix, which provided a variety of datasets and review materials. The dissertation's remaining chapters are organized as follows: The subject of transparency, responsibility, and the use of free prior and informed consent (FPIC) in large-scale agricultural investments will be covered in Chapter 2. In addition, tensions and the effects of LSAI on smallholder farmers, particularly their eviction without proper recompense or mitigation, will be discussed in this chapter. This chapter will be supported with data from the Shashamane Rural District in the Oromia area. Using

empirical data and compliance metrics, Chapter 3 will calculate the livelihood effects of significant agricultural investments in the Shashamane District in the Oromia region. The chapter will contrast the Shala District with the expected consequences of large-scale agricultural investments on local livelihoods in the future, offering insightful information about the long-term implications of such investments. Using empirical data and compliance indicators, Chapter 4 will assess the effects of significant agricultural investments on food security in the Shashamane District of the Oromia region. The influence of large-scale agricultural investments on the local food system, including availability, cost, usage and quality, and stability, will be thoroughly examined in this chapter. With the help of empirical data and accordance measures, Chapter 5 will determine the local environmental effects of significant agricultural investments in the Shashamane District in the Oromia area. Each of the chapters—2, 3, 4, and 5—will focus on a different aspect of the thesis and offer concrete examples and analyses to back up their claims. With policy recommendations and ideas for more study in this field, Chapter 6 will present the main synthesis and thesis conclusions.

CHAPTER TWO

2. Consultation and Dispossession in Large-Scale Agriculture Investment: Evidence from Oromia Region's Shashamane Rural District[15]

Abstract

The Shashamane rural district was selected as a target area and corridor of large-scale agriculture investment (LSAI) to produce surplus agricultural products and ensure local development by the state and private (domestic and foreign) investors. Shalo–Melge private LSAI projects started operation in 2008 in the Shashamane rural district. This farm project comprises a crop production site, construction of a road, a crop storage facility, and developing irrigation in a total of about 24,710.51 acres of land along the central Rift Valley basin, for long-term leases. Little attention has been paid to how land ownership has changed and transaction transparency; how the community has been consulted; whether free, prior, and informed consent (FPIC) has been provided; and how local people have been dispossessed. This study sought to investigate the consultation process, land transaction transparency, the use of FPIC, and local community dis-placement as a result of LSAI in the Shashamane rural district. The study adopted multi-method qualitative and quantitative data collection tools including primary data, collected from a directly impacted population of 134 households, using systematic random sampling techniques; key and in-depth informant interviews; focus group discussions (FGD); and field visits. Through the use of qualitative and qualitative research paradigms, a systematic analysis was conducted. The result of the study shows that 86.6% of respondents (both interested and affected) expressed that both government and the proponents were not taking in account their concerns during the consultation processes. Lack of free, prior, and informed consent (FPIC) reduces local people's sense of recognition and status. Moreover, LSAI dispossessed the rural people from their area of settlement and farmland, triggered a shortage of communal grazing and forest resources. Additionally, nonequivalent and unsatisfactory mitigation and compensation methods highly triggers the negative impacts. As a result of manipulation and therapy used during the consultation process, we assert that the local community had less decision-making authority and that the risk to the farm was thereby increased. The government, investors, and local communities are three actors whose respective roles need to be strengthened and transparent. It is crucial to strengthen the implementation of customary land tenure rights to benefit local and indigenous people and civil society organizations (CSOs).

Keywords: Land dispute; Dispossession; Stakeholder consultation; Large-scale agriculture investment; Oromia region; Ethiopia.

[15] Paper I. Published as Alemu, Y.; Tolossa, D. Consultation and Dispossession in Large-Scale Agriculture Investment: Evidence from Oromia Region's Shashamane Rural District. Land 2022, 11, 1384. https://doi.org/10.3390/land11091384

2.1. Introduction

Large-scale agricultural investments (LSAI) have been shaping and changing Africa's agriculture and food system structure since 2008 (Schoneveld, 2017; Karakara et al., 2020; Oberlack et al.,2021). Most frequently, a sizable area of the occupied land is situated in the rural parts inhabited by indigenous peoples and is viewed as a common resource (Moreda, 2018). Africa is a prime target of this development where populations are rapidly dispossessed and dislocated, as their prime lands are leased for agro-production meant for overseas economies (Odoemene, 2010). The World Bank believes that in just one year, 2008–2009, there was a 14-times increase in the number of deals disclosed, despite disagreement over the numbers (Porsani et.al, 2018). The present "land rush" is notable for the speed with which the demand for land grew, starting in 2008, as well as the scale of the purchases, the long-term nature of the agreements, and the global reach of the phenomena (Cochrane and Legault, 2020).These types of agreements used in the last wave of land acquisitions typically involve long leases, lasting between 50 and 99 years, and involve purchases of more than 10,000 hectares (Shete and Rutten, 2015). More than a dozen African nations, including Ethiopia, have distributed millions of hectares of farmland to investors as of the end of 2009 in the hope that LSAI would open opportunities for quick agrarian development and act as a key tool for addressing enduring rural poverty (Dabala, 2020). LSAI is also referred to as land grabbing, new land colonization, or green colonization (Anseeuw et al., 2012; Yang,2021).

Policymakers, academics, the media (private and public), and NGOs (nongovernmental organizations) from civil society continue to debate the contribution of LSAI. Additionally, the fundamental justification for large-scale agricultural investments in Africa has been the likelihood that they would create jobs for the local population (Pearce, 2012; Petrescu-Mag et al., 2019).

Studies have discovered benefits for employment and rural welfare (Yengoh and Armah, 2015). Investors frequently claim that these land purchases would increase local employment and advance technology to increase crop yields, but these advantages rarely manifest (Brüntrup et al., 2016; (Bekele et al., 2021). However, large-scale agricultural investments have a variety of different effects on the environment, food security, and livelihoods in their target regions (German et al., 2013; Nanhthavong et al., 2021; Nolte, 2014; Oberlack et al., 2021). Other

research demonstrated that LSAIs uproot land users, weaken resilience, dismantle institutions of traditional land tenure, and cause destruction of livelihoods, deforestation, environmental degradation, and increase conflict (Rist et al., 2010; Rulli et al., 2013;Schlett and Beke, 2018;).As a result, the socioeconomic, food security, and environmental effects of LSAIs vary greatly depending on the environment (Shete and Rutten, 2015).

Despite the increase in investment in rural areas, locals are worried about the possible negative effects on their quality of life, including access to agricultural land, productivity, income levels, food security, and access to social services (Hall, 2011; Stebek, 2012;Ooko, 2015;Tura, 2017). Most LSAI research has focused on the wellbeing effects, with an emphasis on increased income, employment possibilities, the development of new management and agricultural skills, the transfer of technology, agricultural productivity, food security, and access to natural resources. Although widely acknowledged as a significant factor and influencer of land agreements, stakeholder consultation processes; free, prior, and informed consent (FPIC); and dispossession remain undefined in terms of concrete research (Lavers,2012;Aisbett and Barbanente, 2016;Nolte et al., 2016). The results of these substantial investments depend on how they are carried out (Wellard-Dyer, 2013).The business models in place are the culmination of all the development initiatives defining the type of linkages, partnerships, and relations, along with the legal environment in the investor's country of origin, investor–community linkages, and the type of partnership with the governments—all influence the implementation models, which vary both within and between communities (Osabuohien et al., 2019).

Moreover, the actual use of FPIC, however, frequently falls far short of the ideal (Horne, 2011; Shete, 2011; Zoomers, 2011; Schutter 2011; Richards, 2013; Hanna and Vanclay, 2013). Based on the principle of Free, Prior and Informed Consent (FPIC) respects indigenous peoples' legitimate right to demand that third parties treat them with equality and respect. Procedurally, free, prior, and informed consent requires processes that enable and support meaningful decisions about indigenous peoples' development paths (UN Sub-Commission on the Promotion and Protection of Human Rights 2004). All people's right to full consultation, expression of views, and compensation, including relocation with adequate state assistance, participation in national development, and, in particular, consultation concerning policies and projects affecting their community, together with improvement of their capacities for development and to meet

their basic needs, are explicitly recognized in Articles (FDREHPR, 1995;EIA, 2002; EPA, 1997;Montilla et al.,2013) and 92 of the Constitution of the FDRE (Shete, 2011). Public participation is a necessary legal requirement for the implementation of significant development projects, programs, and plans, according to the Environmental Impact Assessment Proclamation (Proc. no. 299/2002) (Zoomers, 2011) and Environmental Policy of Ethiopia (EPA, 1997). This declaration and policy served as a proactive instrument and the foundation for integrating environmental, economic, cultural, and social factors into decision-making in a way that supports sustainable development. Moreover, large-scale agricultural production initiatives, which include planting, transplanting, growing, and collecting plant material, are acknowledged as requiring stockholder and public consultation (Montilla and Schwarze, 2013).However, there are significant normative gaps in the law, community consultation, and actual practice surrounding these rights.

However, there are large normative gaps about these rights in the law, community consultation, and actual practice (Vhugen, 2012). For instance, the recent Oromo Protests (2014–2017) were sparked by land expropriations and the removal of forest areas without proper compensation in the Oromia Region (Human Rights Watch, 2016a). The Addis Ababa Integrated Regional Development Plan was brought about by the Federal Government (UN Sub-Commission on the Promotion and Protection of Human Rights 2004). Millions of Oromo smallholders in the Special Zone of Oromia Surrounding Addis Ababa (Finfinnee) are believed to have been uprooted from their farms as a result of the Master Plan's implementation, without proper compensation or resettlement options (Vhugen, 2012; Human Rights Watch, 2016a).Further, the implementation of FPIC, stakeholder consultation processes, local affected and interested parties' perspectives, local people's dispossession, and the interdependencies of LSLAs with the local community are all generally unknown in Ethiopia, and the Oromia regional state in particular (Vhugen, 2012; Dessalegn, 2011).

This study presents recent empirical research on the consultation process, application of FPIC, and background of current LSAI to investigate the level of involvement of local community households in deal-making and compensation. In fact, this study sought to answer four research questions and contribute to the debate on LSAI. This involved bringing the effects of LSAI to government agenda and intervention, and by facilitating monitoring and evaluation of projects and institutions whose goal is to monitor and evaluate LSAI, such as the federal and regional

land administration and land use and lease, investment and environmental protection, and agriculture and rural development offices. To begin, do Shalo–Melge LSAIs include affected and interested parties' perspectives, and is FPIC used? Second, are appropriate augmentation and mitigating actions put in place as soon as possible, ideally during project design and execution? Third, what is the government's relationship with the local community and investors? Fourth, how do perception and participation in the community influence LSAI? The remainder of this article is structured as follows: the summary of the research technique and approach is given in Section 2; the framework for conceptually examining the degree of local community participation in LSAI and consultation outcome is described in Section 3; the results are given and discussed in Sections 4 and 5; and the final section includes conclusions and perspectives.

2.2. Research Methodology and Research Approaches

2.2.1. Choosing a Research Location

Five factors were taken into consideration when the research location Shashamane rural district was chosen for this study:

1. There has been or is currently an LSAI process.
2. The Shalo–Melge LSAI in Ethiopia's Shashamane area of Oromia experienced low community engagement and application of FIPC.
3. Shashamane rural district is perhaps the most known for its higher demographic pressure and land shortage.
4. The local and indigenous population primarily engages in smallholder agriculture and natural resource.

2.2.2. Background Overview Study Area and the Project

The Shashamane Rural District is located topographically in the West Arsi Zone of the Central Main Ethiopian Rift Valley. The Shashamane Rural district is bordered to the north by the Arsi Ngela district, to the west by Bishan Guracha Town, and to the south by the Wndo district of SNNP. A commercial hub called Shashamane Town is roughly 240 km (150 miles) from Addis Ababa, the country's capital. Most of the population comprises Oromo smallholder farmers who rely on communal lands and local resources. A total of 28 kebeles (sub districts) make up the district, which has a population of 125,000 people overall. The land cover of the district consists of arable land, open woodland, grazing land, woodland, and shrub land. The principal crops

farmed—their primary economic activity, smallholder farming-include wheat, sorghum, maize, teff, oil seeds, and spices. There is a high population of livestock, and raising livestock is a significant source of revenue. Since 1993, Mohammed International Development Research and Organization Companies (MIDROC) have been operating in the private sector of Ethiopia's economy. The groups were able to expand rapidly, largely due to their humble beginnings. Their presence has a significant impact on the country's economy, as their large investments and many different activities make a significant impact (NIGATU, 2016) .With the help of four independently operating business groups, MIDROC Ethiopia has been successful in creating a sizable local corporate empire. With more than 70 PLCs (private limited companies) owned by the Investment, Technology, Horizon, and Derba groups, MIDROC Ethiopia's diverse groups are the greatest private economic empire in the nation. One of the MIDROC Ethiopia Investment Group Companies, Elfora Agro-Industries P.L.C. Shalo–Melge LSAI agricultural project began operations in 2008 and is located on 10,000 hectares in the nearby district of Shashamane in the Oromia region of Ethiopia. Elfora Agro-Industries is a company that produces agricultural products. The Shalo-Melge farm currently grows commercial maize (*BH661, BH546),* wheat, haricot beans *(Nassri, Awassa Dume),* and white beans, and soybeans for domestic and international markets. The area is located near the large farm of Elfora Agro-Industries P.L.C, about 7 and 5 km east and west, respectively. Looking at the background of the land relocated to the Shalo–Melega district, it was once owned by rural households in rural areas, with cultivation in villages, and was regarded as general pasture land. A variety of food crops were grown until the land was transferred to Elfora Agro-Industries P.L.C's large-scale crop production. Additionally, the region offered animals and humans access to water supplies, beneficial vegetation, and firewood. For shareholder consultation, both rain-fed and irrigated food crops are taken into account. This production typically involves sophisticated food production methods that use agricultural inputs. Irrigation plans are used to grow irrigated crops, which boosts agricultural output and farmer income. Food crops for industrial/export production are raised in both highlands and lowlands, in a range of agro-ecological zones. Industrial/export crops farmed on a large scale in Elfora Shalo–Melge are irrigated and rain-fed. Crop cultivation is often intense and protective measures are used for industrial and export crops. Large monocultures are the norm for agricultural crop production, and heavy equipment is frequently used in modern farming practices for plowing, sowing, and harvesting; fertilizer and herbicide application; and

irrigation systems. Crop production initiatives can be an element of the watershed and integrated rural development programs.

2.3. Research Design

Qual-quan design with qualitative dominated paradigm of research was used for this study. This allows an understanding and a firm establishing of facts regarding variables investigated, including FIPC. Mixed methods research aims to justify the use of many approaches to resolving research problems rather than limiting or restricting researchers' options (i.e., it rejects dogmatism); it also is an open-minded and inventive method of inquiry rather than one that is restricted. Being inclusive, pluralistic, and complementary enables researchers to embrace a diversified approach to method selection, research planning, and actual research (Johnson and Onwuegbuzie, 2004).The research question is the most important factor; research methods should be chosen in a way that many research questions and combinations of questions are best and most fully answered through mixed research solutions (Johnson and Onwuegbuzie, 2004; Biesta and Burbules, 2003). In fact, this research requires in-depth understanding of the given phenomena, representing an attempt to provide warranted assertions about human beings (or specific groups of human beings) and the environments in which they live and evolve (Johnson and Onwuegbuzie, 2004).

2.3.1. Data and Sampling

In Ethiopia's Oromia state's Shashamane district, primary data were gathered through household surveys. The Elfora Shalo–Melge LSAI is held in these districts (Figure 2.1). Elfora large-scale crop production is a member of MDROC Group, which was founded in 2008 on 10,000 ha of land in Ethiopia's Shashamane District of the Oromia regional state. These LSAIs, which were constructed with little input from residents and stakeholders, support the eviction of smallholders and restrict access to grazing during the dry season. Out of the seven closest *kebeles*, three were chosen at random, and these three *kebeles* are close to the LSAI and can be located within a ten kilometer radius of the LSAI. First, the Shahsemena rural district was specifically chosen for the existence of the LSAI. Primary data were collected through a household survey in the Shashamane district located in the Oromia state of Ethiopia. Second, the district health office's numbers from two months prior estimate that 2098 people are living in the three *kebeles* as a whole (1784 male and 314 female). Furthermore, approximately 85% of the sample population in this study engaged in mixed agriculture (i.e., farming and livestock). Third, the sample size

was calculated using the Cochran, (1977) and Robert (1986) formula, which takes into account a 90% confidence level (z = 1.64), a 70% estimated proportion of a character in the population (p), and a 7% level of precision (E). Finally, 134 families from a population that was directly or indirectly affected were chosen at random based on likelihood proportionality to sample size. Additionally, long-term residents in the area, 18 years or older, experienced with LSAI have been used as including criteria. Conversely, for this investigation, we set a precision level of 7% while taking into account the resources that may be employed to manage the study.

$$n0 = \frac{Z^2 Pq}{e^2} = \frac{1.64^2 * 0.5(1-0.5)}{0.07^2} = \frac{2.6896 * 0.5 * 0.5}{0.0049} = 137.22 \sim 138$$

Where:

n_0 is the sample size;

Z is the selected critical value of desired confidence level;

P is degree of variability in the population;

$q = 1 - P$ and *E* is the desired level of precision.

$$n = \frac{n_o}{1+\frac{(n_o-1)}{N}} = n = \frac{138}{1+\frac{(138-1)}{2098}} = 130.28 \sim 134$$

Where = *n* is the desired sample size,

$$ni = \frac{n*Ni}{N}$$

Where ni = sample of kebeles, *Ni* = population of kebele, *n* = total sample size, and *N* is the total population of the three kebeles. For the sample drawn from each kebele, see Appendix B, Table B1

Figure 2.1. Rain-fed and irrigated crop production of the Elfora Shalo–Melge farm. The farm grows a variety of crops, including maize, sorghum, and soybeans. Food crops include grains, such as corn, wheat, rice, and other types of crops (e.g., vegetables and fruits). (Source: Google Maps).

2.3.2. Data Collection Tools

The effects of LSAI on eviction, dispossession, and compensation (mitigation) mechanisms were investigated using a multi-method qualitative methodology that included household surveys, key informant interviews (KIF), focus group discussions (FGDs), field visits, and observation.

KIT and FGD were guided by a 32-item checklist of COREQ (consolidated criteria for reporting qualitative studies principles) (Tong et.al. 2019). Further, Table 2.1 identifies the variables under investigation.

Table 2.1. List of major variables investigated.

Dimension	Variable Name	Variable Type	Unit of Measurement
Recognition and sense of ownership	Meetings	Dummy	1, if invited to a stakeholder meeting, 0 if not
	Participation	Dummy	1, if participating in the proposal, 0 if not
	Proposal explanation	Dummy	1, if the proposal is adequately explained to all stakeholders, 0 if not
	Effects and hazards	Dummy	1, if the proposal effect and hazards are adequately explained, 0 if not
Power and level of influence	Responsibility	Dummy	1, if the local community is influenced and empowered, 0 if not
	Decisions	Dummy	1, if the decision of the local community incorporated, 0 if not
	Degree of community control	Dummy	1, if higher degree of community control or partnership, 0 if not
Key principle of participation	Open and transparent	Dummy	1, if participation is open and transparent, and understood, 0 if not
	Fair and neutral	Dummy	1 if, the consultation is fair and neural, 0 if not
	Inclusive	Dummy	1, if the proposal is inclusive, 0 if not
	Relevant	Dummy	1, if the proposal is, 0 if not
	Responsive	Dummy	1, if the proposal is responsive to stakeholder input, 0 if not
	Credible	Dummy	1, if the proposal is credible, 0 if otherwise
Impact	Direct impact	Dummy	1, if the proposal is a direct impact, 0 if not
	Dispossession from resident	Dummy	1, if the proposal is to dispossessed you from your residential, 0 if not
	Dispossession from communal land	Dummy	1, if the dispossessed your from communal land, 0 if not
	Indirect impact	Dummy	1, if the proposal is an indirect impact, 0 if not
	Cultural sites	Dummy	1, if the proposal is adequately explained, 0 if not
	Heritage	Dummy	1, if the proposal is affecting heritage explained, 0 if not
	Biodiversity	Dummy	1, if the proposal affects biodiversity, 0 if not
Mitigation and compensation	In-kind compensation	Dummy	1, if in-kind compensation is provided, 0 if otherwise
	Monetary compensation	Dummy	1, if the monetary compensation is provided, 0 if not
	Resettlement	Dummy	1, if compensation is provided resettlement, 0 if otherwise
	Site remediation	Dummy	1, if Site remediation is provided, 0 if otherwise
Mentoring	Monitoring and follow-up	Dummy	1, if the monitoring and follow-up are adequate, 0 if not
Satisfaction	Satisfaction	Rank (4-point scale)	0 being not at all satisfied, 1 being poor satisfaction, 2 being medium satisfaction, and 3 being very satisfied)

A. Questionnaire Survey

The study employed closed-ended questions to ask about households' socioeconomic status, tenure structures, and access to land. Further, information and data related to community participation, consultative process, land confiscation, and forcible relocation of locals' community were asked to rate their overall satisfaction with the project on a 4-point scale (0 being not at all satisfied, 1 being poor, 2 being medium, and 3 being very satisfied), and the degree of participation and consultation process as depicted in the conceptual formwork (see conceptual formwork of the study). They were then asked for any action the government had done to monitor and assess the LSAI's performance. By interrogating respondents and asking them to defend their complaints, efforts were taken to reduce any bias. Additionally, a pilot survey designed to catch misconceptions in the questions was used to pretest and check the questionnaires. The survey's primary goal was to collect common characteristics, effects and mitigation, opinions or beliefs, and experiences of local communities currently residing in LSAI areas. A trained enumerator of development agent (DA) then distributed the questionnaire to the respondents in each kebele. With the help of the district agricultural experts, the investigator, and a total of six enumerators, respondents were interviewed door to door; 134 (100%) of households that took part in the survey responded quickly to the questionnaire. In this study, Cronbach's alpha, a bias indicator of the questionnaire's internal consistency and scale reliability, fell within an acceptable range (George and Mallery, 2003).

B. In-depth Conversations

One-on-one, in-depth conversations with respondents were a part of the interviews. A total of 35 households were interviewed: 15 were from the B/Dannaba, 10 were from the Toga, and 8 were from the D/Calalaqaa kebele. Interviewers were selected based their experience, academic credentials, and ability to communicate in the local language (Afaan Oromo). Moreover, training was given to all interviewers. The main questions during an interview concerned LSAI phenomena, perceptions, and experiences in the last ten years. These questions concerned consultation, relocation, mitigation, and rehabilitation. Investigations focused on factors that contribute to dispossession, such as LSAI and development initiatives that were mentioned in the conceptual framework (Figure 2.1). Separate interviews with identifiable codes for each participant took place in a quiet setting, either at home or in a local community center. When the thematic saturation was reached, interviews were terminated. A notebook was used to record the interview. The length of in-depth interviews was 20 to 25 min.

C. Interviewing Key Informants

Additionally, 28 government employees (purposively selected sample respondents), who are in charge of overseeing large-scale farms and are employed by various federal and regional offices, were interviewed. This included specialists from the district council; land administration offices, agriculture and rural development offices; regional and district investment offices; Elfora Shalo–Melega LSAI (organization managers, experts, and administrators); and the Ethiopian investment agency.

D. Focus Group Conversations (FGDs)

The research used six focus group conversations in two phases, i.e., two per *kebele*. However, people involved in the FGD varied across *kebeles* and phases. For instance, the number of people involved in the Toga *kebele* FGD during the first and second phase was 6 and 7, respectively. The number of people involved in the B/Dannaba *kebele* FGD during the first and second phase was 10 and 6, respectively. The number of people involved in the D/Calalaqaa *kebele* FGD during the first and second phase was 7 and 6, respectively. Moreover, this data collection tool and guide enabled and improved the quality of qualitative data, as previously mentioned. Additionally, transect walks and personal observation of the institutions and farm sites, and community resource mapping were employed. To illustrate or emphasize a particular issue, two images are provided in this report (Figures 2.2 and 2.3).

Figure 2.2. Elfora large-scale crop production farm in the Shashamane district, which is responsible for planting, transplanting, growing, and harvesting plant material, including food crops and export/industrial crops (right side). (Source: authors).

Figure 2.3. Elfora large-scale crop production farm in the Shashamane district, which is responsible for planting, transplanting, growing, and harvesting plant material, including food crops and export/industrial crops (left side). (Source: authors).

2.4. Data Analysis

Descriptive statistics used to analyze the data, are reported in tables. To analyze the data, descriptive statistics are used, as well as frequency and percentages. To increase a broader and deeper understanding of the research phenomenon and to improve the validity of the results, triangulation is used because it is more precise and because it aims to reveal complementarities, convergences, and inconsistencies within the research results (Johnson and Onwuegbuzie, 2004).

2.5. Conceptual Framework for Analyzing Local People's Community Participation in LSAI

We combined political ecology and Arnstein's Ladder to uncover, consulation, FPIC, power dynamics and inequality in Large-Scale Agricultural Investments (LSAI). However, profit-driven orientation remains a pervasive challenge that often disregards local concerns. As a result, Arnstein's Ladder serves as a tool for assessing local participation, emphasizing the importance of evaluating inequalities within LSAI efforts in the broader landscape of political ecology. Figure 4 shows detail of our conceptual framework used to analyze local people's community participation in LSAI. It draws on Arnstein's and Guaraldo's concept of ladders of participation and degrees of citizen power (Arnstein, 1969; Choguill 1996). At the bottom of the ladder, the community has almost no decision-making power. Moving up the ladder, the community exerts increasing influence, to the point where they make the decision at the top. The terms "community involvement" and "participation" are used synonymously in this study to refer to the involvement or participation of the community of households in the creation and

implementation of initiatives and programs that affect them, along with the formal decision-making process. Public involvement contributes to a project's success and sense of ownership over the medium to long term (Nolte, 2014); some are shown in Figure 2.4. The primary goal of public participation is to motivate the populace to contribute meaningfully to the decision-making process (Wouters et al, 2006). Many people enjoyed being consulted because it gives them a sense of recognition and status. The main objective of public participation is to inspire the public to actively participate in decision-making (Biesta, and Burbules, 2003).These advantages occur when public involvement is a two-way process, allowing the agency and the public to both learn and profit (Choguill 1996;; Wouters et al, 2006; Wengert, 1971;Nolte, 2014). The identification of the public's values and their implementation into decisions that eventually affect them are made possible through effective public engagement (Arnstein, 1969). Hence, community perception and participation determine the sense of ownership, success, and sustainability of a project (such as LSAI). However, some argue that involving the local community in a project was time-consuming, and including the view and interests of locals is very difficult. In Ethiopia, community participation in agricultural investment projects is generally not always large, particularly in investment regions such as Oromia regional state, and the Shashamane rural district, due to differences in community characteristics and phenomena that can also affect the level of community perception and participation.

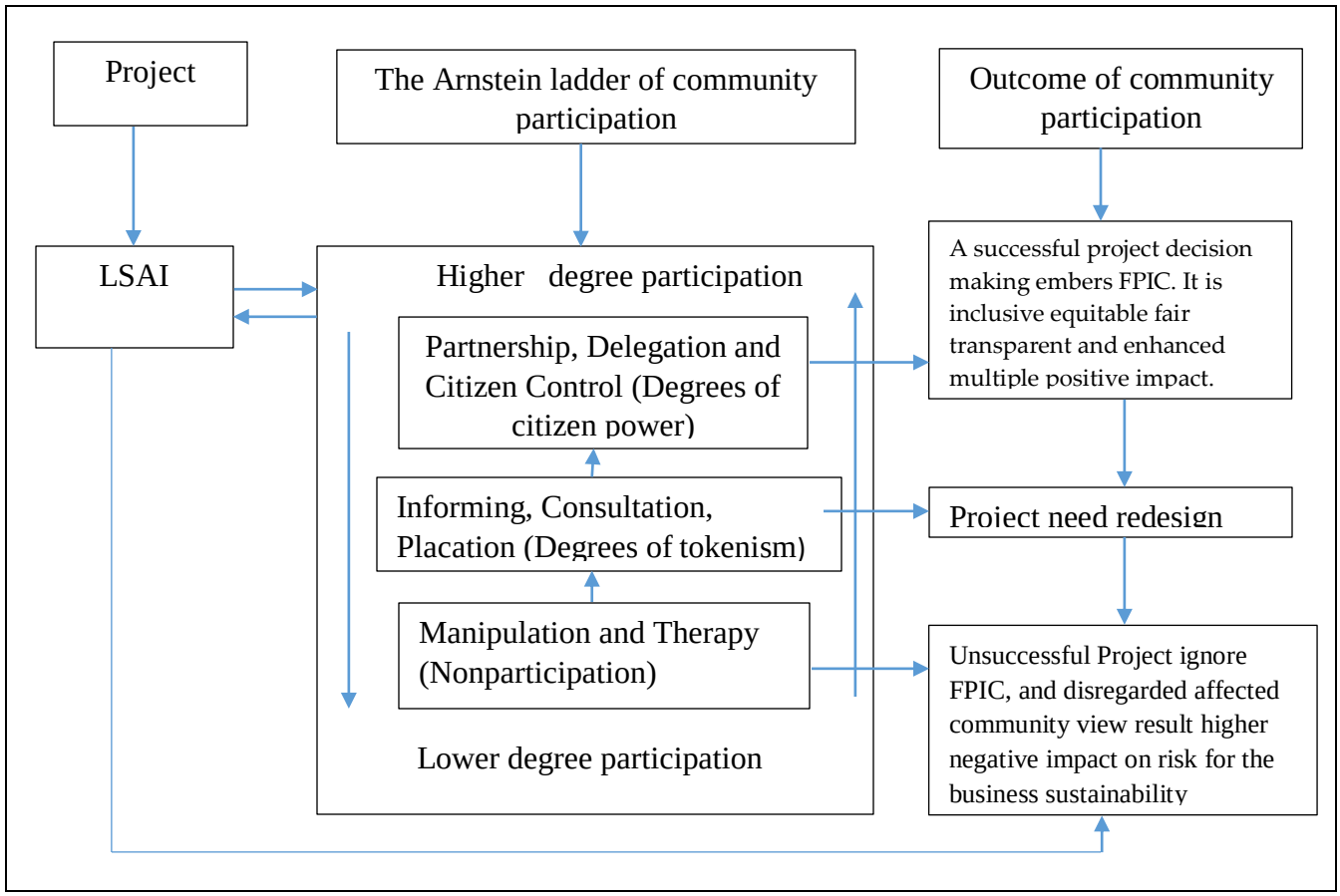

Figure 2.4. A conceptual framework for analyzing local people consultation and participation in LSAI. Source: authors' compilation developed from Arnstein and Guaraldo (Arnstein, 1969; Choguill,1996)

2.6. Results

The result part is divided into six sections. The first part shows the consultation process and FPIC of local people in LSAI in the Shashamane rural district of Oromia regional state. The second part covers the direct and indirect effects of the LSAI proposal on the wellbeing of local communities and the success of investment projects. The third and fourth parts present linking to the participant's basic understanding of the effects of LSAI on unplanned human settlements, social conflicts due to shortage of settlement and communal grazing land, the venue of nonresident workers and migrants, and water disputes, and the consequences on the society. The fifth part includes enhancement and mitigation measures, including providing settlement areas with appropriate housing and social services (water, school, and sanitation) for dispossessed families and nonresident workers and their families. Finally, based on the data gathered during the field study, the overall satisfaction of the local community with LSAI is presented.

2.6.1. Stakeholder Consultation and FPIC of Local People in the Shashamane Rural District LSAI

Table 2.2 depicts the views of affected and interested stakeholders on the LSAI and its effect. Approximately 86.6% of respondents express that their concerns were not taken into account and consultation processes were irresponsive to stakeholder requirements and inputs; 13.4% of the respondents were neither consulted nor informed about the LSAI. Moreover, findings from the consultation are inconclusive, unfair, and not open and transparent, lacking credibility that builds confidence and trust between the government, the proponent, and the local community in the study area. People directly impacted by the plan must, at the very least, have the opportunity to express their opinions about it and any potential social, environmental, or other repercussions.

Table 2.2. Involvement during the consultation application of FPIC or two-way exchange of information *(n = 134)*.

Consultation and FPIC Component		Frequency	Percentage (%)
Stakeholder meetings	Yes = 1	116	86.6
	No = 0	18	13.4
Proposal explanation	Yes = 1	10	7.4
	No = 0	124	92.5
Potential effects and hazards	Yes = 1	8	6
	No = 0	126	94
Power through and a sense of social responsibility	Yes = 1	4	2.1
	No = 0	130	97.9
Decisions are made and based	Yes = 1	7	5.2
	No = 0	127	94.8
Voice issues and impact on the decision-making process	Yes = 1	3	2.2
	No = 0	131	97.8
Inclusive—covers all stakeholders	Yes = 1	6	4.5
	No = 0	128	95.5
Open and transparent?	Yes = 1	9	6.8
	No = 0	125	93.2
Fair, neutral, and performed without prejudice	Yes = 1	5	3.8
	No = 0	129	96.2
Responsive to stakeholder requirements and inputs	Yes = 1	1	0.7
	No = 0	133	99.3
Credible—builds confidence and trust	Yes = 1	2	1.5
	No = 0	132	98.5
Gender issue	Yes = 1	4	2.1
	No = 0	130	97.9

2.6.2. Direct and Indirect Effects of an LSAI Proposal

LSAI was recognized for both its immediate and long-term effects. A direct loss can be measured in a specific way, such as the number of locals who were dispossessed or the amount of property, infrastructure, and natural resources that were harmed. More vulnerable are those who are poor, landless, tend livestock, have a big family size, and are women or elderly men.

The powerful can do what they please with the poor. Indirect losses typically emerge from disruptions to the flow of products and services brought on by large-scale crop production initiatives and include drops in output or revenue along with effects on people's wellbeing. Based on the result of the survey, 97.9% of rural households in the three kebeles (B/Dannaba Toga and D/Calalaqaa) were directly or indirectly affected by the LSAI proposal (see Table 2.3). Based on the survey result, 20.9% of rural households were dispossessed from their locality (dwelling) or residential homes. According to the Shashamane rural district investment office, interviewed for this study, the Shalo–Melge LSAI project has dispossessed 2980 individuals, and the local community is concerned about further evictions due to the government and company's expunction to new arable lands. Almost all kebele administration leaders and elders from B/Dannaba Toga and D/Calalaqaa interviewed thought the LSAI has caused dispossession and resulted in conflict between local peasants and investors.

Table 2.3. Local people affected by the proposal N = 134.

Effect of LSAI		Frequency	Percentage (%)
Local and indigenous people are affected by a proposal?	Yes = 1	130	97.9
	No = 0	4	2.1

Moreover, 52.9% and 91.7% of rural households were dispossessed from their farmland and communal grazing land without adequate compensation for losses. In all three sites we studied, there was a drastic change in this regard. The district agricultural office trained farmers to reduce the number of livestock and improve and use their private enclosure. Government extension agents tried to persuade farmers to start private enclosures where they did not exist. According to the district animal scientist, the absence of grazing land and forestland has a serious problem affecting the local community in the district. Moreover, he also emphasizes dispossession from the locality and occupational activities, and loss of farmland and grazing land were common in the study district.

In the explorative study, the focus group discussant (FGD) explained that:

""Elfora-LSAI is causing large-scale dispossession and communities are at great risk of mass dispossession today young people have no alternative and we have not enough land to share with them. Migration to the urban area, Shashemena town, Aris Negela, and Addis Ababa out of Ethiopia to Arab countries such as Saudi Arabia, Kenya, and South Africa, is the only alternative

to minimize the household pressure, at least they feed themselves and send some money to for family." (FGD interviewed, D/Calalaqaa kebele, 2020)

Loss of cultural, religious, and historical heritage assets, together with the loss of aesthetic resources, are other significant problems that could develop when building and/or operating a rain-fed and irrigation agriculture production project. In this regard, our survey results reveal that 91% and 86.5% of rural households indicated that the LSAI affects cultural sites: religious and historical heritage assets and aesthetic resources, respectively (see Table2.4).

Table 2.4. Local people Dispossession due to the LSAI.

Dispossession and Mitigation Measures		Frequency	Percentage (%)
Dispossession from locality	Yes = 1	28	20.9
	No = 0	106	79.1
Dispossession from farmland	Yes = 1	71	52.9
	No = 0	63	147.1
Dispossession on local grazing land	Yes = 1	128	95.5
	No = 0	6	4.5
Loss of cultural, religious, and historical heritage assets	Yes = 1	123	91.7
	No = 0	11	8.3
Loss of aesthetic resources	Yes = 1	116	86.5
	No = 0	20	13.5

2.6.3. Causal Association between LSAI and Human Health Outcomes, Loss of Crop Production, and Unplanned Human Settlements

Table 2.5 presents the results linking to the participants' basic understanding of the effects of LSAI on human health-related outcomes, loss of crop production, unplanned human settlements, and social conflicts due to shortage of settlement and grazing land, the venue of nonresident workers and migrants, and water disputes. We observed that land acquisitions were a major source of social tension in the district. Many disputes and conflicts arise over land compensations between local governments and farmers. Greater than 75.4%, 76.8%, 73.1%, and 60.5% recognized a causal association between LSAI and human health outcomes, loss of crop production, unplanned human settlements, and social conflicts due to shortage of settlement area, communal grazing land, venue of nonresident workers and migrants, and water disputes, respectively. A dairy farmer from Shashamane rural district said *""Elfora- LSAI affects all of us … because our life is dependent on subsistence agriculture and animal rearing, because of disruption of communal land and lack of farmland was leading to loss on crop and dairy product and further it intensify social conflicts between farmer and investors."*

Table 2.5. Basic understanding of the effects of LSAI on human health-related outcomes, loss of crop production, unplanned human settlements, and social conflicts.

Please Answer the Following Questions		Frequency	Percentage (%)
Communicable diseases such as malaria	Yes = 1	101	75.4
	No = 0	33	24.6
Loss of crops	Yes = 1	103	76.8
	No = 0	31	23.2
Unplanned human settlements	Yes = 1	98	73.1
	No = 0	36	26.8
Conflicts	Yes = 1	81	60.5
	No = 0	53	39.5

Another key informant also illustrated:

"I have faced the constraint of livestock grazing, due to this I have enforced to sell livestock with cheap price or keep in the house without animal fodder and this Elfora LSAI also caused a shortage of traditional energy source to obtain from the forests and timber products".

(Resident, interviewed, B/Dannaba 2020)

The land is a crucial resource since, according to the Shashamane Rural District Agricultural Office Development Agent, over 83 percent of the district's population relies nearly completely on agriculture for their living. Owing to the LSAI, there is not enough arable land to provide all agricultural needs for subsistence. Make sure that the underprivileged and other disadvantaged groups continue to have access to nearby, productive land for growing their food or for pasture.

Another key informant also illustrated:

I have seen very weak management of water resources and pesticide/insecticide storage (appropriate containers, and locked facilities), which is leading to exposing the local community spill overt effects of pesticides, other harmful chemicals, and communicable diseases such as malaria, and diarrhea.In the explorative study, the focus group discussant (FGD) explained that:

"Loss of vegetation and vital natural resources due to land clearing, loss of forest products (fuel wood, timber, non-timber forest products) have become high-priced, especially, resource for livestock production remains limited over time to time." (FGD interviewed, Toga kebele, 2020).

2.7. Enhancement and Mitigation Measures for Settlement Areas

The goal of mitigation is to find ways to protect the area that the plan will affect. It identifies the most effective techniques for mitigating, preventing, and reversing effects. The provision of fair compensation for farmers whose land has been expropriated is one of the major difficulties

associated with rural land acquisition. Concerning this, our survey result reveals that out of a total of 28 dispossessed from their settlement area, 23 (82.14%), 2 (7.17%), and 3 (10.71%) of the rural households were mitigated with a resettlement package (Figure 2.5). However, no one was compensated for a performance bond, insurance, or bank guarantee. Respondents were asked whether or not compensation was adequate; all of the respondents indicated that it was adequate and promised at the time of consultation, but compensation was not provided as promised. The project was established in adequate resettlement areas without appropriate housing and services (water and sanitation).

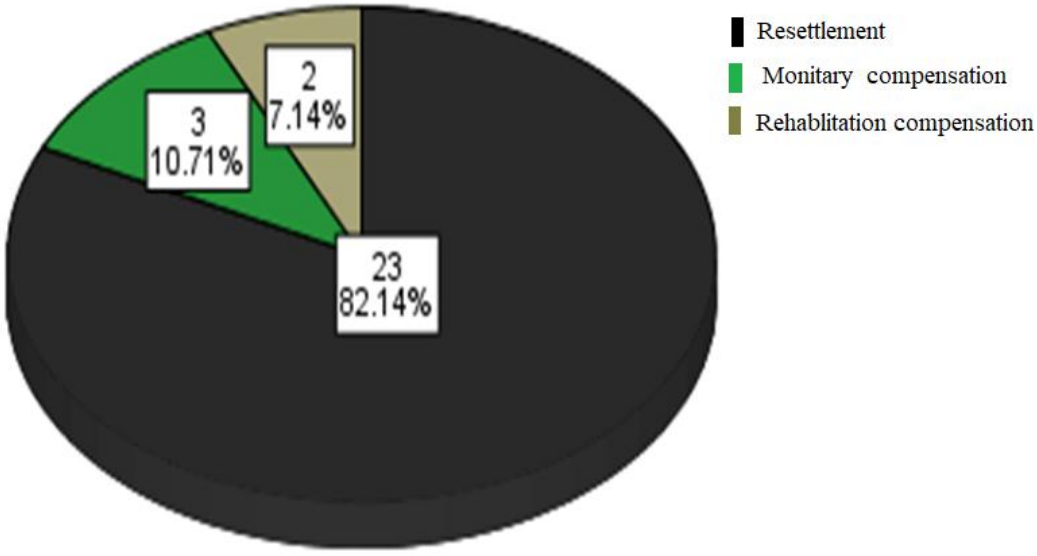

Figure 2.5. Enhancement and mitigation measures in settlement areas.

The key informant involved in Toga kebele added:

"Elfora LSAI is typically cultivated in sizable monocultures, and contemporary farming techniques frequently require the use of fertilizers and pesticides, irrigation systems, and heavy machinery for plowing, planting, and harvesting, which causes disruption of agricultural habits in the local community."

In addition to dispossession from settlement areas or locality or environment and occupational activities without adequate compensation, the local community in the three kebeles was losing farmland without adequate compensation. Of the total 78 dispossessed from their farmland, 60 (84.51%), 9 (12.66%), and 2 (8.2%) of the rural households were given replacement farmland at another location, provided monetary compensation, or offered rehabilitation of existing farmland, respectively, although none received payment for a performance bond, insurance, or

bank guarantee. However, the compensations due to the resources offered to local community protest agents as compensation at another place were not equal. In addition, experts from the Ethiopian Investment Agency, regional and district investment offices, the district council, land administration offices, and agriculture and rural development offices confirmed that the necessary enhancement and mitigation measures were not included as early as possible, ideally during the project design. Moreover, about 55% were unaware of any action taken by the government to mitigate traditional cultural values, spiritual assets, and tourist attractions (Figure 2.6).

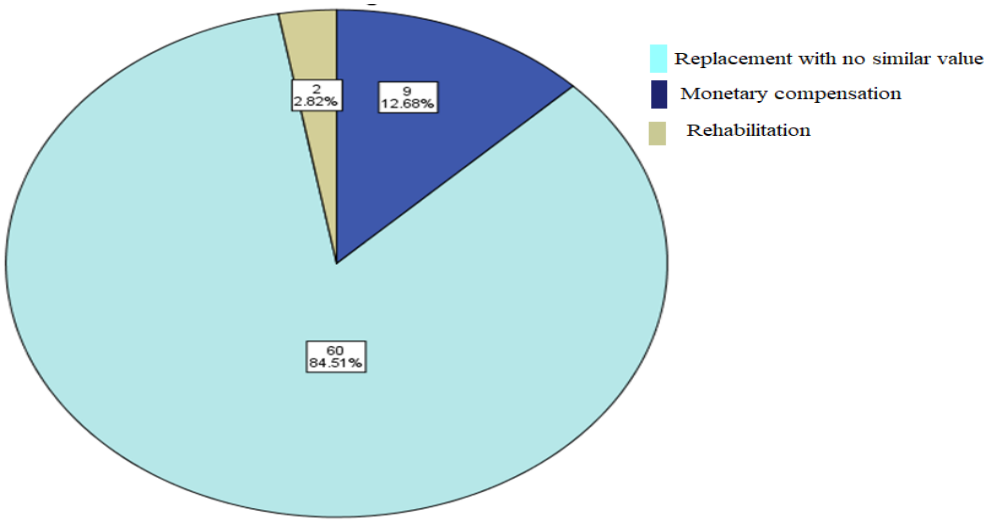

Figure 2.6. Enhancement and mitigation measures for the loss of farmland

2.7.1. Tracking Performance and Final Remarks/Comments from the Participants

To determine whose rights can be upheld or what compromises can be reached, numerous communities have pleaded with their governments to step in when dispossession has happened in various regions of the world. Our survey result indicated that 65.6% of respondents appealed to the local government to monitor and evaluate the performance of the LSAI, while 93% of respondents expressed willingness to return the compensation if the government permits return of the lands previously owned (Appendix B Table B2).

2.7.2. Local Community's Satisfaction with the Overall Project

The local community was asked to rate their overall satisfaction with the project on a 4-point scale (0 being not at all satisfied, 1 being poor, 3 being medium, and 4 being very satisfied). Of

the 134 household respondents, 94%were unsatisfied by the project activity (see Appendix C, Figure C4).

2.8. Discussion

This section discusses the stakeholder engagement process, FPIF implementation, how impacted and interested stakeholders' opinions were considered, how the land deal is transparent, how LSAI caused mass dispossession, and why the promised compensation system was ignored. It also explains why LSAI performance and benefits were low in Ethiopia's Shashamane rural district of Oromia. In fact, international law recognizes governments' and corporations' responsibility to engage affected communities, particularly in accordance with the principle of "Free, Prior, and Informed Consent," as outlined in ILO Convention 169 and the United Nations Declaration on the Rights of Indigenous Peoples (UN Sub-Commission on the Promotion and Protection of Human Rights 2004). According to Articles 43, 44, and 92 of the FDRE Constitution, all people have the right to full consultation and expression of views, compensation, including relocation with adequate state assistance, and participation in national development, including, in particular, the right to be consulted about policies and projects affecting their community, and the development of their capacities and meeting their basic needs (FDREHPR, 1995).In the Environmental Impact Assessment Proclamation (Proc. no. 299/2002) (EIA, 2002) and Environmental Policy of Ethiopia (EPE, 1997), public involvement is a mandatory legal prerequisite for the implementation of major development projects, programs, and plans. This proclamation and policy is a proactive tool and a backbone for harmonizing and integrating environmental, economic, cultural, and social considerations into a decision-making process in a manner that promotes sustainable development. Further, the concept of a "right" to participate in decisions affecting one is strongly mentioned in the literature (Choguill 1996; Anseeuw et al., 2012; Nolte, 2014). Proposals for increased participation have also been directed toward overcoming the adverse effects of policy outcomes (Wouters et al, 2006). Furthermore, participation has several potentials in conflict resolution, as a strategic maneuver to accomplish other unstated or stated objectives, and improve information inputs into administrative decisions (Wengert, 1971). Others also argue that participation is important to obtain traditional knowledge that may be useful for decision-making, improvement to the project design, and other intangible and incidental factors involved in the process (Roniotes et al., 2015). Others have also argued that it is essential to involve the public in identifying the problems and data that could be crucial

to project success. Local expertise was beneficially helpful to the project's growth and viability (Shete et al. 2015).

Many large-scale projects have failed because they either failed to win public acceptance and support or neglected to consider local and traditional factors (Shete et al. 2015). There are numerous disadvantages associated with public participation—it is time-consuming and expensive, and a major obstacle to efficient functioning of private businesses (Wouters et al, 2006). Furthermore, large-scale crop production projects that involve sowing, transplanting, growing, and harvesting plant material, including food crops and export/industrial crops, are boldly acknowledged as involving public consultation (EPA, 1997; EIA, 2002). Overall, in our stud we found evidence for a lack of incorporation and interaction with view of affected and interested stockholders in the consultation process. Additionally, the result suggests that the following factors were deficient: establishing areas of agreement, legitimizing proposals, ensuring greater acceptance and support, and providing a disagreement handling mechanism to reach a common position. Hence, we argue that the Elfora Shalo–Melega LSAI was inconclusive, unfair, and not open and transparent, and therefore lacks credible and relevant participation. As a result, it cannot create and build confidence and trust between the government, the proponent, and the local community; this kind of consultation is categorized to manipulation and therapy (nonparticipation) (Arnstein, 1969). In fact, many people are outraged because they did not receive complete and timely information. Moreover Choguill, (1996) and Nolte and Voget-Kleschin (2014) argue that a weak consultation process leads to a total lack of sense of ownership and project collapse.

Based on the result of the survey, 98% of rural households in the three kebeles (B/Dannaba Toga and D/Calalaqaa) were directly or indirectly affected by the LSAI proposal. Besides the entire effect of LSAI, a significant number of households were dispossessed from their locality. Moreover, 52.9% and 91.7% of rural households were dispossessed from their farmland and communal grazing land without adequate compensation for losses. This involuntary dispossession of local people and evictions of land users have decreased their living standards and livelihoods, and negatively affect the enjoyment of human rights, including the right to life, the right to food, the right to housing, and the right to health, and the property right. Many large-scale projects have failed because they either did not gain public acceptance and support or did

not take into account local and traditional factors (U.S. Agency for International Development, 2018;Dwivedi, 2002). Indigenous or local peoples should never be subject to expropriation without their agreement, and no relocation shall take place without the free, prior, and informed consent (FPIC) of the indigenous people concerned and after agreement on just and fair compensation and, whenever possible, with the option of return (UN Sub-Commission on the Promotion and Protection of Human Rights 2004). In Africa, for example, customary rights hold 80 percent of the land, but only 3 percent of that land is legally owned by communities (U.S. Agency for International Development, 2018). Government organizations that promote investment have frequently allotted property for commercial use while ignoring local populations' land tenure rights (U.S. Agency for International Development, 2018;Dwivedi, 2002;Cotula et al., 2014;Roudart and Mazoyer, 2015;Lunstrum, 2016).Hence, the Ethiopian government, which has undertaken a program of land registration since 2003, has not benefited local communities in the Shashamane rural district because of a low implementation rate to lower-level administration units, i.e., the kebele. The main objective of the project is to address the problem of tenure security, reduce land disputes and litigation, bring empowerment, and increase investment in land (Deininger and Jin 2005). Hence, the success of large investment projects, together with the welfare of nearby communities, is impacted when a project does not appropriately take into account community land rights and usage. Moreover, in this regard, several instruments of international human rights recognize a smallholder's right to land, and its indispensability to realize other human rights (Nolte, 2014). For instance, the FAO's Voluntary Guidelines call upon states to respect, protect, and fulfill the land rights of smallholders concerning the right to adequate food (Zutshi and Adams, 2004). Loss of access to the commons undermines local community livelihoods unless there is compensation by using land of equivalent or superior quality (Hanna and Vanclay, 2013).

Government-granted land-based concessions to firms in emerging markets are projected to be occupied in 93 percent of cases. Therefore, the recognition of collective tenure rights to the commons is a cornerstone of sustainable development and optimizing scarce resources (de Schutter, 2011; Montilla and Schwarze, 2013). All land in the nation, whether it is urban or rural, is declared to be state property and private ownership is prohibited by both the federal and regional constitutions and existing land regulations. Land users (cultivators and pastoralists) only have use rights to the land under their control; they are not permitted to exchange, sell, or

mortgage that land in any way. Moreover, our survey results reveal that 86.5% and 91% of rural households indicated that the LSAI affects, without adequate compensation, the aesthetic resources and the cultural, religious, and historical heritage assets, respectively. Moreover, about 55% were unaware of any action taken by the government to mitigate traditional cultural values, spiritual assets, and tourist attractions. A similar study also reveals that the Government of Ethiopia evicts smallholders for stated purposes of promoting private investments, including for the promotion of large-scale commercial agriculture and urbanization, without adequate due process of adequate compensation and law (Shete, 2011; Vhugen, 2012a; Dessalegn, 2011). Similarly, at all three sites (*kebele*), our study suggest that the LSAI was creating a shortage of communal grain land and increased the intensity of land conflict, causing the deterioration of livelihoods. The finding is in line with the observation that the LSAI is causing the loss of farm and grazing land; cultural, religious, and historical heritage assets; and aesthetic resources (Deininger and Byerlee, 2011; Degife and Wolfram Mauser, 2017; Schlett, and Beke,2018).

Moreover, our findings suggest that the LSAI was causing health-related problems and communicable diseases such as malaria, schistosomiasis, and diarrhea. Other study also documented LSAI impact on child health related issues (Brandt, 2017). Dwivedi (2002) looks at development-induced dispossession (such as LSLIs) in two ways. The first argument is that development-induced dispossession is inevitable, and minimizing the effect of dispossession is necessary. The second view sees dispossession as the ultimate ugly face of development. Instead of improving people's wellbeing, development—via dispossession —causes the disruption of their existing ways of life and the denial of property rights. Generally, without taking either side of these views, this study suggests that the LSAI has dispossessed rural households involuntarily in favor of developing large-scale crop production projects (rain-fed and irrigation) and without providing adequate resettlement areas with appropriate housing and services (water and sanitation), and productive (cultivating) and grazing land. Instances of unreasonable dispossession, where households are obligated off their land without their consent and compensation, and most of the negative impacts of LSAIs on the dispossession of the local community, have been widely reported (Asongu and Nguena, 2015). Another study in semi-agro-pastoral areas of Ethiopia confirmed that LSAIs are causing household dispossession (Bekele et al., 2021). Moreover, this study suggests that the LSAI has created unplanned human settlements and disturbed the standard of living. However, if the dispossession in the future is

inevitable, it should be implemented with community consultation and adequate land improvement strategies (Bekele et al., 2020; Shete, 2020).

Our survey result indicated that 65.6% of respondents appealed to the local government to monitor and evaluate the performance of the LSAI, while 93% of the respondents expressed willingness to return the compensation if the government permits the return of the previously owned land. Moreover, this study suggests effective monitoring and evaluation facilitate early identification of implementation challenges, while also facilitating corrective action and keeping implementation on track. In fact, the Elfora Agro-Industries P.L.C. Shalo–Melega LSAI agricultural project did not conduct an EIA (environmental impact assessment) prior to implementing the Elfora Shalo–Melega LSAI in Shashamane rural district; as a result, the LSAI effects are not minimized and the positive impacts are not enhanced. In many cases, the implementation of investment projects begins before the EIA is submitted and approved (Neudert and Voget-kleschin, 2021).This lays the foundation for future improvements (Economic Commission for Africa, 2016).Companies and investors who cannot recognize and engage effectively with local stakeholders may suffer significant financial, operational, and reputational risks (U.S. Agency for International Development,2018).Because conflicts can result in construction delays, business interruptions, compensation payments, or other indirect operating costs for businesses and investors, these risks are sometimes only noticeable to the firm management (Webler et al., 2001).

Hence, our closure examination shows that the issue of land dispute is common in the study area. To begin, there are four different types of land disputes that are pertinent to this study: disputes among farmers, disputes between farmers on the one hand and the government on the other, disputes between farmers on the one hand and investors on the other, and disputes between an investor on the one hand and the government on the other. Over time, disputes between farmers and investors have become increasingly violent, and when this happens, the federal and regional security forces frequently step in to mediate the situation and prevent farm equipment, irrigation systems, and crops from being destroyed by enraged local farmers and landless youths. According to a Human Rights Watch (2016b) report, one of the key causes of Ethiopia's 2016 government shift was the "Addis Ababa Integrated Development Master Plan," a controversial proposal to expand the municipal boundaries into the farmland of the Oromia region and the lack

of monitoring, low gain, and corruption of megaprojects such as the LSAI. Shashamane's urban and rural districts were among the protest locations in 2016.

2.9. Conclusions

Significant findings are drawn from this study. When examining stakeholder consultation and local rural communities' involvement in the LSAI, it is clear that consultation with affected and interested parties was required for major projects such as large-scale rain-fed and irrigation projects. Among the importance of consultation and including the view of those affected and interested in the project, was also to address the negative potential social, economic, and environmental impacts of development projects. As a matter of fact, transparent land transactions must include community participation. In this regard, we argue that LSAI proponents and investors and the government should open their doors to involve local people and to implement FPIF, which must also constitute a conclusive, fair, open and transparent, credible consultation process. This builds confidence and trust among the government, the proponents, and the local community.

Public participation must at least give individuals who will be directly affected by the plan a chance to voice their opinions and express any potential social, environmental, or other effects. Concerning this, our study reveals that households that a community with an LSAI have reacted unfavorably to the LSAI projects from the very beginning, partly because they were neither consulted openly nor informed in the first place, and partly because of their fear that such an LSAI will have an unwelcome consequence on their settlement, farm grazing, and forest land. Additionally, this study offers proof of the LSLI-induced dispossession and compensation mechanism in Ethiopia's Shashamane district. The findings show that the LSAI is forcing local rural households out of their settlement areas, leaving them without suitable housing and services (such as water and sanitation), and preventing them from accessing pastures and other resources in the research region. Ethiopia has always prioritized small-scale agricultural production as a development strategy, despite recently adopting a plan to promote LSAIs. Export-oriented agricultural investment is a key component of Ethiopia's overall development strategy, which calls for the country to reach middle-income status by 2025; in this regard, the LSAI was affecting local community residents, farms, and grazing land. If relocation is inescapable, it is

best to obtain everyone's cooperation in advance, pay them, and give everyone access to communal resources.

Corrective action is also required to give the dispossessed local community access to resources from the common pool. Access to grazing areas can be guaranteed for rural people through responsible agricultural practices on LSLIs. More specifically, the government should: (1) closely monitor the proper implementation of investment projects for which small-scale farmers' land has been appropriated and (2) evaluate the processes and outcomes in terms of their potential benefits to the disadvantaged smallholders and rural people whose livelihoods solely depend on their lands. The study also revealed that land is the most important source of income, if not the only one. Furthermore, the region had few other sources of income and was dependent on smallholder agriculture. The published literature also implies that enhancing monitoring and evaluation closely improves the proper implementation of investment projects. (3) The government should also revise the compensation policy and resettlement policies, and the Ethiopian and Oromia Regional State Investment Authority should adopt guidelines and approaches that regulate LSAIs to ensure the protection of the tenure systems and specifically consider land rights in the investment. Compensation should, as a matter of legitimacy, lead people to better lives. However, we contend that governmental protections of community rights must be respected and upheld. States can fulfill their obligations and fulfill their responsibilities by putting into practice concepts such as participation, FPIF, nondiscrimination, and accountability. In the event of opposing land claims, it is crucial to account for the land tenure system, current inequalities, and inequities while also providing an effective means of resolving conflicts.

CHAPTER THREE

3. Livelihood Impacts of Large-Scale Agricultural Investments Using Empirical Evidence from Shashamane Rural District of Oromia Region, Ethiopia[16]

Abstract

The impact of Large Scale Agricultural Investments (LSAI) on local people's livelihood improvement has received less attention than it deserves in Ethiopia in general, and the Oromia regional states in particular. The main objective of this study was to analyze the impact of LSAI, which began operations in 2008, on 10,000 hectares of fertile land in the Shashamane rural district of Oromia region, Ethiopia to enhance the quality of life of the local people. A quasi-experimental design was used to achieve this goal. We obtained primary data from 300 households, comprising 134 treatment homes (households in a community with LSAI) from the Shashamane rural district and 166 control households (households in a community without LSAI) from the Shala district using systematic random sampling. Analysis was undertaken using principal component analysis (PCA) and propensity score matching (PSM). The Sustainable Livelihoods Framework (SLF) was used to examine the theoretical concept with empirical findings. According to the Average Treatment Effect on Treated (ATT) results, the treated households' natural, human, and financial capital were −0.91, −0.81, and −0.15 less than control families, respectively. Loss of household livelihoods has deepened and exacerbated local impoverishment. Businesses have not mechanized and controlled these sizable portions of the parcel; instead, peasants have worked on them and exploited the idle parcel. The research suggests that the government's pro-LSAI investment policy is desirable. However, insufficient institutional frameworks for safeguarding local people's livelihoods, LSAI malpractice, and lack of ongoing follow-up all contribute to the LSAI strategy's failure to deliver on its promise. It is imperative to ensure that LSAI are implemented responsibly and sustainably in order to reduce its negative impacts on peasants. The creation of jobs, the improvement of services, and accountable ventures are all beneficial to local communities.

Keywords: Sustainable Livelihoods Framework; Poverty; Principal Component Analysis; Livelihood; Oromia Regional State; Ethiopia.

[16] Paper II. Published as: Alemu, Y.; Tolossa, D. Livelihood Impacts of Large-Scale Agricultural Investments Using Empirical Evidence from Shashamane Rural District of Oromia Region, Ethiopia. Sustainability 2022, 14, 9082. https://doi.org/10.3390/ su14159082

3.1. Introduction

As a result of the 2008 increase in global agricultural commodity and energy prices (OECD,OECD and FAO, 2019), high population pressure in rural areas, the rising middle-income population in the urban centers, and swift inflation in agriculture services, large scale agricultural investment (LSAI) in developing and low-income countries is now being promoted (Godfray et al., 2010; Wulp,2013). Even though the land is globally limited, its fertility is required to produce agricultural commodities (Cervantes-Godoy et al., 2014). The increasing demand for fertile land combined with a limited resource basis will cause the increasing scarcity of agricultural land (Godfray et al., 2010; Nolte, 2014). The agriculture sector, dominated by small farms with less than 2 hectares and managed by family labor, is the backbone of the Ethiopian economy (Zerssa et al., 2021). Ethiopia is a rural country with almost 80% of its population living in rural areas, and land is the most central means of livelihood for rural farmers (Welteji,2018). Ethiopia has immense potential for investment for several reasons. Agricultural investment opportunities are the major investment areas in the country (Schoneveld, 2017) and since 2008, the scale and pace of ongoing LSAIs have been remarkable (UNDP, 2014). These include large-scale agro-investments, small-scale intensive agri-business such as floriculture; investment in other sectors that require agricultural raw materials (for instance, breweries); and the industrial construction and mushrooming of cities and towns (Wiersinga and De Jager, 2009;Vhugen, 2012a) . On top of this, Ethiopia has great market potential in crops and livestock production compared to the Middle East, Europe, and Asia. For the past five consecutive years, the agriculture sector has grown faster with a more than 11% average annual growth rate, and this growth has triggered an increase in the domestic market for both livestock and food crops (Rahmato, 2011). Under the Old Regime (Imperial period), large–scale mechanized agriculture (commercial farming) was seen as a vibrant force for the rural revolution, leading to mechanized agriculture expanding rapidly and in a variety of ways by the 1960s. Cereal pulses, sesame seeds, pepper, fruit, and vegetables, which were the most significant, were among the prominent expanding goods. Early mechanized farms focused on a small number of commercial crops such as sugarcane, cotton, and coffee, but by the 1970s, a wide range of crops was being grown for both the domestic and international markets, with cereal pulses, sesame seeds, pepper, fruit, and vegetables being the most significant. The full extent of mechanized agriculture will probably never be known because the registration of large-scale farm registration has been limited to

district administration (Rahmato 2011; Cochrane and Legault 2020). Since the 1975 radical land reform, the de jure land tenure system throughout Ethiopia has stated ownership (Proclamation No. 1/1995). Following the provisions of the current FDRE's (Federal Democratic Republic of Ethiopia) Constitution, the land tenure system allows the federated states in Ethiopia to develop their own land administration and agricultural investments policy[FDRE, 1995]. Ethiopia, and the Oromia regional state investment-friendly policies, are based on the premise that the promotion of agriculture investments will lead to positive synergies for improvements in the livelihoods of rural smallholders, which will provide previously unavailable employment and off-farm income opportunities that will result in even greater benefits (MoARD, 2010).

In recent times, land transactions for large-scale commercial farming in Ethiopia have experienced a significant increase (Baumgartner et al., 2015; Cotula et al., 2009; Deininger and Byerlee, 2011). To secure these opportunities, the Government of Ethiopia has strategically encouraged land deals for LSAIs as part of its five-year Growth and Transformation Plan (GTP), envisioning that the nation will secure food and cross the threshold prominence of lower-middle-income countries by 2025 (Breu et al., 2016;National Planning Commission, 2016). In the Oromia regional state, the government has leased out more than one million hectares of land to foreign and domestic investors who are supposed to cultivate food and biofuels in large-scale farming (Vhugen, 2012b). In the country, the Oromia regional state is among the top three regions regarding LSA. These LSAIs have contributed to a rise to the recent widespread Oromo protests (2014–2018), and consequently, more than 1000 people have been killed, and tens of thousands exposed to gross violations of human rights (Human Rights Watch, 2016a). Furthermore, in terms of the land size and scale of its acquisition, this is likely to continue because of: (i) the urgency toward the production of agro-fuels as an alternative to fossil fuels; (ii) the scarcity of land resulting from population growth and urbanization; (iii) the intense competition for prices and global food shortages as demand increases from big economies such as India and China; (iv) the scarcity of fresh water in some regions; and (v) an increased demand for certain raw materials from tropical countries (Godfray et al., 2010;Wulp, 2013). Although research has been conducted on various positive and negative aspects of large-scale agricultural investments (LSAIs), such as land acquisition, government revenue, human rights violations, migration, land compensation, domestic market expansion, and job creation, more research is needed to examine the overall livelihood impacts of LSAIs (Baumgartner et al., 2015).

Moreover, studies (Cervantes-Godoy et al., 2014; Anseeuw et al., 2012) have also discussed that there is little information on the impacts of agricultural investments on the improvement in the livelihoods of the local community in implemented areas and the country at large. Moreover, the impact of LSAIs on livelihood improvement above all in Oromia has been, however, not yet fully understood. As a result, the livelihood impacts of Elfora-Agro-industrial P.L.C (Private Limited Company) in Shashamane rural district, Oromia Region, Ethiopia, where the operation began in 2008, are unknown. The purpose of this study was to determine whether or not LSAIs improve the local community livelihood assets and associated outcomes. Natural, human, financial, physical, and social capital were used to assess the improvements and overall well-being or otherwise of the local community's livelihood conditions. The paper thus makes three contributions. Frist, LSAI is a complex subject that can vary substantially depending on the nation, region, and specific investing circumstances. Considerations for geography, demographics, agriculture, and land ownership must be made, in addition to the investment climate, economic conditions, and infrastructure conditions. This study is focused on Ethiopia's Oromia regional state because of these regional contextual distinctions. Second, it provides insights into the impact of LSAI on the livelihoods of the local community, which is one of the most debated issues; third, it employs all of the livelihood assets or the five livelihood indicators for its multiple dimensions as well as robust econometric models such as PSM (propensity score matching). The following sections present the analytical and conceptual framework, materials and research method, results, discussions, and conclusions.

3.2. Analytical and Conceptual Framework

To arrive at a comprehensive understanding of the complexity of LSAI. We integrated the political ecology and SLF perspectives. This link provides a thorough view on the socioeconomic dimensions of such investments. For example, the emergence of large-scale agricultural operations through land deals can result in the loss of small-scale farmers' natural and human resources. In addition, social networks will disrupted, and human, financial, and physical resources will depleted. In such circumstances, a combined approach allows for a more nuanced understanding of the effects of large-scale land investments on local people, taking into account both the larger socio-political backdrop and the immediate livelihood repercussions. Further, aiming to examine the impact of LSAI on the livelihood (the means of gaining a living) of local people in Oromia regional state, Ethiopia, this study employed the binary logistic model,

and PSM (de Haan and Zoomers, 2005; Bekele et al., 2021). Several authors have defined the term sustainable livelihood in different ways in connection with natural resource management, agricultural development, poverty alleviation, and food security. Nonetheless, considering the most common definitions, a sustainable livelihood can be defined as people's capacity to maintain living while surviving shocks and stresses and enhancing their quality of life on a long-term basis (i.e., both now and in the future) without jeopardizing the livelihood options of others (Hebinck and Bourdillon, 2002; Small, 2007;Lindenberg, 2002;Scoones, 2009). In light of this understanding, extensive studies were conducted to examine the livelihood contexts in multiple countries, including Mali, Bangladesh, Zimbabwe, Ethiopia, and Uganda (Thennakoon et al., 2017). Various institutions including the FAO of the United Nations, the Overseas Development Institute, the Institute of Development Studies, and the European Union, and non-governmental organizations such as the Cooperative for Assistance and Relief Everywhere Inc. and OXFAM and donors (e.g., the UK Department for International Development (DFID) and the United Nations Development Program (UNDP) have developed frameworks to analyze the sustainability of livelihoods (Asfaw et al., 2010;Degefa, 2005). The SLF in Figure 1 contains five components: context, assets, policies and institutions, livelihood strategies, and livelihood outcomes (Ashley and Carney, 1999). The context indicates trends and shocks in the external environment of individuals, households, and communities that affect people's livelihoods (e.g., conflict, illnesses, floods, droughts, pests, and diseases) (Serrat, 2017). Livelihood assets are the resources on which people depend to carry out their livelihood strategies. According to some international scientific consensus, livelihood capital comprises five categories vis-a-vis human (education, skills, labor, health), natural (land, forest, water), physical (livestock, roads, markets), financial (savings, credit, income), and social (networks and connections) capital (Small, 2007; Serrat, 2017). Policies and institutions are the formal and informal rules that enable or hinder access to assets, especially land and livelihood strategies (Schoneveld, 2017). Intensification, migration, pastoralism, and non-pastoral activities are some of the livelihood strategies that have been undertaken to live (Serrat, 2017; Scoones, 1998). Livelihood strategies lead to livelihood outcomes. We can relate these outcomes to income and well-being, reducing vulnerability, improved living standards, reducing poverty, and the sustainable use of natural resources (DFID, 1999; Kébé and Muir, 2008; Ellis, 1999). A conceptual framework, used to assess the impact of large-scale land investments on livelihood, is presented in Figure 3.1, which indicates how the

variables interact with each other. Therefore, we adopted the Sustainable SLF to capture the full impact of LSAI on the local community livelihood because SLF recognizes human agency and examines how household livelihood strategies are built (Solesbury, 2005). The SLF is also strong enough to soundly identify explanatory variables used in the empirical analysis. This study answered the following two questions. (1) What are the impacts of LSAI on the local people's livelihood in the Shashamane rural district in the Oromia regional state? (2) What are the possible determinants of household livelihood in the Shashamane rural district affected by LSAIs?

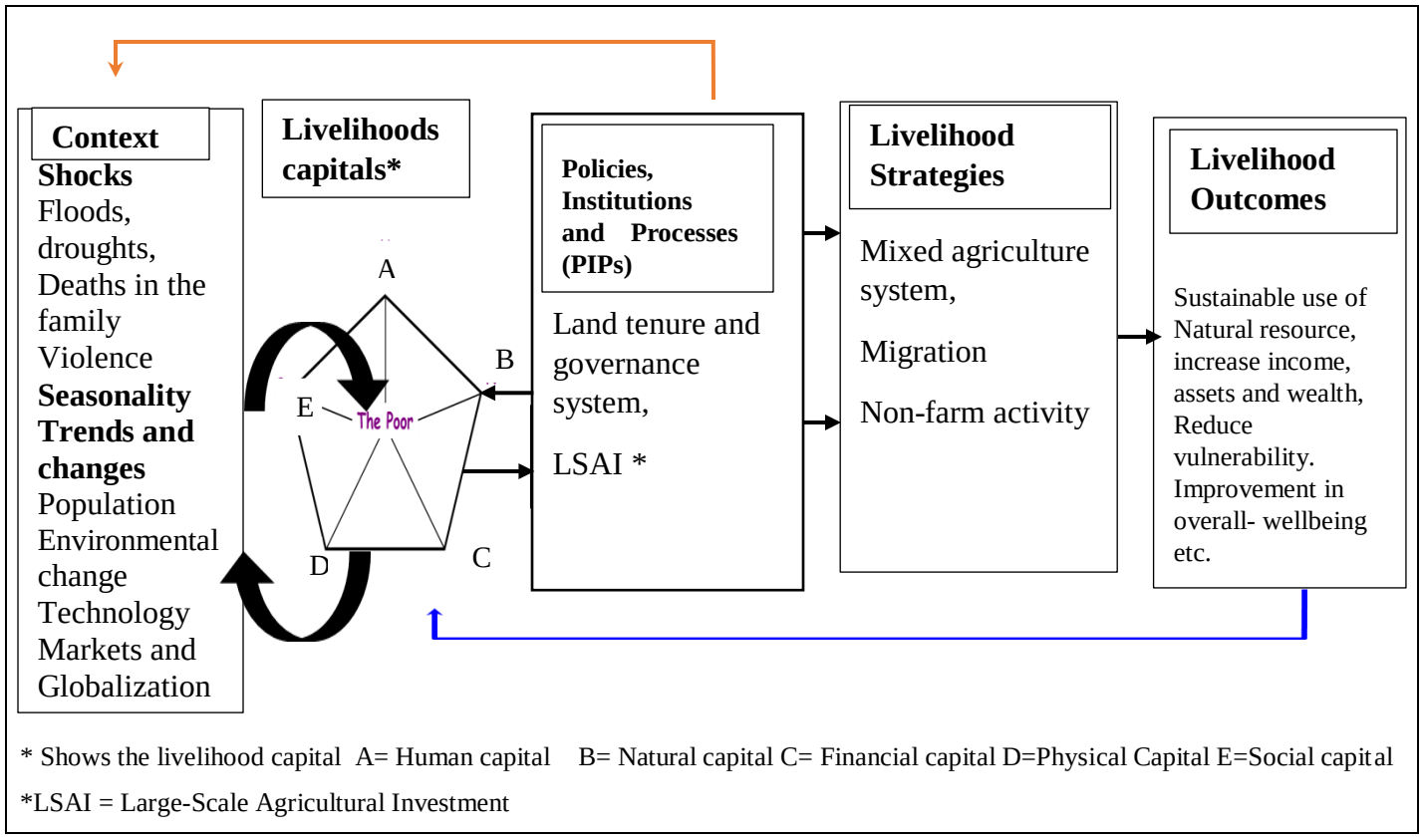

Figure 3.1. A conceptual framework for the study using SLF (modified and adapted from the Department of International Development of the United Kingdom (Ashley and Carney, 1999; DFID, 1999).

3.3. Materials and Research Method

3.3.1. Description of the Study Area

3.3.1.1. Background of Elfora Agro-Industries P.L.C. and Shallo-Melga LSAI Farm Project

Under the MIDROC Ethiopia Investment Group, the Agriculture and Agro-processing Cluster, Elfora Agro-Industries P.L.C., and Saudi Star Agriculture Development companies' lease is

140,000 and 10,000 ha, but the company aims to increase this to 500,000 ha in all parts of Ethiopia for different investment projects in the country (Saudi Star,2012). Elford Agro-Industries P.L.C.'s Shallo and Melge farm is one of the companies engaged in agricultural and agro-processing operations in Shashamane rural district, 250 km (kilometer) from the capital Addis Ababa. This farm currently cultivates and grows commercial maize (*BH661, BH546*), wheat, haricot bean (*Nassri, Awassa, Dume*), white beans, and soya beans using water from Tikure Woha River and groundwater irrigation for the domestic and international market. The selected areas (1) Toga (2), B/Dannaba and (3) D/Calalaqaa kebele (kebele, lower administration unit in Ethiopia) are adjacent to the farm, and are about 5 Km, 7 km, and 5.5 km far in the west, east–west, and east directions of the farm, respectively (see Figure 3.2). The Shala district can be found outside a 30 km radius of Elford Agro-Industries P.L.C. in the west.

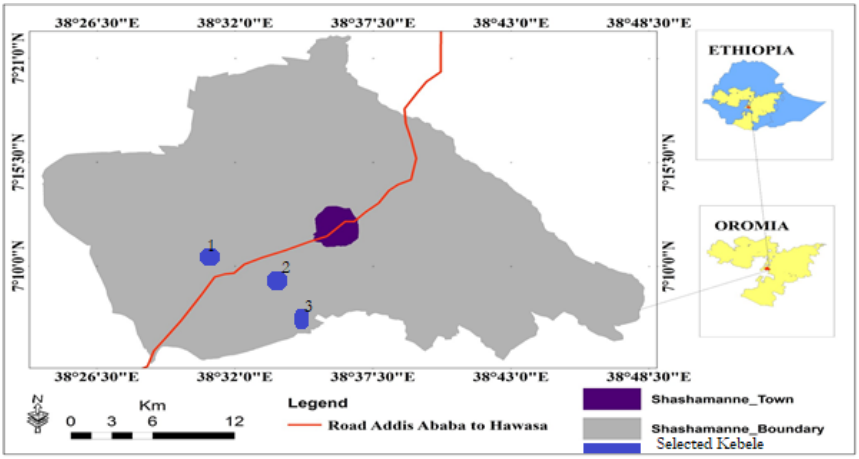

Figure 3.2. Map of the Shashamane rural district and selected kebele in 2016 (WAZF and EDO, 2015).

3.3.2. Research Design

To achieve the objective of the study, a quasi-experimental, and cross-sectional survey research design was implemented, which are among the non-experimental research designs. Primary and secondary types of data were collected through both quantitative and qualitative approaches.

3.3.2.1. Quasi-Experimental Design

Two groups were used to compare the five livelihood capital differences between households in the district and *kebele* with LSAIs, and households in the district and *kebele* without LSAIs were classified as the treated and control groups.

3.3.3. Sampling Techniques and Sample Size

To determine the appropriate sample size, the nature of the population, the purpose of the study, the level of precision and confidence or risk, and the degree of variability in the attributes being measured were major considerations (Singh, 2021; Cochran, 1977). While there are no universal guidelines, the sample size is usually governed by the populace to be tested. Generally, due to easy access to data, cost-effectiveness, and easy management of the data, stratification standards, the study population is selected conveniently. More specifically, multi-stage sampling procedures are used to select sample respondents. First, the Shashamane rural district was selected conveniently for the reason where Elfora Agro-Industries P.L.C. and Shallo-Melga LSAI Farm Project is found and a noticeable capacity of having the LSAI program for more than 10 years. Furthermore, the motive for selecting the area was due to its higher population, the presence of many other private small to LSAI and the limited study on livelihood capitals, and the fact that it is a future investment focus area. In this stage, the Shale district, which is 30 kms far from the investment, was also selected. In the second stage, from the Shashamane district, seven *kebeles* that were less than or equal to 10 kms far away from the investment, and 19 *kebeles* from the Shale district that had similar livelihoods before the investment were selected. In the third stage, six (three from Shashamane and three from the Shale districts) *kebeles* were randomly selected. To determine a representative sample, Cochran (1977) was applied considering a 95% confidence level (z = 1.96), 70% estimated proportion of an attribute in the population (p), and 5% of the level of precision (E) from 4698 (6% or 300 of the total population was sampled) total households. Finally, 300 sample sizes, 134 households from the LSAI area (treatment group) and 166 households from non-LSA or without a LSAI (control group) were identified using a simple random sampling technique from each stratum.

$$n_0 = \frac{Z^2 pq}{e^2} = \frac{1.96^2 \times 0.65(1-0.65)}{0.05^2} = \frac{3.841 \times 0.65 \times 0.3}{0.0025}$$

$$= 322.64$$

where n_0 is the sample size; z = is the selected critical value of desired confidence level; p = is the degree of variability in the population; $q = 1 - p$ and E is the desired level of precision.

$$n = \frac{n_o}{1+\frac{(n_o-1)}{N}} = n = \frac{322.64}{1+\frac{(322.64-1)}{4{,}698}} = 302 \sim 300$$

Where = n desire sample size,

Where n = desired sample size.

A commonly used margin of error in social science surveys is 10% of the expected average value (Singh, 2021). Apart from this, 3%, 5%, 7%, and 10% of margin of error are accepted in determining the sample size. Considering available resources to manage the study, a 5% precision level was used to determine the sample size (Israel, 1992; Bartlett et al., 2001).However, for this study, and considering the available resources and time to manage the study, we used a 0.5% precision level and a 70% estimated proportion of an attribute in the population (*N*) to determine the sample size. This 300 was distributed through to the six *kebele* using the proportional to size (PPS) formula (see Appendix B, Table B3):

$$n_i = \frac{n_0 \times N_i}{N}$$

where n_i is the sample of strata I; $N_i s$ is the population of strata; n = total sample size

$$n_1 = \frac{n_0 \times N_i}{N} = \frac{300 \times 2098}{4698} = 134$$

$$n_2 = \frac{n_0 \times N_i}{N} = \frac{300 \times 2600}{4698} = 166$$

3.3.3.1. Sampling Producer

This study employed a systematic sampling.

$$K = \frac{N}{n} = \frac{4698}{300} = 16$$

So, every sixteenth household was selected until the sample size was completed.

3.3.4. Methods of Data Analysis

Both descriptive statistics and an econometric model were employed. Data collection was undertaken at the Shashamane district (Toga, B/Dannaba, and D/Calalaqaa) and Shala District *kebeles* (Solicha, Waka, and Bute) with the time interval from October to December 2020. Before collecting the relevant data, the questionnaire was pretested and finally approved through face validity and its reliability was also confirmed by estimating the Cronbach's alpha ($\alpha = 0.79$), which is within an acceptable range of the coefficients of reliability (Taber, 2018). After verification and coding of the filled-in questionnaires, the survey data were entered into Stata/MP version 16.0 and PS SS version 25. The questionnaire used for this study was based on close- and open-ended type of questions, and the structure was classified into five livelihood capitals: A—natural capital such as productive land, irrigation, soil, forests, water, air, and so on, B—human capital such as education, skills, knowledge, the ability to work, and good health,

C—financial capital such as savings in bank or microfinance, access to financial services, and regular inflows of money access to institutions and savings, D—physical capital such basic infrastructure, for example, transport and communication systems, shelter, water and sanitation systems, and energy infrastructure, E—social capital such membership of groups or organizations as well as the federal, regional, and local Institutions governing LSAI and outcomes as depicted in the conceptual formwork (Figure 1). The descriptive statistics used include the mean, standard deviation, minimum, paired sample *t*-test, and chi-square test to make important comparisons. To analyze the impact of LSAIs on the livelihood of the local people, a PSM analysis was applied (Heinrich et al., 2010).

3.3.4.1. Econometrics Model Analysis

Based on the surveyed data type, ease of analysis, and interpretation, PSM econometric analysis tools are appropriate for the study. The objective of employing PSM is to minimize the selection bias from treatment groups in observational datasets. It was used to form a comparison group that is similar to the treatment group in terms of the observable characteristics and to estimate the impact of LSAI on the livelihood level of the households. Moreover, a simple comparison of these two groups may result in serious biases and confusing conclusions. PSM is a pertinent approach to avoid such problems of bias and misleads, as proposed by several authors (Bekele et al., 2021; Liu and Ripley, 2014; Thavaneswaran and Lix, 2008), and is one of the existing econometric methods to deal with these biases (Heinrich et al., 2010). The model was also fitted to provide a cause and effect explanation in a quasi-experimental design and properly construct statistical treatment and comparison groups (Rosenbaum And Rubin, 1983) and it measures the magnitude of the impact in terms of the Average Treatment Effect on the Treated households (ATT). PSM can be used to estimate the program or impact of the policy change effects whenever the program implementation generates pools of treated and untreated individuals from which the two matched groups can be drawn. The other reason to implement PSM among other non-experimental methods is that evaluation research lies in devising methods to reliably estimate (the impact of policy change), so that informed decisions about program expansion and termination can be made (Khandker et al., 2010, (FAO, 2009b). Although PSM offers significant advantages, it also has certain limitations. For example, it assumes that all relevant confounding variables are observed, which may not always be the case (Heinrich et al., 2010).Additionally, it

cannot control for unobserved variables, which can lead to a loss of observations. Furthermore, PSM requires some overlap in propensity score distribution (Liu and Ripley, 2014).

In order to overcome these limitations, this study implemented different strategies. These strategies included matching on more covariates and conducting sensitivity analyses. By doing so, the study was able to address the challenges associated with PSM and obtain more accurate results.

The details of the PSM model and its specifications are given below.

Model Specification

The PSM estimators of ATT can be written by Caliendo (2008) as:

$$ATT = E(Y_1 - Y_0 / D = 0, P(X)) = E(Y_1 / D = 1, P(X)) - E(Y_0 / D = 0, P(X)) \quad (1)$$

3.3.4.2. Sensitivity Analysis

This part is the last step of the PSM was conducted to check whether the findings of the study are free from hidden bias. The basic question to be answered here is whether inference about the treatment effects may be changed by unobserved factors (Thavaneswaran and Lix, 2008; Caliendo and Kopeinig, 2008). The estimation of treatment effects with matching estimators is based on the confoundedness or selection of observable assumptions. However, if there are unobserved variables that affect assignment into treatment and the outcome variable simultaneously, a 'hidden bias' might arise (Heinrich et al., 2010). Since it is not possible to estimate the magnitude of selection bias with non-experimental data, the problem can be addressed by sensitivity analysis (Caliendo and Kopeinig, 2008). To check for unobservable biases, the Rosenbaum bounding approach sensitivity analysis was performed on the computed outcome variables for deviation from the conditional independence assumption (Heinrich et al., 2010; Liu and Ripley, 2014).

3.3.4.3. Livelihoods Asset/Wealth

As livelihood asset/wealth index is used as an outcome variable, we were interested in measuring and scrutinizing whether or not it is impacted by the intervention variable (LSAI). The concept of livelihoods is a reference point for a wide range of people involved in different aspects of development policy formulation and planning. As analysts point out, there are two broad approaches to defining livelihoods. One has a narrower economic focus on production, employment, and household income. The other is to take a more holistic view that unites concepts of economic development, reduced vulnerability, and environmental sustainability

while building on the strengths of the rural poor (Scoones, 2009; Kébé and Muir, 2008). The livelihood concepts and methodological approaches used for this research are rooted in the conceptual framework of sustainable livelihoods as presented in Figure 1. This study also used the FAO classification of the five livelihood assets under different livelihood components (FAO, 2009b). Therefore, to properly address the multi-dimensional nature of wealth, we operationalized it along the five livelihood assets dimensions used as indicators to capture the livelihood status of the households as follows. (i) Human capital includes labor, skills, creativity, education, and a social network; (ii) natural capital refers to one's access to natural resources such as land, water, minerals, forest, pastures, and crops; (iii) physical capital is about food stocks, livestock, tools, or machinery; (iv) financial capital refers to money, loans, credit, remittances, state transfers, or savings; and (v) the last 'capital' is social capital, which mainly concerns the quality of relationships among different people and the extent to which one can rely on support from the family or perhaps mutual assistance (Lindenberg, 2002;Stewart Carloni et al., 2006).

3.3.4.4. Weight Allocation and Data Requirement

To identify the relevant variables and arrive at relative weights, to consolidate these variables into a single index, principal components analysis (PCA) was chosen. Recently, many scholars have used principal component analysis to measure the sustainable livelihood adopted by the Department for International Development (DFID), poverty, and vulnerability (FAO, 2009a; Fitawek and Hendriks, 2021; Wineman and Liverpoo-Tasie, 2017). We employed data-driven non-price weighted indices of PCA because PCA is a broadly used statistical-based technique to construct a sustainable livelihood index and determine a single variable, one for each of the five livelihood assets. It is a type of factor analysis that is often used to reduce dimensions of data, or find out hidden variables, by digging out a linear combination that preeminently depicts the co-variance among all components (United Nations Statistics Division, 2005; Bartholomew, 2010). Every household is categorized by an asset index, Ai, which is a function of a set of variables, *aij*, representing their ownership of asset *j*:

$$A_i = f(a_{ij}) = f(a_{i1},...,a_{ik}) \quad (2)$$

where $j = [1;k]$.

Each household asset index, A_i, can, consequently, 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 as of the following equation.

$$A_i = (v_1 \times a_{i2}) + (v_2 \times a_{i2}) + ... + (v_k \times a_{ik}) \quad (3)$$

This index can be constructed based on the data related to household assets by creating an m × n matrix, X, where n represents the ownership of asset items (columns) to be collected from m households (rows). Subsequently, 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 × n matrix, Y. Furthermore, the n × n correlation matrix, R, is calculated from the normalized data matrix, Y.

$$(R - OI)V = 0 \quad (4)$$

Based on the above equation, *O* and *V* can be solved [59]. In Equation (3), *O* represents a vector of eigenvalues, *I* stands for an identity matrix, and V represents a matrix of eigenvectors related to the eigenvalues in *O*. Each eigenvector will then be balanced to check 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 dataset. It assigns the larger weights to assets that largely vary across households; hence, assets found in most households receive small weights. In this study, LSAI was taken as the dependent variable, which is explained by different demographic, socio-economic, and institutional factors. Moreover, the treatment and control households differed in several characteristics (such as sex, age, family size, dependency ratio, land size, etc.), which might influence the probability of participation in the LSAI. Based on previous studies (Bekele et al., 2021; Fitawek and Hendriks, 2021; Teklemariam et al., 2016) specific conditions in the study area and 14 independent variables were selected. The full lists of the explanatory variables' names, descriptions, units of measure, and expected signs are presented and summarized in Table 1.2.

3.4. Empirical Results

3.4.1. Descriptive and Summary Statistics for Treatment and Control Sample Households

The analyzed data consisted of 300 properly filled questionnaires, where 134 (44.6%) of respondents were from Shashamane rural households (in a community with a LSAI) and 166 (55.4%) of respondents were from the Shala district (household community without a LSAI) in the West Arsi Zone, Oromia Region, Ethiopia. The results of the descriptive statistics presented in Table 1 show that there was a significant difference between the treatment and control groups in their age, education, total family size, dependency ratio, farmland size, total livestock owned in tropical livestock units, distance to potable water points, availability of nearest market, training on agricultural technology, and access to credit. However, no significant difference was observed between the two groups in variables such as sex, perception of aid, availability of all-weather roads, and the nearest health center. The results of the descriptive statistics presented in Table 3.1 also show that 95.6% of households were male households. Out of the total respondents, 85.7% of respondents went to school, and the majority had completed primary education. However, only 14.3% did not have the chance to go to school. The results of the study also revealed that the market was accessible for about 65.6% of the treatment households, whereas 81.15 of the control groups accessed the market for their products. Regarding the accessibility of water, only 7.46% of respondents from the treatment group accessed at least 20 L of water per person per day from a source 10 km away from their dwelling in the past year, but it was 30.7% for the control group. The percentage distribution of the treatment and control groups concerning access to training in agricultural technology in the past year was 75.3 and 57.8%, respectively. The chi-square test showed that there was a significant difference between the treatment and control groups in sex, education, market access, access to water of at least 20 L of water per person per day, and agricultural technology at less than 1% significance level.

Table 3.1. The descriptive and Chi-square statistics results of the treatment and control sample households.

Independent (Categorical Variable)	Control *(f)*	%	Treatment *(f)*	%	Total *(f)*	%	Chi2 (1) (*p*-Value)
Sex of respondent							
Male	161	96.99	126	94.0	287	95.6	1.5651
Female	5	3.01	8	5.97	13	4.33	(0.211 NS)
Education Level							
1 (None)	10	6.02	33	24.6	43	14.3	81.5932
2 (Informal education)	55	33.13	12	8.96	67	22.3	(0.000)
3 (1–8 Grade)	100	60.24	55	41.0	155	51.6	***
4 (9 Grade and above)	1	0.6	34	25.3	35	11.6	

Access to market							
No	31	18.67	46	34.33	77	25.67	9.5229
Yes	135	81.33	88	65.67	223	74.33	(0.000) ***
Perception on aid							
No	116	69.88	82	61.19	198	66.00	2.4926
Yes	50	30.12	52	38.81	102	34.00	(0.114 NS)
Availability of all-weather roads							
No	64	38.55	59	44.03	123	41.00	0.9190
Yes	102	61.45	75	55.97	177	59.00	(0.338 NS)
Availability of water point *							
No	115	69.28	124	92.54	239	79.67	24.7647
Yes	51	30.72	10	7.46	61	20.33	(0.000) ***
Access to the nearest health center							
No	53	31.93	39	29.10	92	30.67	0.2780
Yes	113	68.07	95	70.90	208	69.33	(0.598 NS)
Training in agricultural technology							
No	70	42.17	33	24.63	103	34.33	10.1200
Yes	96	57.83	101	75.37	197	65.67	(0.000) ***
Access to credit							
No	85	51.20	38	28.36	123	41.00	15.9992
Yes	81	48.80	96	71.64	177	59.00	(0.000) ***

* Source of clean drinking water within 10 km of the dwelling, and at least 20 liters of water per person per day from a source, and during the normal period. *** $p < 0.01$.

In Table 3.2, the *t*-test results are shown of the characteristics of the respondent households selected. The mean age of treatment households was 42 years, whereas it was 45 years for the control households. This implies that younger households participated in the LSAI project. The mean total family size of treatment households was 4.88 years and the mean total family size of control households was 5.83 family members, implying that relatively fewer households participated in the LSAI project. The results of the *t*-test showed (−4.4246) that there was a statistically significant mean difference between the treatment and control households at 1%. The households of the treatment group had on average fewer family members compared to the control group. Furthermore, the mean dependency ratio of the treatment and control sample households was 94.89 and 125.63, respectively. The results of the *t*-test showed that (−4.33) there was a statistically significant mean difference between the treatment and control households in their dependency ratio at a 1% significance level. The mean landholding size of the treatment group and control group households was 1.19 and 2.06, respectively. This shows that the control groups had a relatively larger land size than the treatment groups. The results of

the *t*-test (−11.21) showed that there was a statistically significant mean difference in far/land size between the treatment and control households in their dependency ratio that was significant at 1%. The mean livestock holding of the treatment and control households was 5.12 and 6.58 in TLU (total livestock unit), respectively. This shows that the control groups had a relatively large TLU than that of the treatment groups. The results of the *t*-test showed that there was a statistically significant mean difference between the treatment and control households at 1%.

Table 3.2. The descriptive and t-value results of the treatment and counterfactual sample households.

Continuous Variable	Treatment N = 134	Counterfactual N = 166	t-Value	*p*-Value
	Mean	Mean		
Age of respondents	42	45	−2.52	0.012 **
Total family size	4.88	5.83	−4.4246	0.000 ***
Dependency ratio	94.89	125.63	−4.3346	0.000 ***
Farm Land size	1.19	2.06	−11.2187	0.000 ***
Livestock amount *	5.12	6.58	9.2858	0.000 ***
Distance to potable water points	2.30	2.07	5.1781	0.000 ***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Source: Own survey result, 2020.

3.4.2. Descriptive and Summary Statistics of Livelihood Impact Indicator

The study results also showed a statistically significant mean difference between the five livelihood impact indicators. The average natural capital for treatment households was lower than (0.05) that for the control households (0.97) with a standard deviation of 0.15 for the treatment and 0 for the control groups, respectively. This implies that most precious natural capital resources are diminished due to LSAI (source). The average human capital for treatment households was 0.13 and the average human capital for control households was 0.95 with a standard deviation of 0.17 and 0.06, respectively. The mean financial capital for treatment households was 0.00, whereas for the control households, it was 0.05 units. Physical capital was higher for the treatment households (0.98) than for the control households (0.043). The average social capital was higher for the treatment households (0.812) than for the control households (0.00). This implies that LSAIs have a positive impact on the treatment of households in social capital due to the highest population. The results of the *t*-test showed that there was a statistically significant mean difference between the treatment and control households in their natural, human, financial, physical, and social capital at a 1% significance level (see Table 3.3).

Table 3.3. The descriptive statistics of the livelihood impact indicator variables.

Variable	Sample	Mean	Std. Err.	Std. Dev.	t-Value	*p*-Value
Natural capital	Control (Obs = 166)	0.97	0	0	78.4220	0.000 ***
	Treatment (Obs = 134)	0.05	0.01	0.15		
Human capital	Control (Obs = 166)	0.95	0.00	0.06	56.6020	0.000 ***
	Treatment (Obs = 134)	0.13	0.01	0.17		
Financial capital	Control (Obs = 166)	0.15	0	0	18.1414	0.000 ***
	Treatment (Obs = 134)	0.00	0.00	0.10		
Physical capital	Control (Obs = 166)	0.04	0	0	−76.6803	0.000 ***
	Treatment (Obs = 134)	0.98	0.01	0.15		
Social capital	Control (Obs = 166)	0.00	0	0	−83.8677	0.000 ***
	Treatment (Obs = 134)	0.81	0.01	0.12		

*** $p < 0.01$. Source: Own survey result, 2020.

3.4.3. Regression Result of the Binary Logistic Model

Of the total 14 variables included in the study, eight were significant (see Table 3.4). The positively significant variables were sex ($p = 0.068$, at 10% significant), total family size ($p = 0.003$, at 1%, significant), dependency ratio ($p = 0.018$ at 5%), farmland size ($p = 0.000$, at 1% significant), total livestock amount ($p = 0.000$, 1% significant), and training on agricultural technology ($p = 0.040$, at 5% significant). However, access to credit ($p = 0.000$) and availability of the nearest market ($p = 0.002$,) negatively and significantly influenced the probability of program participation at 1% significance. This negative relationship between access to credit, availability of the nearest market, and program participation implies that the probability of program participation decreases with an increase in access to credit and availability of the nearest market. Age, education, perception of aid, distance to potable water points, the availability of all-weather roads, and the availability of the nearest health center were not significant in explaining those participating in the LSAI program.

Table 3.4. The logistic regression model estimates of participation in the LSAI.

DeptV (Pro. Intervention)	dy/dx	Coefficient	Std. Err	z	$p > \|z\|$
Age	0.27	1.112	0.78	1.41	0.157
Sex	0.00	0.0248	0.01	1.83	0.068 *
Education	0.072	0.292	0.21	1.39	0.163
Total family size	0.072	0.293	0.10	2.93	0.003 ***
Dependency ratio	0.00	0.007	0.00	2.36	0.018 **
Farm land size	0.29	1.187	0.24	4.80	0.000 ***
Total Livestock amount	0.12	0.496	0.12	3.88	0.000 ***
Perception on aid	0.03	0.135	0.35	0.38	0.706
Distance to potable water points	−0.18	−0.742	0.45	−1.64	0.101
Availability of all-weather road	−0.06	−0.277	0.33	−0.83	0.409
Availability of nearest health center	−0.00	−0.023	0.38	−0.06	0.952
Availability of nearest market	−0.31	−1.299	0.41	−3.15	0.002 ***
Training in agricultural technology	0.18	0.774	0.37	2.05	0.040 **
Access to credit	0.17	−8.534	2.08	−4.10	0.000 ***

Note: *** $p < 0.01$,** $p < 0.05$, * $p < 0.10$. Logistic regression number of obs = 300. LR chi2(14) = 173.52; Prob > chi2 = 0.0000. Log likelihood = −119.47504 Pseudo R^2 = 0.4207.

Source: Own survey result, 2020.

3.4. Propensity Score Estimation Result

This section presents the performance criteria of the matching algorithms and Propensity score and covariate balance test (see Appendix B, Table B8 and B10 respectively), the kernel densities of the propensity scores of the treatment and control households, and common support for propensity score estimation in Figures 3.3 and 3.4.

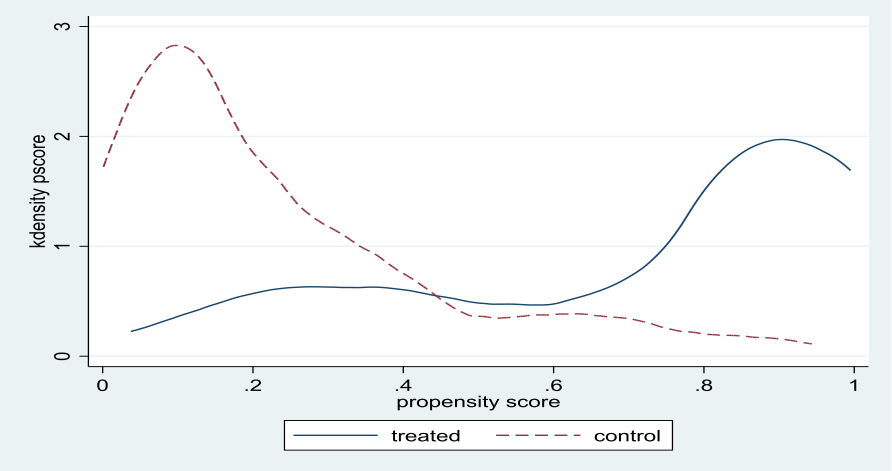

Figure 3.3. The propensity score distribution

.

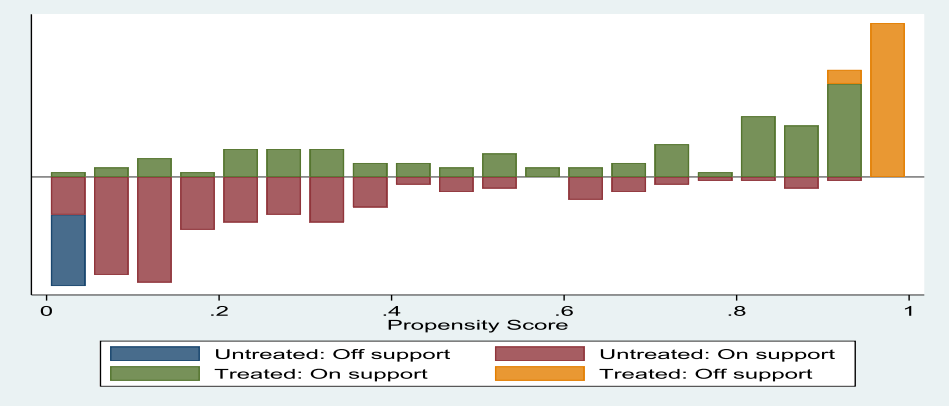

Figure 3.3 The score estimation of the common support for propensity.

3.4.1. Estimation of ATT

This part addresses the average treatment effect on the treated (ATT) households using the five livelihood capital or assets. Table 3.5 shows the results of the Average Treatment effect on Treated (ATT) households on natural, human, financial, physical, and social capital.

Table 3.5. Results of the Average Treatment effect on Treated (ATT) household using the five livelihood capital or assets.

Variable	Sample	Treated	Controls	Difference	Mean S.E.	T-Stat
Natural Capital	Unmatched	0.05	0.97	−0.92 ***	0.011	−78.42
	ATT	0.06	0.97	−0.91 ***	0.017	−51.19
	ATU	0.97	0.14	−0.83		
	ATE			−0.86		
Human Capital	Unmatched	0.13	0.95	−0.82 ***	0.014	56.60
	ATT	0.13	0.94	−0.81 ***	0.022	−35.50
	ATU	0.84	0.13	−0.71		
	ATE			−0.75		
Financial Capital	Unmatched	0.00	0.15	−0.14 ***	0.008	18.14
	ATT	0.00	0.15	−0.15 ***	0.012	−12.20
	ATU	0.00	0.18	−0.18		
	ATE			−0.17		
Physical Capital	Unmatched	0.98	0.04	0.93 ***	0.012	−76.68
	ATT	0.98	0.05	0.92 ***	0.018	50.04
	ATU	0.13	0.98	0.84		
	ATE			0.88		
Social Capital	Unmatched	0.81	0.00	0.80 ***	0.009	83.87
	ATT	0.80	0.00	0.79 ***	0.014	54.78
	ATU	0.00	0.76	0.75		
	ATE			0.77		

*** $p < 0.01$.

3.5. Sensitivity Analysis

The result of sensitivity analysis using the Rosenbaum bounding approach revealed that it is free of hidden bias (see Appendix B, Table B12).

3.6. Discussion

Proponents of LSAI argue that access to irrigation, dissemination of technologies, and generating local employment opportunities to improve the livelihoods of the local people are the major contributions of the LSAI (Cotula et al., 2009). For instance, studies by Baumgartner (2015), Deininger (2016), and Hufe (2017) also demonstrated that LSAI has the potential to create markets and jobs as well as increase the rate of adoption of harvesting technology and input use (seeds, fertilizer, farm equipment, etc.). Others have also argued that LSAI has been seen as an opportunity to increase foreign direct investment and improve infrastructure connectivity such as dry and wet roads, telecommunication, water access, education, and other basic services (Anseeuw et al., 2012; Aisbett and Barbanente, 2016; Collier and Venables, 2012). Collier (2012) also argued that for countries with ample uncultivated land resources that had remained heavily dependent on the agricultural sector, the LSAI provides a great role in more rapid rural development and poverty reduction. However, in contrast to the results by Collier, (2012), Keeley et al. (2014), Deininger and Xia, (2016), and Hufe and Heuermann (2017), we found that the mean landholding size of the treatment group and control group households was 1.19 and 2.06 ha, respectively, which was statistically significant at 1%. This has brought about the decline in local community assets such as forest resources, and exacerbated a shortage of farmland size. The future of small-scale landholders now no longer benefits from the LSAI, which means that the LSAI cannot sincerely play a critical function in the livelihood improvement of the local community. It is acknowledged that land serves as the basis for community values in addition to being a fixed asset and is necessary for raising enough crops and animals to provide a supply of food (Phélinas and Choumert, 2017). The mean livestock holding of the treatment and control households in TLU was 5.12 and 6.58, respectively, and was statistically significant at 1%. This shows that the control groups had a relatively large livestock size than the treatment groups. This leads to the asset depletion of local communities, and there is ample evidence that rural households keep livestock across various levels of income and that livestock are capital assets, produced in the past and contributing to future product output. In this regard, the LSAI has not relatively contributed to livestock capital improvement among the

treatment households. In light of this study, many NGOs (non-governmental organizations) (Zagema, 2011) have taken a strong position against LSAI development in Ethiopia based on its negative livelihood impacts (Shete, 2011). The mean natural, human, and financial capitals of the treatment households were 0.05; 0.13, and 0.00, respectively. All of the mean values of the above variables were smaller than those compared to the control households. It is fascinating to note that there was a decline in the mean values of the variables concerning the treatment households due to the LSAI intervention. The complete livelihood impacts on rural communities involved in LSAI are well-understood (Mutea et al., 2019; Speller et al., 2017). The decline in the mean values of overall livelihood assets of treatment groups in this study indicates that the LSAI considerably reduced the livelihood capital and wealth status of the treatment households. The current landholding system in the rural Shashamane and Shala districts of Oromia regional state evolved through land distribution, land allocation, inheritance, and gifts. A study by Speller et al. (2017) on the impact of large-scale agricultural investments on local communities updated voices from the field and confirmed that LSAI aggravates mass dispossession. The most prominent negative impacts arising in the investments examined were disputes over access to land (Buffett, 2011). People's lives in rural communities are intimately tied up with their access to land and other natural resources and the arrival of an investor can have significant implications. Interviewees had, on balance, negative perceptions of the impact of investments across a range of land-related issues including the previous use of the land; the terms of, and process for, land acquisition; resettlement procedures; access to and the use of the land by communities; the degree of land use practiced by the investor; and the rights of farmers and other customary land users (Mutea et al., 2019). In the study area, land is the scarcest natural capital, which could show future potential for land conflict. Our study also revealed that there were several sources of conflict between the LSAI and nearby communities. A similar study conducted by Nolte (2014) also revealed that LSAIs were causing conflict between investors and the local community. The average treatment on the treated (ATT/difference) of the propensity score estimation result of the natural, human, and financial capital was −0.91, −0.81, and −0.15, respectively, and lower than the control households, with sensitivity at a γ value of 2. This implies that the project harms the local people's livelihood capital in large-scale agricultural investment areas, and the local people's livelihoods were not improved as a result of the LSAI. Correspondingly, this rapid investment growth has caused rural chaos among the community,

smallholder farmers, and landless youths as land is the most crucial, if not the only, means of livelihood in the study area. The statistical *t*-test values, t = −51.19, t = 35.50, t = 12.20, t = −50.04, and t = 54.78, showed that there was a significant difference at 1%. It is imperative to note that there was an overall reduction in natural, human, and financial capital. Conversely, the physical and social capital of the treatment households increased due to the LSAI intervention. These findings are consistent with the results of research that has been conducted in Africa that found the possible adverse impact of LSAI on the livelihoods of the investment hosting communities (Richards, 2013;Fernández and Schwarze,2013;Dye, 2014). The findings are also in agreement with various studies that have testified about the prospective negative impacts of LSAIs on the livelihoods of the affected community in Ethiopia (Rahmato 2011; Cotula et al., 2009; Aisbett and Barbanente, 2016). Furthermore, Porsani's (2019) study in Mozambique revealed that large-scale land acquisitions aggravate poverty and worsen the livelihoods and poverty of local communities. Our study also revealed a reduction in the inclusive livelihood asset indices of the treatment group, showing that LSAI significantly increases the poverty of the affected Shashamane rural district kebeles. Likewise, the reduction in the natural livelihood asset index of the treatment group implies that LSAI substantially reduced the land size of the affected Shashamane rural district kebeles, which forces the local community to turn to domestic and international migration to seek greater opportunities. This is particularly important to consider as the livelihoods and agricultural commodity production issues are dependent on the land for a majority of the population of Ethiopia. According to Dessalegn (2011) and Shete et al. (2015), the LSAI operating in Ethiopia has caused rural land loss among youths in many parts of the country. Other studies that have been recently conducted also suggest that technology transfer from LSLI to the community did not occur in Ethiopia (Moreda, 2017; Lay et al., 2018). At the same time, this activity undermines the standard of living. If a household has secure access to land, they are also likely to be well-endowed with financial assets as they can use the land for productive purposes and to secure loans (Solesbury, 2005; De Zoysa, 2013; Cole, 2012). This indicates that a single asset can generate multiple benefits. Apart from risking losing access to and control over the land on which they depend, deprivation of land due to LSAI has historically been a major trigger to conflict and outright civil war (Schoneveld, 2017; Alden-Wily, 2011). To fulfill human rights and enjoyment such as the right to food, the right to a livelihood, the right to housing, the right to property, and the right to development, the land is a crucial factor (Human

Rights Watch, 2016b;De Zoysa, 2013; Lavers, 2012;Porsani et al., 2019;Shete and Rutten, 2015;Schutter, 2010).

The protection of land rights for smallholders and indigenous people has been recognized as part of the country's domestic law and international human rights instruments (FDREHPR, 1995, Arts. 9(4), 13(2). Any activity or development initiatives that deteriorate the livelihoods of rural householders is prohibited by the FDRE Constitution (Tura, 2017). A large amount of research has been conducted on the issues of the process of large-scale land acquisitions, and debate about the positive and negative impacts of LSAI at the global level remain (Depledge, 2008). However, looking and linking the LSAI and SLF have been limited. The advantage of using SLF as an analytical tool for addressing the impact of LSAI help us to see the micro- and macro-level institutions, and their impact at different scales such as the individual, household, group, village, region, or nation (Ashley and Carney, 1999; Scoones, 1998). Considering SLF is a holistic approach, the present study adopted SLF to assess the impact of LSAI on the local people's livelihood capital. Overall, our findings suggest that Elfora Agro-Industries P.L.C, which is engaged in the production and sales of agricultural products for domestic and foreign markets (such as countries in the Middle East, mainly, Saudi Arabia, United Arab Emirates, Yemen, and African countries such as Egypt, Congo, Brazzaville, and Cote- d'Ivoire), is not pro-sustainable livelihood and has not delivered its promises such pro-poor, pro-job, and pro-local development, since local communities living with LSAI are not benefiting from the LSAI. Hence, rural economic development and rural household livelihood need to improve and be supported through other rural livelihood improvement mechanisms in the region such as in the rural Shashamane district, where the LSAI is starting its operation.

3.7. Conclusions

Land has been given away to national and multinational foreign investors in low- and middle-income areas at a rate that had not been seen in decades, typically on long-term leases. Government pro-investment policies such as deregulation, incentives such as lower taxes and fewer obligations, and legitimacy via development, food, and fuel security and crises by food-importing and fuel-exporting nations, expanding business and market opportunity, and profit-seeking are the key stimuli and drivers of LSAI re-investment. Furthermore, the crises of 2007 and 2008 related to economy and energy, along with the food price hike in 2008, have paved the way for the so-called land acquisition and agricultural investment of farmland in different parts

of the world. The same is also true in Sub-Saharan Africa (SSA) and Ethiopia (Deininger and Byerlee, 2011; Breu et al., 2016). This paper discussed the Ethiopian and Oromia regional state's potential for LSAI, particularly in the Shashamane rural district. The Shashamane rural district has greater potential for LSAI and has attracted many LSAIs such as the Shallo-Melge farm project. In total, the MIDROC Ethiopia Investment Group and its affiliated Saudi Star companies have received 500,000 hectares of land in all parts of Ethiopia for different land investment projects. Elford Agro-Industries P.L.C.'s Shallo-Melge LSAI farm project, one of the MIDROC group of companies, is a multifaceted investment that started operation in 2008 on 10,000 hectares of fertile land in the Shashamane rural district in the Oromia region, Ethiopia. The Elford Agro-Industries P.L.C. Shallo-Melge LSAI farm project currently cultivates and grows commercial maize *(BH661, BH546*), wheat, haricot beans (*Nassri, Awassa Dume*), white beans, and soya beans for the domestic (such as Shortan Addis) and international market (such as Saudi Arabia, and the Middle East). In particular, the impact of most large-scale land investments on the local people and on livelihood improvement has not gained the attention it deserves in general in Ethiopia, particularly in the Oromia regional state because of a lack of reliable data. Many have argued that rapid investment growth has caused and negatively affected the local community's livelihood capitals (human, natural such as land, financial, physical, and social capitals). Because land is the most crucial, if not the only, means of livelihood for rural farmers in Ethiopia, the backbone engine of growth for the Ethiopian economy is smallholder agriculture, with a 54% contribution to the gross domestic product, 80% employment opportunity for a population of 120 million, and almost 90% for exports (Kirchner, 2016). Moreover, pro-smallholder farmers and a commercialization policy to increase agricultural productivity were initiated in 1991, with Ethiopia's development strategy positioned for the overall economic development of the country. Hence, an absolute majority of the local community in the Shashamane district depends on small-scale and family agriculture for survival. Empirically, this investigative article explored the livelihood impacts of LSAIs using empirical data and observations in the Shashamane district of the Oromia region. The present study also applied and adopted PCA, PSM, and DFID's livelihood framework to assess the impact of the LSAI on the local people's livelihood capital. With the above method and framework in mind, our results from both the quantitative and qualitative parts showed that the LSAI has negatively impacted the local people's livelihood capital and exacerbated the local poverty situation. The five main

livelihood capitals we used in the DFID's livelihood framework were natural, human, financial, physical, and social capitals. The assets are generally recognized within sustainable livelihoods theory. Hence, this not-well functional LSAI project has contributed below their economic potential in terms of the local people's livelihood improvement through job creation, income, natural resources including land, water, basic infrastructure (water, sanitation, energy, transport, and communications), housing, and the means and equipment of production. Moreover human capital is the software and brain war of any nation and constitutes the most important form of capital. Infrastructure not only enhances socioeconomic growth, but it is also an important driver of sustainable development. Infrastructures comprise the stock of basic facilities and capital equipment required for society to be functional including roads, bridges, rail lines, air transport, schools, hospitals, and other public works. Social capital includes social and financial capital such as regular remittances or pensions, savings, and supplies of credit, and the service sector and the population of the region are large and growing. This is at odds with the main objective in which the LSAI is the engine of growth through the absorption of excess labor from the rural sector. Oromia regional state is rich in labor and could be better than any state including Afar or Somalia, if young children in the region can be better educated in the future so that they can transform the economy (Kirchner, 2016). However, the LSAI's contribution of human capital such as skills, knowledge, and technology transfer to the local people has been very minimal. Hence, the region needs to take advantage of its enormous natural, human, financial, physical, and social capital. We limited our analysis to the influence of the LSAI on local people's livelihoods, but future research should focus on the relationship between the agricultural value chain and the LSAI, and the gender implications of the LSAI.

CHAPTER FOUR

4. Large-Scale Agricultural Investments Impact on Food Security: Evidence from Ethiopia's Shashamane Rural District, Oromia Regional State.[17]

Abstract

With the goal to combat food insecurity and increase agricultural output, LSAI was reintroduced in Ethiopia in 2008. The effect of LSAI on food security, however, is still minimal. In the Shashamane rural district of Ethiopia's Oromia Regional State, this paper seeks to examine the impact of LSAI on food security. With 144 households being LSAI treatment and 166 serving as controls, data from 300 chosen rural households were gathered utilizing a quasi-experimental study methodology. To create food security indicators and evaluate the impact of LSAI on rural household food security, propensity score matching and principal component analysis were utilized. Furthermore, to fully grasp the complexities of food security, the study discussed the theory and the pillars of food security. The descriptive statistics and mean results revealed that most households, with and without LSAI, were food insecure, as measured by multiple food security indicators such as food energy intake (57%), household food insecurity access scale score (55.33%), months of adequate household food provisioning (59%), household dietary variety score (59.33%), household food consumption score (58.67%), household food spending share (59.33%), and coping strategy index (58.67%). After running a regression analysis, it was found that eight out of the fourteen hypothesized variables had a significant impact on LSAI participation. The average treatment impact on the treated (ATT) however revealed that LSAI did not have a visible positive effect on the local community's food access. Indeed, both local populations with and without LSAI were food insecure, as measured by numerous food security indices, with significant effects for availability, access, usage, and stability The study suggests revising policies, designing appropriate correction strategies, and monitoring food security promises benefits before further land deals are crucial, along with creating social support systems that prioritize the food sufficiency of individuals and their households. Food insecurity also requires holistic interventions that address its underlying causes.

Keywords: Propensity Score Matching, Diversification, Food security pillars, Shashamane Rural district Oromia Regional State, Ethiopia.

[17] Paper III. Under Review as Yideg A. and Degefa T. 2022. Large-Scale Agricultural Investments Impact on Food Security: Evidence from Ethiopia's Shashamane Rural District, Oromia Regional State.--Manuscript Draft-- FOSE-D-22-00166- Journal of springer nature food security

4.1. Introduction

One billion people live in extreme poverty globally, and 75% of them work and live in rural areas (World Health Organization, 2022). The global food crisis that erupted in 2008 and 2009 exacerbated the situation (Anseeuw, 2013). Food insecurity is still a major long-term concern and is expected to get considerably worse given the COVID-19 pandemic's consequences, continuous conflicts, and extreme weather (Udmale, et.al., 2020). Additionally, given that the problem with food prices has exacerbated food insecurity and increased competition for agricultural land and water resources, it is not surprising that the cost of farmland has increased significantly in recent years (Anseeuw, 2013). The Midwest of the United States witnessed a 15% increase in agricultural prices in 2007, Poland saw a 31% increase, while Brazil saw a 16% increase (Von Braun, 2008). Land prices frequently increase as agricultural prices rise because larger earnings per unit of land improve the expected returns on land. Although though agricultural water use is predicted to rise dramatically over the next few years, many nations have already reached their water resource constraints (Boretti, and Rosa, 2019).

The surge in fuel and fiber prices in 2007-2008, which enabled several African governments to transfer enormous tracts of allegedly "unclaimed" or "abandoned" land, as well as the global economic and political crises, all contribute to promote private sector involvement in LSAIs, which are predominantly used for food production (Deininger et al., 2011; Ali et al., 2019;). LSAIs, often known as "land deals," are utilized to address both food shortages and profit margins (Hall, 2011; Pearce, 2012). This pattern, which was most noticeable in Africa, raised hopes that private capital would supplement official investment and help compensate for decades of agricultural underinvestment (Anseeuw, 2013). For countries with an abundance of farmland who had remained mostly dependent on the agriculture sector, this was seen as a step toward more rapid rural development and the eradication of poverty (Collier and Dercon, 2014).

Furthermore, it raised international concern that agricultural investment including large-scale land purchase for food production could have a negative influence on local communities (Anseeuw, 2013). Yet, it was acknowledged that there might be a chance for favorable effects from such investments (Speller et al., 2017). According to estimates, 22.6 million Ethiopians would face food insecurity in 2022. (OCHA, 2023).As a component of the sub-Saharan area, East Africa, where a sizeable share of the population is classed as food insecure, is representative of this problem (Atara et al., 2019). Although the FAO and other assistance agencies have been

worried about the issue for a century, it wasn't until the early 1970s that it became a problem and a development challenge in Ethiopia, and it then expanded across the nation in the decades that followed (Degefa, 2005). Significantly, the occurrence of severe drought and widespread starvation since the 1980s has sparked the need for food security and food aid initiatives in the nation. This need is being fueled by the declining economy, which is manifested by factors such as a high unemployment rate, an apparent inability to control hyperinflation, and climate change, among other interconnected causes (Moreda, 2018). As a result, agriculture is crucial to Ethiopia's economy and efforts to combat hunger (Mellor and Dorosh, 2010). Ethiopia's economy is expanding and there are many business opportunities there, but few foreign investors have yet to seriously consider investing there (Schoneveld, 2017; Zerssa et al., 2021). About 15.8% of all investment projects approved in 2012 were FDI, with the main sources of FDI coming from China, India, Germany, Italy, Sudan, Turkey, Saudi Arabia, Yemen, the United Kingdom, Israel, Canada and the United States USA came (EIC, 2015).).

Although this marked a significant step forward in the country's history, the total number of projects and the amounts invested have increased only slightly since 2012 (EIC, 2016). In addition, Ethiopia experienced a major agricultural investment boom due to the increasing food demand and price shock. In addition, as part of the five-year Growth and Transformation Plan (GTP), the Ethiopian government has strategically promoted land deals for massive agricultural investment, aiming to achieve food security and middle-income country status in Ethiopia by 2025 (National Planning). Commission, 2016).Ethiopia is the first country in Africa to receive land investment and the regional state of Oromia was one of the three regions with the highest LSAI score in the country (Tura, 2018). One of the factors driving political change is food production; Between 2005 and 2012, Ethiopia leased one million hectares of productive agricultural land to foreign and local investors (Dessalegn, 2011). In Oromia alone, around one million hectares of land have been leased to investors, mainly for food production and agrofuels for the export market (Tura, 2018). In addition, the Ethiopian private sector continues to grow and companies and entrepreneurs are in dire need of capital to grow. In this context, several international private investors are involved in activities aimed at strengthening the financial base of the domestic private sector (Wulp, 2013). Finally, the Ethiopian government supports land commercialization and conversion to large-scale agriculture as essential elements to modernize agriculture and improve production efficiency, which will lead to increased food production and

economic growth (Dessalegn, 2011). The consequence of large scale agricultural land deals may be significantly high for the local communities as land is the major input for food production and the majority of those working in agriculture are poor. In addition, small-scale farmers in Ethiopia cultivate 95% of the country's land, which is used for agriculture, and they produce more than 90% of the nation's agricultural output (Welteji, 2018). 94 percent of food crops and 98 percent of Ethiopia's coffee, the country's top export good, are grown by small-scale farmers (Gebre-selassie and Bekele, 2010). Just 6% of food crops are grown on private and public commercial farms, and 2% of coffee is grown. A little more than 5% of the total cultivated land is used by these commercial farms. The main crops grown by the few commercialized state farms are fruits, vegetables, coffee, cotton, and tea, though they only yield a very small return despite significant investments (MEDIC, 1999).

Land provides access to natural resources, which, in turn, provides access to food, income, and employment in Ethiopia. Land also gives people a place to live and is significant for their sense of identity (Zoomers, 2011). Available empirical studies show that large scale agricultural land investments hardly meet food security in Ethiopia (Shete and Rutten 2015). Furthermore, according to other recent studies, such as the work of Lay et al., (2021), large scale agricultural investment deprives local communities of their livelihood, worsens their food insecurity, and results in income loss for local people. Also in Ethiopia, studies by OXFAM International (2011), Lavers (2012) and Azeb and Mauser (2017) found that the transfer of agricultural land to investors poses a major challenge to food security at the local level, but the magnitude on food security have not been quantified by the local population. In addition, Nolte et al. discovered. (2016), Moreda (2018), Lay et al. (2018), Ali et al. (2019) and Dodge (2023) assume that the introduction of LSAI can have a significant and adverse impact on the food security situation in local communities, as local communities are excluded from the development process. As a result, a small number of case studies were conducted with families or individuals. However, as has been noted by many researchers (Degefa, 2001; Tefera, 2009; Tefera, 2010), a situation of food insecurity or food insecurity at the national level does not apply at the household or individual level. The impact of LSAIs on food safety in the study area was not the subject of an empirical study. Accordingly, this study was designed to assess the impact of LSAIs on food security based on data sets and empirical observations in Shashamane district, Oromia Regional State, Ethiopia. The LSAI was expected to improve the overall food security status of the local

community as measured by seven internationally recognized household food security indicators. Here we conduct an empirical test to see if these claims hold true in our case studies (a community of families with and without LSAI in the Oromia Region, Ethiopia). The remaining parts of the paper are organized as follows: The following section provides a conceptual and analytical framework for understanding food security and its main pillars. We then describe the methodology we used, including the sampling procedure, the variables we considered, and the econometric techniques we used. Then we present our empirical results and in the last part of the article we discuss our results and draw conclusions.

4.2. Analytical and Conceptual Framework

4.2.1. Food Security and Its Core Components Pillars

The notion of food security looks at how humans obtain and manage food (Aborisade and Bach, 2014). By examining how power dynamics affect food availability, access, utilization, and stability, political ecology can make connections with this theory. Examining the Food Entitlement Decline model and the Food Availability Decline Approach is one way to connect these two theories (Hall et al., 2015; Derara and Tolossa, 2016). Whereas the second model concentrates on people's access to food, the first model is more concerned with the production and distribution of food. Examining the Pressure and Release Model provides another approach to make the connection between the two ideas (Derara and Tolossa, 2016). This model considers a greater number of variables, such as population growth, poverty, inequality, environmental degradation, and political instability that might lead to food insecurity. Through an examination of the ways in which power dynamics impact these variables, political ecology can help us to better understand and address food insecurity (Fairhead et al., 2012; IFAD, 2011). Further the four pillars of food security and associated theories are used to comprehend and recognize food insecurity at the individual, family, and community levels. According to Derara and Tolossa (2016), because food security is a multidimensional problem, it can be better understood by investigating situations at the community and household levels, particularly in countries such as Ethiopia, which has a diverse physical environment and socioeconomic characteristics of its people. The pillars of food security (availability, access, utilization, and stability) are also used in this thesis to examine the complex nature of local food security issues in rural areas. It provides an overview of the causes of food insecurity at the local, household, and community levels (Laborde et al., 2020) (See Figure 4.1). It gives an overview of the factors that contribute to food

insecurity at the local, household, and community levels (Laborde et al., 2020). It is also important to examine the analysis of large-scale land deals using food entitlement decline, the food availability decline approach, political economy explanations, and the pressure and release model, as these methods help to identify specific mechanisms and root causes that contribute to the deterioration of food security (Le Moul and Forslund 2017). More recently, the idea of food security has switched its emphasis from global, state - wide, and regional availability to that of households and individuals (Degefa, 2005). This is due to the fact that, as was already mentioned, merely increasing food production, supply, and sufficiency on a larger scale does not ensure that everyone has access to enough food (Le Moul and Forslund, 2017). As a result, an estimated 828 million people will be severely food insecure in 2022, although global food supplies are now more than adequate, an increase of one million from the year before, when hunger rates began to rise (FAO, 2019a) and Ethiopia is one of the most food insecure countries in sub-Saharan Africa. An estimated 30.8% of the Ethiopian population lived below the national poverty line (Deshpande et al, 2022). Pastoralists and agro-pastoralists in arid and semi-arid regions, farmers in drought-prone areas, resource-poor small farmers and the unemployed are the main groups of people lacking access to food (Bilora, 2006; Rural et al., 2008). Where competition for productive land and water (eg.LSAI) has been identified as a potential driver of conflict as land loss for food production, acute food insecurity and malnutrition tend to worsen (Ali et al.,2019; Deininger and Byerlee, 2011; IFAD, 2011; Lay et al., 2021). Other factors affecting the likelihood of food insecurity are household-level conditions such as education, wealth, and spending, and regional-level conditions such as infrastructure, markets, and supporting institutions (Ahmed et al.,2018). According to Bilora (2006) and Endalew et al. (2015), the main obstacles to food security in Ethiopia include population pressure, depletion of the environment and natural resources, poverty, insufficient infrastructure and social services, inappropriate policies, and a lack of institutional ability to address the underlying causes of food insecurity. Ethiopia's food security issues are likewise quite serious, complicated, and wide-ranging. They need to conduct in-depth research and get a complete grasp of the causes and effects at the grassroots level in order to create lasting remedies through future policy intervention. The ability to develop emergency and crisis management strategies is typically lacking in marginalized populations. Stressors may compel or trigger adjustments that upset the equilibrium of the situation, rendering it imbalanced and unsustainable (Hassen, 2008).

According to the notion of food security discussed earlier, Ethiopia is one of the world's most food insecure and aid-dependent countries. Most people have experienced both chronic and brief food shortages, particularly during the past 40 years, in both urban and rural locations. Food imports and food aid, with the latter accounting for the lion's share of the total, closed the sizable imbalance between supply and demand for food. Many academics have concluded that there are many interrelated factors that contribute to Ethiopia's present food insecurity problems (Derara and Tolossa, 2016). A few of these include unpredictable rainfall, degraded soil, inadequate storage, pre- and post-harvest crop loss, households' inability to purchase enough food, small and fragmented farmland sizes, a lack of off-farm income opportunities, the underdevelopment of the livestock sub-sector, inadequate credit and extension services, and tenure insecurity. Since this strategy's strength is in its recognition of food supplies, purchasing power, income of the population, transport and market, infrastructure, we have adopted the pillars of food security in line with the broader political ecology approach (Charlton, 2016; Laborde et al., 2020).

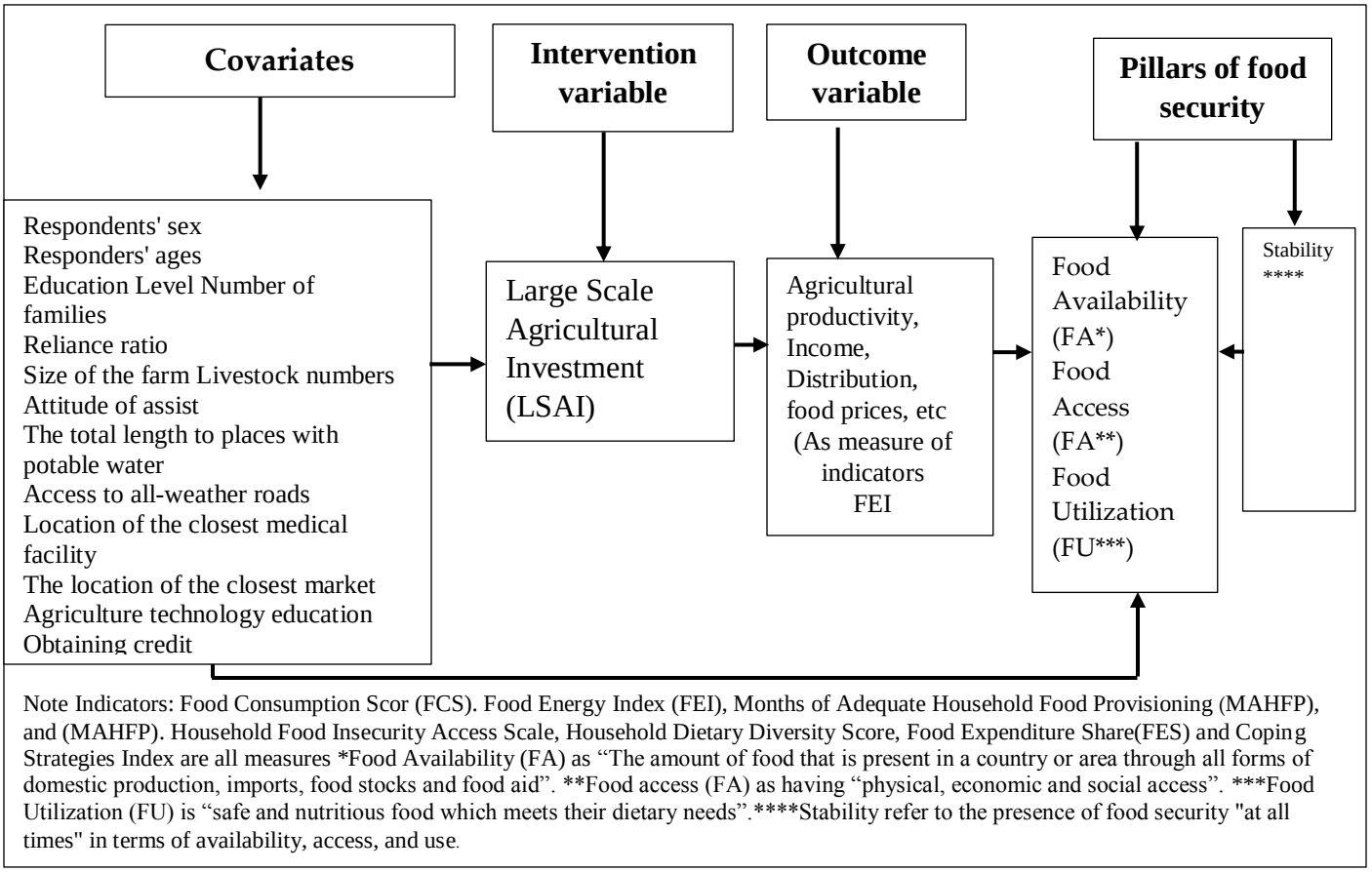

Figure 4.1: Four pillars of food security analytical and framework adopted from (Maxwell, 2008).

4.3. Methods of the Research

4.3.1 Selecting a Research Location

The Shashamane and Shala districts serve as the study area for this study, which is located in Ethiopia's West Arsi Zone. The study's focus was on the kebeles of B/Dannaba, Toga, and D/Calalaqaa, which are close to the Elfora Agro-Industries P.L.C. Shalo Melge LSAI agricultural project. Shala was chosen as the control area, and Shashamane as the treatment area.

Although Shashamane and Shala are located at different distances from Addis Ababa, they share several similarities. Both areas have a predominantly agricultural economy and are the location of smallholder farmers that depend on rain-fed agriculture to grow crops like maize, wheat, and beans. Additionally, the two areas have a similar socio-economic context, with a high prevalence of food security and constrained access to vital services like schooling and medical care. The agro-ecological context of the two areas is also comparable, with similar soil types and climatic conditions. This study's comparison of the treatment and control regions is crucial because it enables us to pinpoint the specific impacts of the Elfora Agro-Industries P.L.C. Shalo Melge LSAI farm project on outcomes related to food security. The Elfora Agro-Industries P.L.C. Shalo Melga LSAI farm project is located in Shashamane, which is part of the treatment area. This project has generated controversy because of worries about how it may affect the food security of nearby populations. Shala, which is situated in the control area, on the other hand, has no significant investments in agriculture. The two locations are excellent for comparison since they are similar to one another, and any discrepancies in the outcomes of food security between the two places may be linked to the presence or absence of the Elfora Agro-Industries P.L.C. Shalo Melge LSAI farm. The main objective of this study was to assess the impact of Elfora Agro-Industries P.L.C. to investigate. Shalo Melge LSAI Agricultural Project for Food Security in surrounding communities. The study examined many aspects of food security, including food use, availability and access.The study collected data on a range of food security indicators, including household income, food expenditure, dietary habits and diet diversity. Once the information was collected, it was analyzed to determine the impact of Elfora Agro-Industries PLC's Shalo Melge LSAI agricultural project on food safety outcomes. In summary, this study is essential to understand how large-scale agricultural investments affect local communities' access to food. By comparing the treatment area to the control area, the study provides valuable insight into the potential pros and cons of such investments.

4.3.2. Research Design

The study used a cross-sectional survey method and a quasi-experimental approach. Data were collected from primary and secondary sources using both quantitative and qualitative methods. The study divided the households surveyed into two groups: those in the community with ALS, considered the "treatment group" and those in the community without LSAI, considered the "counterfactual" (Bekele et al., 2021a).

4.3.3. Sampling Techniques

Determining the appropriate sample size and data collection methods for a study requires consideration of several factors, including the type of population and the goals of the research (Dawson, 2009). Likewise, it is crucial for researchers to consider factors such as desired precision, confidence level, variable variability, statistical tests used, and population characteristics when determining the appropriate sample size (Israel, 1992; Singh, 2021).The study used both qualitative and quantitative data collection methods. When selecting the study population, we considered research goals, ease of access to data, cost-effectiveness, and ease of data management. The sample of respondents was selected using a multi-level sampling technique. First, we consciously chose Shashamane district because of the long-term implementation of the LSAI program (more than 10 years), the presence of many small and large private agricultural investments, the lack of research on food security and the suitability of the neighborhood for investment. We chose the Shale district, 35 km west of LSAI, as the control area because of the high proportion of people who work in mixed farming there. In the second phase, we randomly selected three *kebeles* out of 7 *kebeles* in rural Shashamane district and three *kebeles* out of 19 *kebeles* in Shala district, both located an average of 10 km from the LSAI. We used Cochran's (1977) formula with a 95% confidence level (z = 1).96) estimated a 70 percent proportion of the attribute in the population (p) and a 5 percent accuracy (E) of a total of 4,698 households to determine the sample size. We collected 300 samples, which is 6% of the total. Finally, in each stratum, we selected 134 families from the LSAI range (study group) and 166 families from the LSAI-free or LSAI-free range (control group). (For more information on how the sample size was determined in this section and the sampling techniques used) (See Appendix B, Table B3).

4.3.4 Method of Data Analysis

We used both descriptive statistics and econometric modeling to analyze the data. Between October 2019 and January 2020, we collected data from *kebeles* in Shashamane District (B/Dannaba, Toga and D/Calalaqaa) and from *Kebeles* in Shala District (Solicha, Waka and Bute). We assessed the validity of the questionnaire prior to data collection and validated its validity by calculating Cronbach's alpha (=0.79), which is within a reasonable range of reliability coefficients (George and Mallery, 2003). We encrypted and validated completed surveys before entering survey data into Stata/MP version 16.0 and SPSS version 25. For data analysis, descriptive statistics such as mean, standard deviation, coefficient of variation, t-tests for paired and minimal samples and chi-square tests. The principal components analysis (PCA) method was used to construct an overall indicator of food security that accounts for a range of household-level variables related to availability, access, use and consumption

4.3.5 Variables Definition and Hypothesis are Given As Follows.

4.3.5.1 Covariates Variables and Intervention Variable

14 independent variables were chosen, with consideration given to the particulars of the study area and the data that were available (Table 1.2). The following information is located here: the gender of household heads, their age in years, their education level, the size of their entire family, their dependency ratio, the size of their farmland, the number of animals they own in terms of tropical livestock units, their perception of aid, their distance from a source of potable water, their access to all-weather roads, their proximity to a health facility or a market, their ability to access training in agricultural technology, and their credit usage. Descriptions of the variables used in the PSM model are given in (Appendix 2). In this study, LSAI was used as the dependent variable. Propensity scores (PS) were estimated using a logistic model regressing on the family trait vector X (PS). The covariates included in the propensity model were based on some theoretical considerations that supported the use of covariates that are relatively stable over time or clearly exogenous to treatment (Grotta and Bellocco, 2014; Heinrich et al., 2010; Morgan & Winship 2014).potentially related to treatment and outcome variables (Daniel et al.2007; Austin 2011). Kernel fitting (KM) was used to ensure the reliability of the estimated treatment effect (Pearl 2000; Imbens 2004). LSAI was used as the dependent variable in this study. Propensity Scores (PS) were calculated using a logistic model regressing on the family trait vector X (PS). The propensity model covariates were selected based on theoretical

considerations that suggest using covariates that are relatively stable over time or clearly exogenous to treatment (Grotta and Bellocco, 2014; Heinrich et al., 2010; Morgan and Winship 2014), which may be linked to treatment and outcome variables (Daniel et al., 2007; Austin 2011). Kernel fitting (KM) was used to ensure the accuracy of the estimated treatment effect (Pearl, 2000; Imbens, 2004). A t-test was used to determine whether there was balance between the treatment and control groups in terms of the covariate (quality agreement) and the significance of the treatment effect.

4.3.5.2 Food Security Measurement

"Food security is defined to exist 'when all people at all times have physical, social and economic access to food of sufficient quantity and quality in terms of variety, diversity, nutrient content, and safety to meet their dietary needs and food preferences for an active and healthy life, coupled with a sanitary environment, adequate health, education and care " (FAO, 2006a:6)

Food accessibility, availability, use and sustainability are the four cornerstones of this definition of food security (Riely et al., 1999; Fracassi and Raza, 2021). The terms "accessibility," and "availability" refer to the physical presence of a sufficient quantity of food, "utility" and "stability" respectively. "Accessibility" refers to the physical presence of sufficient food, "Availability" refers to people having access to sufficient resources to obtain adequate food for a nutritious diet, and "Utilization" refers to having sufficient energy and nutrients to consume with "good biomass". "Absorption" of the food you eat and "stability" refers to possession (FAO, 2006). In order to achieve food security, each pillar is important but not sufficient (Aborisade and Bach 2014).To properly assess food security, all pillars must be considered simultaneously in order to target food security actions appropriately (Le Moul and Forslund, 2017). For example, household food insecurity occurs when food security conditions are not met and household members report that they cannot afford balanced meals, need to reduce meal size due to lack of food supplies or food (or both), or that they are starving because a score (Carolan, 2020).A crucial element of ensuring good nutrition within and across populations is growing up or living in environments where there is enough food. The overall health is greatly impacted by poor nutrition. Negative adult and generational health outcomes can be increased by lifetime exposure to poor nutrition (Sell et al., 2010). According to studies (FAO 2001; Charlton 2016; Béné et al. 2019), chronic exposure to poor nutrition has a negative impact on brain development, increases the risk of child mortality, and is linked to chronic diseases like diabetes

and heart disease. A significant correlation exists between community-level social capital (i.e. civic engagement, reciprocity norms, and trust) and a reduced risk of going hungry (Barrett 2010; Aborisade and Bach, 2014). Additionally, social capital—particularly neighborly reciprocity—contributes to the food security of households (Hebinck and Bourdillon, 2002).Regardless of whether a household has limited food or financial resources, it is less likely to go hungry if it has a higher level of social capital (Shimpton and Rokx, 2012). The 1996 World Food Summit's declaration makes it abundantly clear that access to nourishing food is a key factor in determining whether or not people have access to food security, in line with Amartya Sen's entitlement theory (Sen 1981). This in turn depends on the food being readily accessible, on people being able to regularly obtain sufficient amounts of it, and on people being able to store and prepare it in a way that has a positive nutritional impact (FAO, 1996). The four pillars of food security model as a guide for calculating food security in the setting Food security is a multifaceted concept, and no single correct measure captures all facets (Hendriks et al. 2016; Mutea et al. 2019). Therefore, we primarily used seven internationally recognized food security attributes as an indicator of food security at the household level; each indicator was interpreted as a measure of food security at the household level (see Table 4.1).. These prior empirical investigations (Teklemariam et al., 2016; Haji and Legesse, 2017; Bekele et al., 2021a; Guyalo et al., 2022) used the PSM model to examine how LSAI affects families' food security status in Ethiopia.

Table 4.1. Classification Systems of Food Security Measure

Component	Indicator	Calculation guidelines and Recall Period	Category number	Category description	Range (Threshold)	Reference
Availability (is the supply of food adequate?)	Food Energy Intake (FEI)	The minimal Dietary Energy Requirement (MDER), which is 2,100, is the weighted average of the minimal energy needs for the different gender age groups in the population.	1	Food secure	>2100	(Hassen 2008; Tefera 2010)
			2	Mildly food insecure	1925.1-2099.9	
			3	Moderately food	1750.1-1925	
			4	Severely food insecure	0-1750	
	Food Consumption Score (FCS)	Nine groups were created by grouping the food eaten during the previous seven days: the fundamentals, vegetables, fruits, meat and fish, legumes, milk, oils, sugar, and condiments. The weights of the other groups are then multiplied by the weights of each group. The	1	Acceptable	>35	(Swindale 2005; WFP ,2009)
			2	Borderline	21.5-35	
			3	Poor	0-21	

		nutritional density of the main food groups serves as the basis for weight estimation. Staples rate at 2, while fruits and vegetables rate at 1, meat and fish at 4, pulses at 3, milk at 4, oils at 5, sugar at 5, and condiments at 0 out of a possible 10. A score for household food consumption is obtained by adding up all food groups. The FCS had a 30-day recall period (1-month).				
Access (can people obtain the food they need?)	(HFIAS) Household Food Insecurity Access Scale Score	Respondents are asked nine questions, each containing a condition question and a frequency question.The questions concern the nervousness and anxiety related to the domestic food supply, its poor quality, insufficient consumption and its physical consequences. Respondents are asked whether any of the above events have occurred in the past 30 days (yes or no). If the respondent selects "Yes," a frequency question is asked to determine times (more than 10 times) the condition has occurred in the past 30 days. In this study, the incidence is always coded as 0 if the corresponding incidence question is answered with "no" (e.g.for example if Q1 = 0 then Q1a = 0, if Q2 = 0 then Q2a = 0 etc.). Four food safety categories were then developed to ensure that households were ranked according to their most intense response. The HFIAS refresher period lasted for the last four weeks (30 days).	1	Food secure	Based on algorithm classification process	(Salvador Castell et al., 2015)
			2	Mildly food insecure		
			3	Moderately food insecure		
			4	Severely food insecure		
Utilization (do people have enough intake of nutrients?),	Household Dietary Diversity Score (HDDS)	The previous 24 hours have seen the division of food into 12 categories: cereals, white tubers and roots, vegetables, fruits,		Good dietary diversity	>6	(Swindale and Bilinsky, 2006)
				Medium dietary diversity	4.5-6	
				Low dietary diversity	<4.5	

		meats, eggs, fish, other seafood, legumes, nuts and seeds, milk and milk products, oils and fats, and sweets, spices, condiments, and drinks. The appropriate response should be either "0" or "1". By totaling up all the food categories, a household's dietary variety score—which ranges from 0 to 12—is calculated.				
	Months Of Adequate Food Provisioning (MAHFP)	A household's inability to satisfy its food demands for a certain number of months out of the preceding 12 months, divided by 12. All of the sample families' means were determined for this study, and those who scored above the mean were labeled as food secure while those that scored below the mean were labeled as food insecure.	1	Food secure	12	(Bilinsky and Swindale, 2010)
			2	Mildly food insecure	10-11	
			3	Moderately food insecure	8-9	
			4	Severely food insecure	<=7	
Consistency (is there always access to food?).	Food Expenditure Share (FES)	FES= $\frac{Monthly\ Food\ Exper}{total\ of\ monthly\ food\ expenditure}$ $expenditure\ 1 + non-food\ mon$ Recall period for FES was 30-days (1-month).	1	Food secure	<50	(INDDEX ,2018)
			2	Mildly food insecure	50-65	
			3	Moderately food insecure	65-75	
			4	Severely food insecure	>75	
	Index of Coping Strategies (CSI)	The weighted frequency of each coping mechanism response. The weights were created through focus group discussions or qualitative observation, such as using credit to buy food. An index of household coping strategies is created by adding up all the responses.	1	Food secure	0-2	(Maxwell 1995, 2008)
			2	Mildly food insecure	3-12	
			3	Moderately food insecure	13-40	
			4	Severely food insecure	>40	

4.3.5.3. Outcome Variables

In general, outcome variables in PSM refer to the variable for which we intend to measure the effect of an intervention, such as food security status. One of the outcome variables, coded as the following: If an investment affects a household, the value is 1, otherwise it is 0 (See Table 4.2).

Table 4.2. Variables of outcome

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

4.4 Empirical Results

The analysis findings from both the descriptive and PSM models were presented in this section. There are five sections in this paragraph. The first section discusses the characteristics of the surveyed households. The second part investigates the general state of food security for the sampled households and makes comparisons between the conditions in treatment and control homes. The third section discussed the outcomes of the PSM model's step-by-step processes. The study's discussion and conclusion are covered in the fourth and fifth parts, respectively.

4.4.1. Characteristics of the Surveyed Households

The findings of the t-test in Table 4.3 demonstrated a significant distinction between treatment and control homes. A bigger percentage of older households participated in the LSAI study in the treatment households, which had a mean age that was lower (41.92 years) than control families (45.57 years). Additionally, the mean family size in treatment households was lower (4.88 members) than it was in control households (5.83 members), indicating that the LSAI experiment had fewer participants. The t-test found significant mean differences in ownership of land, livestock, and dependence ratio between treatment and control families. The mean dependency ratio in treatment families was lower (94.89) than in control households (125.63), indicating that there was more dependence in the control group. Aside from having less land overall (1.19

hectares on average) than control families (2.06 hectares), treatment households also had less cattle (5.12 TLU on average) than control households (6.58 TLU).

Table 4.3. Summary and descriptive data for the homes in the treatment and control samples

Continuous Variable	Treatment n = 134 Mean	Comparison n= 166 Mean	t-valu	P-value
Age of respondents	41.92	45.56	-2.52	0.012**
Total family size	4.88	5.83	-4.4246	0.000 ***
Dependency ratio	94.89	125.63	-4.3346	0.000***
Farm Land size	1.19	2.06	-11.2187	0.000***
Livestock amount	5.12	6.58	9.2858	0.000***
Distance to potable water points	2.30	2.07	5.1781	0.000***

***p<0.01, **p < 0.05

Source: Own survey results, dated 2020. Non-significant connections are abbreviated as ns.

4.4.2. Comparisons of Food Security Status between Households in Community (Treatment) With LSAI and With LSAI (Counterfactual) Based On Food Security Indicators

To compare household characteristics between families in the treatment and control groups in an understandable way, we ran several t-tests on different variables. The amount of land a farm household owns has a significant impact on their level of food security. A household with sufficient arable land will probably produce more food. Additionally, this can show how dependent a household is on its land for survival in general and how secure its access to food is in particular. The mean per capital calorie intake using FEI measure, the sampled household of control and treatment was 1435.956 and 1428.555 respectively. Other measures such as MAHFP, HFIAS, HDDS, HFCS, FSE and CSI of both control and treatment was 7.956157 and 8.611948, 10.2628 and 9.845204, 5.181069 and 5.185683, 28.48247 and 28.38348, 57.40381 and 58.40477, and 34.68049 and 36.30819 respectively (see Table 4.3). A statistically significant difference between the control and treatment groups is shown by the t-test statistic value at a 1% level of significance. Summary result of FEI, MAHFP, HFIAS, HDDS, HFCS and HFES show that 57%, 59%, 55.33%, 59.33%, 58.67%, 59.33% and 58.67% of the respondent from both group were food insecure, respectively (see Table 4.5).

Table 4.4. An overview of the state of food security based on food security indicators

	Sample	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]		t-value
FEI	Comparison (Obs = 166)	1435.95	30.84	357.01	1374.953	1496.958	t = -0.1800
	Treatment (Obs=134)	1428.55	27.29	351.69	1374.659	1482.451	
MAHFP	Comparison (Obs = 166)	7.95	.05	.62	7.849725	8.062589	t = 13.3633 (0.0000***)
	Treatment (Obs=134)	8.61	.00	.09	8.596807	8.627089	
HFIAS	Comparison (Obs = 166)	10.26	.29	3.36	9.687616	10.83798	t = -1.0972
	Treatment (Obs=134)	9.84	.24	3.20	9.35421	10.3362	
HDDS	Comparison (Obs = 166)	5.18	.12	1.47	4.929402	5.432736	t = 0.0266
	Treatment (Obs=134)	5.18	.11	1.50	4.954677	5.416689	
HFCS	Comparison (Obs = 166)	28.48	.56	6.50	27.37066	29.59428	t = -0.1391
	Treatment (Obs=134)	28.38	.45	5.80	27.49361	29.27336	
FSE	Comparison (Obs = 166)	57.40	1.23	14.29	54.96066	59.84695	t = 0.5634
	Treatment (Obs=134)	58.40	1.24	16.05	55.94398	60.86556	
CSI	Comparison (Obs = 166)	34.68	1.04	12.06	32.61962	36.74136	t = 1.2033
	Treatment (Obs=134)	36.30	.87	11.30	34.57594	38.04043	

***P<0.01, NS= not significant

Table 4.5. Summary of Food security Status of Treatment (n=134)

Indicator	Food secure (*f* and %)	Food insecure (*f* and %)
Food Energy Intake (FEI)	52 (38.81)	82(61.19)
Months of Adequate Food Provisioning (MAHFP)	52(38.81)	82(61.19)
(Household Food Insecurity Access Scale Score (HFIAS)	58 (43.28)	76(56.72)
Household Dietary Diversity Score (HDDS)	52(38.81)	82(61.19)
Household Food Consumption Score (HFCS)	51(38)	83(62)
Household Food Expenditure Share (HFES)	48 (35.82)	86(67.18)
Coping Strategy Index (CSI)	14 (10.45)	120(89.55)

Table 4.6. Summary of Food security Status of Comparison (n = 166)

Indicator	Food secure (*f* and %)	Food insecure (*f* and %)
Food Energy Intake (FEI)	77(46.39)	89(53.61)
Months of Adequate Food Provisioning (MAHFP)	71(42.77)	95(57.23)
Household Food Insecurity Access Scale Score (HFIAS)	76(45.78)	90(54.22)
Household Dietary Diversity Score (HDDS)	70(42.17)	96(51.83)
Household Food Consumption Score (HFCS)	73(43.98)	93(56.02)
Household Food Expenditure Share (HFES)	74(44.58)	92(55.42)
Coping Strategy Index (CSI)	70(42.77)	96(57.23)

Table 4.7. Summary of food security Status of the both group

Indicator	Food secure	Food insecure
Food Energy Intake (FEI)	128	172
	43 %	57%
Months of Adequate Food Provisioning (MAHFP)	123	177
	41%	59%
Household Food Insecurity Access Scale Score (HFIAS)	134	166
	44.67%	55.33%
Household Dietary Diversity Score (HDDS)	122	178
	40.67	59.33
Household Food Consumption Score (HFCS)	124	176
	41.33	58.67
Household Food Expenditure Share (HFES)	122	178
	40.67	59.33
Coping Strategy Index (CSI)	124	176
	41.33	58.67

4.4.3. The Binary Logistic Regression Model result

In our logistic regression model (Table 4.6), eight variables were significant predictors of program participation. These included gender, total household size, dependency ratio, farm size, total livestock population, and agricultural engineering training. However, access to credit and proximity to the nearest market had a significant negative impact on program participation. Gender, total household size, dependency ratio, farm size, total livestock population, and agricultural technology education were positively associated with program participation. Conversely, access to credit and proximity to the nearest market were negatively correlated with program participation. Variables such as age, education, perception of help, proximity to drinking water sources, availability of all-weather roads, and proximity to the nearest health center had no significant impact on program participation.

Table 4.8. The logistic regression model estimate for treatment

DeptV(Pro. intervention)	dy/dx	Coefficient	Std. Err	z	P>|z|
Age	0.27	1.112	0.78	1.41	0.157
Sex	0.00	0.0248	0.01	1.83	0.068*
Education	0.072	0.292	0.21	1.39	0.163
Total family size	0.072	0.293	0.10	2.93	0.003**
Dependency ratio	0.00	0.007	0.00	2.36	0.018**
Farm Land size	0.29	1.187	0.24	4.80	0.000***
Total Livestock amount	0.12	0.496	0.12	3.88	0.000***
Perception on aid	0.03	0.135	0.35	0.38	0.706
Distance to potable water points	-0.18	-0.742	0.45	-1.64	0.101
Availability of all-weather road	-0.06	-.277	0.33	-0.83	0.409
Availability of nearest health centre	-0.00	-0.023	0.38	-0.06	0.952
Availability of nearest market	-0.31	-1.299	0.41	-3.15	0.002***
Training on agricultural technology	0.18	0.774	0.37	2.05	0.040**
Access to credit	0.17	-8.534	2.08	-4.10	0.000***

Note: ***p<0.01,**p<0.05, *p<0.10

Logistic regression Number of obs = 300

LR chi2(14) = 173.52; Prob > chi2 = 0.0000

Log likelihood = -119.47504 Pseudo R2 = 0.4207

Source: Own survey result, 2

4.4.3.1. Propensity Score Estimation

Propensity score and covariate balance testing for treatment and control households are presented in Appendix B Table B1), accompanied with an explanation of the PSM model's variables. For PSM, a number of matching algorithms are available. This strategy makes use of more data, which reduces variance. Kernel matching offers a built-in robustness check to protect against the drawbacks of other matching techniques (Chagwiza, 2016). We use matching and the kernel algorithm in this study. Kernel algorithm and matching were compared using the highest Balancing test, %Var 38, the Matched sample, and the lowest Pseudo-R2 as selection criteria.

4.4.3.2. Area of Common Support and Score for Balancing Propensity

For propensity score estimate common support illustration (see Appendix C, Figures C5 and C6, respectively) .For the Goodness-of-fit test for the modle (see Appendix C, Figure C7).

4.5 Impact estimation

Based on the above comparison, it is evident that LSAI has a direct significant influence on the availability, access, usage, and stability of food, which are the four pillars of food security.

However, simply comparing the frequency, percentage, and mean differences between treatment and control households is not enough to fully explain the effects of other household characteristics, such as farm land size, production technology (including inputs and equipment), access to information and extension services, credit availability, and infrastructure. These elements may confound the effects of LSAI and have a substantial influence on the food security situation of households. Therefore, a more comprehensive analysis that takes these other factors into account is needed to fully understand the impact of LSAIs on food security. In other words, the food security status of affected and unaffected households can be affected by a variety of factors, not just LSAIs. Once slope values are established, the impact of LSAIs on affected households (as measured by indices such as the FEI, MAHFP, HFIAS, HDDS, HFCS, FSE and CSI Index) can be estimated using core algorithms and matching strategies to determine the medium of treatment. Effect (ATT/Impact). It could be argued that measuring observable covariates for the pre-treatment period, after the families involved have already noticed the effects of the intervention, would increase bias. While this is generally a limitation of measuring impact with the PSM technique, in this study some of the covariates used to match affected and unaffected households were variables (e.g., age and sex of the head of household) that were determined by the intervention could not be easily modified Using these covariates helps reduce the size of the gap/constraint. The triangulation of the data collection method was also used to increase the accuracy of the information obtained from the two sets of families.

4.5.1. Impacts on calorie intake and Months of Adequate Household Food Provisioning (MAHFP)

The average impact of LSAI on treatment groups along a number of food security pillars and indicators is the result of average treatment on the treated (ATT), or the average treatment on the treated. The household calorie intake per adult equivalent and the months of adequate household food provisioning (MAHFP) were -44.5743358 and -.737665746, respectively, according to the average treatment effect on treated (ATT). The statistical t-test result between the treatment and control groups was non-significant at t=-0.65 and -10.49, respectively. Household food provisioning (MAHFP), which is significant at 1%, is also present. (See Table 4.7.)

4.5.2. Impacts on Household Food Insecurity Access Scale (HFIAS)

The average treatment effect on treated (ATT) shows that the household HFIAS Access Scale was -.059600259. This implies that the Food Access Component of food security pillar of was not improved as a result of LSAI. The statistical t-test value and Mean effect size (S.E) between treatment and control group was t= -0.21 and.29006982 respectively (see Table 4.7).

4.5.3. Impacts on Household Dietary Diversity Score (HDDS) and Household Food Consumption Score (HFCS)

The average treatment effect on treated (ATT) of HDDS and HFCS was -.059600259 and -.215876377 respectively. The statistical t-test value between treatment and control group was t=-0.21and -0.18 respectively (see table 4.7).

4.5.4. Impacts on Food Share Expenditure (FSE) and Coping Strategies Index (CSI)

The average treatment effect on treated (ATT) result of FSE and Coping Strategies Index (CSI) was-6.33924588 and .495098573 respectively. The statistical t-test value between treatment and control group was -2.11 and 0.23 respectively.Morver, Food Share Expenditure (FSE) is significant at 5%. (see Table 4.7).

Table 4.9. Impact of LSAI on FEI, MAHFP, HFIAS, HDDS, HFCS, FSE and CSI

Outcome Variable	Sample	Treated	Comparison	Difference (ATT)	Mean effect size S.E.	T-stat
FEI	Unmatched	1435.95	1428.55	7.40	41.119	0.18
	ATT	1410.06	1454.63	-44.57	69.029	-0.65
	ATU	1439.51	1381.91	-57.59	.	.
	ATE			-52.38	.	.
MAHFP	Unmatched	7.95	8.61	-.65	.049	-13.36
	ATT	7.87	8.61	-.73*	.070	-10.49
	ATU	8.60	7.83	-.77	.	.
	ATE			-.76	.	.
HDDS	Unmatched	5.18	5.18	-.00	.173	-0.03
	ATT	5.26	5.32	-.05	.290	-0.21
	ATU	5.14	5.25	.10	.	.
	ATE			.04		
FCS	Unmatched	28.48	28.38	.09	.711	0.14
	ATT	28.43	28.64	-.21	1.16	-0.18
	ATU	28.32	28.22	-.10	.	.
	ATE			-.14	.	.
HFIAS	Unmatched	10.26	9.84	.41	.380	1.10
	ATT	9.95	9.40	.55	.636	0.87
	ATU	9.81	9.83	.02	.	.
	ATE			.23	.	.
CSI	Unmatched	34.68	36.30	-1.62	1.35	-1.20
	ATT	34.41	33.92	.495	2.195	0.23
	ATU	36.32	33.70	-2.62	.	.
	ATE			-1.37	.	.
FES	Unmatched	57.40	58.40	-1.00	1.776	-0.56
	ATT	56.63	62.97	-6.33**	3.010	-2.11
	ATU	58.54	57.69	-0.84	.	.
	ATE			-3.04	.	.

Note: ***p<0.01,**p<0.05, *p<0.10

4.6 Result of Sensitivity Analysis

Table 4.10.The results of the sensitivity analysis.

Variable		$e^{\gamma}=1$	e^{γ}=1.25	$e^{\gamma}=1.5$	$e^{\gamma}=1.75$	$e^{\gamma}=2$
FEI food Energy Index (FEI),		.09283	.010932	.000951	.000069	$4.4e^{-06}$
Months of Adequate Household Food Provisioning (MAHFP).	ATT	$3.3e^{-16}$	0	0	0	0
Food Consumption Score (FCS)		.275223	.059173	.009043	.001118	.00012
Household Dietary Diversity Score (HDDS),		.473866	.152232	.034277	.00613	.000941
Household Food Insecurity Access Scale (HFIAS),		.050617	.245673	.532572	.768208	.903277
Coping Strategies Index (CSI)		.30307	.670807	.890317	.971318	.993647
Food Share Expenditure (FES)		.000171	$2.5e^{-06}$	$3.2e^{-08}$	$3.7e^{-10}$	$4.0e^{-12}$

4.7. Discussion

The increase in food prices seen worldwide since 2008 presents a chance to maximize Ethiopia's agricultural potential (Cochrane and Legault, 2020). Sub-Saharan Africa's (SSA) low agricultural productivity remains a significant development challenge for African policymakers and the global development community (Van Ittersum et al., 2016). In a similar vein, Keeley et al. (2014) contend that government plans to expand agriculture and advance food and energy security included land investment. In an effort to increase food security and lessen poverty, several agreements have been formed (Nolte et al., 2016). The Government of Ethiopia has actively pushed land agreements for large-scale agricultural investment as part of its five-year Growth and Transformation Plan (GTP), with the aim of reaching food security and lower-middle-income status by 2025 (Moreda 2018). Ethiopia is a crucial case in the global discussion of large-scale land deals (Dessalegn 2011; Horne 2011; Cotula et al., 2014; Moreda 2018; Bekele et al., 2021b). The government actively participates in the widespread practice of transferring vast tracts of land to foreign governments and corporations promoting large-scale agriculture as a means of fostering economic growth and satisfying growing food shortages (Moreda, 2018). Additionally, it is anticipated that these companies (farms that produce crops for export and biofuel producers) will primarily help the country's economy (Lay et al., 2021). Because the government actively participates in the practice of transferring sizable tracts of land to foreign governments and companies for large-scale agriculture in order to promote economic growth and meet rising food demands (Moreda, 2018). Additionally, it is anticipated that these companies (farms that produce crops for export and biofuel producers) will primarily help the country's economy (Lay et al., 2021). The fact is that many Ethiopian farmers produce less than they need

for their personal needs. According to Dessalegn and Ababa (1999), two-thirds of families only have access to farming land that is less than 0.5 hectares in size, which is insufficient to sustain a family.On the other hand, there is debate over the empirical effects of these sizable agricultural investments on food security. Some research indicate that LSAI increases market and infrastructure accessibility, increases agricultural output, creates jobs, and has a favorable effect on food security. For instance, LSAI in Ethiopia had favorable benefits on household income, food consumption, and nutrition, according to a research by the International Food Policy Research Institute (IFPRI) (Taffesse and Dorosh, 2013). An additional recent investigation, conducted by Mawoko et al. (2018), looked at the impact of large-scale agricultural investments on household food security among smallholder farmers in the Gurué and Monapo districts of Mozambique. They discovered that these interventions improved family food security and created work possibilities in rural regions. The study also argues that one way to improve family food security is to promote large-scale agricultural investments. However, a more recent study on large-scale land investments and food security in Ethiopian agro-pastoral areas by Bekele et al. (2021b) used propensity score matching to evaluate the impact of LSAI on food security and found that LSAI reduced daily per capital caloric intake by up to 745 kcal per day per adult for those with LSAI compared to those without LSAI. Studies (Alamirew et al., 2015; Amanuel et al., 2019; Mechiche-Alami et al., 2021; and others) have revealed that large-scale agricultural investments have a detrimental impact on food security in Ethiopia. A propensity score matching estimation between treatment and control households, with and without LSAI, was used to test a number of hypotheses that we developed in order to better understand how large-scale farms affect households' access to food. When a group of participants undergoes treatment and researchers want to compare their results with those of a control group, it is advisable to applying propensity score matching (Thavaneswaran and Lix, 2008). More specifically, the Shashamane rural district comparison result is consistent with findings from 11 other sub-Saharan African nations (Müller et al., 2021). Additionally, for the control and treatment groups, respectively, the mean values for the food availability component measures, such as the Food Energy Intake (FEI) or calorie requirement measure, were 1435.95 and 1428.55 and were not statistically significant. The values for the MAHFP, HFIAS, HDDS, HFCS, FSE, and CSI measurements for the control and treatment groups were 7.95 and 8.61 (significant 1%), 10.26 and 9.84, 5.18 and 5.18, 28.42 and 28.38, 57.40 and 58.40, and 34.68 and 36.30, respectively. We also found that sex

(p=0.068), total family size (p=0.003), dependency ratio (p=0.018), farm land size (p=0.000), total livestock amount (p=0.000), agricultural technology training (p=0.040), credit availability (p=0.000), and distance to nearest market (p=0.00) significantly influenced LSAI. According to the empirical analysis of a research by (Teklemariam et al. 2016) utilizing PSM in Ethiopia, farmers with LSAI report more acute food insecurity. The average treatment effect on treated (ATT) was found to be lower by 44.57 and 737665746 kcal per day per adult, respectively, when compared to households without significant agricultural investment, according to Bekele et al. (2021b) using household calorie intake per adult equivalent and Months of Adequate Household Food Provisioning (MAHFP). Furthermore, Shete & Rutten (2015) in Ethiopia utilized the propensity score matching technique to evaluate how the LSAI influenced food security in order to adjust for sample selection bias brought on by the non-random selection of participants for the LSAI. Comparing families placed closer to a large scale land investment to those located farther away, they found that LSAI decreases or reduces daily per capita calorie intake by 27% kcal per day per adult. The presence of considerable land investments nearby has little effect on the coping strategies based on food security. In order to develop and carry out a suitable strategy, a multifaceted approach must be taken in order to achieve and sustain global food security (Barrett 2010; FAO 2019b). Faulty analysis and flawed actions are to blame for the failure of action plans to address food security (Clover 2003; Ströh de Martinez et al. 2016). We principally employ seven well accepted food security indicators to assess food security at the household level. According to the findings of our PSM and average treatment impact on treated (ATT) for FEI and MAHFP, LSAI has not increased the accessibility of local community food production. Furthermore, MAHFP were significant at 1%, proving that LSAI had a worse influence on the neighborhood than it did without LSAI.Therefore, it is not surprising that the majority of LSAI are export-focused. The HFIAS Access Scale treatment effect on treated (ATT) was on average -.059. This indicates that LSAI did not improve the food access portion of the food security pillar. On the treated (ATT) results, HDDS and HFCS had average treatment effects of -.059 and -.21, respectively. This demonstrates that the LSAI had no beneficial effects on the food security pillar's dietary diversity score.

Additionally, our average treatment effect on treated (ATT) result CSI shows that the coping strategies are not significantly affected. FSE, which were significant at 5%, added more proof that the local community with LSAI was more negatively impacted by LSAI. Our findings from

measures of food accessibility, such as FIR and MHFAP, as well as economic vulnerability or stability, such as FES and CSI, did not change as a result of LSAI. Similarly, our findings from measures of food utilization, such as HDDS and HFCS, did not change. Furthermore, we discover that the majority of respondent households in both LSAI-affected and non-affected communities are food insecure. When a household is closer to a large-scale land investment (via LSAI), it requires more Food Share Expenditure (FES) and MAHFP (Months of Adequate Household Food) Provisioning than when it is further away. Likewise, in contrast to the findings of (Taffesse and Dorosh, 2013; Stebek, 2012; Keeley et al., 2014; National Planning Commission, 2016; Zhan et al. 2018), the results of this study that applied PSM showed that LSAI has not overall improved the local community food security status of a household in a community with LSAI. As a result, LSAI has not kept its promises (e.g. increased productivity and food security status, particularly for smallholder farmers). Our study as a whole showed that the four pillars of food security—availability (i.e., is there an adequate supply of food?), access (i.e., can people get the food they need?), utilization (i.e., do people get enough nutrients?), and stability (i.e., can people always get food?—were not improved by LSAI. Furthermore, it has been discovered by Anseeuw et al. (2012), Cotula et al. (2009), Schoneveld (2011), Schutter Schutter (2011), Hufe and Heuermann (2017), and Lay et al. (2021), that LSAI can significantly and unfavorably contribute to food insecurity.

4.8. Conclusion

Research findings regarding the impact of LSAI on food security remain debatable. This study used actual data from the Shashamane rural region in Oromia Regional, Ethiopia, to assess the impact of LSAI on food security. In this study, the prevalence and level of household food security were compared between households in communities with LSAI (treated) and households in communities without LSAI (control), using the seven food security indicators, and Propensity Score Matching (PSM). The investigation yielded three findings. First, Elfora Agro-Industries PLC operates the Shallo-Melega LSAI farm in the Shashamana rural district, where smallholder farming is prevalent in small plots of land and produces crops for subsistence and/or sale on local markets. As a result, poverty in this area is significantly higher than in the control group (Shala district). Secondly the frequency and mean results show a substantial difference between the treatment and control groups for six internationally recognized food security indicators in terms of frequency and mean. This indicates that the

variables Food Energy Intake (FEI), Months of Adequate Household Food Provisioning (MAHFP), Household Food Insecurity Access Scale Score (HFIAS), Household Dietary Diversity Score (HDDS), Household Food Consumption Score (HFCS), Household Food Expenditure Share (HFES), and Coping Strategy Index (CSI) significantly impacted the majority of respondents in both groups. According to the findings of PSM's average treatment on treated (ATT) patients, LSAI had little to no beneficial effects on the food security of the neighborhood. The sensitivity analysis supported the outcome as well Moreover, the four foundations of food security—availability (is there an adequate supply of food?), access (can people get the food they need?), utilization (do people get enough nutrition from their diets?), and stability (can people always get food?—were more pronounced in the local community with LSAI. Therefore, we urge the government to modify investment strategies in a way that takes the local context into account and advice against continuing to support LSAI at the expense of locals' food insecurity. Finally, it is advised to take the following immediate measures: There is a need for localized livelihood diversification, manufacturing investment, and the development of social protection systems that are concerned with the welfare of people and households.

CHAPTER FIVE

5. Environmental Impacts of Large-Scale Agricultural Investments: Empirical Evidence from the Great Rift Valley of Ethiopia [18]

Abstract

While many researchers have studied the socioeconomic impacts of Large-Scale Agricultural Investments (LSAI) in low-income countries, comparatively little research has focused on their consequences for local environments and community conservation efforts. This gap hampers informed decision-making, which makes it necessary to investigate the impact of LSAI on the local natural environment and the community's conservation efforts. We used a mix of qualitative and quantitative methods, including participant observation, document analysis, community mapping, spatial analysis, and a community-based Focus Group Discussion (FGD) with a quasi-experimental design. Further, we used a customized Environmental Vulnerability Standard (EVS) developed by the Pacific Applied Geosciences Commission version (SOPAC) and field investigation to create environmental impact variables. We then used Principal Component Analysis (PCA) and Propensity Score Matching (PSM) to create an index and analyze the impact. We used the Drivers-Pressures-State-Impact-Response (DPSIR) framework to explain the connection between LSAI and changes in the local environment. Our descriptive study found that both the treatment and control groups recognized and implemented 18 of the 21 agricultural and land degradation conservation measures within the previous 24 months. The Average Treatment Effect on Treated (ATT) results, on the other hand, revealed that households in communities with LSAI were more vulnerable to environmental risks, had higher land degradation, and were less resilient than those in communities without LSAI. Our sensitivity analysis confirmed that the negative impacts predicted by our study accurately reflected the local effects of LSAI. Therefore, expanding and setting up LSAI ventures in other arable and woodland zones within the region would be unwise. Instead, monitoring existing LSAI implementation and supporting local farmers' efforts to conserve agriculture and rehabilitate already degraded land are crucial for mitigating negative impacts. This study's results can help inform policymakers and other stakeholders in their decision-making regarding LSAI, emphasizing the need to prioritize local communities' interests and environmental conservation.

Keywords: Resilience; Land degradation; Vulnerability; Exposure; the Great Rift Valley of Ethiopia

[18] Paper IV. Published as a book Yideg Alemun and Degefa Tolossa, 2022. Environmental Impacts of Large-Scale Agricultural Investments: Empirical Evidence from the Great Rift Valley of Ethiopia ELIVA PRESS e-version ISBN: 978-99949-8-064-2 © Eliva Press Global Ltd. part of Eliva Press S.R.L., 2022 © Yideg Alemu, Degefa Tolossa Eliva Press S.R.L. Publishing Group address is: Bulevardul Moscova 21, Chisinau, Moldova, Europe Website: www.elivapress.com

5.1. Introduction

Natural resource demand for land and water has significantly increased in the last decade (Lay et al., 2021). The phenomena of land-related deals, for example, LSAI (Large Scale Agricultural Investments) have historically changed since 2005, reaching a peak in 2009-15(Deininger & Byerlee, 2011; Dessalegn, 2011; Keeley et al., 2014). In recent years, there has been an increase in LSAI cases all over the world, but especially in the global south, with Africa being the most affected continent (De Zoysa, 2013).A growing global population, clean energy, eco-tourism, income, profit, food security by importing nations, and altered food consumption patterns are the most notable drivers of LSAI. Enthusiasm for LSAI varies (Hlpe, 2011). Other a report by Cotula et al. in 2009, indicated that there has been a significant increase in the acquisition of land since 2008. These land purchases, which predominately involved parcels of land, have the potential to degrade the environment by causing deforestation, biodiversity loss, soil erosion, and other problems. Ethiopia is one of the top 20 LSAI destinations in the world, and one of the first 10 in Africa (Cotula et al., 2009; Nolte et al., 2016).

It has been reported that by January 2011, the government has transferred 3,319,000 hectares of land to local and foreign investors (Dessalegn, 2011). In addition to the land currently given, it has been planned that the amount of land transferred to large-scale land investors will reach many million hectares by 2015, and as a result, by 2016, at least 7 million hectares of agricultural land will have been transferred to investors, accounting for around 38 percent of the entire amount of land used by smallholders (Dessalegn, 2011; Moreda, 2018). Moreover, the exact area covered by the land deal is unknown; various sources provide varying estimates. Shallo-Elfora Melga's Agro-Industries P.L.Cs (Private Limited Company) farm started operation in 2008, on 10,000 hectares of territory in the Shashamane rural district of Oromia regional State, the LSAI farm is currently engaged in agricultural production and agro-processing. Ethiopia serves as an example of the environmental issues associated with LSAI, particularly in Africa. (Buffett, 2011; Zoomers, 2011).

The phenomena of this LSAI coincide with a shrinking natural resource base and increasing quasi-experimental study (i.e. exposed Vs non-exposed) (Lay et al., 2021). Further pressure on LSAI undermines social, economic, and environmental impacts and has caused over-exploitation of the existing farmland that results and caused land use/cover changes, biodiversity loss,

deforestation, environmental degradation, and loss of topsoil, a decline in agricultural production, shortage of food and poverty. Globally, agriculture (small and large) covers 38 % of the global land surface(Cotula et al., 2009; Lambin and Meyfroidt, 2011; Lay et al., 2021), the environment is under increasing pressure due to diverse factors such as population growth, urbanization, food production and consumption, and uncertainties induced by climate change (Obidzinski et al., 2012). Agriculture and natural resources are important to Ethiopia's economy, and their use can result in significant short-term economic gains. However, over time, inappropriate use of these natural resources worsens both environmental deterioration and chances for economic growth and subsistence (Wiersinga and De Jager, 2009). Recent trends indicate that the marriage between LSAI and environmental suitability is growing unhappy, and more synergies are needed (Baumgartner et al., 2015; Nolte et al., 2016). As forest areas and agroforestry systems are replaced by monoculture plantations, large-scale capital-intensive farming is often associated with deforestation, soil erosion, and a reduction in biodiversity. Furthermore, input-intensive monoculture agriculture can contribute to chemical exposure and water pollution (Balehegn, 2015).There is plenty of evidence of such a negative environmental impact, including the territorial growth of LSAI over millions of hectares of land in the global south and Africa (Dauvergne and Neville, 2010; Buffett, 2011; Bissonnette, 2016; Koninck and Rousseau, 2012).

Different countries in the region have been damaged by environmental deterioration brought on by LSAI (Rist et al., 2010). The term "LSAI" should also be interpreted to refer to "Land grabs" or "green grabs," which is the appropriation of entire ecosystems with the extraction of natural resources as the primary justification (Lambin and Meyfroidt, 2011; Obidzinski et al., 2012; De Zoysa, 2013; Lunstrum, 2016). To date, there has been an overarching review of the global evidence of the impact of LSAI on the environment at a global level (Anseeuw et al., 2012; Breu et al., 2016; Nolte et al., 2016). Now, there is also scant evidence on how local communities react to the environmental impact of LSAI, and action taken to reduce the negative impacts and enhance the positive parts, including rehabilitation and mitigation efforts by local people, where LSAI stated operation (Lay et al., 2021). Taddese, (2001) argued unsustainable agriculture and land-tenure policies in Ethiopia are the main contributors to desertification and the decline of agro-biodiversity, and this issue needs to be urgently addressed. Due to its abundance of resources and potential for irrigation, Ethiopia, particularly the Oromia Region, is a popular

location for foreign land purchases (ONRS, 2015). The impact of LSAI on the local natural environment and action by the local community to reverse land and natural resource degradation, and their effect on production in Ethiopia is, but not yet fully comprehended. Additionally, there is empirical research on the impact of LSAI in Ethiopia mainly focusing on human rights, food security, social corporate responsibility, livelihood improvement, technology transfer, employment generation for the rural poor, infrastructure, empowerment, and crop production (Bekele, Dries, et al., 2021; HRW, 2012; Moreda, 2018; Schutter, 2010; Shete and Rutten, 2015). Additionally, Hufe & Heuermann (2017), Lay et al. (2021), Yang & He, (2021) argued that the empirical data that is currently available regarding the effects of LSAIs in low-income countries is biased towards the evaluation of agricultural producers, economic benefits, and land tenure and that the natural environment's exposure, vulnerability, and resilience have received less attention.

Additionally, media and researchers have paid close attention to the rise of big land acquisitions and energy crises, which often include long-term leases on state-owned or customer land (Brüntrup et al., 2016). A variety of factors can affect environmental impacts, including location, climate, and agricultural practices. This makes it essential to conduct localized and context-specific research, which is often lacking; however, scholars such as Maru et al. (2015) have previously examined the environmental impacts of LSLA land use change. Also, in Oromia regional state, there is insufficient empirical research to support well-informed decision-making on LSAIs' effects on the environment. (Osabuohien et al., 2019). To date, no research has been conducted in the study area that combines data and techniques using a quasi-experimental design and a DPSIR (Driving force–Pressure–State–Impact–Response) framework to comprehensively assess local environmental sustainability and vulnerability. Therefore, this study aims to investigate the impact of LSAI on environmental degradation, land degradation, exposure, and resistance in the rural Shashamane district of Ethiopia's Oromia Regional State.

The paper makes two contributions because it is hypothesized that LSAI enhances and supports the general state of local environmental sustainability and decreases vulnerability. The DPSIR framework approach is used to assess the LSAI impact, and state change on the local environment, and mitigation measures or responses to reduce the negative impacts, with emphasis on the Shashamane rural district, one of the most contentious issues. Second, it sheds

light on how LSAI and society and the environment can coexist sustainably. To address the impact, it also employs strong econometric models, a tailored EVI (Environmental Vulnerability Index) which was developed by the South Pacific Applied Geoscience Commission (SOPAC), the United Nations Environment Program, and others. We outline the conceptual framework, methodology, findings, discussion, conclusions, and perspective in the following parts.

5.2. Conceptual Framework

To gather, represent, analyze, and explain the issues and problems pertaining to current or future circumstances and how they may be resolved, conceptual models are required (Patrcio et al., 2016). In the study, the Driver-Pressure-State-Impact-Response Framework (DPSIR) was utilized to study the environmental impact of Large Scale Agricultural Investments (LSAI) within the broader context of political ecology. This framework allowed for a structured analysis of the various elements involved in the LSAI process. The DPSIR framework was created by the Organization for Economic Cooperation and Development (OECD) in 1993 (Kanianska, 2016). This framework is often depicted as organizational diagrams that group and condense data in a uniform, logical, and hierarchical manner (Elliott et al., 2014), making it an essential tool for conceptualizing causal links. The model has been widely used since the early 1990s in the fields of environment and climate change. It comprises of five interconnected variables, beginning with "driving forces" (such as economic sectors and human activities like expansion for LSAI), leading to "pressures" (such as emissions and waste), "states" (physical, chemical, and biological), and "impacts" on ecosystems, human health, and functions, ultimately culminating in political "responses" (such as prioritization, target setting, and indicators) (Kristensen, 2004; Patrício et al., 2016). Recently, framework has been utilized to assess the effectiveness of development policies through its multifaceted analysis of competing social, economic, and ecological factors (Patrício et al., 2016). The model has become widely recognized for its ability to investigate the complex processes that occur within human-environmental systems, as it can capture the intricate cause-and-effect interactions between the economic, social, and environmental sectors. Increased competition for land, water, and energy, as well as problems like overfishing and the urgent need to lessen the environmental impact of the food system, have all had a significant impact on agricultural production (Hodge, 1997; Kristensen, 2004). As a result, environmental assessments should include all elements of the chain between human activity, its environmental consequences, and societal responses to those consequences. Multiple

indicators should typically be used in environmental assessments to provide a thorough understanding of the situation (Turner, 2008). The DPSIR model was utilized to identify key factors and establish the interrelationships between driving forces, pressures, countries, impacts, and responses to assess the impact of LSAI on land use, terrain, and ecosystem services (refer to Figure 5.1). Through this method, we were able to concentrate on the usefulness and applicability of the DPSIR framework in examining and elucidating the relationships between LSAI and the associated environmental issues, including their operation, response, and stakeholder communication. This study is an initial attempt to analyze how DPSIR was used to assess LSAI in the Shashaman rural district. Thus, it is clear that society must be aware of the threats that these pressures pose to natural and human systems, which necessitates a threat assessment, and take action to lessen or make up for them, i.e., threat operation (Kristensen, 2004,Elliott et al., 2014).

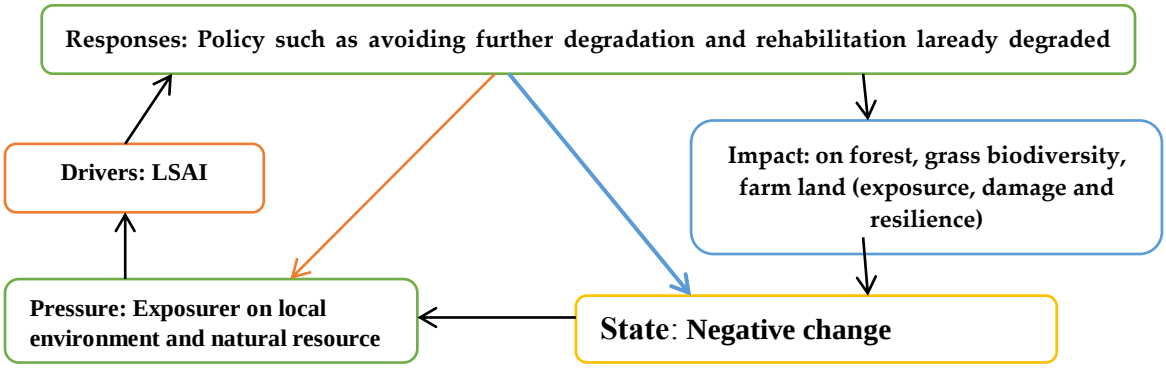

Figure 5.1. DPSIR analytical framework is used to analyze the impact of LSAI on the local environmental state (Kristensen, 2004; Patrício et al., 2016).

5.3. Research Method

5.3.1. Geo-location, Climate and Agro-ecology Elfora Agro-Industries Shalo-Melge Farm

The Shashamane and Shalla rural districts of the West Arsi zone make up the study area, which is located in the Ethiopian Great Rift Valley. The West Arsi zone's topography varies from 500 to 3200 meters above sea level (masl). The area is divided into three distinct zones: the highlands, locally referred to as Dega or Badaa (2300 to 3200 masl), the midlands, locally referred to as Woinadega or Badadaree (1500 to 2300 masl), and the lowlands, locally referred to as Kola or Gamojjii (500 to 1500 masl). These zones respectively account for 45.5%, 39.6%, and 14% of the region's land area.

There are three distinct seasons—two rainy and one dry—with an average annual temperature of 15 to 20°C in Ethiopia's West Arsi zone. The main wet season, also referred to as the Meher season or Gaana, lasts from mid-September to June and is marked by an average annual rainfall range of 800 to 1400 millimeters. Additionally, there is a shorter rainy season called the Belg season, also known as Arfaasaa, which lasts from February to May and contributes to up to 40% of the region's crop production. Approximately 50% of the yield in some regions, including Shashamane Belg, depends on the Belg season. From October to January, there is a dry period known as the Bona or Bega season. The West-Arsi zone Agricultural and Rural Development Office has recognized 13 diverse soil types in the zone, with Orthic luvisols being the most common at 56.6%, followed by Eutric Combilsols (18.94%), Vertisols (12.1%), and other soil types (12.26%)(Senbeta, 2009).The Shashamane district, located in the rural part of the study area, has considerable potential for agricultural growth. The majority of the district is devoted to agriculture, with a small portion of land covered by trees and natural plants. The primary crops grown in the area include wheat, barley, potatoes, maize, teff, peas, and beans. Soil types in the region vary from clay, loam, sandy loam, loamy sand, sandy clay, silty clay, and silt. Groundwater is stored and transported through secondary porosities in rock formations resulting from weathering and tectonic fractures. Rivers, springs, and hand-dug wells provide the district's water supply. Due to its fertile soils, groundwater, and complex agro-ecology, the area is attractive for investment in the agricultural sector, ranging from food items to industrial raw materials and biofuels. Furthermore, the area is well-positioned in terms of infrastructure and is a key source of foreign currency for the country. The Tikur Wuha River, a major tributary of Ethiopia's Lake Hawassa, is located on the northeast bank of the lake, with latitudes of 6048'00"–7010'00"N and longitudes of 38°26'30"–38°43'00"E. Its elevation ranges from 1643 to 2976 meters above sea level. The river is a vital source of water for agriculture and other socioeconomic activities in the region.

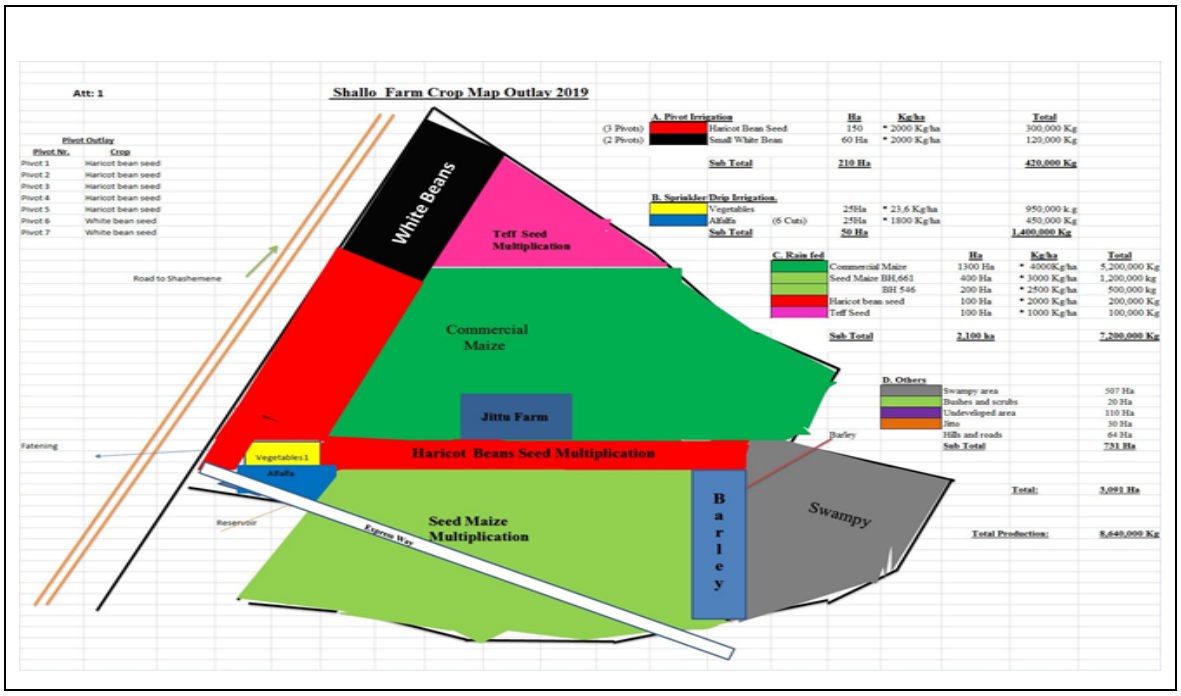

Figure 5.2. Shallo farm crop map outline 2019 Map of Ethiopia and Elfor- Agro-industrial P.L.C Shallo-Melge farm plant Land Holding & Use

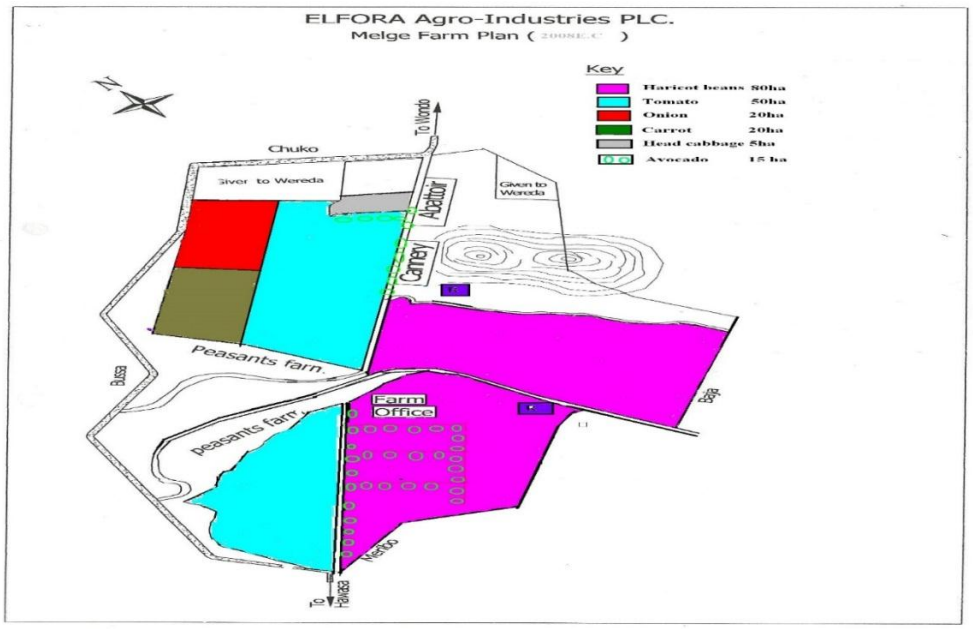

Figure 5.3. Melge farm crop map outline 2019 Map of Ethiopia and Elfor- Agro-industrial P.L.C Shallo-Melge farm plant Land Holding & Use (Source: Elfor- Agro-industrial P.L.C Shallo-Melge administrative office).

5.3.2. Research Design

To evaluate the impact of large scale agricultural investments (LSAIs) on the natural environment in local communities, this study used a non-experimental research approach, especially a quasi-experimental and cross-sectional survey. Respondents were divided into two groups: the treatment group consisted of households in areas with LSAIs, while the control group was composed of households in communities without LSAIs. The primary objective of this study was to analyze the effects of LSAIs on the natural environment in these communities.

5.3.3. Sampling Techniques and Sample Size

The sample respondents were chosen using multi-stage sampling processes (for the details of sampling procedures and sample size determination see Appendix B, Table B3).

5.3.4. Data Analysis Techniques

The investigation utilized The Environmental Vulnerability Index (EVI) and its sub-indices, including the Environmental Degradation Index (EDI), Risk Exposure Index (REI), and Intrinsic Resilience Index (IRI), as indicators to evaluate the impact of Large-Scale Agricultural Investments (LSAI) on the local environmental state. Specifically, the Environmental Vulnerability Index (EVI) used in this investigation reflects the overall vulnerability of the environment to external stressors, such as climate change, land-use changes, and human activities. The EVI is a composite index that measures the susceptibility of the environment to damage, the sensitivity of the environment to the damage, and the capacity of the environment to recover from the damage. The Environmental Degradation Index (EDI) measures the extent of environmental degradation resulting from Large-Scale Agricultural Investments (LSAI).

The EDI includes indicators such as soil erosion, deforestation, loss of biodiversity, and pollution. The EDI is an essential measure of the direct impact of LSAI on the local environment. The Risk Exposure Index (REI) measures the exposure of the environment to different risks, such as droughts, floods, and pests, resulting from LSAI. The REI includes indicators such as the extent of the area susceptible to floods, the frequency of droughts, and the prevalence of pests. The REI is an important measure of the indirect impact of LSAI on the local environment. The Intrinsic Resilience Index (IRI) measures the intrinsic resilience of the environment to recover from external stressors, such as land-use changes, climate change, and

natural disasters. The IRI includes indicators such as the extent of the area covered by vegetation, the diversity of the vegetation cover, and the extent of soil conservation practices. The IRI is an essential measure of the capacity of the local environment to recover from the impact of LSAI. Data was collected from the Shala District kebele (including Solicha, Waka, and Bute) and neighboring Shashemene district (including B/Dannaba, Toga, and D/Calalaqaa kebele) between October 2019 and January 2020. To ensure data quality, the questionnaire was evaluated for face validity prior to data collection. Reliability was also assessed by calculating Cronbach's alpha, which was found to be 0.79 - a reasonable range for reliability coefficients (George and Mallery, 2003). Descriptive statistics including mean, standard deviation, minimum, paired sample t-tests, and chi-square tests were used to make significant comparisons. Additionally, document analysis, community mapping, spatial analysis, and a community-based Focus Group Discussion (FGD)

The PSM model analysis was employed to investigate the impact of LSAI on the local environmental state. By using the EVI and its sub-indices, and the PSM model the study aimed to provide a comprehensive understanding of the impact of LSAI on the local environment, taking into account both the direct and indirect effects of these investments

5.3.4.1. Environmental Vulnerability Index (EVI)

Our assessment of the EVI at the local level was conducted using a customized methodology developed by the South Pacific Applied Geoscience Commission (SOPAC), the United Nations Environment Programme (UNEP), and their collaborators (Barnett et al., 2008). 32 indications of dangers, 8 indicators of resistance, and 10 indicators that assess damage make up the original Environmental Vulnerability Index (EVI)(SOPAC, 2005).The 50 indicators are weighted equally and then combined using the arithmetic mean (Kaly et al., 2004). Although, PCA (Principal Components Analysis) is among the most popular methods for gathering high-dimensional data and utilizing the dependencies between the variables to express it in a more manageable, lower-dimensional form without sacrificing too much information (Jollife and Cadima, 2016; LD et al., 2008). PCA is an ordination-based statistical technique for data analysis that separates a collection of possibly correlated variables—those that share a property, such as points in time or location, for example—into a collection of uncorrelated variables that precisely capture the variability in the data set. PCA can therefore be used to draw attention to patterns in multivariate

data. As a non-parametric analysis, PCA is unaffected by any theories regarding the probability distribution of the data. The probability distribution of the data is not taken into account by PCA because it is a non-parametric analysis (Abdi and Williams, 2010).

There are many purposes for having an EVI indicator (Gowrie, 2003). But there are some major ones such as tracking environmental progress which can be done by monitoring the environment and changes over time (Pratt et al., 2004). Another purpose is to better integrate environmental concerns into sectorial and economic policies. In that way, indicators can provide the tool that is necessary to encourage governments to perform better in the environment (Barnett et al., 2008). To assess and examine whether the intervention variable had an effect on the local environmental state, we use the EVI index (Risk Exposure Index, Intrinsic Resilience Index, and Environmental Degradation) as an outcome variable (LSAI). The term "environment" is used to refer to "those biophysical systems that can be maintained without human support" (Pratt et al., 2004). "The degree to which the environment is susceptible to damage and degradation," according to the EVI, is what vulnerability is understood to mean (Kaly et al., 2004).

A crucial idea in the EVI is "resilience," which is viewed as the antithesis of vulnerability (Pratt et al., 2004; SOPAC, 2005). According to SOPAC (2005), it refers to "the degree to which the responder can resist damage/degradation by hazards." Environmental degradation refers to the "reduction or distraction of lands biological poetical", and common forms of environmental degradation include desertification ion, land degradation, surface runoff, and erosion channels (Suhrke, 1993). Ecosystems' loss of diversity, extent, quality, and function are all regarded as additional vulnerability "damage" (Kaly et al., 2004). Resistance is defined as "the inherent characteristics of a state or a local community that would tend to make it more or less able to deal with natural and manmade hazards," the first of which is the "frequency and severity of hazardous events." Environmental vulnerability is defined as "vulnerability acquired as a result of ecosystem degradation or loss of ecological integrity" (Pratt et al., 2004; John 2021). Finally, using PCA as the output variable in the model, we created 50 tailored indicators of the larger Environmental Vulnerability Index (EVI) and sub-indicators (9, indications for ERE, 10 indicators for IRI, and 31 indicators for EDI for each household. As a result, the extensive use of PCA-based vulnerability indices can guide more in-depth and context-specific research efforts

and suggest more focused policy development that can help with transitions toward reduced vulnerability (Abson et al., 2012; Foxon et al., 2009).

5.3.4.2. Measuring Impact: Econometrics Model Analysis

Propensity score matching (PSM) econometric analytic tools are suitable for the study based on the type of surveyed data, ease of analysis, and interpretation. The PSM technique was used to create a comparison group that is comparable to the treatment group in terms of observable features and evaluates the influence of LSAI on the local environmental state in order to reduce selection bias from treatment assignment in observational data sets. Furthermore, a straightforward comparison of these two groups could lead to significant biases and inaccurate results. PSM was recommended by a number of authors as a way to circumvent this bias and misinformation issue (Heinrich et al., 2010;Haji and Legesse, 2017;) and is one of the available econometric techniques to deal with these biases(Caliendo and Kopeinig, 2008; Heinrich et al., 2010).

Additionally, this model can be used to explain causes and effects in quasi-experimental designs and create statistical treatment and comparison groups correctly, and measure the magnitude of the impact in terms of the Average Treatment Effect on the Treated or affected households (ATT) (Rosenbaum and Rubin, 2006). When a program's implementation results in pools of treated and untreated conditions from which the two matched groups may be taken, PSM can be used to evaluate the program's or a policy change's effects. another justification for doing so PSM was an assessment research technique, along with other non-experimental methodologies, that focuses on developing techniques to accurately estimate [the impact of policy change] so that sensible decisions about program extension and termination can be made (Haji and Legesse, 2017). The impact of LSIA in Ethiopia has also been assessed using this method by Alamirew et al.(2015) Guyalo (2019) Müller et al.(2021) Shete (2011) and Shete et al.(2015). It is anticipated that Propensity Score Matching (PSM) will offer a weighting system that produces impartial estimations of the treatment's effect. We want to determine the average treatment effect on the treated (ATT), as stated in Eq., using the aforementioned indicators (1). Caliendo and Kopeinig (2008) indicates this impact (ATT) as:

$$JATT = E(J \mid D = 1)E[Y(O) \mid D = 1)] \qquad 1$$

Where, Y0 = performance in the control group, and Y1 = performance in the treatment group.

5.3.4.3. Choice of Covariate Variables for Econometric Estimations

Our selection of relevant independent variables was based on various factors such as the accessibility of data, economic theory, and empirical reviews of prior literature. The main group variables that we considered in our study were socioeconomic, biophysical, demographic, natural environment, and plot variables. A detailed list of all the explanatory variables, including their names, descriptions, units of measurement, and expected signs, is provided in Table 1.2. In this table, a minus sign denotes an expected negative relationship, while a plus sign denotes an anticipated positive relationship. Additionally, the propensity score and covariate balance test results are shown in appendix B, Table B10.

5.4. Empirical Results

5.4.1. Conservational Agriculture and Land Degradation Conservation Measures.

According to the study's findings, several of the respondents in both (treatment and control) groups were identify several types of agriculture and natural environment degradation (99.3%), aware of several types of agriculture and natural environment conservation measure practice (99.3 %) and practical knowledge or practices to several agricultural and natural and land degradation conservation measures (99%), in the past 12 months, respectively (Detail of the Characteristics of the surveyed households and summary statistics for treatment and control sample households And for several types of land degradation result see Appendix B, Table B4. and Table B5 respectively). Research findings reveal that out of 21 land degradation conservation measures 18 of the conservation measure were known and implemented in a different season by both treatment and control groups This is where: Zero/minimum tillage, Intercropping, drought tolerance seed, high yielding variety seeds and fertilizer, Composting, Planting in deep holes, water harvesting, trenches, channels, planted bunds, bunds (soil and stone), crop rotation, Vegetation strips, Agro-forestry, Mulching, Conservation tillage, Contour plowing, Terrace For both groups Weather insurance, nutrition variety agriculture, and Integrated pest management (IPM) were not know and practiced. Research findings reveal that Different were found in conservation measure practice between treatment and control groups (see Figure 5.4).

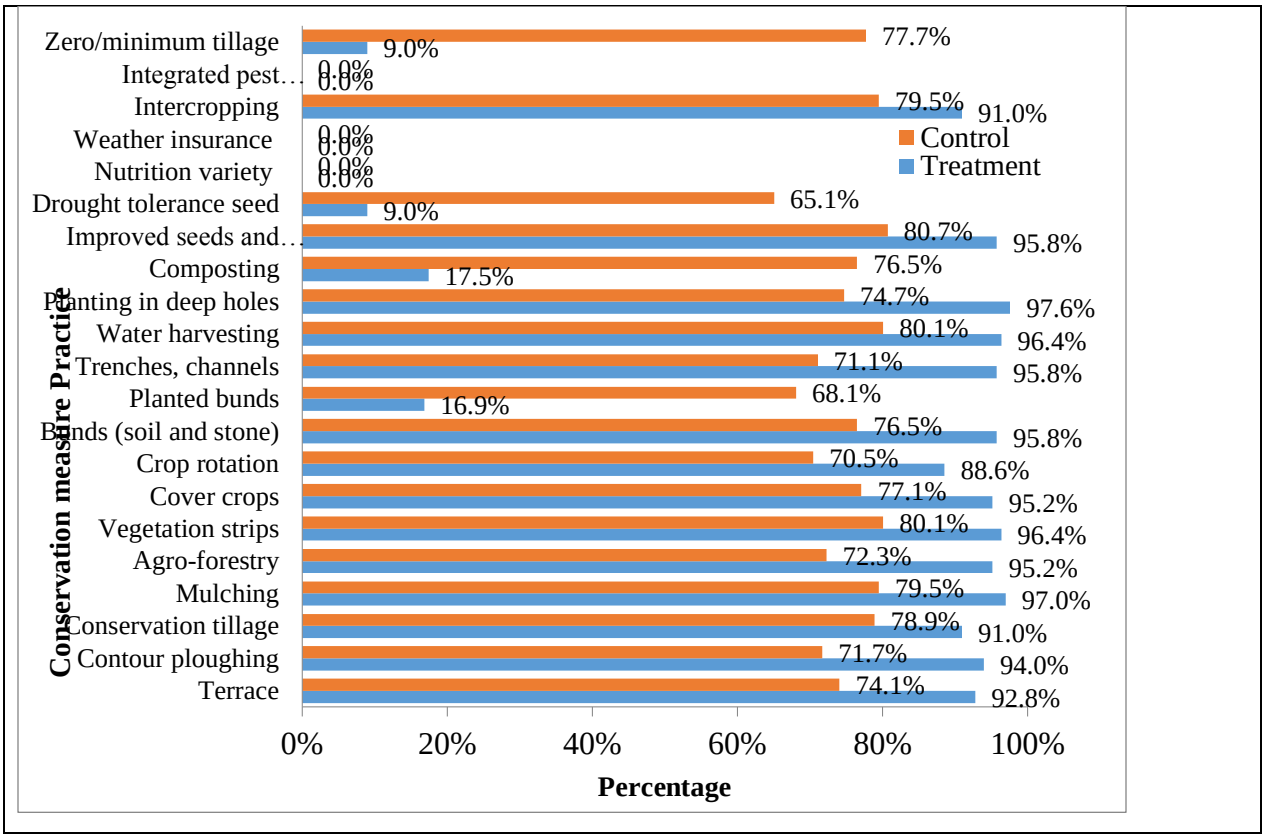

Figure 5.4. Conservational Agriculture and Land Degradation Conservation Measures.
Source: Own survey result, 2020

5.4.4.1. Reasons to Conservation Measures

The investigation uncovered the motivations behind some farmers' agriculture and land degradation conservation efforts. People's conservation activities have been linked to a variety of reasons. There are 300 households in total (134 treatment and 166 control) that were surveyed, the 43 %, 37%, 36%, 40%, 53%, 55%, and 78% prioritized and ranked 1st as conservation measures were to improve land productivity, soil fertility, and reduce soil erosion, reduce risk of flooding, improve food security and nutrition security, increase income thought livestock forage, and increase and household employment respectively. Figure 5.5 show summary of reasons of practicing conservation measures by both groups.

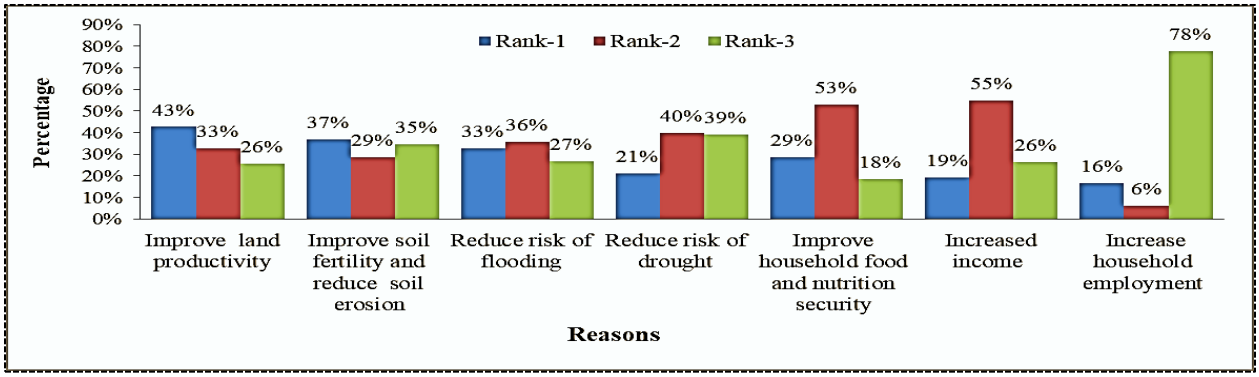

Figure 5.5. Reason for conservational measure practice and adoption of production technology (treatment and control group).

Source: Own survey result, 2020

5.4.4.2. The Major Obstacles to Conservation Practice

The research uncovered the reasons why some farmers do not practice conservation practices. Varied households practice different levels of conservation. As a result, the major roadblocks to conservation were identified and investigated. People's failure to implement conservation techniques has been blamed on a variety of factors. The majority (52.3 percent) of the 300 households surveyed (134 treatment and 166 control) said the greatest constraint influencing conservation measures is a lack of government support. Land scarcity and fragmentation, higher conservation equipment prices, seedling availability, access, input price, and lack of household income accounted for 22.4 percent, 16.7%, and 7.6% of the total, respectively (See Appendix B, Table B6).

"In the Shala rural district, farmers had very small plots of land, and we struggled to make ends meet. Consequently, there was a shortage of fertile land, which hindered our active participation in conservation efforts. This is because conservation practices on small plots of land would lead to even further land shortages and soil degradation. Techniques like terracing, establishing protected areas, undertaking reforestation efforts, and implementing sustainable agricultural practices such as crop rotation or agroforestry require extensive land use." FGD Participants *shala distict.*

While FGD participants in the Shashamane rural district stated that, *"Shashamane has limited agricultural land, and agriculture serves as the primary source of household income. We have been actively participating in conservation efforts, and believe that conservation practices can increase the fertility of our land. This is due to the fact that using conservation techniques on*

small pieces of land helps maintain soil health, biodiversity, and overall sustainability. Techniques such as mulching, crop rotation, intercropping, cover cropping, minimizing soil disturbance, and incorporating native plants have been employed"

5.4.4.3. Main Source of Information for Conservation Practice and Adoption

Government extinction workers, NGO and community meetings, farmer training centers, neighbors, and indigenous knowledge friends were the major sources of information in Shahemena rural and Shalla district.

5.4.2. Descriptive Statistic of result of EDI, IRI, and REI Variables

The outcomes of the mean and t-test analyses of the environmental impact indicator variables are shown in Table 5.1. In terms of mean and t=test of IRI and EDI outcome variables, the descriptive statistics showed that there were significant differences between treatment and control. This means that in treatment families where LSAI is active, a greater EDI was observed. Due to higher degradation, the local community living in the vicinity of the LSAI are lower IRI. The mean score ERI for treatment and control households was 0.02 and.02, respectively. T-test results were 0.2535 and non-significant.

Table 5.1 Descriptive statistics of Environment impact indicator variables

Variable	Dimension	Sample	Mean	Std. Err.	Std. Dev.	T= stat	P-value
The Risk Exposure Index, (REI)	Exposure	Control (Obs = 166)	0.02	.143727	1.66	0.2535	0.8001 NS
		Treatment (Obs=134)	0.02	.127490	1.64		
Environmental Degradation Index (EDI),	Damage	Control (Obs = 166)	0.86	.361741	4.18	-3.5923	0.000***
		Treatment (Obs=134)	0.70	.262309	3.37		
Intrinsic Resilience Index, (IRI)	Resilience	Control (Obs = 166)	1.31	.111785	1.29	-15.1339	0.0004***
		Treatment (Obs=134)	1.07	.109914	1.41		

**p0.05, ***p0.01. Source: 2020 survey results

5.4.3. The Outcome of the Binary Logistic Regression Model

In the logistic regression model we used to evaluate the likelihood of participating in the program, eight variables were significant (see Appendix B, Table B7).These were: sex (p= 0.068, at 10% significance), total family size (p= 0.003, at 1% significance), dependency ratio (p= 0.018 at 5% significance), farm land size (p = 0.000, at 1% significance), total livestock amount (p=0.000, 1% significance), and agricultural technology training (p= 0.040, at 5% significance). Access to financing (p=0.000) and proximity to a market (p=0.002), on the other hand, have a negative and significant impact on the likelihood of program participation at a 1% level. This negative association between credit availability, proximity to a market, and program

participation means that the likelihood of program participation decreases as credit availability increases.

5.4.4. Estimation of the Propensity Score

The likelihood that non-treated groups (those residing in kebeles without LSAIs) will receive treatment is indicated by the propensity score (be in kebeles with LSAIs). After estimating a propensity score, we used a Hosmer-Lemeshow test - goodness of fit (GOF) test, Multicollinearity, and Heteroskedasticity test for logistic regression to see if the estimation was valid (Hosmer et al., 1997)(see Appendix C, Figure C7). The test measures the discrepancies between the observed number of events, the actual data, and the expected number of events from the model (Mnsson, 2012) or determines whether the model is consistent with the observed data sets by measuring the discrepancies between the observed number of events, the actual data, and the expected number of events from the model. The propensity scores for the treatment and control households are shown in Figure 4. A wide range of matching algorithms are supported by PSM. In this study, we use a kernel matching technique. This approach uses more information, which lowers variance. Kernel matching offers an integrated robustness check to guard against the shortcomings of other matching techniques (Chagwiza et al., 2016).

5.4.4.1. Result of Common Support Region and Propensity Score for Balancing

Propensity score distribution and common support for propensity score estimation illustrated result (See Appendix C, Figure C5). The standard support is shown (See Appendix C Figure C6) (see for Appendix C, Figure C7). For the Goodness-of-fit test for the modle (see Appendix C, Figure C7).Determining the overlap and common support region between the treatment and comparison groups is essential because ATT is only defined in the zone of common support.

5.4.5. Impact Estimation ATT

5.4.5.1. Impacts of LSAI Environmental Risk Exposure, Environmental Degradation, and Intrinsic Resilience

Table 5.2 depicts the Average treatment effect of Risk Exposure to Environmental Degradation and Intrinsic Resilience on treatment (ATT or difference). The result of ATT of the REI, EDI, and IRI shows 0.33, 0.90*, and 2.3* respectively. Furthermore, the IRI of the local community with LSAI is lower. This means that, despite the preservation of its key base structures and functions, a family in a community with LSAI has a poorer ability to resist, absorb, accept, and recover from LSAI effects quickly and effectively. In addition, the ecosystem's other components—such as soil fertility, air and water quality, and others—were not improved by

LSAI. This implies households in a community with LSAI were more exposed to dangerous environmental exposure, and natural and environmental degradation such as land degradation. This implies that community proxy to LSAI exposed to higher environmental Risk Exposure such as high winds, longer dry periods seasons, etc., and the Environmental state was affected as a result of LSAI. EDI and IRI were significant at 1%.

Table 5.2. Risk Exposure, Environmental Degradation, and Intrinsic Resilience

Variable	Dimension	Sample	Treatment	Control	Difference /ATT/	S.E	T-state
REI	Exposure	ATT	0.18	0.15	0.33	0.32	1.05
EDI	Damage	ATT	1.14	0.23	0.90*	0.69	12.30
IRI	Resilience	ATT	0.94	1.38	2.3*	0.25	8.98

**p0.05, ***p0.01. Source: Own survey result, 2020

5.4.6 Sensitivity analysis

Based on the sensitivity analysis, the impact estimates produced by this study are affected by the selection bias in the observed gamma value 2. Table 5.3 displays three distinct measures of risk exposure: the Risk Exposure Index (REI), the Intrinsic Resilience Index (IRI), and the Environmental Degradation Index (EDI).

Table 5.3. Result of sensitivity analysis using Rosenbaum bounding approach

Indicator	Dimension		$e^{\gamma}=1$	e^{γ}=1.25	$e^{\gamma}=1.5$	$e^{\gamma}=1.75$	$e^{\gamma}=2$
The Risk Exposure Index, REI	Exposure	ATT	.999712	.999995	1	1	1
Environmental Degradation Index, EDI	Damage		.194107	.536932	.808882	.938168	.983147
Intrinsic Resilience Index, IRI	Resilience		0	$4.6e^{-14}$	$6.0e^{-12}$	$2.0e^{-10}$	$2.8e^{-9}$

Source: Own computation (2020), γ stands for gamma value

5.5. Discussion

The results from quantitative analysis affirm that out of 21 conservation agriculture (CA) and land degradation conservation measures, 18 of the conservation agriculture (CA) and land degradation conservation measures were known and implemented during the past 24 months, by both treatment and control groups. There is a general census on the negative relation between land degradation and agricultural productivity (FAO, 2016). There is a discrepancy in the reasons why the treatment and control groups practice conservation. The central reason for the household community with LSAI to practice conservation agriculture (CA) and land degradation conservation measures was to reverse already degraded soil and protect against future soil erosion and land fragmentation and biodiversity loss, reduce the impact of spillover of

agricultural chemicals due to LSAI, and increase agricultural and food production. The central reason for household communities without LSAI to practice conservation agriculture (CA) and land degradation conservation measures was to maintain the soil physical, biological, and chemical status of the land. Since land has been deteriorated, it is possible to rehabilitate it and so return it to the highest level of utility possible, albeit not as good as it was in its damaged state. So far, there is a lot of evidence that CA and land degradation conservation actions have positive yield benefits(FAO, 2016; Ghaley et al., 2018; Nkonya et al., 2015). One of the most important and right away advantages of conservation agriculture at the farm level is thought to be increased food security (Nyikahadzoi et al., 2012). Conservation agriculture practices are expected to result in sustained improvements in crop yields due to the biophysical modifications that occur, as pointed out by Erenstein (1999). Additionally, according to a study by Mango et al. (2017), conservation agriculture and natural resource conservation can significantly reduce nitrogen loss in the soil, promote water and soil conservation, and improve the agronomic use efficiency of applied nutrients. These findings further support the benefits of adopting conservation agriculture and natural resource conservation practices. In our result majority (52.3%) reported lack of government support, the higher price of conservation equipment, availability, access, price of the input, and lack of household income were the main constraints preventing agricultural and natural environmental conservation measures. In China, the use of no-till techniques resulted in increased yields of 30 percent net economic returns and lower wheat production costs. Furthermore, conservation agriculture can minimize water runoff by 40-69 percent. Herbicide, nitrate, and soluble phosphate contamination of surface waters is reduced as a result (by 70 percent, 85 percent and 65 percent respectively)(Rosegrant et al., 2014).

When compared to standard techniques, water collection combined with conservation agriculture enhanced farmers' gross margins 4-to-7-fold and increased returns on labor 2-to-3-fold in Zimbabwe. In areas with lower rainfall, these techniques have had the most success (Mcgahuey and Scherr, 1997). Moreover, a local communities in treatment or LSAI intervention communities were more practiced and engaged in CA and land degradation rehabilitation than the control (none exposed). Regarding the source of information, our research results from government agricultural extension workers, local NGOs, community meetings, farmer training centers, neighbors, indigenous knowledge and friend were the major source of information in the Shahamene and Shalla districts. A useful tool for quantifying the likelihood of treatment

assignment based on observed baseline characteristics is the propensity score (Austin, 2011). The average treatment effect (ATE) is a metric used in randomized experiments, policy intervention evaluation, and project comparisons to compare treatments (or interventions) (Heinrich et al., 2010). The ATE calculates the variance in mean (average) results between the treatment and control groups of units (Caliendo and Kopeinig, 2008; Heinrich et al., 2010; Austin, 2011). The average treatment effect (ATE) was calculated in this study using the kernel matching method. This method uses average outcomes for people with comparable observed characteristics to impute the missing potential outcomes for the untreated group based on covariates X. Result of risk exposure shows that positive ATT /difference was higher than in control groups. Moreover, our assessment presents households in the community with or proxy to LSAI were exposed to higher environmental risk exposure such as high winds, longer dry periods seasons, air pollution, water pollution, etc. Additionally, the local environment was exposed to an environmental stressor. Any physical, chemical, or biological agent that can have a negative impact on people or ecosystems is referred to as a stressor. Moreover, this ecological system disturbance resulting from LSAI leads to a grave environmental state effect.

Due to the fact that LSLIs are mostly found on fertile, water-rich lands, pastures are scarce and toxins and noise are exacerbated. According to additional research by Anseeuw et al. (2012), Obidzinski et al. (2012), Onoja and Achike (2015), Breu et al. (2016), Phélinas and Choumert (2017), and Yang (2021), LSAI is affecting land-use and the environment in Asia and Africa. Our study's findings were also in line with those of (Ali et al., 2019; Deininger et al., 2011; German et al., 2013; HK et al., 2010; Lambin and Meyfroidt, 2011; Lay et al., 2018; Mechiche-Alami et al., 2021) studies. Our ATT/difference result for intrinsic resilience was -1.385 in a similar manner. This suggests that households in LSAI-affected communities were less resilient than those in LSAI-free communities. Other empirical data show that LSAI is used at the expense of ecological integrity, which may endanger the development's long-term sustainability (Azeb and Wolfram Mauser, 2017; Pearce, 2012; Tura, 2017). As a result, arguments in favor of "development and investment first, environment later" should be viewed with caution, because underestimating environmental impacts can create new barriers to sustainable development (Balehegn, 2015). The result of environmental degradation demonstrates that positive ATT /difference and higher than in control groups. This implies that communities with LSAI or proxy to LSAI are more affected by environmental degradation than without LSAI. Several

environmental impacts are associated with LSAIs. Although it is generally agreed that LSAI has resulted in deforestation and land degradation in Indonesia, Cambodia, and Ethiopia(Aabø and Kring, 2012; Azeb and Wolfram Mauser, 2017; Obidzinski et al., 2012). Forests play a crucial role in contributing to stability and preventing soil erosion and flooding. However, large-scale land acquisitions can have a significant negative impact on forests, as shown by research conducted by Davis et al. (2015). When forested lands are acquired for agricultural or other purposes, it often leads to rapid deforestation, which can have devastating consequences for both the local environment and the global climate.

The clearing of land and large-scale deforestation resulting from land acquisitions can also lead to increased competition for land between investors and local farmers, as reported by Obidzinski et al. (2012). This can result in the dispossession of local cultivators, encroachment into fertile wetlands by illegal investors, and even dispossession of up to 30% of the population, as reported by investment case studies reported by Deininger and Byerlee (2011). Moreover, large-scale land acquisitions can increase greenhouse gas emissions via deforestation and the use of fertilizers and pesticides, as noted by the IPCC in 2006. These factors highlight the need for sustainable and responsible land use practices that take into account the long-term impacts on both the environment and local communities. Lay et al.(2018) and Obidzinski et al.(2012) argue large areas of forest cleared by LSAI needed to be reversed by afforestation project by investors and the local community. A different recent study by Müller et al. 2021 shows that foreign and domestic-foreign partnerships with LSAI frequently lead to the conversion of forested landscapes into agricultural fields, especially in low-income countries with fewer environmental regulations.

Large-scale land deals have been linked to indirect habitat destruction and deforestation. For instance, rangelands are replaced by newly acquired croplands in Brazil, and forests are then transformed into grazing areas (Hermele, 2014). Tilman (1999) contended that the global agricultural sector has exceeded a significant tipping point, transitioning from a minor contributor to off-site environmental damage in previous years to the primary cause of nitrogen and phosphorus loading in terrestrial, freshwater, and marine ecosystems. Besides, our study several studies by Shete, (2011); and Shete and Rutten, (2015) Moreda, (2018) and Bekele, (2021a),claim that households in a community with LSAI were more affected by high land

degradation, eutrophication and soil depilation and exposure to climate variability and vulnerability, and lower resilience of natural environment duet higher expansion of large-scale agricultural investment in Ethiopia. Further, LSAI can also have important implications for ecological significant areas (Rulli et al., 2013; Davis et al., 2015; Müller et al., 2021). We argue that the DPSIR (Driving Force, Pressure, State, Impacts, and Response) conceptual framework is a convenient model for identifying and illustrating environmental problems and drivers, such as the expansion of large-scale agricultural investments (LSAI). This model can help show how drivers (such as land deals) exert high pressure on the environment, and how this pressure translates into changes in the state of the environment and negative impacts. We can also explore how government institutions and local communities respond to the negative impact of LSAI through rehabilitation of degraded land and efforts to avoid further land degradation. Moreover, using the DPSIR model, we can highlight how conservation efforts and tackling the drivers of change can also address major developmental issues, such as agriculture and food productivity.

5.6. Perspective and Conclusion

Large-scale agricultural investment (LSAI) has had numerous negative effects on the environment. One of the primary and most visible impacts is through deforestation, as land is cleared to make way for large-scale agriculture. This can result in soil erosion, loss of biodiversity, and degradation of ecosystems, leading to long-term environmental damage. LSAI can also contribute to water scarcity, water pollution, and greenhouse gas emissions, which can exacerbate environmental problems. The use of synthetic fertilizers and pesticides, which can be harmful to the health of the soil, people, and local wildlife, is another aspect of large-scale agricultural practices. The economic advantages of LSAI must be balanced with the need to preserve the environment in order to ensure sustainability. Governments, investors, and other stakeholders must work together to implement best practices and policies that promote sustainable agriculture and protect the environment. Our empirical research focused extensively on the impacts of LSAI on the local environment, including how it devastated it, as well as the local community's reactions to negative environmental effects and the loss of useful utility. To explore this matter, we used a variety of data sources, on-site observations, and methodological approaches like quasi-experimental design, DPSIR, PCA, and PSM to investigate this issue. Additionally, to evaluate the environmental impacts of LSAI in the Shashamane rural district of the Oromia region of Ethiopia, we used specialized indices such as EVI, EREI, ERI, and EDI,

developed by the South Pacific Applied Geosciences Commission (SOPAC). Our descriptive results confirmed that 18 out of 21 conservation agriculture and land degradation conservation strategies were known and applied in different seasons by both treatment and control groups, indicating the importance of monitoring LSAI's implementation and encouraging local farmers' conservation agriculture and land rehabilitation activities. However, our findings also revealed that LSAI has significant impacts on both households and the environment in an LSAI-affected community, emphasizing the need to avoid weak LSAI practice and land degradation and to adapt additional conservation agriculture such as Integrated Pest Management (IPM), weather insurance, and supporting nutrition variety seeds, suitable land management, and rehabilitation activities to improve the state of the environment and local people's productivity. Additionally, this paper demonstrates the harmful and damaging impact of LSAI on local natural resources and environmental conditions in Ethiopia's Oromia Shashamane rural district, as well as the response to alleviate those impacts, and quantifies and illuminates the (ATT) utilizing a modified EVI and three sub-indicators (REI, IRI, and EDI). Furthermore, our study shows that the local natural environment and community with LSAI were affected more than the control households without LSAI, which was confirmed through sensitivity tests (i.e the negative impacts were true impacts of LSAI expansion), indicating that establishing further LSAI projects in other agricultural and forest areas of the region is not far-sighted. With the Oromia region being one of Ethiopia's most fertile areas, with extensive natural reserves, including pristine forests, wetlands, tropical grasslands, and wildlife, there are opportunities to establish and execute policies that will assure the Oromia region's long-term growth. Adopting sustainable land management techniques and making sure that large-scale land deals are carried out responsibly and sustainably, with respect for the local environment, are therefore imperative. Furthermore, it's critical to thoroughly assess the effects of large-scale agricultural investment projects before putting them into action to prevent potential negative effects on the neighborhood and community. As a result, it is critical to conduct thorough and comprehensive assessments of the potential environmental and social impacts of large-scale agricultural investment projects prior to their implementation in order to identify and mitigate any potential negative consequences that they may have on the local ecosystem and natural resources. In conclusion, it is critical to understand the potential environmental effects of LSAI and take steps to reduce them. For everyone involved to ensure a healthy and prosperous planet for future generations, sustainability must be a top priority.

CHAPTER SIX

6.1. Synthesis and Policy Implication

The 2008/2009 global downturn and increasing prices for food, energy, and fiber led to investment in large-scale agricultural production by businesses, governments, and the private sector. This resulted in a huge and ongoing social phenomena and an important international concern relating to land transfers. The South, which includes Africa, is heavily involved in transferring ownership, leasing property, or concluding other contracts for land usage or development by people, businesses, governments, and investors. The scale and implications of these land deals are likely greater than previously estimated. However, accurately measuring the extent of land deals and monitoring their multidimensional impact, including the negative effects on local communities and small-scale farmers, and natural environment remains a contentious issue.

Ethiopia allowed for large-scale private agriculture investment through FDI during the Emperor era, but FDI slowed during the Durg era. However, FDI got renewed attention during the EPRDF regime with the initial investment policy No. 15/1992, update 37/96, and most recently approved new proclamation 1076/2018, Public-Private Partnership (PPP), which facilitates and acknowledges that privatization and the private sector are essential to advancing the country's economic development (domestic, joint ventures, foreign direct Investors and diaspora). Particularly by the EPRDF government and policy makers in Ethiopia LSAI is seen as an opportunity to attract FDI, enhance PPP, sustain agricultural productivity, lessen poverty, better chronic and transient food insecurity, and run an environmentally friendly enterprise. Furthermore, with these instruments, the country will be food secure and will have moved into the middle-income category by 2025 (MoFED 2006; MoARD 2010; FDRE 2012). Meanwhile, Ethiopia has experienced unprecedented and provocative political and economic transitions since Prime Minister Abiy Ahmed took office in April 2018. Among the economic reforms are full and partial privatization of state-owned enterprises, deregulation of the aviation, logistics, and telecommunications sectors, introduction and implementation of domestic economic reform, and FDI investment in agriculture. Ethiopia has now emerged as one of the countries with the highest levels of large-scale agricultural investment (LSAI), particularly in Africa. Between 3 and 3.6 million hectares of land have reportedly been given to investors, with the majority of these deals

being in the agricultural sector. Further, this land deal phenomenon has been increasingly common in the regional state of Oromia over the previous two decades, driven by a variety of reasons such as regional government economic development initiatives, proximity to the capital, labor force, its large-scale irrigation potential, and simple access to transportation, plentiful fertile soil, arable land, and availability of water. Land developers and investors can take advantage of discounts on rent and lease prices, payment grace periods, and free land from the Oromia regional government. Furthermore, they offer 100 percent exclusion from customs obligation and assessments on imported capital products, apparatus, hardware, and development materials. Additionally, spare parts worth up to 15% of the value of the investment capital goods can be imported duty-free. Losses made during the tax break can be carried over for half of the tax break.

Nevertheless, the impact of these LSAI investments on the state of Oromia does not receive the attention it deserves. This thesis aims to investigate and evaluate the impact of large-scale agricultural investments (LSAI) in Ethiopia, specifically in the Shashamane Rural District of the Oromia Region. The rights of local communities to participate in land transactions, the implementation of free, prior, and informed consent (FPIC), accountability and transparency in these transactions, as well as the effects on local livelihoods, food security, and the environment of the region, were the specific areas of focus. The Shashamane rural district in the Oromia region were selected for this case study, with the Shalo-Melega Elfora Agro-Industries private farm serving as an example of large-scale agricultural investment (LSAI). The farm has already concluded the deal with the government and is fully operating. It has been registered under Ethiopian investment legislation and the worldwide large-scale land investment observatory known as the Land Matrix (Project ID 1241). This large-scale private farm in the Shashamane rural district's Great Rift Valley spans 10,000 hectares of productive land. The 99-year lease agreement includes property traditionally used by smallholders and communities for farming, grazing, and forestry resources, as well as customary land. Since 2008, the farm has been producing agricultural commodities for local markets as well as various organizations such as hotels, airlines, colleges, hospitals, supermarkets, and the Ministry of Defense. It also supplies to Middle Eastern nations (Saudi Arabia, United Arab Emirates, and Yemen) and African countries (Egypt, Congo, and Brazzaville, Cote d'Ivoire). The Shalo-Melge Elfora Agro-Industries cultivates commercial crops such as maize, wheat, haricot beans, white beans, and soybeans with

drip irrigation systems and used water from the Tikur Woha River. Further, the basin is endowed with several lakes of varying sizes with high environmental significance. Overall, this thesis investigates the promises of large-scale agricultural investments (LSAI) to address multiple concerns, taking into account community viewpoints, compensation, food security, livelihoods, and environmental sustainability. The study focuses on the impact of LSAI in the Shashamane Rural District of the Oromia Region offers outcome of a case study and policy suggestions based on the findings.

6.2. Failure to be Transparent and Accountable, as Well as Dispossession of Locals

Over 1.0 million hectares of agricultural land in Oromia alone have already been leased to investors, mostly for food and agro-fuel production for export, with a portion of this property belonging to small-holder farmers. This makes Oromia the third most popular LSAI destination, after Beinshangul Gumuz and Gambella (Tura, 2018). Indeed, the Oromia Regional State's efforts to promote a market-oriented economy and public-private partnerships (PPPs) have made investing in the region more attractive. These initiatives have been reinforced by the passing of Regulation No. 208/2019 and other supporting laws. The Oromia Region's relative macroeconomic stability and agricultural potential make it an attractive destination for land investments. The region offers opportunities for diverse agricultural ventures, including cash crops, livestock farming, and horticulture. Additionally, the presence of trainable workers facilitates skill adaptation to meet industry demands. These factors contribute to the Oromia Region becoming a favored choice for private investors. Likewise, the regional government evaluated the role that agriculture played in the development of the nation, both in terms of meeting the country's expanding food needs and acting as a foundation for economic diversification. To achieve these objectives, the region drew a huge number of domestic joint venture, foreign direct, and diaspora investors through "Ease of Doing Business" procurers. The Shashamane rural district actively participates in LSAI and was selected as a target area and corridor of LSAI to produce surplus agricultural items and ensure local development by state and private (domestic and foreign) investors in the area. Shalo-Melge private LSAI projects commenced operations in the Shashamane rural region in 2008, and the farms include an agricultural production facility, road construction, a crop storage facility, and irrigation development is one of the LSAI in the region. In line with investment promotion, Ethiopia

ratified various laws and international treaties, including, implementing right to consultation, and Free Prior and Informed Consent (FPIC) before any program, initiative, or law that affects local or Indigenous peoples and smallholder farmers, their territory, or resources. The right is also encouraged in the 1995 constitution of Article 44 (protection of property rights) and sub-article 2 (prohibition of expropriation without compensation). Nonetheless, there are worries that the constitution has not been successfully enforced in the context of land deals, particularly in cases when the government has enabled significant land acquisitions by domestic and foreign companies. One issue with LSAI transactions is that they take place in secret, with little to no engagement from locals and no incentives for accountability or openness (Visser and Spoor 2011). Thus, it is also critical to evaluate whether these investments have produced "multiple-wins" — solutions that benefit local governments, investors, and the community at large.

In this regard, our study conducted at the Shalo-Melge private LSAI in the Shashamane rural area, which commenced operations in 2008, reveals several shortcomings in the project's implementation. These include inadequate consultation and participation of the local community, insufficient compensation for the loss of communal and private land, a lack of necessary regional and local institutions, resources, experience, and experts. Additionally, there has been insufficient recognition of traditional land tenure systems by the Land Administration Proclamation No. 456/2005, delayed implementation of agricultural land certificates, limited effectiveness of guidelines for land administration and use (2005), including land-use rights, and ineffective dispute resolution mechanisms. These factors collectively contributed to the failure to adequately protect the rights of consultation and smallholder farmers. Moreover, market-oriented economy and the public-private partnership (PPP) model, along with more extensive agricultural investment policies, tend to serve the interests of the state and the private sector at the expense of a larger stakeholder group in the local community. Further, this investigation observed, lacks of transparency, accountability, and adequate protection of the rights of local communities. The investment proclamation and governance structure have failed to provide equal opportunities for citizens to improve their economic status and achieve equitable wealth distribution. The LSAI project has had a particularly negative impact on the community due to governance shortcomings. In addition, land governance institutions are insufficient to protect rural poor's rights and hinder their ability to negotiate fair and legitimate investments and purchase deals. Although the project has been unable to mechanize and control substantial tracts of land, local

farmers have continued to farm and use the undeveloped property. Moreover, conflicts between communities and enterprises have arisen due to the inability to safeguard clearly defined customary land rights, a lack of transparency, a lack of free, prior, and informed consent, and unfair profit distribution, among other reasons. The consultation process has been manipulated and has weakened the local community's capacity for sound judgment, increasing the risk to the farm. Local community members, scholars, civil-society organizations, and non-governmental organizations have been severely underrepresented in the process, which has been sheared and individualistic. However, the United Nations Charter and the Ethiopian government constitution frown upon illegal expatriation of indigenous and local communities. To improve the equitable distribution of the investment's numerous advantages, the respective and shared roles of the government, the investor, and the local communities must be reinforced and clarified. It is essential to establish strong agreements that encourage openness, transparency, and the use of revenue generated for advancing domestic development objectives. Additionally, it is crucial to make sure that local residents can benefit from investments (Paper I).

6.3. The Impact of Large-Scale Agricultural Investment (LSAI) on the Various Components of Household Livelihood Capital.

With a land area of 1,104,300 km2 and a rich agricultural heritage, Ethiopia is the second-largest country in Africa. There are about 35% of acres that are suitable for agriculture due to fertile soil and favorable climate conditions. Despite Ethiopia's significant progress in agricultural production, with a substantial amount of arable land being used for farming, the majority of farmers (74%) operate small farms, and a significant percentage (67%) suffer from poverty. Agriculture in Ethiopia is dominated by smallholder farmers, who cultivate 94% of the country's crops. Although these efforts have been made, Ethiopia is heavily dependent on rain-fed agriculture and has made limited progress in terms of technological advancements. Nevertheless, Large-Scale Agricultural Investment (LSAI) is expected to benefit local livelihoods and contribute to economic growth and sustain agricultural production. In particular, the Oromia region in Ethiopia offers great potential for agricultural development and is a preferred investment destination. The region's economy depends heavily on agriculture, which employed almost 85% of its workforce and contributed 53% of its GDP in 2014-15. A wide range of agricultural subsectors, such as food items, industrial raw materials, and biofuels, are covered by the LSAI in the region. To comprehensively understand the impact of LSAI on smallholder

farms' livelihoods in rural areas, the study employed the Sustainable Livelihoods Framework (SLF). The SLF methodology was chosen for its detailed approach, focus on the human aspect, and ability to establish micro-macro links. It facilitates the examination of people's assets and their translation into productive outcomes. It also facilitated understanding the implementation of government measures for sustainable livelihoods. The SLF defines livelihoods as the capacities, capital, and activities that fulfill the needs of individuals, households, or communities (Chambers and Conway, 1992; Zhang et al., 2020). The DFID Livelihood Framework has recognized five types of capital: natural, human, financial, physical and social capital. These assets are vital to the livelihoods of Ethiopian communities and contribute to the country's economic growth. Agriculture, which employs 80% of the population and generates 39% of GDP, is heavily dependent on land and labor (Yusuf, 2022). In rural areas, these resources are essential for farmers' livelihoods. The Sustainable Livelihoods Framework (SLF) was preferred in this study because of its applicability and data interpretation. Previous studies have used sustainable livelihoods frameworks to assess the impact of large-scale agricultural investments (LSAIs) on rural communities. These frameworks consider factors such as access to resources and social capital to assess the sustainability and resilience of rural livelihoods to LSAI. By using sustainable livelihoods frameworks, researchers gain a comprehensive understanding of the impact of LSAIs on rural communities, allowing to identify strategies to improve sustainability and provide information for policy decisions (Bekele, et.al, 2021).

Our empirical results, which focused on the Average Treatment Effect on Treated (ATT), established that, in comparison to control households in the Shala district, households in the rural Shashamane district, where significant land transactions have occurred, had lower levels of natural, human, and financial capital. This illustrates how LSAI directly affects neighborhood communities, whose property is being taken away even though it is the basis of their livelihoods. Additionally, ineffective land administration frameworks characterized by poor observation, laziness, a lack of accountability and responsibility, and projects that are comprehensive with the local environment around them further exacerbate the problem (Paper I). Moreover, losses in natural, human, and financial capital due to LSAI projects also indicate deterioration in social and physical capital, such as road connectivity, which may only support the investor in extracting resources and creating easy supply for domestic and international markets. The asset index and the wealth of communities are negatively impacted by LSAI, which results in decreased

affluence and increased impoverishment locally. It is obvious that LSAI has reduced the hosting community's assets for sustaining its way of life and caused financial loss. Due to the existing strategy's disregard for the local context and way of life, immediate action is required to remedy this problem. Without action, the investment will worsen the asset classes and have a detrimental impact on the local community. The Ethiopian government failed to defend the inhabitants from the damages and livelihood capital loss brought on by LSAI (Paper II).

6.4. The Impact of LSAI on the Food Security Status of the Affected Households

During 2007-2008, the spike in food prices had far-reaching consequences, resulting in an increase in hunger worldwide. In 2008, FAO (Food and Agriculture Organization) estimated that over a billion people were undernourished. Several countries were affected by this global phenomenon, particularly developing nations heavily dependent on food imports. A number of factors contributed to the sharp rise in food prices, including droughts, floods, biofuel demand, and financial speculation (World Bank, 2008b). Food demand is projected to grow by 70% by 2050, according to projections (World Bank, 2008b). As a result of factors such as population growth, rising incomes, urbanization, expanding feed production, and changing dietary patterns, this surge is expected to continue. Around 70% of the world's population relies on smallholder agriculture for sustenance (Altieri et al., 2012), making smallholder agriculture crucial to global food production. For 60-80% of the population in many low-income countries, it is a vital source of income (FAO, 2013). With the goal of achieving food security, modernizing agriculture, and increasing productivity by 2025, Ethiopia's government has made bold commitments to transform the agricultural sector through large-scale investments. While these efforts have been made, the country remains one of the most insecure in the world when it comes to food insecurity. Ethiopia now has 20.4 million people that need food assistance. This emphasizes how vital it is to keep working harder to achieve the desired outcomes. Evaluating the effects of certain actions is crucial in this situation.

Our research focuses on the Large-Scale Agricultural Investment (LSAI) initiative, which was formerly lauded by authorities but has lately come under fire for performing poorly and falling well short of expectations. Our findings show that LSAI has not had a positive and significant impact on the majority of food security outcomes in the intervention areas of Shashamane rural district, when compared to areas without LSAI in Shala district, in contrast to the government's

claims that the project would achieve the four pillars of food security (availability, access, utilization, and vulnerability). The results imply that LSAI may threaten food security, undercutting the desired goals. Some public bodies are also becoming increasingly aware of the economic strain that LSAI places on the country, particularly in relation to non-operational investments. For instance, our research shows that LSAI considerably lowers the Multi-Dimensional Aggregate Household Food Poverty (MAHFP) and Food Consumption Score (FCS). The anticipated outcomes also show that the LSAI project has not significantly improved the food security status of the impacted families when taking into account a food security index that takes into account the multidimensional components of food security. This shows that despite its size, the agricultural investment project did not improve the community's level of food security. The government must deal with these problems and help smallholder farmers in order to maintain food security in the face of changing circumstances (Paper III).

6.5. The Impact of Large-scale Land Deal on the Local Natural Environment

Large-scale land deals or large-scale agricultural investments (LSAI) have an adverse effect on the environment. However, most governments have developed limited national protocols and execution that reduce the negative impact of land deals and their adverse impacts on the environment and related populations. ESIAs (environmental and social impact assessments) and operational plans for impact management are frequently employed in these processes. Although the majority of the country's constitution and legislation address environmental and social issues, they do not address how large-scale land deals affect those issues. With respect to this, Ethiopia is not exceptional. The Environmental Impact Assessment Proclamation No. 299/2002, for instance, mandates that all development projects that may have substantial environmental implications undertake an EIA.

The EIA process comprises detecting, projecting, and assessing potential environmental effects as well as coming up with solutions to lessen or eliminate such effects. The EIA Proclamation has drawn criticism, meanwhile, for being insufficiently successful in tackling the detrimental effects of land deals on the environment. As a result, the number of cultivated hectares increased in line with an increase in the prevalence of large-scale investments in agriculture in Ethiopia. However, little study has been carried out on the impact of these investments in terms of local natural resources and environment. Therefore, this study focuses on how LSAI affected and

devastated the local environment, how the local government and community react to negative environmental effects and the loss of useful utility, and what steps they are taking to lessen the negative impacts and better protect the local environment. The study uses a combination of data and methodological techniques and a quasi-experimental design (i.e., treatment area: investment area Shashamana rural District and its outcome is (Y | P = 1), and comparison area: non-investment area Shala district and the counterfactual outcome (Y | P = 0). The study uses modified and customized EVI and sub-indices EREI, ERI, and EDI created by the South Pacific Applied Geosciences Commission version (SOPAC) to assess the environmental impacts of LSAI. DPSIR and PCA were employed in the investigation as analytical lenses and construct indices, respectively. According to the resul, both the treatment and control groups were aware of and implemented 18 of the 21 conservation agriculture and land degradation conservation techniques in various seasons, though with variable levels of motivation. Similarly, the result from ATT, utilizing a modified EVI and three sub-indicators (Risk Exposure Index (REI), Environmental Degradation Index (EDI) and Intrinsic Resilience Index (IRI)) shows that the local natural environment and community with LSAI were more affected than the control households without LSAI (i.e. LSAI areas showed lower resilience, higher risk exposure, and worsened environmental degradation). The the level of sensitivity study supports the LSAI's actual effect tests, the adverse effects are indeed caused by the expansion of the LSAI. In addition to ensuring livelihood, economic, and social sustainability, environmental sustainability must also be taken into consideration (Papers II and III). The local environment, including the soil, water, forests, biodiversity, and environment ought not to be sacrificed in the name of investments. To achieve local environmental protection goals, whether through large-scale agricultural investment or otherwise, local community actions to enhance livelihoods and preserve the environment must be fostered on a local and practical level (Paper IV).

6.6. Contribution to the Scientific Discussion and Theoretical Advances

Effects on investment are a central issue in the political economy of development and crucial in providing the preconditions for economic growth. Over the past 20 years, there has been an increased demand for acquiring agricultural land observed across the globe. However, there is ongoing debate over the type of agriculture. Further, this issue has divided the current farming type into two regimes: "small-scale" and "large-scale". Many Policymakers, private investors,

and scholars argue that Large-Scale Agricultural Investments (LSAI) are significantly changing the world's agrarian structure as small-scale farming is considered an obstacle to development. Others, however, support smallholder agriculture as a means of eradicating poverty, and the investments made by smallholder farmers themselves are pivotal. They claim that small-scale farming can maintain with the world's changing pace and maintain a crucial role in key emerging and developing nations by providing food security and feeding the population. Additionally, their financial contributions serve as the basis and driving force for sustainable development. Consequently, this study offers empirical support for the ongoing discussion on greater agricultural investment.

On the other hand, this study contributes to the "ownership of land regime " as the government argues in favor of "state ownership," stressing that privatization of land would lead to enough land sale, which would expose smallholder peasants and pastoralists to land speculation and eventually to eviction as well-off individuals could opt for land grabbing. This would, in turn, result in a high number of unemployed and unemployable peasants and pastoralists. The government's land ownership is criticized for impeding land market growth, which has an impact on productivity. Large-Scale Agricultural Investment (LSAI) with little community involvement has resulted in the eviction of nearby communities for which they were not adequately compensated. The impact of LSAI on community livelihoods is being discussed, with investors claiming that it will introduce technology, create jobs, and resolve energy and food shortages. Critics, including groups like La Via Campesina, the Oakland Institute, and the UN Special Rapporteur on the right to food, contend that LSAI damages local people and infringes on their human rights because they are either forcibly evicted from their land or improperly informed. Smallholder difficulties must be resolved.

Despite many arguments that a developing country is typically characterized as land-abundant, and land deals are viable and sustainable options for investment if investors adopt responsible investment practices, empirical evidence from Paper II shows that local community proxies to LSAI are primarily harmed by ongoing, extensive private land investments. In this due consideration, this paper broadly relates to the literature on LSAI on local residents at the local and household level and contributes in a distinctive way to the expanding body of knowledge on LSAI. The study employed the Sustainable Livelihood Framework (SLF) to thoroughly evaluate

the impacts of large-scale agricultural investments (LSAI) on the local community's way of life in the Shashamane rural district, and it found that LSAI led to an increase in the capital of the community. While debates over how to manage land for environmental protection frequently center on government control (such as protected areas) or private property, data suggests that bolstering common property can restore ecosystems and preserve rural livelihoods. In this aspect, this work makes a unique addition. Furthermore, the study used the DPSIR framework to assess the environmental impact of LSAI, emphasizing the necessity of having access to accurate data for making informed decisions and implementing sustainable land use practices. The public and private sectors can create a more sustainable future by putting an emphasis on data-driven decision-making, protecting natural resources for coming generations.

6.7. Policy Implications and Recommendations

Policies encourage long-term development, preserve community rights, and foster stakeholder trust. Improvements to local people's livelihoods and food security, as well as protection of the natural and environmental resources on which local people rely, are being examined. The following policy implications and recommendations were made to assist international communities, LSAI-host government policymakers, LSAI promoters, local communities, civil society, NGOs, academicians, and researchers in reaching their full potential to produce any favorable outcomes concerning the subject.

6.7.1. The International Community

- LSAI has unintended effects worldwide, particularly in host nations in the global south.
- Smallholder farmers' livelihoods, food security, and the environment suffer due to LSAI.
- Dispossession without consent violate the right to free, prior, and informed consent.
- The negative impacts of LSAIs on the environment, community livelihoods, and food security need to be addressed, as policymakers responsible for LSAI-host governments must be mindful of the rights of indigenous or local communities.
- Conventions like PRS, VGs, and F&G should be incorporated into policy and legal frameworks for land-based investments and the international community should monitor and follow up on LSAIs to ensure compliance with international law and principles.

6.7.2. For the Federal and Regional Governments.

- Stakeholder engagement is weak between the state, investors, and local community.
- Public participation should be a legal requirement, ensuring access to information and considering community opinions in decision-making processes.
- Adequate compensation and resettlement measures should be provided to mitigate the negative impacts of involuntary dispossession, aligning with international standards and respecting land rights.
- Monitoring frameworks for LSAI implementation are insufficient and need strengthening.
- Elfora Agro-Industries' projects are not fully operational, requiring investor development.
- LSAIs often create conflicts, requiring settlement and investor security. Mechanisms for resolving conflicts and addressing land disputes should be in place, considering land tenure systems and protecting community rights.
- Given that LSAIs have had an influence on the environment (by increasing exposure, degrading land, and decreasing reliance), mechanisms that minimize impact and make ecologically beneficial LSAI investments need to exist.
- Poor performance of LSAIs using public resources must be investigated.
- The government should expand its role to monitor and support investors and raise community awareness.
- Coordination among government bodies is crucial for LSAI management.
- Support for local farmers and land conservation is important.
- LSAIs should undergo impact assessments and prioritize sustainability.
- Corporate social responsibility should benefit the community in land agreements.

6.7.3. For Large-Scale Agriculture Investors

- Current irrigation machines are not fully functional and need replacement or repair.
- The company employs supervisors, technicians, drivers, and provides temporary employment during peak agricultural activities.
- Short-term training should be arranged for local youth in mechanics, welding, construction, plumbing, etc., to meet the technical demands of the investment.
- LSAIs often fail to address grievances from the community, leading to conflicts. Timely responses can reduce conflict.

6.7.4. For Non-profits, Civil Society Organizations and Academic Institutions.

- Non-governmental and civil society organizations should facilitate meetings between smallholders and investors for integration and collaboration.
- These organizations should advocate for suitable business models, transparent land governance, and respect for local rights and benefits.
- Public awareness campaigns and education should promote inclusive and sustainable LSAIs among the local populace, investors, and government officials.

6.7.5. For Local People and community.

- Strong institutions and commitment at all levels are crucial for successful implementation and prevention of malpractice in LSAIs.
- Local governments can pressure investors to provide educational and health facilities, share irrigation resources, and create job opportunities for the community.
- Short-term training programs should be organized for local youth to acquire skills needed for large-scale agricultural developments.
- Strengthening Agricultural Transformation at the local level is essential for agricultural growth, poverty reduction, and improved livelihoods.
- Monitoring LSAIs is important to prevent land access restrictions and ensure food security, poverty reduction, and rural development, and timely compliance with complaints is crucial to reduce land disputes in the area.

6.8. Implications for Further Research

Crucial gaps in our understanding that require further investigation, including:

1. Investigate the health impacts of LSAIs on local people.
2. Examine the effects of land-use agreements on water resources, considering the "land-water nexus."
3. Collect gender-disaggregated data to understand the consequences of LSAIs on women and develop gender-sensitive policies.
4. More research on the topology of inclusive business models and policies in large-scale agricultural investment (LSAI) is crucial.
5. Explore the influence of LSAIs on the entire food system and their broader economic, societal, and environmental impacts.

6. Investigating potential technological and innovative solutions to mitigate the negative environmental consequences of agricultural production.

To ensure successful large-scale agricultural investment (LSAI) with positive economic, social, and environmental outcomes, several factors must be considered. Offering incentives such as tax exemptions, financial and technical support, and favorable regulatory frameworks can further enhance investment. However, LSAI alone cannot guarantee desired results or address social and environmental concerns. Issues like adequate compensation for dispossessed individuals, land degradation, land tenure rights, food security, indigenous rights, and minority protection must also be prioritized. In fact, maximizing profits and achieving the country's development goals, such as the Growth and Transformation Plan (GTP I and II) or An African Beacon of Prosperity plan and sustainable development goals (SDGs), are important considerations. While, success of LSAI depends on a participatory leasing process that incorporates the voices of affected parties and ensures benefits for local communities. Transparent and accountable deal procedures, including lease size, mitigation measures, and lease duration, improve land access and control. Involving all stakeholders, including government, investors, and local communities, in LSAI governance is essential. However, the current regulatory obligations, monitoring, and local institutional capacity for investors are limited. Addressing these issues is vital to realize the promised benefits of LSAI, particularly in improving local livelihoods, and protect the environment.

REFERENCE

Abbink, J. (2011). Land to the foreigners: economic, legal, and socio-cultural aspects of new land acquisition schemes in Ethiopia. Journal of Contemporary African Studies, 29(4), 513-535.

Abdullah, S., Barua, D., Abdullah, S. M. A., & Rabby, Y. W. (2022). Investigating the impact of land use/land cover change on present and future land surface temperature (LST) of Chittagong, Bangladesh. Earth Systems and Environment, 6(1), 221-235.

Abesha, N., Assefa, E., & Petrova, M. A. (2022). Large-scale agricultural investment in Ethiopia: Development, challenges and policy responses. Land Use Policy, 117, 106091.

Aborisade, B., & Bach, C. (2014). Assessing the pillars of sustainable food security. *European International Journal of Science and Technology*, *3*(4), 117-125.

Abson, D. J., Dougill, A. J., & Stringer, L. C. (2012). Using principal component analysis for information-rich socio-ecological vulnerability mapping in Southern Africa. *Applied Geography*, *35*(1-2), 515-524.

Achebe, C. (1983). The Trouble with Nigeria. Heinemann Educational Books.

Ackerman, W. B., & Lohnes, P. R. (1981). Research methods for nurses. New York, NY: McGraw-Hill Book Company.

Ade, A. F., HS, T., & Malicia, E. (2018). Considering Affected People Rights as a Human Rights in the Land Acquisition for Public Interests.

Adugna, T., & Alemu, A. (2020). Large-scale land acquisition, rural livelihoods and food security in Ethiopia: A review of the literature. Journal of Rural Studies, 73, 123-132.Agricultural Sector of Developing and Transition

Ahmed KD, Jema H, Lemma Z.(2018). Determinants of food insecurity and coping strategies of rural households: The case of Shalla District, West Arsi Zone, Oromia Region, Ethiopia. J Dev Agric Econ. 2018;10:200–12.

Akrivos, D., Louloudis, G., & Kyriakidis, P. (2018). Assessing ecosystem services and sustainable land use changes in Mediterranean regions using the DPSIR framework. Ecological Indicators, 91, 94-105.

Aisbett, E., & Barbanente, G. (2016). Impacts of large scale foreign land acquisitions on rural households: Evidence from Ethiopia.

Alamirew B, Grethe H, Siddig KHA, Wossen T .(2015). Do land transfers to international investors contribute to employment generation and local food security? Evidence from Oromia Region, Ethiopia. Int J Soc Econ 42:1121–1138. https://doi.org/10.1108/IJSE-02-2014-0037

Alden Wily, L.(2012). Customary land tenure and registration in Africa: Does it have a future?. The Journal of Peasant Studies, 39(1), 1-47.

Alden Wily, L. (2011). February). Nothing new under the sun or a new battle joined? The political economy of African dispossession in the current global land rush. In *International Conference on global land grabbing* (pp. 6-8).

Alexandratos, N. (Ed.). (1995). World agriculture: towards 2010: an FAO study.

Ali, D., Deininger, K., & Harris, A. (2019). Does large farm establishment create benefits for neighboring smallholders? Evidence from Ethiopia. *Land Economics*, *95*(1), 71-90..

Ali, D. A., Deininger, K., & Harris, A. (2017). Using national statistics to increase transparency of large land acquisition: Evidence from Ethiopia. World Development, 93, 62-74.

Allan, T., Keulertz, M., & Woertz, E. (2015). The water–food–energy nexus: an introduction to nexus concepts and some conceptual and operational problems. International Journal of Water Resources Development, 31(3), 301-311.

Altieri, M.A., Nicholls, C.I., & Henao, A. (2012). Agroecology and the design of climate change-

resilient farming systems. Agronomy for Sustainable Development, 32(1), 131-149. doi: 10.1007/s13593-011-0038-9.

Amare, A. (2015). Wildlife resources of Ethiopia: Opportunities, challenges and future directions: From ecotourism perspective: A review paper. Natural Resources, 6(06), 405.

Amis, M., Zinyengere, N., & Cassim, A. (2017). Exploring opportunities for domestic-local investment in water and sanitation services: challenges and constraints. *Water Research Commission. http://www. wrc. org. za/wp-content/uploads/mdocs/TT*, 20725-17.

Angelos, J., Arens, A., Johnson, H., Cadriel, J., & Osburn, B. (2016). One Health in food safety and security education: A curricular framework. *Comparative Immunology, Microbiology and Infectious Diseases*, *44*, 29-33.

Anseeuw W (2013) The rush for land in Africa: Resource grabbing or green revolution? South African J Int Aff 20:159–177. https://doi.org/10.1080/10220461.2013.780326

Anseeuw W, Boche M, Breu T. (2012) Transnational land deals for agriculture in the global South. … Rep. based ….

Anseeuw, W., Alden Wily, L., Cotula, L., & Taylor, M. (2012). Land rights and the rush for land: findings of the global commercial pressures on land research project.

Ansoms, A. (2013). Large-scale land deals and local livelihoods in Rwanda: The bitter fruit of a new agrarian model. African Studies Review, 56(3), 1-23.

Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of planners*, *35*(4), 216-224.

Asfaw, W., Tolossa, D., & Zeleke, G. (2010). Causes and impacts of seasonal migration on rural livelihoods: Case studies from Amhara Region in Ethiopia. *Norsk Geografisk Tidsskrift–Norwegian Journal of Geography*, *64*(1), 58-70.

Ashley, C., & Carney, D. (1999). *Sustainable livelihoods: Lessons from early experience* (Vol. 7, No. 1). London: Department for International Development

Asongu, S. A., & Nguena, C. L. (2015). Equitable and sustainable development of foreign land acquisitions: Lessons, policies, and implications. In *Handbook of Research on In-Country Determinants and Implications of Foreign Land Acquisitions* (pp. 1-20). IGI Global.

Atara, A., Tolossa, D., & Denu, B. (2019). Assessment of food security situation of the rural households: The case of Boricha Woreda of Sidama Zone, Ethiopia. *GeoJournal*, *86*, 711-727.

Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate behavioral research*, *46*(3), 399-424.

Azadi, H., Houshyar, E., Zarafshani, K., Hosseininia, G., Witlox, F., (2013). Agricultural

Azeb W. Degife, Wolfram Mauser (2017). Socio-economic and Environmental Impacts of Large-Scale Agricultural Investment in Gambella Region, Ethiopia. J US-China Public Adm. 2017;14.

Balehegn, M. (2015). Unintended consequences: The ecological repercussions of land grabbing in sub-Saharan Africa. *Environment: Science and Policy for Sustainable Development*, *57*(2), 4-21.

Barnett, J., Lambert, S., & Fry, I. (2008). The hazards of indicators: insights from the environmental vulnerability index. *Annals of the Association of American Geographers*, *98*(1), 102-119.

Barrett CB. (2010).Measuring food insecurity. *Science* (80).;327:825–8.

Bartholomew, D.J. (2010). Principal Components Analysis. Int. Encycl. Educ. 374–377.

Bartlett JE, Kotrlik JW, Higgins CC.(2001). Organizational Research: Determining Organizational Research: Determining Appropriate Sample Size in Survey Research Appropriate Sample

Size in Survey Research. Inf Technol Learn Perform
Baudron, F., & Giller, K. E. (2014). Agriculture and nature: trouble and strife?. *Biological Conservation*, 170, 232-245.
Baumgartner, P., Von Braun, J., Abebaw, D., & Müller, M. (2015). Impacts of large-scale land investments on income, prices, and employment: Empirical analyses in Ethiopia. *World Development*, 72, 175-190.
Baumgartner, P.; von Braun, J.; Abebaw, D.; Müller, M. (2015). Impacts of Large-scale Land Investments on Income, Prices, and Employment: Empirical Analyses in Ethiopia. *World Dev. 72*, 175–190.
Behrman, J., Meinzen-Dick, R., & Quisumbing, A. (2012). The gender implications of large-scale land deals. Journal of Peasant Studies, 39(1), 49-79.
Bekele, A.E.; Drabik, D.; Dries, L.; Heijman, W.(2020).Large-scale land investments, household displacement, and the effect on land degradation in semiarid agro-pastoral areas of Ethiopia. *Land Degrad.* Dev.32, 777–791.
Bekele, A.E.; Dries, L.; Heijman, W.; Drabik, D.(2021a).Large scale land investments and food security in agropastoral areas of Ethiopia. *Food Secur.* 2021, 13, 309–327.
Béné C, Oosterveer P, Lamotte L, Brouwer ID, de Haan S, Prager SD, et al.(2019).When food systems meet sustainability – Current narratives and implications for actions. World Dev [Internet]. *The Authors;* 113:116–30. Available from: https://doi.org/10.1016/j.worlddev.2018.08.011
Bennett, A. (2004). Case study methods: Design, use, and comparative advantages. Models, numbers, and cases: Methods for studying international relations, 2(1), 19-55.
Bickel, M., & Breuer, T. (2009). Foreign direct investments in land in developing countries. Rural, 21, 34-37.
Biesta, G. (2010). A new logic of emancipation: The methodology of Jacques Rancière. *Educational theory*, *60*(1), 39-59.
Biesta, G.J.J.; Burbules, N.C. (2003).Library Availability; Rowman & Littlefield: Lanham, MD, USA, 2003. Bilinsky P, Swindale A. (2010). MAHFP Indicator Guide.
Bilora G. (2006).The food security challenges in Ethiopia *Publ PAJS.*
Bindraban, P. S., Bulte, E. H., & Conijn, S. G. (2009). Can large-scale biofuels production be sustainable by 2020?. Agricultural Systems, 101(3), 197-199.
Bissonnette J-F.(2016).Is oil palm agribusiness a sustainable development option for Indonesia? A review of issues and options. https://doi.org/101080/0225518920161202101 [Internet]. Routledge; 2016 [cited 2021 Oct 22];37:446–65. Available from: https://www.tandfonline.com/doi/abs/10.1080/02255189.2016.1202101
Boretti, A., & Rosa, L. (2019). Reassessing the projections of the world water development report. NPJ Clean Water, 2(1), 15.
Borras Jr, S. M., & Franco, J. C. (2012). Global land grabbing and trajectories of agrarian change: A preliminary analysis. Journal of agrarian change, 12(1), 34-59.
Borras Jr, S. M., Franco, J. C., & Wang, C. (2013). The challenge of global governance of land grabbing: changing international agricultural context and competing political views and strategies. Globalizations, 10(1), 161-179.
Borras Jr, S. M., Franco, J. C., Moreda, T., Xu, Y., Bruna, N., & Demena, B. A. (2022). The value of so-called 'failed'large-scale land acquisitions. *Land Use Policy*, *119*, 106199.
Borras Jr, S. M., Hall, R., Scoones, I., White, B., & Wolford, W. (2011). Towards a better understanding of global land grabbing: an editorial introduction. *The Journal of Peasant*

Studies, 38(2), 209-216.

Borras, S. M., & Franco, J. C. (2014). From threat to opportunity? Problems with codes of conduct for land grabbing. Rethinking Food Systems: Structural Challenges, New Strategies and the Law, 147-162.

Bottazzi, P., Crespo, D., Bangura, L. O., & Rist, S. (2018). Evaluating the livelihood impacts of a large-scale agricultural investment: Lessons from the case of a biofuel production company in northern Sierra Leone. Land Use Policy, 73, 128-137.

Brandt, J. (2017). Large scale land investments: Impact on child health (No. 13-2017). MAGKS Joint Discussion Paper Series in Economics.

Breslin, S., (2013) China and the South: objectives, actors and interactions. Dev.

Brimblecombe, F., Cotula, L., Oya, C., & Huggins, C. (2020). Gender and large-scale land acquisitions: insights from three cases. The Journal of Peasant Studies, 47(1), 36-56. https://doi.org/10.1080/03066150.2019.1603539

Breu, T., Bader, C., Messerli, P., Heinimann, A., Rist, S., & Eckert, S. (2016). Large-scale land acquisition and its effects on the water balance in investor and host countries. *PloS one*, *11*(3), e0150901.

Breu, T.; Bader, C.; Messerli, P.; Heinimann, A.; Rist, S.; Eckert, S.(2016). Large-Scale Land Acquisition and Its Effects on the Water Balance in Investor and Host Countries. PLoS ONE 2016, 11, e0150901. [Google Scholar] [CrossRef][Green Version]

Brink, P. J., & Wood, M. J. (1983). Basic steps in planning nursing research. Monterey, CA: Wadsworth.

Brüntrup, M.; Absmayr, T.; Dylla, J.; Eckhard, F.; Remke, K.; Sternisko, K.(2016) Large-Scale Agricultural Investments and Rural Development in Tanzania: Lessons Learned, Steering Requirements and Policy Responses; World Bank: Washington, DC, USA, Volume 26. [Google Scholar]

Buffett HG.(2011).Investment in Agriculture. Africa Res Bull Econ Financ Tech *Ser.* .48:19282B-19282B.

Burkitbayeva, S., & Swinnen, J. (2018). Smallholder agriculture in transition economies. Journal of agrarian change, 18(4), 882-892.

Burns, N., & Grove, S. K. (1987). The practice of nursing research conduct, critique and utilization. Philadelphia, PA: W. B. Saunders Company.

Busscher, N., Parra, C., & Vanclay, F. (2020). Environmental justice implications of land grabbing for industrial agriculture and forestry in Argentina. *Journal of Environmental Planning and Management*, *63*(3), 500-522.

Caliendo, M., & Kopeinig, S. (2005). Some practical guidance for the implementation of propensity score matching.

Caliendo, M., & Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of economic surveys*, *22*(1), 31-72.

Campbell, B. M., Beare, D. J., Bennett, E. M., Hall-Spencer, J. M., Ingram, J. S., Jaramillo, F., ... & Shindell, D. (2017). Agriculture production as a major driver of the Earth system exceeding planetary boundaries. *Ecology and society*, *22*(4).

Campbell, D. T., & Cook, T. D. (1979). Quasi-experimentation. Chicago, IL: Rand Mc-Nally.

Carney, D., Drinkwater, M., Rusinow, T., & Neefjes, K. (1998). Sustainable rural livelihoods: What contribution can we make? DFID, London.

Carolan, M. (2020). Putting food access in its topological place: thinking in terms of relational becomings when mapping space. *Agriculture and Human Values*, *38*(1), 243-256.

https://link.springer.com/article/10.1007/s10460-020-10149-y
Central Statistics Agency of Ethiopia(CSA). (2007). Ddemographic and health survey, Addis Ababa Central Statistics Agency
Cervantes-Godoy, D.; Dewbre, J.; Amegnaglo, C.J.; Soglo, Y.Y.; Akpa, A.F.; Bickel, M.; Sanyang, S.; Ly, S.; Kuiseu, J.; Ama, S.; et al.(2014).The Future of Food and Agriculture: Trends and Challenges. 2014. Available online: https://www.fao.org/3/i6583e/i6583e.pdf (accessed on 8 June 2022).
César, E., & Ekbom, A. (2013). Ethiopia environmental and climate change policy brief. *Sida's helpdesk for environment and climate change*, 1-32.
Chagwiza, C., Muradian, R., & Ruben, R. (2016). Cooperative membership and dairy performance among smallholders in Ethiopia. *Food policy*, *59*, 165-173.
Chamberlin, J., & Schmidt, E. (2012). Ethiopian agriculture: A dynamic geographic perspective. Food and agriculture in Ethiopia: progress and policy challenges, 2, 1-52.Change 44 (6), 1273–1294.
Chambers, R., & Conway, G. (1992). Sustainable rural livelihoods: Practical concepts for the 21st century. IDS Discussion Paper, 296.
Charlton, K. E. (2016). Food security, food systems and food sovereignty in the 21st century: A new paradigm required to meet Sustainable Development Goals.
Chen, Y., Li, X., Wang, L., & Wang, S. (2017). Is China different from other investors in global land acquisition? Some observations from existing deals in China's Going Global Strategy. Land Use Policy, 60, 362-372.
Choguill, M. B. G. (1996). A ladder of community participation for underdeveloped countries. *Habitat international*, *20*(3), 431-444.
Cismas, I., & Paramita, P. (2015). Large-Scale Land Acquisitions in Cambodia: Where Do (Human Rights) Law and Practice Meet?. Development Policy, 249.
Cleeve, E., (2009), The eclectic paradigm and foreign direct investment in sub-Saharan Africa. Repositioning African Business and Development for the 21st Century. Proceedings of the 10 annual conference. Manchester University, UKRodriguez, X. A., and Pallas, J., (2008), Determinants of Foreign Direct Investment in Spain. Department of Quantitative Economics, University of Santiago de Compostela, Spain.
Clover J.(2013).Food Security in Sub-Saharan Africa. *African Secur Rev*.12:5–15.
Cochran, S., & Banner, D. (1977). Spall studies in uranium. Journal of Applied Physics, 48(7), 2729-2737.
Cochrane, L., & Legault, D. D. (2020). The rush for land and agricultural investment in Ethiopia: What we know and what we are missing. *Land*, *9*(5), 167.
Cohn, T. H., & Hira, A. (2020). Global political economy: Theory and practice. Routledge.
Cole, C. (2012). Livelihood, Sustainable Development and Indigenous Forestry in Dryland Nigeria; John Wiley: Hoboken, NJ, USA, Available online: https://agris.fao.org/agris-search/search.do?recordID=GB19960158499 (accessed on 29 October 2021).
Collier P and Dercon.S.(2014).African Agriculture in 50 Years: Smallholders in a Rapidly Changing World? *World Dev. 63, 92-101* - Google Search. 2014 p. 92–101.
Collier P, Venables AJ. (2012). Land Deals in Africa: Pioneers and Speculators. *J Glob Dev.3.*
Corr, C., Snodgrass, M. R., Greene, J. C., Meadan, H., & Santos, R. M. (2020). Mixed methods in early childhood special education research: Purposes, challenges, and guidance. *Journal of Early Intervention*, *42*(1), 20-30.
Coscieme, L., Pulselli, F. M., Niccolucci, V., Patrizi, N., & Sutton, P. C. (2016). Accounting for

"land-grabbing" from a biocapacity viewpoint. Science of The Total Environment, 539, 551-559.
Cotula, L. (2009). Land grab or development opportunity?: agricultural investment and international land deals in Africa. Iied.
Cotula, L. (2011). Land deals in Africa: What is in the contracts?. Iied.
Cotula, L.; Oya, C.; Codjoe, E.A.; Eid, A.; Kakraba-Ampeh, M.; Keeley, J.; Kidewa, A.L.; Makwarimba, M.; Seide, W.M.; Nasha, W.O.; et al. (2014).Testing Claims about Large Land Deals in Africa: Findings from a Multi-Country Study. J. *Dev. Stud.* (50) 903–925
Cotula, L. (2018). The land matrix: Land deals driving land grabbing. In Land grabs in Asia (pp. 37-56). Springer.
Creswell, J. W., Klassen, A. C., Plano Clark, V. L., & Smith, K. C. (2011). Best practices for mixed methods research in the health sciences. Bethesda (Maryland): National Institutes of Health, 2013, 541-545.
Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. Handbook of mixed methods in social and behavioral research, 209(240), 209-240.
D'Odorico P, Rulli MC, Dell'Angelo J, Davis KF. (2017).New frontiers of land and water commodification: socio-environmental controversies of large-scale land acquisitions. L *Degrad Dev*.;28:2234–44.
Dabala, A.M. .(2020).Large-scale land acquisition and human rights at the crossroads: Quest for a rights-based approach to land administration in Ethiopia. J. Sustain. Dev. Law Policy (The) 10, 184. [Google Scholar] [CrossRef]
Daly, H. E., & Cobb Jr, J. B. (1989). For the common good: Redirecting the economy toward community, the environment, and a sustainable future. Beacon Press.
Daniel E, Imai K, King G, Stuart E, Stuart EA.(2007). Matching as Nonparametric Preprocessing for Reducing Model Dependence in Parametric Causal Inference The Harvard community has made this.
Daniel, S. (2011). Land grabbing and potential implications for world food security. In Sustainable agricultural development (pp. 25-42). Springer, Dordrecht.
Dauvergne P, Neville KJ. (2010).Forests, food, and fuel in the tropics: The uneven social and ecological consequences of the emerging political economy of biofuels. J Peasant Stud. 2010;37:631–60.
Davis KF, Yu K, Rulli MC, Pichdara L, D'Odorico P. (2015).Accelerated deforestation driven by large-scale land acquisitions in Cambodia. *Nat Geosci. ;8:772–5.*
Davis, K. F., D'Odorico, P., & Rulli, M. C. (2014). Land grabbing: A preliminary quantification of economic impacts on rural livelihoods. *Population and environment*, *36*, 180-192.
Dawson C.(2009). Introduction to research methods: a practical guide for anyone undertaking a research project - Discover [Internet]. Oxford How To Books,. [cited 2021 Oct 21]. Available from: https://discover.library.unt.edu/catalog/b6498578
de Haan, L.; Zoomers, A.(2005).Exploring the Frontier of Livelihoods Research. *Dev. Chang., 36, 27–47.*
De Juan, A., Geissel, D., Lay, J., & Lohmann, R. (2022). Large-scale land deals and social conflict: Evidence and policy implications (No. 328). GIGA Working Papers.
De Schutter, O. (2011).How not to think of land-grabbing: Three critiques of large-scale investments in farmland. J. *Peasant Stud. 38, 249–279.*
De Schutter, O. (2010).The Emerging Human Right to Land. Int. *Community Law Rev. 12, 303–334.*

De Zoysa R (2013),The implications of large scale land acquisition on small landholder's food security. 34

Declaration on Economic Policy of Socialist Ethiopia.(1975). Addis Ababa, February 7, 1975.

Degefa T.(2001). Causes of Seasonal Food Insecurity in Oromiya Zone of Amhara Region: Farmers' View. Int Conf African Dev Arch.;1–23.

Degefa T.(2005). Rural Livelihood, Poverty and Food Insecurity in Ethiopia. PhD Dissertation. Norwegian University of Science and Technology, NTNU, Trondheim.

Degife, A.W.; Mauser, .(2017).W. Socio-economic and Environmental Impacts of Large-Scale Agricultural Investment in Gambella Region, Ethiopia. J. S-China Public Adm., 4, 183–197.

Dehejia, R. H., & Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and statistics*, *84*(1), 151-161.

Deininger K, Byerlee D, Lindsay J, et al (2011) Rising Global Interest in Farmland : Can it Yield Sustainable and Equitable Benefits? Rising Glob Interes Farml. https://doi.org/10.1596/978-0-8213-8591-3

Deininger, K., & Byerlee, D. (2010). The rise of large-scale farms in land-abundant developing countries: Does it have a future. In Conference Agriculture for Development-Revisited, University of California at Berkeley. October (pp. 1-2).

Deininger, K.; Jin, S. (2005) Tenure security and land-related investment: Evidence from Ethiopia. Eur. Econ. Rev., 50, 1245–1277.

Deininger, K.; Xia, F. (2016).Quantifying Spillover Effects from Large Land-based Investment: The Case of Mozambique. World Dev. 2016, 87, 227–241.

Dejene, M., & Cochrane, L. (2021). The power of policy and the entrenchment of inequalities in Ethiopia: reframing agency in the global land rush. *The Transnational Land Rush in Africa: A Decade After the Spike*, 215-234.

Denzin, N.K., and Lincoln, Y.S., (2005), The Sage Handbook of Qualitative Research. Third Edition.

Depledge J .(2008). Winds of change? Environ Policy Law 38:251–252

Deshpande, A. S., Mulat, A. K., Mao, W., Diab, M. M., & Ogbuoji, O. (2022). Coverage of social assistance in Ethiopia during the COVID-19 pandemic: a time-to-event analysis. BMJ Global Health, 7(7), e008432.

Desmond, N. C. (2021). Large Scale Land Acquisition and the Violation of Local Communities' Substantive Rights in Cameroon: The Need for a Rights-Based Approach to Land Governance. *Texas Journal of Multidisciplinary Studies*, *1*(1), 214-218.

Dessalegn R. (2011).Land to investors : Large-Scale Land Transfers in Ethiopia. L Gov equitable Sustain Dev.;0–36.

Dessalegn Rahmato. (2009). The peasant and the State, studies in agrarian change in Ethiopia 1950s-2000s. In Annales d'Éthiopie (Vol. 25, No. 1, pp. 318-321). Persée-Portail des revues

De Stefano, L., Carrao, F., Greco, S., & Sabatino, S. (2019). A systemic approach to assess sustainable land use: An application of the DPSIR framework in Calabria region (Southern Italy). Journal of Cleaner Production, 237, 117721.scientifiques en SHS.

Rahmato, D., Kidanu, A., & Ababa, A. (1999). Consultations with the Poor. *A Study to Inform The World Development Report/2000/01On Poverty and Development*.

Department for International Development (DFID).(1999).Sustainable Livelihoods Guidance Sheets, section 2. Department for International Development (DFID). Dep. Int. Dev. 26. Available online: http://www.livelihoodscentre.org/documents/20720/100145/Sustainable+livelihoods+guidance+sheets/8f35b59f-8207-43fc-8b99-df75d3000e86 (accessed on 8 June 2022).

Dheressa, D. K. (2013). The socio-economic and environmental impacts of large scale (agricultural) land acquisition on local livelihoods: A case study in Bako Tibe Woreda of Oromia Region, Ethiopia (Master's thesis).

Dodge, C. (2023). Beyond the Global Land Grab: New Directions for Research on Land Struggles and Global Agrarian Change: Gustavo de LT Oliveira, Juan Liu, and Ben M. McKay, eds. London and New York: Routledge, 2022. 160.00cloth(ISBN9781032112145), 58.95 eBook (ISBN 9781003218906).

Doody, O., & Doody, C. M. (2015). Conducting a pilot study: Case study of a novice researcher. British Journal of Nursing, 24(21), 1074-1078.

Dwivedi, R. (2002).Models and Methods in Development-Induced Displacement (Review Article). Dev. *Chang*. (33), 709–732.

Dye, J. (2014).Food Security and Large-Scale Land Acquisitions: The Cases of Tanzania and Ethiopia, ProQuest Diss. Theses. 2014.

European Commission(EC)(2003). Common Implementation Strategy for the Water Framework Directive (2000/60/EC). Guidance Document No. 4: Basic principles of the DPSIR framework. European Commission, Brussels

Economic Commission for Africa.(2016). Planning for Africa's Development. Available online: https://www.uneca.org/economic-report-africa-2016 (accessed on 1 November 2021).

Edafe, O. O., Osabuohien, E., & Osabohien, R. (2021). Large-scale Agricultural Investments and Female Employment in Nigerian Communities. In *IOP Conference Series: Earth and Environmental Science* (Vol. 655, No. 1, p. 012082). IOP Publishing.

European Environment Agency (EEA), (2010). Towards efficient use of water resources in Europe. European Environment Agency, Copenhagen.

Environmental Impact Assessment Proclamation (EIA). (2002).Environmental Impact Assessment Proclamation.Available online: https://www.ilo.org/dyn/natlex/docs/ELECTRONIC/85156/95183/F804075597/ETH85156.pdf (accessed on 30 June 2022).

Ethiopa Investment Commission (EIC). (2015)..ETHIOPIA : A Preferred Location for Foreign Direct Investment in Africa. 1–59.

EIC. (2016).Investment Opportunities & Policies in Ethiopia Ethiopia : Brief Country Profile.

Elias Hodel, and Kurt Geber .(2010). Commercial Pressures on Land Reported areas Institution: Center for Development and Environment

Elliott M, Cutts ND, Trono A. A (2014). Typology of marine and estuarine hazards and risks as vectors of change : a review for vulnerable coasts and their management. Ocean Coast Manag [Internet]. Elsevier; [cited 2021 Oct 11];93:88–99. Available from: https://hull-repository.worktribe.com/output/437660/a-typology-of-marine-and-estuarine-hazards-and-risks-as-vectors-of-change-a-review-for-vulnerable-coasts-and-their-management

Ellis, F. (1999). Rural Livelihood Diversity in Developing Countries Evidence and Policy Implications; Overseas Development Institute: London, UK, Available online: http://hdl.handle.net/10535/4486

Endalew B, Muche M, Tadesse S. (2015).Assessment of food security situation in ethiopia: A Review. Asian J. Agric. Res. p. 55–68.

Environmental Protection Authority (EPA).(1997). Environmental PolicyAvailable online: https://www.google.com/search?q=EPA+(1997)+Environmental+Policy.+31.&rlz=1C1YTUH_enET1003ET1003&oq=EPA+(1997)+Environmental+Policy.+31.&aqs=chrome..69i57j0i546l3.5628j0j15&sourceid=chrome&ie=UTF-8 (accessed on 29 June 2022).

Erenstein OCA.(1999).The Economics of Soil Conservation in Developing Countries: The Case of Crop Residue Mulching. Wageningen Univ.

Esayas Y. (2010).Evaluating the Impact of Land Use Land Cover Change on Soil Erosion and Runoff Using Swat Model at Tikur Wuha Watershed. Addis Ababa University; http://etd.aau.edu.et/handle/123456789/7539

European Union (EU).(2009). Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. Official Journal of the European Union, 5, 2009

Eurostat. (2013). Monitoring the Quality of the Environment in the European Union: Framework for a European Environmental Economic Accounts. Luxembourg: Publications Office of the European Union.

Fan, S., & Chan-Kang, C. (2005). Is small beautiful? Farm size, productivity, and poverty in Asian agriculture. Agricultural economics, 32, 135-146.

Fairhead, J., Leach, M., & Scoones, I. (2012). Green grabbing: A new appropriation of nature?. Journal of peasant studies, 39(2), 237-261.

Food and Agriculture Organization (FAO). (2001). Food security. Retrieved from http://www.fao.org/3/y4671e/y4671e03.htm

FAO. (2006). Food security indicators: Availability, access, utilization, and stability. Retrieved from http://www.fao.org/3/a-y4671e.pdf

FAO.(2006a). Food security: concepts and measurement. Rome. Retrieved from http://www.fao.org/3/y4671e/y4671e06.htm

FAO.(2012a) The State of Food and Agriculture: Investing in Agriculture for a Better Future (Rome: FAO), http://www.fao.org/docrep/017/i3028e/i3028e.pdf (accessed on 7 April 2020).

FAO. (2015). Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security.

FAO.(2013). Smallholders and family farmers. Retrieved from http://www.fao.org/family-farming/background/en/

FAO.(2001).Glossary. State Food Insecurity World 2001 [Internet]. 2001 [cited 2021 Oct 26];49–50. Available from: http://www.fao.org/docrep/003/y1500e/y1500e00.htm

FAO.(2009a)Measuring Household Relisience to Food Insecurity, Foodsec.Org. 2009. Available online: http://www.foodsec.org/fileadmin/user_upload/eufao-fsi4dm/docs/resilience_wp.pdf%5Cnpapers3://publication/uuid/484EA881-EC20-47DC-89B4-4D5E4926429E (accessed on 8 June 2022).

FAO. (2008).The State of Food Insecurity in the World 2008. Rome: FAO,

FAO.(2016) the Economics of Conservation Agriculture. Biol Conserv [Internet]. 2016;2:47–58. Available from: https://www.fsnnetwork.org/sites/default/files/economicconservation.pdf

FAO. (2009b).The Livelihood Assessment Tool-kit: Analysing and Responding to the Impact of Disasters on the Livelihoods of People; FAO & ILO: Genève, Switzerland; Rome, Italy, 2009. [Google Scholar]

FAO. (1996).World Food Summit 13-17 November 1996: Rome Declaration on World Food Security and World Food Summit Plan of Action. World food Summit [Internet]. 1996;1–32. Available from: http://www.fao.org/docrep/003/w3613e/w3613e00.htm

FAO.(2019).MOVING FORWARD ON FOOD LOSS AND WASTE REDUCTION FOOD AND AGRICULTURE T [Internet]. Rome; 2019. Available from:

https://www.fao.org/3/ca6030en/ca6030en.pdf
FAO.(2012). The State of Food and AgricultureInvesting in agriculture for a better future
Federal Democratic Republic of Ethiopia(FDRE).(2012). Investment Incentives and Investment Areas Reserved for Domestic Investors, Federal Negarit Gazeta, Council of Ministers Regulation No. 270/2012.
Federal Democratic Republic of Ethiopia House of Peoples Representatives (FDREHPR).(1995). Proclama nON NO. 1/ A Proclamation to Pronounce the Coming into Effect of the Constitution of the Federal Democratic Republic of Ethiopia; Fed Negarit Gazet A 1'1Year No1 Addis ABABA–21sl August 1995; Volume 1, pp. 1–38. Available online: https://www.abyssinialaw.com/quick-links/item/1783-en-constitution (accessed on 8 June 2022).
Felder, T. M., Cayir, E., Nkwonta, C. A., Tucker, C. M., Harris, E. H., & Jackson, J. R. (2022). A mixed-methods feasibility study of breastfeeding attitudes among Southern African Americans. Western Journal of Nursing Research, 44(1), 50-65.
Fernández, L.T.M.; Schwarze, J. John Rawls's .(2013).Theory of Justice and Large-Scale Land Acquisitions: A Law and Economics Analysis of Institutional Background Justice in Sub-Saharan Africa. J. Agric. *Environ. Ethics*, 26, 1223–1240.
Fiala, N. (2018). The land rush revisited: The political economy of land grabs. Journal of Peasant Studies, 45(2), 237-263.
Fitawek, W., Hendriks, S., Reys, A., & Fossi, F. (2020). The effect of large-scale agricultural investments on household food security in Madagascar. *Food Security*, *12*, 1349-1365.
Fitawek, W.; Hendriks, S.L. (2021).Evaluating the Impact of Large-Scale Agricultural Investments on Household Food Security Using an Endogenous Switching Regression Model. Land 2021, 10, 323. [Google Scholar] [CrossRef]
Foley JA. (2011). Can we feed the world & sustain the planet? Sci Am.;305:60–5.
Foxon TJ, Reed MS, Stringer LC. (20019).Governing long-term social–ecological change: what can the adaptive management and transition management approaches learn from each other? Environ Policy Gov [Internet]. John Wiley & Sons, Ltd; [cited 2021 Nov 4];19:3–20. Available from: https://onlinelibrary.wiley.com/doi/full/10.1002/eet.496
Fracassi P, Raza A. (2021).Malnutrition and Food Insecurity : Definitions, Facts ,Trends. FAO.p.1–6.
Garnett, T., Appleby, M. C., Balmford, A., Bateman, I. J., Benton, T. G., Bloomer, P., ... & Godfray, H. C. J. (2013). Sustainable intensification in agriculture: premises and policies. Science, 341(6141), 33-34.
Geary, K. (2012). Our Land, Our Lives': Time out in the global land rush. Oxfam.
Gebeyehu, A. K., & Abbink, J. (2022). Land, sugar and pastoralism in Ethiopia: Comparing the impact of the Omo-Kuraz sugar projects on local livelihoods and food (in) security in the lower Omo Valley. *Pastoralism*, *12*(1), 1-20.
Gebre-selassie A, Bekele T. A (2010).Review of Ethiopian Agriculture : Roles , Policy and Small-scale Farming Systems. Glob Grow Casebook Insights into African *Agric* 36–65. Available from: https://issuu.com/kopin/docs/food_security_kopin_ethiopia_case_s
Geda, A., (2006), The Political Economy of Growth in Ethiopia, Chapter 4, Vol.2. http://alemayehu.com/AA%20Recent%20Publication/Growth_CambChap_Sept2006.pdf, accessed on 15 October 2020.
George D, Mallery P. (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update.
German, L., Schoneveld, G., & Mwangi, E. (2013). Contemporary processes of large-scale land

acquisition in Sub-Saharan Africa: legal deficiency or elite capture of the rule of law?. *World Development*, (48), 1-18.
Ghaley BB, Rusu T, Sandén T, Spiegel H, Menta C, Visioli G, et al. (2018).Assessment of benefits of conservation agriculture on soil functions in arable production systems in Europe. Sustain. 2018;10.
Gilfoy, K. (2015). Land grabbing and NGO advocacy in Liberia: A deconstruction of the 'homogeneous community'. African Affairs, 114(455), 185-205.
Giupponi, C. (2007). Decision Support Systems for Implementing the European Water Framework Directive: The MULINO Approach. Environmental Modelling & Software, 22(2), 248-258. doi: 10.1016/j.envsoft.2005.12.005
Godfray HCJ, Beddington JR, Crute IR, et al (2010) Food security: The challenge of feeding 9 billion people. Science (80-) 327:812–818. https://doi.org/10.1126/SCIENCE.1185383
Government of Ethiopia(GoE). (2014). Ethiopian Governemnt Portal. Retrieved December 12, 2014, from Regioanl States: http://www.ethiopia.gov.et/regional-states
GoE. (2014). Ethiopian Governemnt Portal. Retrieved December 12, 2014, from Regioanl States: http://www.ethiopia.gov.et/regional-states
Gowrie MN. (2003).Environmental vulnerability index for the Island of Tobago, West Indies. Ecol Soc. 2003;7.
Graham, A., Aubry, S., Künnemann, R., & Suárez-FIAN, S. M. (2009). Land grab study. *CSO Monitoring*,
Grain (2008). 'SEIZED! The 2008 Land Grab for Food and Financial Security', GRAIN
Greene, J. C., & Caracelli, V. J. (2003). OF MIXED METHODS PRACTICE. *Handbook of mixed methods in social & behavioral research*, 91.
Grotta A, Bellocco R. (2014).A review of propensity score : principles , methods and application in Stata. 2014;
Guyalo, A. K., Alemu, E. A., & Degaga, D. T. (2021). Impact of large-scale agricultural investment on the livelihood assets of local community in Gambella region, Ethiopia. International Journal of Social Economics, 48(3), 363-383.
Guyalo, A. K., Alemu, E. A., & Degaga, D. T. (2022). Impact of large-scale agricultural investments on the food security status of local community in Gambella region, Ethiopia. Agriculture & Food Security, 11(1), 1-28.
Hahn, P. R., Murray, J. R., & Carle, A. C. (2021). Quasi-experimental designs for effectiveness research. Annual Review of Public Health, 42, 297-314.
Haji J, Legesse B.(2017).Impact of sedentarization program on the livelihood and food security of Ethiopian pastoralists. *J Arid Environ*.;136:45–53.
Hall, R. (2011). Land grabbing in Southern Africa: the many faces of the investor rush. Review of African political economy, 38(128), 193-214.
Hall, R., & Scoones, I. (2011). Financialization and the governance of large-scale land deals: Lessons from three cases. The Journal of Peasant Studies, 38(2), 479-503.
Hall, R., & Scoones, I. (2014). Introduction: Financialization and the governance of large-scale land deals: Analysing new pressures and contestations in agro-food systems. In R. Hall, I. Scoones, & M. Tsikata (Eds.), Plantations, peasants and paddy fields: A celebration of the career of Professor James C. Scott (pp. 1-18). Yogyakarta, Indonesia: Pustaka Pelajar.
Hall, R., Edelman, M., Borras Jr, S. M., Scoones, I., White, B., & Wolford, W. (2015). Resistance, acquiescence or incorporation? An introduction to land grabbing and political reactions 'from below'. The Journal of Peasant Studies, 42(2), 467-488.

Hallam, D. (2009). International investments in agricultural production. *Land grab*.
Hallam, D. (2011). International investment in developing country agriculture—issues and challenges. Food Security, 3(1), 91-98.
Hamilton, J. D. (2009). Causes and Consequences of the Oil Shock of 2007-08 (No. w15002). National Bureau of Economic Research.
Hanna, P.; Vanclay, F.(2013).Human rights, Indigenous peoples and the concept of Free, Prior and Informed Consent. Impact Assess. *Proj. Apprais.*, *31*, *146–157*.
Harsanyi, J. C. (1977). Morality and the theory of rational behavior. Social Research, 44(4), 623-656.
Harvey, M., & Pilgrim, S. (2011). The new competition for land: Food, energy, and climate change. Food policy, 36, S40-S51.
Hassen. (2008). Food security Food security. Nature [Internet]. 2008;544:1–2. Available from: http://dx.doi.org/10.1038/544S5a
Healy, M., & Perry, C. (2000). Comprehensive criteria to judge validity and reliability of qualitative research within the realism paradigm. Qualitative market research: An international journal.
Hebinck P, Bourdillon M. (2002).Analysis of Livelihood. Women, men Work Rural livelihoods Cent Zimbabwe1–13. Available from: https://www.researchgate.net/profile/Paul_Hebinck/publication/40798693_Analysing_livelihoods/links/57bd645b08ae6918243019f1/Analysing-livelihoods.pdf
Heeks, R. (2019). Digital development and the datafication of subsistence farming. The Electronic Journal of Information Systems in Developing Countries, 88(1), 1-17.
Heinrich C, Maffioli A, Vázquez G.(2010). A Primer for Applying Propensity-Score Matching:Impact-Evaluation Guidelines. Tech Notes, No IDB-TN-161 [Internet]. 2010;1–56. Available from: http://www.iadb.org/document.cfm?id=35320229
Hendriks SL, van der Merwe C, Ngidi MS, Manyamba C, Mbele M, McIntyre AM, et al. (2016).What are we measuring? Comparison of household food security indicators in the Eastern Cape Province, South Africa. Ecol Food Nutr [Internet]. Routledge;;55:141–62. Available from: http://dx.doi.org/10.1080/03670244.2015.1094063
Henze, P. B., (2000), Layers of time: A history of Ethiopia
Hermele K. (2014). The appropriation of ecological space : agrofuels, unequal exchange and environmental load displacements.
Herrmann H, Bucksch H. Schutter m.(2013).Wörterb Geotech Geotech Eng. 2013;979–979.
Herrmann, R. T. (2017). Large-scale agricultural investments and smallholder welfare: A comparison of wage labor and outgrower channels in Tanzania. *World Development*, *90*, 294-310.
Hess, T.; Sumberg, J.; Biggs, T.; Georgescu, M.; Haro-Monteagudo, D.; Jewitt, G.; Ozdogan, M.; Marshall, M.; Thenkabail, P.; Daccache, A.; et al. A (2016).Sweet deal? Sugarcane, water and agricultural transformation in Sub-Saharan Africa. Glob. Environ. Chang. 2016, 39, 181–194.
Hesse-Biber, S. (2010). Qualitative approaches to mixed methods practice. *Qualitative inquiry*, *16*(6), 455-468.
Heumesser, C., Schmid, E., (2012). Trends in Foreign Direct Investment in the
Hindeya, T. W. (2018). An analysis of how large-scale agricultural land acquisitions in Ethiopia have been justified, implemented and opposed. *AfricAn identities*, *16*(1), 18-34.

Hindu Business Line.(2019). Karuturi - Will new land deal prove fertile?", Hindu https://www.thehindubusinessline.com/markets/stock-markets/karuturi-will-new-land-deal-prove-fertile/article26913517.ece

HK G, AS R, F A, MK C, P H, N R, et al.(2010).Tropical forests were the primary sources of new agricultural land in the 1980s and 1990s. Proc Natl Acad Sci U S A. Proc Natl Acad Sci U S A; 2010 [cited 2021 Oct 22];107:16732–7. Available from: https:// pubmed.ncbi.nlm.nih.gov/20807750/

High Level Panel of Experts (HLPE).(2011).The High Level Panel of Experts on Food Security and Nutrition Land tenure Land tenure and international investments in agriculture and international investments in agriculture The High Level Panel of Experts on Food Security and Nutrition HLPE R E P O R

Hodge T. (1997).Toward a conceptual framework for assessing progress toward sustainability. Soc Indic Res. ;40:5–98.

Horne, F. (2011).Understanding Land Investment Deals in Africa—Country Report: Ethiopia; Oakland Institute: Oakland, CA, USA, 2011; pp. 1–53. [Google Scholar]

Horne, F., & Mousseau, F. (2011). Understanding Land investment deals in Africa: country report Ethiopia. *The Oakland Institute*.

Hosmer DW, Hosmer T, Le Cessie S, Lemeshow S.(1997).A comparison of goodness-of-fit tests for the logistic regression model. *Stat Med.* (16) 965–80.

Hossain, M. M., Bose, M. L., Rahman, M. H., & Khan, M. A. S. A. (2021). Understanding the landlessness of the small and marginal farmers in Bangladesh: An application of the sustainable livelihoods framework. Journal of Rural Studies, 81, 244-255.

Hossainand, M. S., Alamgir, M., & Nath, B. (2020). Sustainable livelihood framework for analyzing forest based livelihoods in protected areas of Bangladesh. Journal of Environmental Science and Natural Resources, 13(1), 11-20. https://doi.org/10.3329/jesnr.v13i1.50453

Hum. Rights Watch (HRW).(2012). Waiting Here For Death" [Internet]. Hum. Rights Watch. Available from: http://www.hrw.org/reports/2012/01/16/waiting-here-death

Human Rights Watch.(2016a). Human Rights Watchorld Report Ethiopia. 2016. Available online: https://www.hrw.org/world-report/2016/country-chapters/ethiopia# (accessed on 1 November 2021).

Hufe P, Heuermann DF.(2017). The local impacts of large-scale land acquisitions: a review of case study evidence from Sub-Saharan Africa. J Contemp African Stud. Routledge; 2017;35:168–89.

International Fund for Agricultural Development (IFAD).(2011).New realities , new challenges : new opportunities for tomorrow ' s generation [Internet]. Rurual Poverty Rep. 2011. Available from: http://www.ifad.org/rpr2011/report/e/rpr2011.pdf

Imbens GW. (2004).Nonparametric estimation of average treatment effects under exogeneity: A review. Rev Econ Stat. 2004;86:4–29.

International Monetary Fund (IMF) .(2018).Country Report No. 18/354 THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA, retrieved on February 28th, file:///C:/Users/sara.mokaddem/ Downloads/cr18354%20(1).pdf

Intergovernmental Panel On Climate Change (IPCC).(2006). Guidelines for National Greenhouse Gas inventories. Inst Glob Environ Strateg. ;1–20.

Israel GD. (1986). Determining Sample Size 1 The Level Of Precision. *Biometrics* Vol 42, No 4 pp. 1992;Vol. 42, N.

Jha, M., & Setty, K. N. (2018). Water quality assessment using the DPSIR framework for sustainable management of water resources. Environmental monitoring and assessment, 190(12), 717.

Jahnke, H. E., & Jahnke, H. E. (1982). *Livestock production systems and livestock development in tropical Africa* (Vol. 35). Kiel: Kieler Wissenschaftsverlag Vauk.Jayne, T. S., Mather, D., &

Mghenyi, E. (2010). Principal challenges confronting smallholder agriculture in sub-Saharan Africa. World development, 38(10), 1384-1398.
Jayne, T. S., Mather, D., & Mghenyi, E. (2010). Principal challenges confronting smallholder agriculture in sub-Saharan Africa. World development, 38(10
Jiao, X., Smith-Hall, C., & Theilade, I. (2015). Rural household incomes and land grabbing in Cambodia. Land Use Policy, 48, 317-328.
Joffe, M. M., & Rosenbaum, P. R. (2018). Invited commentary: Propensity scores. American Journal of Epidemiology, 187(8), 1601-1604.
John Campbell JB-GB. (2021).Climate Change and Small Island States: Power, Knowledge and the South Pacific -
Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. Educational researcher, 33(7), 14-26. doi: 10.3102/0013189X033007014
Jollife IT, Cadima J. Principal component analysis: .(2016).A review and recent developments. Philos Trans R Soc A Math Phys Eng Sci. Royal Society of London; 2016;374.
Jourdan, C., Schreurs, J., & van der Ploeg, J. D. (2021). The politics of forest restoration: The discursive formation of forest landscape restoration in Central America. Land Use Policy, 108, 105509.
Jurayevich, M. B., & Bulturbayevich, M. B. (2020). Attracting Foreign Investment in the Agricultural Economy. International Journal of Business, Law, and Education, 1(1), 1-3.
Jurkevics, A. (2022). Land grabbing and the perplexities of territorial sovereignty. Political Theory, 50(1), 32-58.
Jurkevics, A. (2022). Land grabbing and the perplexities of territorial sovereignty. *Political Theory*, *50*(1), 32-58.
Kabudula, C.W.; Houle, B.; Collinson, M.A.; Kahn, K.; Tollman, S.; Clark, S. (2016).Assessing Changes in Household Socioeconomic Status in Rural South Africa, 2001–2013: A Distributional Analysis Using Household Asset Indicators. Soc. Indic. Res. 2016, 133, 1047–1073.
Kaly U, Pratt C, Mitchell J. (2004).The Environmental Vulnerability Index (EVI) / SOPAC Technical Report 384.1–388. Available from: http://islands.unep.ch/EVI 2004 Technical Report.pdf
Kanianska R. (2016).Agriculture and Its Impact on Land-Use, Environment, and Ecosystem ServicesLandsc Ecol - Influ L Use Anthropog Impacts Landsc Creat [Internet]. IntechOpen
Karakara, A.A.; Osabuohien, E.; Olokoyo, F.O.; Beecroft, I. .(2020).The Palgrave Handbook of Agricultural and Rural Development in Africa; Springer Nature: Cham, Switzerland,.
Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a research paradigm and its implications for social work research. Social sciences, 8(9), 255.
Kébé, M.; Muir, J.(2008).The sustainable livelihoods approach: New directions in West and Central African small-scale fisheries. Achiev. Poverty Reduct. Responsible Fish. Lessons West Cent. Afr. FAO Fish. Aquac. Tech. Pape. 2008, 513, 5–22. [Google Scholar]
Kebede, B. (2002). Land tenure and common pool resources in rural Ethiopia: A study based on fifteen sites. *African development review*, *14*(1), 113-149.
Kebede, D., Tesfay, G., & Emana, B. (2021). Impact of land acquisition for large-scale agricultural investments on income and asset possession of displaced households in Ethiopia. Heliyon, 7(12), e08557.
Keeley J, Seide WM, Eid A, Kidewa AL. (2014)Large-Scale Land Deals in Ethiopia: Scale, Trends, Features and Outcomes to date. 2014. Available from: http://pubs.iied.org/pdfs/12575IIED.pdf

Keene, S., Walsh-Dilley, M., Wolford, W., & Geisler, C. (2015). A view from the top: examining elites in large-scale land deals. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, *36*(2), 131-146.

Kefale, A., (2009), Federalism and ethnic conflict in Ethiopia: A comparative regional study, Routelage Series in Federal Studies

Kelemu, F. (2015). Agricultural mechanization in Ethiopian: experience, status and prospects. Ethiopian Journal of Agricultural Sciences, 25(1), 45-60.

Khan, M. A. (2007). Foreign direct investment and economic growth: The role of domestic financial sector (No. 2007: 18). Pakistan Institute of Development Economics.

Khandker, S.; Gayatri, S.; Hussain, K. (2010). Handbook on Impact, Available online: https://documents1.worldbank.org/curated/en/650951468335456749/pdf/520990PUB0EPI1101Official0Use0Only1.pdf (accessed on 8 June 2022).

Kirchner, S. (2016).The World Bank Aids Smallholder Farmers in Ethiopia; World Bank: Washington, DC, USA, 2016. [Google Scholar] [CrossRef]

Kline, Green, Don, Stout. (1969). Agricultural mechanization in equatorial Africa. East Lansing, Michigan: Institute of International Agriculture, Michigan State University

Koninck R de., Rousseau J-F. (2012).Gambling with the land : the contemporary evolution of Southeast Asian agriculture. NUS Press; 2012;

Kotrlik, J. W. K. J. W., & Higgins, C. C. H. C. C. (2001). Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. Information technology, learning, and performance journal, 19(1), 43.

Kretschmer, B., Bowyer, C., & Buckwell, A. (2012). EU Biofuel Use and Agricultural Commodity Prices: A review of the evidence base. Institute for European Environmental Policy (IEEP), London.

Kristensen P. (2004).The DPSIR framework. A Compr / Detail Assess vulnerability water Resour to Environ Chang Africa using river basin approach [Internet]. Available from: http://enviro.lclark.edu:8002/rid=1145949501662_742777852_522/DPSIR Overview.pdf

Kugelman, M., & Levenstein, S. L. (2009). Land grab. *The race for the world's farmland. Washington, DC: Woodrow Wilson International Center for Scholars*. corridor, Mozambique. Journal of Land Use Science, 13(3), 325-343.

Kwanya, T. (2022). Mixed Methods and Quality of Postgraduate Research: A Kenyan Perspective. In *Handbook of Research on Mixed Methods Research in Information Science* (pp. 147-172). IGI Global.

Laborde D, Martin W, Swinnen J, Vos R. (2020).COVID-19 risks to global food security. Science (80-). 369:500–2.

Lambin EF, Meyfroidt P. (2011).Global land use change, economic globalization, and the looming land scarcity. Proc Natl Acad Sci U S A. 2011;108:3465–72.

Lambin, E. F., & Meyfroidt, P. (2011). Global land use change, economic globalization, and the looming land scarcity. *Proceedings of the national academy of sciences*, *108*(9), 3465-3472.

Land Matrix. (2020). Land Matrix analytical report 2020: Commercial pressures on land. Retrieved from https://landmatrix.org/media/filer_public/77/12/7712ac9d-c117-4a17-a88e-91e7e0ddbc41/analytical_report_2020_en.pdf

Lang, C., Motteux, N., & Durand-Lasserve, A. (2021). Land tenure and social justice in the era of neoliberalism. Land Use Policy, 109, 105682

Larson, D.F. K. Otsuka, T. Matsumoto, T. Kilic (2014). Should African rural development strategies

depend on smallholder farms? An exploration of the inverse-productivity hypothesis Agricultural Economics, 45 (3) pp. 355-367

Lavers, T. (2012). 'Land grab' as development strategy? The political economy of agricultural investment in Ethiopia. The Journal of Peasant Studies, 39(1), 105–132. https://doi.org/10.1080/03066150.2011.652091

Lavers, T. (2012). Patterns of agrarian transformation in Ethiopia: State-mediated commercialization and the 'land grab'. Journal of peasant studies, 39(3-4), pp.795-822.

Lay J, Anseeuw W, Eckert S, et al (2021) Taking stock of the global land rush Analytical Report III

Lay J, Nolte K, Sipangule K. Jann Lay , Kerstin Nolte and Kacana Sipangule.(2018). Large-Scale Farms and Smallholders : Evidence from Zambia.

Lay, J., Anseeuw, W., Eckert, S., Flachsbarth, I., Kubitza, C., Nolte, K., & Giger, M. (2021). Taking stock of the global land rush: Few development benefits, many human and environmental risks. Analytical Report III. Bern, Montpellier, Hamburg, Pretoria: Centre for Development and Environment, University of Bern; Centre de coopération internationale en recherche agronomique pour le développement. German Institute for Global and Area Studies.

Lay, J., Nolte, K., & Sipangule, K. (2018). Large-scale farms and smallholders: Evidence from Zambia (p. 310). Hamburg, Germany: German Institute of Global and Area Studies (GIGA).

LD H, JR H, SR H. (2008).Issues in the construction of wealth indices for the measurement of socio-economic position in low-income countries. Emerg Themes Epidemiol [Internet]. Emerg Themes Epidemiol; [cited 2021 Sep 27];5. Available from: https://pubmed.ncbi.nlm.nih.gov/18234082/

Lee, J. S. H., Abood, S., Ghazoul, J., Barus, B., Obidzinski, K., & Koh, L. P. (2014). Environmental impacts of large-scale oil palm enterprises exceed that of smallholdings in Indonesia. Conservation letters, 7(1), 25-33.

Leech, N. L., & Onwuegbuzie, A. J. (2009). A typology of mixed methods research designs. Quality & quantity, 43, 265-275.

Le Moul, P., & Forslund, A. (2017). Conceptualizing food security for all: An empirical study. Food Security, 9(5), 991-1004.

Leykun, M., (2013), Ethiopian Privatization Agency to transfer 20 state owned enterprises, Fortune Report,

Liao, C., Jung, S., Brown, D. G., & Agrawal, A. (2020). Spatial patterns of large-scale land transactions and their potential socio-environmental outcomes in Cambodia, Ethiopia, Liberia, and Peru. Land Degradation & Development, 31(10), 1241-1251.

Lieswiadomy, R. M. (1987). Foundations of nursing research. Norwalk, CT: Appleton & Lange.

Lindenberg, M. (2002).Measuring Household Livelihood Security at the Family and Community Level in the Developing World. World Dev. 30, 301–318. [Google Scholar] [CrossRef]

Lisk, F. (2013). 'Land grabbing'or harnessing of development potential in agriculture? East Asia's land-based investments in Africa. The Pacific Review, 26(5), 563-587.

Liuand, X., Yin, Q., & Zhang, J. (2020). An Analysis of the Sustainable Livelihoods Framework for Poverty Alleviation in Rural China. Sustainability, 12(19), 8092. https://doi.org/10.3390/su12198092

Liu, J., & Savenije, H. H. (2008). Food consumption patterns and their effect on water requirement in China. Hydrology and Earth System Sciences, 12(3), 887-898.

Liu, L.; Ripley, D. (2014).Propensity Score Matching in a Study on Technology-Integrated Science Learning. Int. J. Technol. Teach. Learn. 2014, 10, 88–104.

Liu, P. (2014). Impacts of foreign agricultural investment on developing countries: evidence from

case studies. *FAO Commodity and Trade Policy Research Working Papers*, (47), 0_1.
Locher, M. (2015). The 'Global Land Rush', Local Land Rights and Power Relations: European Forestry Investments in Tanzania. PhD thesis, University of Zurich (Doctoral dissertation, University of Zurich).
Lowder, S. K., Sánchez, M. V., & Bertini, R. (2021). Which farms feed the world and has farmland become more concentrated?. World Development, 142, 105455.
Lowder, S. K., Sánchez, M. V., & Bertini, R. (2021). Which farms feed the world and has farmland become more concentrated?. World Development, 142, 105455.
Lunstrum E (2016) Green grabs, land grabs and the spatiality of displacement: Eviction from Mozambique's Limpopo National Park. Area 48:142–152. https://doi.org/10.1111/area.12121
Luursema, H. (2022). *The dark side of the'Green Gold'in Gambela, Ethiopia* (Doctoral dissertation).
MacNeill, T. (2017). Development as Imperialism: Power and the perpetuation of poverty in afro-indigenous communities of coastal Honduras. *Humanity & Society, 41(2), 209-239.*
Magliocca, N., de Bremond, A., Ellicott, E., Seghezzo, L., Venencia, C., Mosciaro, M. J., & Nolte, C. (2022). Two of a kind? Large-scale land acquisitions and commodity frontier expansion in Argentina's Dry Chaco. *Ecology and Society*, *27*(2).
Mango N, Siziba S, Makate C. (2017).The impact of adoption of conservation agriculture on smallholder farmers' food security in semi-arid zones of southern Africa. Agric Food Secur. BioMed Central; 6:1–8.
Månsson K. (2012).Issues of multicollinearity and conditional heteroscedasticy in time series econometrics Issues of multicollinearity and conditional heteroscedasticy in time series econometrics.
Mapuranga, L., & Majoni, J. (2022). Implications of Contemporary Transnational Land Grabs on African Economic and Environmental Sovereignty. Sovereignty Becoming Pulvereignty: Unpacking the Dark Side of Slave 4.0 Within Industry 4.0 in Twenty-First Century Africa, 261.
Markowitz, M. L. (2013). Agriculture and the food system: A short history and country case study in Mongolia.
Mawoko Z, Hendriks S, Reys A. (2018). The influence of large-scale agricultural investments on household food security in the Gurue and Monapo districts of Mozambique. 2018;
Maxcy, S. J. (2003). Pragmatic threads in mixed methods research in the social sciences: The search for multiple modes of inquiry and the end of the philosophy of formalism. Handbook of mixed methods in social and behavioral research, (51-89).
Maxcy, S. J. (2003). Pragmatic threads in mixed methods research in the social sciences: The search for multiple modes of inquiry and the end of the philosophy of formalism. *Handbook of mixed methods in social and behavioral research*, (51-89).
McCarthy, J., Vel, J. A., Afiff, S., & Hidayati, N. (2011). Reconfiguring authority and scale in the global environmental facility: The case of Indonesia. World Development, 39(6), 951-962.
Mcgahuey M, Scherr S (1997) Land and water management. Danish Hydraul 16:10–11. https://doi.org/10.4337/9780857932167.00020
McKeon, N. (2015). Large-scale land acquisitions in Africa: A review of the implications for food security. Agriculture and Human Values, 32(4), 705-725.
McWilliam, S. (2012). Critical realism and realist research in human geography: A method or a philosophy in search of a method? Progress in Human Geography, 36(3), 379-388.
Mechiche-Alami A, Yagoubi J, Nicholas KA (2021) Agricultural land acquisitions unlikely to

address the food security needs of African countries. World Dev 141:105384. https://doi.org/10.1016/j.worlddev.2020.105384

MEDIC (1999): Survey of the Ethiopian Economy: Review of Post Reform Developments 1992/3-1997/8. Ministry of Economic Development and Cooperation, Addis Ababa

Mellor JW, Dorosh P. (2010).Agriculture and the economic transformation of Ethiopia. ESSP II Work Pap. http://www.ifpri.org/sites/default/files/publications/esspwp010.pdf

Messerli, P., Giger, M., Dwyer, M. B., Breu, T., & Eckert, S. (2014). The geography of large-scale land acquisitions: Analysing socio-ecological patterns of target contexts in the global South. Applied Geography, 53, 449-459.

Mohammed International Development Research & Organisation Companies (MIDROC). (2007). TIRET SPECIAL Millennium Issue. Public Relations Dep. MIDROC Ethiop. 2007. Available from: https: //doi.org/10.1016/j. phrs.2020.104743%0Ahttps:// doi.org/10.1057/s41267-019-00222-y

Ministry of Agriculture and Rural Development (MoARD).(2010). Ethiopia Agricultural Sector Policy and Investment Framework (PIF). Federal Democratic Republic of Ethiopia, Addis Ababa: Ministry of Agriculture and Rural Development.

Ministry of Finance and Economic Development (MoFED).(2006). Ethiopia: Building on Progress:A Plan for Accelerated and Sustained Development to End Poverty (PASDEP), September 2006.

MoFED.(2006). Ethiopia: Building on Progress:A Plan for Accelerated and Sustained Development to End Poverty (PASDEP), September 2006.

MoFED.(2003).Rural Development Policy and Strategies. Government of the Federal Democratic Republic of Ethiopia, Ministry of Finance and Economic Development, Economic Policy and Planning Department, Addis Ababa, April 2003

Mokkadem, S. (2019). Abiy Ahmed's 'Medemer'Reforms: Can it Ensure Sustainable Growth for Ethiopia and What are the Challenges Facing the New Government?.

Montilla Fernández LT, Schwarze J. (2013). John Rawls's Theory of Justice and Large-Scale Land Acquisitions: A Law and Economics Analysis of Institutional Background Justice in Sub-Saharan Africa. J Agric Environ Ethics 26:1223–1240. https://doi.org/10.1007/s10806-013-9447-x

Moore, C. G., Carter, R. E., Nietert, P. J., & Stewart, P. W. (2011). Recommendations for planning pilot studies in clinical and translational research. Clinical and translational science, 4(5), 332-337.

Mora, S. (2022). Land grabbing, power configurations and trajectories of China's investments in Argentina. Globalizations, 19(5), 696-710.

Moreda T .(2018). The right to food in the context of large-scale land investment in Ethiopia. Third World Q 39:1326–1347. https://doi.org/10.1080/01436597.2018.1460199

Morgan SL and CW. (2014)Counterfactuals and Causal Inference Methods and Principles for Social Research. 2 nd edn. Cambridge University Press.

Müller MF, Penny G, Niles MT, Ricciardi V, Chiarelli DD, Davis KF, et al. (2021).Impact of transnational land acquisitions on local food security and dietary diversity. Proc Natl Acad Sci [Internet]. National Academy of Sciences; [cited 2021 Oct 27];118. Available from: https://www.pnas.org/content/118/4/e2020535118

Murombedzi, J. (2014). National and transnational land grabs in Africa: Implications for local

resource governance. In Adaptive cross-scalar governance of natural resources (pp. 95-121). Routledge.

Murphy, M., Scott, L. J., Salisbury, C., Turner, A., Scott, A., Denholm, R., ... & Horwood, J. (2021). Implementation of remote consulting in UK primary care following the COVID-19 pandemic: a mixed-methods longitudinal study. *British Journal of General Practice*, *71*(704), e166-e177.

Mutea E, Bottazzi P, Jacobi J, Kiteme B, Speranza CI, Rist S.(2019).Livelihoods and Food Security Among Rural Households in the North-Western Mount Kenya Region. Front Sustain Food Syst. Frontiers; 0:98.

Nalepa, R. A., Gianotti, A. G. S., & Bauer, D. M. (2017). Marginal land and the global land rush: A spatial exploration of contested lands and state-directed development in contemporary Ethiopia. Geoforum, 82, 237-251

Nanhthavong, V.; Oberlack, C.; Hett, C.; Messerli, P.; Epprecht, M.(2021).Pathways to human well-being in the context of land acquisitions in Lao PDR. Glob. Environ. Chang. 68, 102252.

Narula, S. (2013). The global land rush: Markets, rights, and the politics of food. *Stan. J. Int'l L.*, *49*, 101.

National Planning Commission.(2016).(GTP II) Growth and Transformation Plan II, National Planning Commission.. Available online: http://www.npc.gov.et/web/guest/gtp/-/document_library_display/48Gh/view/58840.

Negarit Gazette.(1975).34th year, No. 22, Addis Ababa, 11th March

Negarit Gazette, No. 21,1976,Regulations for the Establishment of Agricultural Development Corporations,

Negarit Gazette, 2012). Investment Proclamation No. 63,No.769 of of Ethiopia

Negash, E. (2013). Political economy of land grabbing in Ethiopia. In S. B. Awate, G. M. Mebratu, & S. B. Tesfay (Eds.), Proceedings of the 1st National Conference on the Ethiopian Economy (pp. 77-88). Addis Ababa: Ethiopian Economics Association.

Neudert, R.; Voget-kleschin, L. (2021).What Are the Effects of Large-Scale Land Acquisitions in Africa on Selected Economic and Social Indicators?. Available online: https://www.cidse.org/wp-content/uploads/2021/06/study-LSLA.pdf (accessed on 30 June 2022).

Nigatu, A.(2016).A Qualitative Content Analysis of Web Based Sustainability Reporting: A Case Study of Midroc Ethiopia Groups; T Karlstad Business School

Nkonya E, Mirzabaev A, von Braun J. (2015).Economics of land degradation and improvement - A global assessment for sustainable development. Econ L Degrad Improv - A Glob Assess Sustain Dev. 2015;1–686.

Nolte, K. (2014). Large-scale agricultural investments under poor land governance in Zambia. Land Use Policy 2014, 38, 698–706.

Nolte, K., Chamberlain, W., & Giger, M. (2016). International Land Deals for Agriculture: fresh insights from the Land Matrix: Analytical Report II. Bern: Bern Open Publ.. https://doi.org/10.7892/boris.85304

Nolte, K.; Voget-Kleschin, L.(2014). Consultation in Large-Scale Land Acquisitions: An Evaluation of Three Cases in Mali. World Dev. 2014, 64, 654–668. [Google Scholar] [CrossRef]

Nyantakyi-Frimpong, H., & Bezner Kerr, R. (2017). Land grabbing, social differentiation, intensified migration and food security in northern Ghana. The Journal of Peasant Studies, 44(2), 421-444.

Nyikahadzoi K, Siziba S, Mango N, Mapfumo P, Adekunhle A, Fatunbi O. (2012). Creating food self reliance among the smallholder farmers of eastern Zimbabwe: Exploring the role of integrated agricultural research for development. *Food Secur*.4:647–56.

Oakland Institute. (2011). Understanding Land Investment Deals in Africa—Country Report: Ethiopia.

Oberlack, C., Tejada, L., Messerli, P., Rist, S., & Giger, M. (2016). Sustainable livelihoods in the global land rush? Archetypes of livelihood vulnerability and sustainability potentials. Global environmental change, 41, 153-171.

Oberlack, C.; Giger, M.; Anseeuw, W.; Adelle, C.; Bourblanc, M.; Burnod, P.; Eckert, S.; Fitawek, W.; Fouilleux, E.; Hendriks, S.L.; et al. (2021).Why do large-scale agricultural investments induce different socio-economic, food security, and environmental impacts? Evidence from Kenya, Madagascar, and Mozambique. Ecol. Soc. 26, 18. [Google Scholar] [CrossRef]

Obidzinski K, Andriani R, Komarudin H, Andrianto A. (2012). Environmental and social impacts of oil palm plantations and their implications for biofuel production in Indonesia. *Ecol Soc*. 17.

Obstfeld, M. and Rogoff, K.S., (2010).Global imbalances and the financial crisis: products of common causes," Economic Policy, Vol. 25, No. 62,

Odoemene, A. (2010).Climate Change, Land Grabbing and Food Security; 2010; Volume 212, pp. 1–23. Available online: https://uaps2015.princeton.edu/papers/150759 (accessed on 8 June 2022).

Organization for Economic Co-operation and Development (OECD).(2019). Agricultural Outlook; FAO-OECD: Lazio, Rome, Italy,

Olsen, W. (2004). Triangulation in social research: qualitative and quantitative methods can really be mixed. Developments in sociology, 20, 103-118.

Onoja A, Achike A (2015) Large-Scale Land Acquisitions by Foreign Investors in West Africa: Learning Points. Cons J Sustain Dev 14:173–188. https://doi.org/10.7916/D8X63MP1

Oromia National Regional State (ONRS).(2015).Investment guide of Oromia Regional State

Ooko, M.O. (2015). Challenges of Strategy Implementation in Private Hospitals in Kenya: A Case of Aga Khan University Hospital. Int. J. Curr. Bus. Soc. Sci. 2015, 1, 193–213. [Google Scholar]

Osabuohien, E.S.; Efobi, U.R.; Herrmann, R.T.; Gitau, C.M.W. (2019). Female labor outcomes and large-scale agricultural land investments: Macro-micro evidencefrom Tanzania. *Land Use Policy 82, 716–728.*

Oxford Committee for Famine Relief (Oxfam).(2011). Growing a better future food justice in a resource-constrained world, . Oxford: Oxfam GB for Oxfam International.

OXFAM.(2020). Behind the Brands: Food justice and the 'Big 10' food and beverage companies. Oxfam Briefing Paper, 257.

OXFAM. (2011). Land and PowerThe growing scandal surrounding the new wave of investments in land. Oxfam Brief Pap. 151.

Panel, M. M. (2018). Mechanized: Transforming Africa's agriculture value chains. Intl Food Policy Res Inst.

Patrício J, Elliott M, Mazik K,.(2016). Papadopoulou KN, Smith CJ. DPSIR-Two decades of trying to develop a unifying framework for marine environmental management? Front Mar Sci. 2016;3:1–14.

Patton, M. Q. (2002). Two decades of developments in qualitative inquiry: A personal, experiential

perspective. *Qualitative social work*, *1*(3), 261-283.
Pearce, F. (2012). The Land GrabbersThe New Fight Over Who Owns the Earth; Beacon Press: Boston, MA, USA,
Pearl J. (2000).The Logic of Counterfactuals in Causal Inference. Forecast.;95:1–8.
Pereira, A. D., Braga, M. J., & Teixeira, M. T. (2021). The impact of foreign direct investment on agricultural productivity: Evidence from Brazilian microdata. Land Use Policy, 103, 105298.
Persson, A. G. (2016). Foreign direct investments in large-scale agriculture: the policy environment and its implications in Ethiopia.
Petrescu-Mag RM, Petrescu DC, Reti KO (2019) My land is my food: Exploring social function of large land deals using food security–land deals relation in five Eastern European countries. Land use policy 82:729–741. https://doi.org/10.1016/J.LANDUSEPOL.2019.01.003
Phélinas P, Choumert J. (2017).Is GM Soybean Cultivation in Argentina Sustainable? World Dev. 2017;99:452–62.
Philipp, B.V. Joachim, A. Deginet, M. Marc.(2015). Impacts of Large-scale land investments on income, prices, and employment: empirical analysis in Ethiopia World Dev., 72 pp. 175-190
Pironand, L., Keita, F., & Togola, M. (2021). Building Resilience in the Face of Climate Change: Assessing Livelihood Assets and Adaptation Strategies in Mali. Climate, 9(4), 57. https://doi.org/10.3390/cli9040057
Polit, D. F., & Hungler, B. P. (1987). Essentials of nursing research. (3rd ed.). Philadelphia, PA: J. B. Lippincott.
Ponting, C. (1991). A green history of the world (pp. 1-7). London: Sinclair-Stevenson.
Porsani, J.; Caretta, M.A.; Lehtilä, K. (2018). Large-scale land acquisitions aggravate the feminization of poverty: Findings from a case study in Mozambique. GeoJournal 2018, 84, 215–236.
Pratt CR, Kaly UL, Mitchell J. Manual.(2004).How to Use the Environmental Vulnerability Index (EVI). SOPAC Tech Rep 383. 98. Available from: http://islands.unep.ch/EVI Manual.pdf
Prescott, P. A., & Soeken, K. L. (1989). The potential uses of pilot work. Nursing Research, 38(1), 60.
Proclamation (1995)—Proclamation No. 1/of the Constitution of the FDRE. A Proclamation to Pronounce the Coming into Effect of The Constitution of the Federal Democratic Republic of Ethiopia.
Proclamation (1975). Proclamation No. 26/for the ownership and control by the government of the means of production,
Proctor, F., & Lucchesi, V. (2012). Small-scale farming and youth in an era of rapid rural change. London, UK: Knowledge Programme Small Producer Agency in the Globalised Market.
Rahmato, D. (2011). Land to investors: Large-scale land transfers in Ethiopia (No. 1). African Books Collective.
Rahmato, D. (2014). The perils of development from above: land deals in Ethiopia. African Identities, 12(1), 26-44.
Rice, A. (2009). Is there such a thing as agro-imperialism. The New York Times Magazine, 16, 2009.
Rice, X. (2010) 'Ethiopia – country of the silver sickle – offers land dirt cheap to farming giants', The Guardian, accessed on 17 March 2010 at: http://bit.ly/fXgdUH
Richards, M. (2013).Social and Environmental Impacts of Agricultural Large-Scale Land Acquisitions in Africa—With a Focus on West and Central Africa; Rights and Resources Initiative: Washington, DC, USA, 2013.

Riely F, Mock N, Cogill B, Bailey L, Kenefick E.(1999).Food Security Indicators and Framework for Use in the Monitoring and Evaluation of Food Aid Programs, Food and Nutrition Technical Assistance (FANTA) Project. Washington, DC United States Agency Int Dev [Internet].

Rights and Resources Initiative (2016). Free, Prior and Informed Consent: An Indigenous Peoples' Right and a Good Practice for Local Communities.

Rist, L.; Feintrenie, L.; Levang, P. (2010).The livelihood impacts of oil palm: Smallholders in Indonesia. Biodivers. Conserv. 2010, 19, 1009–1024. [Google Scholar] [CrossRef]

Robbins, P. (2012). Political ecology: A critical introduction. John Wiley & Sons.

Robertson, B.; Pinstrup-Andersen, P. (2010).Global land acquisition: Neo-colonialism or development opportunity? Food Secur. 2, 271–283. [Google Scholar] [CrossRef]

Robson, C., (2002), Real World Research. Second Edition.

Roniotes, A.; Malotidi, V.; Virtanen, H.(2015).A Handbook on the Public Participation Process in the Mediterranean; Kyrristou 12: Athens, Greece, 2015. [Google Scholar]

Rosenbaum PR, Rubin DB. (2006).The central role of the propensity score in observational studies for causal effects. Matched Sampl Causal Eff.;70:170–84.

Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. Biometrika, 70(1), 41-55.

Rosenbaum, P. R., & Rubin, D. B. (1985). Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. The American Statistician, 39(1), 33-38.

Rosenberg, D. (2011). Food and the Arab Spring. Gloria center.

Ross, A. R. (2014). Editor's introduction: The global land grab. Grabbing back. Essays against the global land grab, 9-35.

Roudart L, Mazoyer M (2015) Large-Scale Land Acquisitions: A Historical Perspective. http://journals.openedition.org/poldev. https://doi.org/10.4000/POLDEV.2088

Roux, L., and Barry, M., (2009), Paradigms and Cadastral Research. 7th FIG Regional Conference, Spatial Data Serving people: Land Governance and the Environment – Building the Capacity, Hanoi, Vietnam.

Rugman, A. M., (2010). Reconciling internalization theory and the eclectic paradigm. Multinational business review, 18 (2). PP. 1-12. University of Reading

Rulli, M. C., Saviori, A., & D'Odorico, P. (2013). Global land and water grabbing. Proceedings of the National Academy of Sciences, 110(3), 892-897.

Salvador Castell G, Pérez Rodrigo C, Ngo de la Cruz J, Aranceta Bartrina J. (2015).Household food insecurity access scale (HFIAS). Nutr Hosp.;31 Suppl 3:272–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25719795

Santangelo, G. D. (2018). The impact of FDI in land in agriculture in developing countries on host country food security. Journal of World Business, 53(1), 75-84.

Saudi Star.(2012).Agriculture and Irrigation Project in Ethiopia.. Available online: https://www.business-humanrights.org/en/latest-news/saudi-star-agriculture-and-irrigation-project-in-ethiopia/ (accessed on 8 June 2022).

Schlett, A.; Beke, J. .(2018).The Triumph of Large-Scale Agriculture and Its Socioeconomic Impact. Sociol. Mintis Veiksmas 2018, 43, 95–106. [Google Scholar] [CrossRef]

Schoneveld GC (2011).The anatomy of large-scale farmland acquisitions in sub-Saharan Africa. 1–21

Schoneveld, G. C. (2017). Host country governance and the African land rush: 7 reasons why large-scale farmland investments fail to contribute to sustainable development. Geoforum, 83, 119-132.

Schoneveld, G. C., German, L. A., & Nukator, E. (2011). Land-based investments for rural development? A grounded analysis of the local impacts of biofuel feedstock plantations in Ghana. Ecology and Society, 16(4), 10

Schutter O De. (2010).The Emerging Human Right to Land. Int Community Law Rev. 2010;12:303–34.

Schutter, O. (2011).The Green Rush: The Global Race for Farmland and the Rights of Land Users. Harvard Int. Law J. 2011, 52, 503–559.

Scoones I (2009). Livelihoods perspectives and rural development. J Peasant Stud 36:171–196. https://doi.org/10.1080/03066150902820503

Scoones, I. (1998).Sustainable Rural Livelihoods: A Framework for Analysis. Inst. Dev. Stud. 1998, 42, 57–63.

Scoones, I., Hall, R., Borras Jr, S. M., White, B., & Wolford, W. (2013). The politics of evidence: methodologies for understanding the global land rush. Journal of Peasant Studies, 40(3), 469-483.

Scoones, I. (2015). Sustainable livelihoods and rural development. In R. J. Southerton (Ed.), Encyclopedia of consumer culture (pp. 1719-1721). Thousand Oaks, CA: SAGE Publications.

Sen A.(1981). Ingredients of Famine Analysis: Availability and Entitlements. Q J Econ.;Volume 96,:433-464.

Senbeta a F. (2009).Climate Change Impact on Livelihood, Vulnerability and Coping Mechanisms: A Case Study of West-Arsi Zone, Ethiopia. Lund Univ Int Master's Program Environ Stud Sustain Sci. ;MSc:54.

Serrat, O. (2017).The Sustainable Livelihoods Approach. In Knowledge Solutions: Tools, Methods, and Approaches to Drive Organizational Performance; Serrat, O., Ed.; Springer: Singapore, 2017; pp. 21–26.

Shete, M. (2011) Implications of land deals to livelihood security and natural resource management in Benshanguel Gumuz Regional State, Ethiopia. In Proceedings of the International Conference on Global Land Grabbing at the Institute of Development Studies, Brighton, UK, 6–8 April 2011.

Shete, M. (2020) Stakeholders' Perspectives on Large-Scale Agricultural Investment in Ethiopia: An Analysis of the Disconnects between Expectation and Reality. Asian J. Agric. Extension, Econ. Sociol. 38, 98–113.

Shete, M., & Rutten, M. (2015). Impacts of large-scale farming on local communities' food security and income levels–Empirical evidence from Oromia Region, Ethiopia. *Land use policy*, *47*, 282-292.

Shete, M.; Rutten, M.; Schoneveld, G.C.; Zewude, E. (2015a).Land-use changes by large-scale plantations and their effects on soil organic carbon, micronutrients and bulk density: Empirical evidence from Ethiopia. *Agric. Hum. Values* 2015, 33, 689–704.

Shimpton R, Rokx C.(2012).The Double Burden of Malnutrition – A Review of Global Evidence. HNP Discuss. Pap..

Shittu, J. (2013). Sovereignty, Human Rights and the Global Land Grab. Available at SSRN 2290092.

Singh, H. (2021).Basics of Sample Size Determination(2021). Int. J. Adv. *Eng. Manag*, 147–149. [Google Scholar]

Singh, K. K. (2022). Research Methodology in Social Science. KK Publications.

Sjölander, A., & Rubin, D. B. (2019). Propensity scores and causal inference: A cautionary tale.

American Journal of Epidemiology, 188(7), 1251-1254.
Small, L.-A. (2007).The Sustainable Rural Livelihoods Approach: A Critical Review. Can. J. Dev. Stud./Rev. Can. D'études Du Dév. 2007, 28, 27–38.
Smeets, E., & Weterings, R. (1999). Environmental Indicators: Typology and Use in Environmental Policy. Copenhagen: European Environment Agency.
Smith, J., Lavender, B., Auld, H., Broadhurst, D., & Bullock, T. (1998). Adapting to climate change and variability in Ontario.
Smith, M. L. (2000). Evaluating the impact of policies and programs. In Bickman, L. & Rog, D. J. (Eds.), Handbook of applied social research methods (pp. 231-254). Sage Publications.

Solesbury, W. (2005). Sustainable Livelihoods: A Case Study of the Evolution of DFID Policy; Overseas Development Institute: London, UK,; pp. 133–154.
South Pacific Applied Geoscience Commission (SOPAC).(2005). Annual report summary 2005 | Pacific Environment Portal Data Portal Pacific Data Hub.
Sosa Varrotti, A. P., & Gras, C. (2021). Network companies, land grabbing, and financialization in South America. Globalizations, 18(3), 482-497.
Speller, W.R.; Mirza, H.; Giroud, A.; Huaman, J.S.; Dixie, G.; Okumura, A. (2017). The Impact of Larger-Scale Agricultural Investments on Local Communities; World Bank: Washington, DC, USA,
Spieldoch, A., & Murphy, S. (2009). Agricultural land acquisitions: Implications for food security and poverty alleviation. Land grab, 39-53.
Staddon, C., & Scoones, I. (2013). From representation to negotiation: Engaging with the politics of agrofuels and land in Africa. Journal of Peasant Studies, 40(1), 87-105.
Stebek, E. N. (2011). Between 'land grabs' and agricultural investment: Land rent contracts with foreign investors and Ethiopia's normative setting in focus. Mizan law review, 5(2), 175-214.
Stephens, L., Fuller, D., Boivin, N., Rick, T., Gauthier, N., Kay, A.& Ellis, E. (2019). Archaeological assessment reveals Earth's early transformation through land use. Science, 365(6456), 897-902.
Sterns, J. A., Schweikhardt, D. B., & Peterson, H. C. (1998). Using case studies as an approach for conducting agribusiness research. *The International Food and Agribusiness Management Review*, *1*(3), 311-327.
Stewart Carloni, E. Crowley.(2006). Food and Agriculture Organization of the United Nations. Guide Rapide Pour les Missions: Analyse des Institutions Locales et des Moyens d'Existence; FAO: Rome, Italy, 2006; p. 37.
Ströh de Martinez C, Feddersen M, Speicher A.(2016). Food Security in Sub-Saharan Africa: A Fresh Look on Agricultural Mechanisation.
Suhardiman, D., Giordano, M., Keovilignavong, O., & Sotoukee, T. (2015). Revealing the hidden effects of land grabbing through better understanding of farmers' strategies in dealing with land loss. Land Use Policy, 49, 195-202.

Suhrke A. (1993).Pressure points: Environmental Degradation, Migration and Conflict. Peace Confl. 1993;1–43.
Sullivan, J. A., Brown, D. G., Moyo, F., Jain, M., & Agrawal, A. (2022). Impacts of large-scale land acquisitions on smallholder agriculture and livelihoods in Tanzania. Environmental Research Letters, 17(8), 084019.

Sutton, J., & Kellow, A. (2010). MIDROC Ethiopia: From land deals to investment. Review of African Political Economy, 37(126), 363-378.

Taber, K.S. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. Res. Sci. Educ., 48, 1273–1296.

Taffesse, A. S., & Dorosh, P. A. (2013). Agricultural land abundance and investment opportunities for inclusive growth: Ethiopia's evolving farming system. IFPRI Discussion Paper 01251. International Food Policy Research Institute (IFPRI). Retrieved from https://www.ifpri.org/publication/agricultural-land-abundance-and-investment-opportunities-inclusive-growth-ethiopias

Talleh Nkobou, A., & Ainslie, A. (2021). 'Developmental nationalism?'Political trust and the politics of large-scale land investment in Magufuli's Tanzania. *Journal of Eastern African Studies*, *15*(3), 378-399.

Tamanaha, B. Z. (2008). The dark side of the relationship between the rule of law and liberalism. *NYUJL & Liberty*, *3*, 516.

Tashakkori, A., & Teddlie, C. (2009). Integrating qualitative and quantitative approaches to research. *The SAGE handbook of applied social research methods*, *2*, 283-317.

Tashakkori, A., Teddlie, C., & Teddlie, C. B. (1998). Mixed methodology: Combining qualitative and quantitative approaches (Vol. 46). sage.

Teddlie, C., & Tashakkori, A. (2011). Mixed methods research. The Sage handbook of qualitative research, 4, 285-300.

Tefera MM. (2009).Causes of rural household food insecurity: a case from Kuyu District, Central Ethiopia. J *Sustain Dev Africa. 11:286–304*

Tefera MM.(2010). Food security attainment role of urban agriculture: a case study from Adama City. *Ethiop J Bus Econ.;1:223–49.*

Teklemariam D, Azadi H, Nyssen J, et al (2016).How sustainable is transnational farmland acquisition in Ethiopia? Lessons learned from the Benishangul-Gumuz Region. Sustain 8:. https://doi.org/10.3390/su8030213

Thavaneswaran, A.; Lix, L.(2008).Propensity Score Matching in Observational Studies; University of Manitoba: Winnipeg, MB, Canada, 2008.

The economist .(2009). Cornering foreign fields. The econimist Magazine, May 21, 2009.

Thennakoon, T.M.S.P.K.; Kandambige, L.S.T.; Liyanage, C.(2017). Impact of Human—Elephant Conflict on Livelihood A Case Study from a Rural Setting of Sri Lanka.. Available online: http://dr.lib.sjp.ac.lk/handle/123456789/7215 (accessed on 24 September 2021).

Tienhaara, K. (2021). The politics of resource extraction: Indigenous peoples, multinational corporations and the state. Palgrave Macmillan.

Tilman D, Balzer C, Hill J, Befort BL.(2011). Global food demand and the sustainable intensification of agriculture. Proc Natl Acad Sci [Internet]. National Academy of Sciences; 2011 [cited 2021 Oct 18];108:20260–4. Available from: https://www.pnas.org/content/108/50/20260

Tilman D. (1999).Global environmental impacts of agricultural expansion: The need for sustainable and efficient practices. Natl Acad Sci. 1999;96:5995–6000.

Tilman, D., Balzer, C., Hill, J., & Befort, B. L. (2011). Global food demand and the sustainable intensification of agriculture. Proceedings of the National Academy of Sciences, 108(50), 20260–20264. https://doi.org/10.1073/PNAS.1116437108

Tiruneh, Andargachew.(1991).The ethiopian revolution (1974 to 1984). University of London, London School of Economics (United Kingdom),

Tong, A.; Sainsbury, P.; Craig, J. (2007).Consolidated criteria for reporting qualitative research

(COREQ): A 32-item checklist for interviews and focus groups. Int. J. Qual. Health Care 2007, 19, 349–357.
Tucker, S. A., Johnson, R. B., Onwuegbuzie, A. J., & Icenogle, M. L. (2020). Conducting mixed methods research: Using dialectical pluralism and social psychological strategies.
Tura HA.(2018). Land rights and land grabbing in Oromia, Ethiopia. *Land use policy*.;70:247–55.
Tura, H.A.(2017). Linking Land Rights and the Right to Adequate Food in Ethiopia: Normative and Implementation Gaps. *Nord. J. Hum. Rights*
Turner DR. (2008). The Use of Environmental Indicators For Impact Assessment In Compliance With The National Environmental Policy Act.
U.S. Agency for International Development.(2018). Investor Survey on Land Disputes: Perceptions and Practices of the Private Sector on Land and Resource Tenure Risks; U.S. Agency for International Development: Washington, DC, USA, 2018.
Udmale, P., Pal, I., Szabo, S., Pramanik, M., & Large, A. (2020). Global food security in the context of COVID-19: A scenario-based exploratory analysis. Progress in Disaster Science, 7, 100120.
UN Sub-Commission on the Promotion and Protection of Human Rights (2004). Report of the Working Group on Indigenous Populations on Its Twenty-Second Session.
United Nations Conference on Trade and Development.(2014) (UNCTAD). United nations conference on trade and development. Review of Maritime Transport.
UNCTAD.(2017). Beyond austerity: towards a global new deal
UNCTAD.(2022). Rising prices elevate the alarm for food security and political stability
United Nations Development Programme (UNDP).(2014).Assessing Global Land Use Balancing Consumption With Sustainable Supply.
Office for the Coordination of Humanitarian Affairs .(OCHA).(2023). ETHIOPIA Cluster Status: Food Last updated: 2 Feb 2023. https://reports.unocha.org/en/country/ ethiopia/card/1THC27CGy6/
United Nations Statistics Division.(2005). Multivariate methods for index construction, Househ. Sample Surv. Dev. Transit. Ctries. 367–387.
United Nations(UN).(2012). Guiding principles on business and human rights: Implementing the United Nations "Protect, Respect and Remedy" framework.
Van Assche, K., & Zoomers, A.(2022). Disrupting large-scale land acquisitions: How strategic legal action can challenge the corporate power of global agribusiness. Journal of Peasant Studies, 49(2), 308-331.
Vasileiou, K., Barnett, J., Thorpe, S., & Young, T. (2018). Characterising and justifying sample size sufficiency in interview-based studies: systematic analysis of qualitative health research over a 15-year period. BMC medical research methodology, 18, 1-18.
Vermeulen, S., Cotula, L., Gargiulo, C., Houdet, J., Mayers, J., Pons, V., & Santarius, T. (2019). Towards a Fair and Sustainable Global Land Rush: Working Principles and Research Agenda. Sustainability, 11(22), 6371. https://doi.org/10.3390/su11226371

Vhugen, D. (2012a). Large-Scale Commercial Investments in Land: Seeking to Secure Land Tenure and Improve. Haramaya Law Review, 1(1), 1-30.
Vhugen, (D. 2012b).Large-Scale Commercial Investments In Land: Seeking To Secure Land Tenure and Improve Livelihoods. Haramaya Law Rev. 2012, 1, 1–30.
Visser, O., Mamonova, N., & Spoor, M. (2012). Oligarchs, megafarms and land reserves: understanding land grabbing in Russia. *The Journal of Peasant Studies*, *39*(3-4), 899-931.

Von Braun, J. (2008). Food and financial crises: Implications for agriculture and the poor (Vol. 20). Intl Food Policy Res Inst.
Von-Braun, J., & Meinzen-Dick, R. S. (2009). Land grabbing" by foreign investors in developing countries: risks and opportunities.
Warikandwa, V., & Nhemachena, A. (Eds.). (2017). Transnational Land Grabs and Restitution in an Age of the (De-) Militarised New Scramble for Africa: A Pan African Socio-Legal: A Pan African Socio-Legal Perspective. African Books Collective.
Wayessa, Gutu Olana.(2020). Impacts of land leases in Oromia, Ethiopia: Changes in access to livelihood resources for local people." *Land use policy* (97) 104713.
WAZF&EDO.(2015).Shashamane woreda map, Unpublished Material.
Webler, T.; Tuler, S.; Krueger, R. (2001).What Is a Good Public Participation Process? Five Perspectives from the Public. Environ. Manag. 27, 435–450.
Wellard-Dyer, K.(2013).Large-scale Land Deals, Food Security and Local Livelihoods. CAADP Policy Br 12.
Welteji, D. (2018). A critical review of rural development policy of Ethiopia: access, utilization and coverage. *Agriculture & Food Security*, *7*(1), 55.
Wengert, N. (1976). Citizen participation: practice in search of a theory. *Nat. Resources J.*, *16*, 23.
White, B., Borras Jr, S. M., Hall, R., Scoones, I., & Wolford, W. (2012). The new enclosures: critical perspectives on corporate land deals. *The Journal of Peasant Studies*, *39*(3-4), 619-647.
Wiegink, N. (2020). Learning lessons and curbing criticism: Legitimizing involuntary resettlement and extractive projects in Mozambique. Political Geography, 81, 102192.
Wiersinga, R. C., & de Jager, A. (2009). *Business opportunities in the Ethiopian fruit and vegetable sector*. Ministry of Agriculture, Nature and Food Quality.
Wineman, A., & Liverpool-Tasie, L. S. O. (2017). Land markets and land access among female-headed households in northwestern Tanzania. *World Development*, *100*, 108-122.
Wisborg, P. (2013). Justice and sustainability: Resistance and innovation in a transnational land deal in Ghana. Justice and Sustainability: Resistance and Innovation in a Transnational Land Deal in Ghana, 137-162.
Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). At risk: Natural hazards, people's vulnerability, and disasters. Routledge.
Wodajo, T., & Senbet, D. (2017). Does privatization improve productivity? Empirical evidence from Ethiopia. International Journal of African Development, 4(2), 3.
Wolford, W., Borras Jr, S. M., Hall, R., Scoones, I., & White, B. (2013). Governing global land deals: The role of the state in the rush for land. Development and change, 44(2), 189-210
World Bank.(2011). Rising global interest in farmland: Can it yield sustainable and equitable benefits?. Washington, DC: World Bank
World Bank Group.(2016). Environmental and Social Framework.
World Bank Group .(2005). Foreign Direct Investment:
World Bank.(2010). Improving the livelihoods of palm oil smallholders: the role of the private sector. International Finance Corporation, World Bank Group, Washington, DC, USA.
World Bank.(2010a). Rising global interest in farmland: Can it yield sustainable and equitable benefits? World Bank.
World Development Report.(2008). Agriculture for development World Bank, Washington, DC
World Bank.(2008b). Rising food prices: policy options and World Bank response. http://siteresources.worldbank.org/NEWS/Resources/risingfoodprices_backgroundnote_apr 08.pdfWorld Health Organization. (2022). UN Report: Global hunger numbers rose to as

many as 828 million in 2021. World Health Organization (WHO).
World Bank.(2021). Ethiopia Resilient Landscapes and Livelihoods Project - II (P174385)
Wouters, M., Hardie-Boys, N., & Wilson, C. (2011). Evaluating public input in National Park Management Plan reviews: facilitators and barriers to meaningful participation in statutory processes. *Science for conservation*, (308).
Wu, J., & Li, M. (2013). Land use change and agricultural intensification: key Research Questions and Innovative Modeling Approaches. *A background paper submitted to the International Food Policy Research Institute. Final Report*.
Wulp Van der, A. C. E. (2013). The role of the state in facilitating land grabs in Ethiopia. *Wageningen University, Wageningen*.
Yang B, He J (2021) Global land grabbing: A critical review of case studies across the world. Land 10:1–19. https://doi.org/10.3390/land10030324
Yeboua, K., & Cilliers, J. (2021). Development prospects for the Horn of Africa countries to 2040. *ISS East Africa Report*, *2021*(42), 1-68.
Yengoh, G.T.; Armah, F.A.(2015).Effects of Large-Scale Acquisition on Food Insecurity in Sierra Leone. *Sustainability* 7, 9505–9539. [Google Scholar] [CrossRef
Yin, R., K.,.(1994).Case Study Research: Design and Methods, Second Edition, Sage, Thousand Oaks
Yusuf, S. A. (2022). Agriculture in Ethiopia: Overview and Policy Issues. African Development Bank Group. Retrieved from https://www.afdb.org/en/blogs/afdb-championing-inclusive-growth-across-africa/post/agriculture-ethiopia-overview-and-policy-issues
Zagema, B. Land and Power.(2011).The Growing Scandal Surrounding the New Wave of Investments in Land; Oxfam Briefing Paper: Nairobi, Kenya,
Zerssa, G., Feyssa, D., Kim, D. G., & Eichler-Löbermann, B. (2021). Challenges of smallholder farming in Ethiopia and opportunities by adopting climate-smart agriculture. *Agriculture*, *11*(3), 192.
Zhan, J., Mirza, H., & Speller, W. (2018). Investment: International investment and local food security. *IFPRI book chapters*, 30-37.
Zhang, J., Wang, J., Shi, Y., & Liu, Y. (2020). A review of rural livelihoods in China: Understanding changes and causes. Journal of Rural Studies, 73, 125-137.
Zoomers, A. (2011). Introduction: Rushing for land: Equitable and sustainable development in Africa, Asia and Latin America. *Development*, *54*(1), 12-20.
Zutshi, A.; Adams, C.A.(2004).Voluntary GuidelinesFood and Agriculture Organization of the United Nations: Rome, Italy,

APPENDICES

Appendix A

Annex I

Data collection tool

Response of the household[X] should be coded in the last row provided for answer.

Name of the enumerator_____

Code_____

HH ID_____

District _____Kebele_____Village _____

Date ____ Time _____

Introduction: This research aims to investigate effect of agricultural investments on food security, livelihood improvement and environment in Shalla and Shashemene Zuria district, West Arsi Zone, Oromia Regional State of Ethiopia. For this purpose, the researcher would like to know your opinion and your pragmatic view regarding the local trends in land deals and implementations of large-scale agricultural investments on food security, livelihood improvement and natural environment. Trends of land identification and transfer to investors and the level of local communities' involvement in the process of large-scale agricultural investments. The researcher would like first to inform you that participation in the study must be based on your free will. Second, the researcher is very much grateful for the sacrifice you paid to this end and the information gathered will be highly confidential and will only be used for the purpose of this research. Furthermore, any information that you provide is valuable to this study. I would like to extend my appreciation and thanks for your cooperation and commitment of your precious time.

Thank you for you cooperation!

PART 1-A Socio-Demographic Information

2. District/ Woreda /	3. K e b l a	4. S e x (use the code Code : sex	5. How old is [X]?	6. Marital status Code : Marital status	7. What is [X]'s relationship to the household head or closest kin?	8. [X] Total family size	9. [X] by age group	10. What was the highest grade completed by [X]	11. What is [X]'s main activity during the past 12 months?
Code 01- Shashemana Zuria woreda 02- Shalla woreda	Name	M..1 F…2	Year	1.Married 2.Living together 3.Unmarried 3.Separated 4.Divorced 5.Never married 7.Windowed	Code : Relation Head Spouse Son/daughter Brother/Sister Grandchild Father/Mother Other relative	Number	[Put the number) Children 5 years age and below __ Children 6-10 years of age _____ Children between 11-14 _____ A male family member (15-64)___ A female family member (15-64) __ A family member above 65 years____	Code: education 1. None 2 Informal education 3 . 1-8 Grade 4 . 9-12 Grade 5 . Diploma 6. Degree and above	Code: Occupation Crop production Animal husbandry Mixed House wife Agricultural wage Non-agricultural wage labor Student

Part 2 – A Agricultural Production (Crop) and Food Security Measurer Using Household Food Balance Model (HFBM)

	Question	Code and response sheet	
1	How many hectares of agricultural land do members of this household own?	0. Landless ☐ 1. 0. 25-1 H ☐ 2. 1-2 H ☐ 3. 2- 3 H ☐ 4. 3-4 H ☐ 5. 4-5 ☐ 6. 5-6 ☐ 7. 6-7 above ☐	
2	Do you use any tractor or animal for land preparation?	No (0) ☐ Yes (1) ☐	
3	Which type of draught power did you use?	1- Tractor ☐ 2 - animal ☐ 3- human ☐ 3 other specify----------	
4	Do you cultivate any crop during the past 12 months?	No (0) ☐ Yes (1) ☐	If you Yes, go to number 5

Instruction: Instruction: Please Insert the Code Number And /Or Use [√] In the Response Sheet/Columns Box.

5. Crop production and type	Code: Tick the code [√]	6 In which season did you grow this [X] crops? Code: 1 Mehre, 2 . Bega, 3. Belge , 4 Year round using irrigation [Insert the code number…1,2..3..4]	7. Total quintal of Crop harvested during the harvest season?	
			Quintal	K.G
White teff (Xaafii)	01			
Barley (Garbuu)	02			
Wheat (Qamadii)	03			
Mize (Boqqoolloo)	04			
Sorghum (Mishingaa)	05			
Bean (Baaqelaa)	06			
linseed (Nuugii)	07			
Coffee (Buna)	08			
Enset (Warqee)	09			
Potato (Dinichaa/moose)	010			
Tomato (Timaatima)	011			
Sugarcane (Shankoora)	012			
Onions (Qullubbii adi)	013			
Chat (Caatii)	014			
Lentils (Misira)	015			
others specify--------	016			

7. Did your household received food aid (government) or remittance in the past 12 month?

0 .No ☐ Yes 1 ☐ If No, jump number 9.

		Quintal	Kg
9.	Total grain obtained through gift or remittance?		
10	How many quintal of grain was bought for this year for the house hold?		
11	How many kilograms of meat, meat based products and poultry produced in this year per household?		
12	How many kilograms of dairy and dairy based products obtained, in this year per household?		
13	How much post harvest losses noticed due to grain pests, disasters, thievery in this year ?		
14	How many grain/per quintal reserved or stored as for seed for this year ?		
15	How much of grain sold within this year from your total production?		
16	How much grain donated to others within the year of production?		

Part-2 B. Livestock ownership and production

	Animal type	Number
17. How many animal type does your household currently Owen?	Oxen/bull	
	Cows/Calves	
	Horse/donkey/mule	
	Camel	
	Goats	
	Sheep	
	Chickens	
	Honey bee	
	Other livestock	

18. In the past 12 month, did your household involved in animal production for domestic market? NO [0] ☐ Yes [1] ☐

If you yes:

Animal product	√	How much have you earned from livestock product in birr?
Rental of Ox/bull		
Diary product		
Rental of Horse/donkey/mule		
Camel milk		
Goats milk		
Sheep milk		
Egg sales		
Honey sales		
Dung cakes		
Other livestock		

Part– 3 A Household Food Insecurity Access Scale (HFIAS) Measurement Tool

No	QUESTION	RESPONSE OPTIONS	Code
1	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1=Yes	….|___|
1a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the pastfour weeks) 3 = Often (more than ten times in the past four weeks)	….|___|
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes	….|___|
2a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	….|___|

3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q4) 1 = Yes	….|___|
3a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	….|___|
4	In the past four weeks, 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	0 = No (skip to Q5) 1 = Yes	
4a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	….|___|
5	5. In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1 = Yes	….|___|
5a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	….|___|
6	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q7) 1 = Yes	….|___|
6a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	….|___|
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q8) 1 = Yes	….|___|
7a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	….|___|
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q9) 1 = Yes	
8a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks)	….|___|

		3 = Often (more than ten times in the past four weeks)	
9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No (skip to Q) 1 = Yes	….|___|
9a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	….|___|

Part-4A. Experience of food insecurity –Seasonal calendar, Food consumption score and copying strategy

A. Months of Adequate Household Food Provisioning (MAHFP) for Measurement of Household Food Access:

			2016/7						2017/8					
			March	April	May	June	July	August	September	October	November	December	January	February
	In the past 12 months, on the scale from 1 to 5 Please indicate those moths in which agricultural work load was 1 very low, 2 low, 3 moderate, 4 high, and 5- very high													
	In the past 12 months, on the scale from 1 to 5 please indicate your general food supply in different moths 1 very low 2 low 3 moderate 4 high 5- very high													
	For those moths with low or very low food supply what do think the main reason for lack of food supply 1-…lack of home produced, 2-…not enough food available on the market 3-…lack of cash for purchase , price high 4-..storage problem (capacity) 5-…lost of stored food (e.g pest) Other specify ____	Main												
		2nd												
		3rd												
	For those moths with low or very low food supply how do you cope with food shortage? 1-…reduce meals per day 2…reduce the amount of food per meal 3…use saving 4…eat cheaper, inferior type of food 5 …migration 6 withdraw children from school 7 sell animals 8 sell other assets 9 use remittance 10…other specify _	Main												
		2nd												
		3rd												

Part 4B. Food Consumption Score (FCS)

Food Items	Food groups	Number of days 1-7
1.In the past 7 days, on how many days did you consume food items listed?	Food item	Frequency: (Use 0-7 to answer number of days: Use 0 for not applicable)
Maize , maize porridge, rice, sorghum, millet pasta, bread and other cereals	Cereals & tubers	
Cassava, potatoes and sweet potatoes		
Beans. Peas, groundnuts and cashew nuts	Pulses	
Vegetables and leaves	Vegetables	
Fruits	Fruits	
Beef, goat, poultry, pork, eggs and fish	Meat & fish	
Milk yogurt and other diary	Milk	
Sugar and sugar products	Sugar	
Oils, fats and butter	Oils	
Condiments	Condiments	

Part 4C. Coping Strategies Index

In the past 7 days, if there have been times when you did not have enough food or money to buy food, how often has your household had to:	Frequency: (Use 0-7 to answer number of days: Use NA for not applicable)
Rely on less preferred and less expensive foods?	
Borrow food, or rely on help from a friend or relative?	
Purchase food on credit?	
d. Gather wild food, hunt, or harvest immature crops?	
e. Consume seed stock held for next season?	
f. Send household members to eat elsewhere?	
g. Send household members to beg?	
h. Limit portion size at mealtimes?	
i. Restrict consumption by adults in order for small children to eat?	
TOTAL HOUSEHOLD SCORE	

Part -5 A Livelihood Improvement

A-Natural Capital

Instruction: Use This Symbol [√] to Indicate Response of the Household.

A1. Do you have agricultural land currently own? 0. No___1. Yes __
A2 .Do you currently use agricultural land yourself? 0. No___1. Yes __
A3 Do you have the right to rent and lease the land out? 0. No___1. Yes __
A4.Do you have currently land rented in? 0. No___1. Yes __
A4. Do you have currently land rented out? 0. No___1. Yes __
A5. Do you have land ownership Certificate? 0. No___1. Yes __
A6. Is there gender equality in the land transfer process? 0. No___1. Yes __
A8.Do you believe land certification increase land productivity? 0. No___1. Yes __
9A. Do you have the right to sell the land? 0. No___1. Yes __
A10. Is the main source of water for your agricultural land is rain? 0. No___1. Yes
A11. Do you have irrigation accesses? 0. No___1. Yes __
A12. Is the soil fertile of your agricultural land is very good? 0. No___1. Yes __
A13. Do you apply fertilizer and improved seed? 0. No___1. Yes __
A14. Please rate rainfall situation your *Woreda*?

1. Very good ☐ 2. Good ☐ 3.Medium ☐ Low ☐. Very low ☐

Part 5 B. Physical Capital:

B1. Dose the house/dwelling you live in belong to you (ownership)? 0. No___1. Yes __
B2. Did your basement and bad room are separated? 0. No___1. Yes __
B3. Do you have a separate kitchen? 0. No___1. Yes __
B4. Do you have all weather roads? 0. No___1. Yes __
B5. Do you have nears market? 0. No___1. Yes __
B6. Do you have nears woreda agricultural office? 0. No___1. Yes __
B7. Do you have access electricity? 0. No___1. Yes __
B8. If you yes do use improved stove? 0. No___1. Yes __
B9. Do you use traditional stove ? 0. No___1. Yes __
B10. Do you have bicycle, motorbike or car? 0. No___1. Yes __
B11. Do you have telephone or mobile? 0. No___1. Yes __
B12. Do you have axe, sickle, plough, hoe, shovel etc..? 0. No___1. Yes __
B.13 Do you have refrigerator 0. No___1. Yes __
B.13 Do you have internet accesses 0. No___1. Yes __

Part 5 C. Human Capital:

C1. Do you have nearest health center? 0. No___1. Yes __

C2. Did you receive any agricultural training form office of agriculture, and/or NGO in the past 12 to 24 months ? 0. No___1. Yes __

C4. Has this household have toilet facility? 0. No___1. Yes __

C5. Did you have accesses enough drinking water? 0. No___1. Yes __

C6. Do you have piped water inside your dwellings? 0. No___1. Yes __

C7.Do you have protected well and pump water source? 0. No___1. Yes __

C8. Did your water source is unprotected well and pump? 0. No___1. Yes __

D9. Did your water source is river, lack, spring, pound and rainwater? 0. No___1. Yes __

C10. Before consuming drinking water dose your household do anything to the water? 0. No___1. Yes __

C 9. Did you have to pay anything for getting drinking water? 0. No___1. Yes __

D 10. In the past 12 months, did family labor was reduced due to illness or injury? 0. No___1. Yes __

C 11. Do you have traditional food storage? 0. No___1. Yes __

C 12. How far is it to your source of water? (0= in the house, 1=less than 15 minutes, 2=15-30 minutes, 3=30-60 minutes, 4= more than 1 hour, 8=other:_____ 9= unknown)

Note : 1) Reasonable access is defined as the availability of at list one health post or clinic per kebela 2) Reasonable access is defined as the availability of at list 20 litter of water person per day form a source within 10 kilometer of the dwelling.

Part 5 E. Social Capital:

E1. Did you or any member of this household attend meeting or receive visits by any institution providing agricultural extension service in the past 24 month? 0. No___1. Yes __

E2. Are you a member of agricultural cooperation? 0. No___1. Yes __

E3. Do you get training on crop management practice in the past 12 month 0. No___1. Yes __

E4. Did you get training about new agricultural technology? 0. No___1. Yes __

E5. Did you get training on livestock management practice in the past 12 month? 0. No___1. Yes __

E6. Did you get training on weather insurance in the past 12 month 0. No___1. Yes __

E7. Did you get information from Radio, TV and media? 0. No___1. Yes __

E8. Did you get information from Neighbor, friend, trader, input dealer? 0. No___1. Yes __

E9. Did you participate in a group and organization such as Iddir (funeral), mehaber (Religious), dispute settlement,? 0. No___1. Yes __

E10. Did you participate in water, forest, tree, labor sharing group ? 0. No___1. Yes __

E11. Did you participate in business association? 0. No___1. Yes __

E12. Do you have access to agro-meteorological weather advisory? 0. No___1. Yes __

Part 5 F. Financial Capital

F1. Do you have a saving or other type of financial account with Bank or Micro-finance institutions? 0. No___1. Yes __

F2. Do you have nearest agricultural seeds vender? 0. No___1. Yes __

F3. Do you have nearest agricultural fertilizer vender? 0. No___1. Yes __

F4. Do you have nearest agricultural pesticide vendor? 0. No___1. Yes __

F5. Bank and microcredit centers are near? 0. No___1. Yes __

F6. Did any household member receive remittance, pensions or donation? 0. No___1. Yes __

F7. Can you get any grain and loan during deficit period from your neighbor or friends 0. No___1. Yes __0.

F8. Can you get any cash loan in times of need from your neighbor or friends 0. No___1. Yes __

Part 6A: Natural Environment

No	Question	Code : *(0) No (1)Yes*
1	Do you identify several type of land degradation?	☐ ☐
2	Is there soils contamination from spilling of hazardous materials and misuse of pesticides and fertilizers in your environment by Elfora Agro-Industries Plc agricultural investment ?	☐ ☐
3	Is there insufficient arable land to satisfy subsistence agricultural needs and restriction for livestock grazing due to the presence of Elfora Agro-Industries Plc agricultural investment?	☐ ☐
4	Do you recognize any change in the local hydrology of surface water-bodies (such as streams, rivers, lakes) such that conservation-worthy or commercially significant fish stocks are affected?	☐ ☐
5	Is there a significant pollution risk through liquid or solid wastes to humans, sources of water extraction, conservation worthy aquatic ecosystems and species, or commercial fish stocks in your environment?	☐ ☐
6	Do you notice risk of diseases in areas of high population density (e.g on chocerciasis, filariasis, malaria, hepatitis, gastrointestinal diseases)?	☐ ☐
7	Is there a significant quantity of eroded material, effluent or solid wastes in your environment?	☐ ☐
8	Do flood or otherwise affect areas which support conservation worthy terrestrial or aquatic ecosystems, flora or fauna ?	☐ ☐
9	Do you recognize sanitation treatment facilities close to human settlements (particularly where locations are susceptible to flooding)?	☐ ☐
10	Do you see sources of water extraction?	☐ ☐
11	Do you experience noticeable permanent or seasonal reduction in the volume of ground or surface water supply?	☐ ☐
12	Do you identify several types of land degradation and soil erosion conservation measures?	☐ ☐

Part-6 B- Impact of agricultural investment on the Environment

Instruction: Use This Symbol [√] to Indicate Response of the Household

1 Are you dispossessed due to Elfora Agro-Industries PLC agricultural farm project?
0. No___1. Yes ___ If you say No skip question number 2, 3, 4 , 5, and 6

2 Do you obtain resettlement package including compensation to your farm? 0. No__1. Yes __

3 Are you or any member of your household is employed in this Elfora Agro-Industries Plc agricultural farm? 0. No___1. Yes __

4 Do you believe that dispossessed peoples have lower standard of living including income?
0. No___1. Yes __

5 Do you see improvement in quality of life due to agricultural investment and an increases access to electricity , road other new infrastructures development ? 0. No___1. Yes __

6 Do you obtain any education and training service by the project? 0. No___1. Yes __

7 Do you recognize the population pressure due to the arrival of migrants attracted by agricultural investment opportunities? 0. No___1. Yes __

8 Is there an increase population and ethnic diversity after migration? 0. No___1. Yes __

9 Do the project encouraging population growth? 0. No___1. Yes __

10 Is there temporary imbalance between men and women due to male workers and migrants?
0. No___1. Yes __

11 Is there a social conflict due to migrants, non-resident workers and producers? 0.
No___1. Yes __

12 Does the project have changed the way of life, jeopardizing traditional cultural values?
0. No___1. Yes __

13 Is there loss of traditional authority due to the agricultural investment? 0. No___1. Yes __

14 Is there loss of spiritual assets, due to agricultural investment project? 0. No___1. Yes __

15 Is there a exclusion and marginalization, or gender related problems in the project employment, capacity building, education and tarring opportunity of the programs?
0. No___1. Yes __

16. Do you satisfy the by the project activity and feel sense of ownership?
No___1. Yes __

1. How is the extent of satisfaction on the project service provision in general in your locality?
1. Very satisfied 2. Medium 3. Poor 4. Not good at all

Enumerator signature _____ Team Leader signature_____

Part 6 C- Conservation measure and Practice

	13. Do you plan to adopt this [Practice] 0 NO- 1 YES-	14. What are the main reason to adopt this [practice]			Adoption reasons	15. What are the main constraints preventing you from adopting [practice]			Adoption constraints
Conservation measure Practice	Code [Use the symbol [√]	Main Code#	2nd	3rd	Code	Main Code#	2nd	3rd	Code
Terrace	01				1-Improve productivity 2-improve soil fertility 3-reduce risk of drought 4-reduce risk of flooding 5-improve household food and nutrition security 6-increased income 7-reduce household 8-other				1-lack of information on practice 2-lack of access to credit 3-lack of education and training 4- lack of access to labor 5-lack of availability to improved inputs(e. g seed and fertilizer) 6-lack of market to sell production 7-lack of land tenure 8-in ability to make long-term investment 9- contradict with traditional practice 10 wealth rank 11- lack of government support 13.-Due to lack of household income 13-other, please specify
Contour ploughing	02								
Conservation tillage	03								
Mulching	04								
Agro-forestry	05								
Vegetation strips	06								
Cover crops	07								
Crop rotation	08								
Bunds (soil and stone)	09								
Planted bunds	10								
Trenches, Channels	011								
Water harvesting	012								
Planting in deep holes	013								
Composting									
High yielding variety seeds and Appling fertilizer	015								
Drought tolerance seed	016								
Nutrition variety	017								
Weather insurance	018								
Intercropping	019								
zero/minimum tillage ,	020								
Integrated pest management (IPM)	021								

Part 6.D1 Environmental Vulnerability Index (EVI)

Index	Dimension	Brief description
Environmental Vulnerability Index (EVI)	Environment	Environmental Vulnerability Index (EVI) The Environmental Vulnerability Index (EVI) compromises 32 indicators of hazards, 8 indicators of resistance, and 10 indicators that measure damage (Kely ea al, 2004, Pratt ea al., 2004) The 50 indicators are given equal weights and then aggregated by an arithmetic mean. The vulnerability is the capacity of a community to adapt itself when climate changes cause modifications to the environment and condition the life (SOPAC, 2005)

Part 6 D2. The EVI sub-indices

The EVI sub-indices	Dimension and definition
The Risk Exposure Index,	Exposure Exposure is defined as each meaningful climatic variation influencing the examined system. Intensity, frequency, duration and physic extension of the hazard are specifically considered. In the disaster risk management, the exposure is a set of elements of the analysed system (SOPAC, 2005)
Intrinsic Resilience Index	Reliance Resilience is defined as the ability of a potentially exposed system, community or a society, to resist, absorb, accept and recover from disasters effects in a prompt and effective manner, even though the conservation of its essential base structures and functions (SOPAC, 2005)
The Environmental Degradation Index	Damage Land degradation The land degradation concerns the loss of soil fertility due to the erosion. Three classes that consider the yearly loss of soil (in tons) were ascribed, based on the USLE (Universal Soil Loss Equation) [62]as used in the Anti-erosion study by LVIA. At each class a value between 1 (better condition) and 3 (worst situation) was assigned

Part 6D3.Customized Question derived from the EVI standard indicator list

Index	s.no	Standard	Customized Question derived from the EVI standard indicator list
Environmental Risk Index (ERI)	1	High winds	Do wind situation and pressure is affecting your community?
	2	Dry periods	Did Dry Periods are increased in your community?
	3	Wet periods	Are wet periods decreasing and affecting your productivity?
	4	Hot periods	Dose hot periods are affecting your community?
	5	Cold periods	Dose cold periods are affecting your community?
	6	Sea surface temperature	Dose Sea surface temperature is affecting your community?
	7	Volcanoes	Are some Volcanoes affecting your community?
	8	Earthquakes	Do Earthquakes is affecting your community?
	9	Tsunamis	Do Tsunamis is affecting your community?
Intrinsic Resilience Index (IRI),	10	Land Slides	Dose high landslides and flooding is affecting your community?
	11	Land area	Do your land area is suitable for agriculture production?
	12	Country dispersion	Does your community has connected and strong network with other international border?
	13	Isolation	Does your district connected with other districts for marketed, religion, economy, and infrastructure?
	14	Relief	Dose the government assist you during natural and human made disaster
	15	Lowlands	Dose lowlands area are well protection in your community?
	16	Borders	Does your local community share borders with other country?
	17	Conflict	Is there farming and grazing land conflicts your community?
	18	Migration	Dose migration has common in your local community
	19	Introduction	Are your community affected by foreign introduced invasive and mono species?
Environmental Degradation Index (EDI).	20	Ecosystem imbalance	Dose some Ecosystem imbalance in your community?
	21	Environmental openness	Dose Environmental openness affect your local community
	22	Endemics species	Dose endemics species are damaged and/or fragmented by various human activities?
	23	Endangered species	Dose Endangered species get adequate protection in your local community?
	24	Extinctions	Is different species are extinct overtime in your local community?
	25	Vegetation cover	Is there vegetation cover loss in your community?

	26	Loss of cover	Dose natural rescues loss of cover
	27	Habitat fragmentation	Habitat fragmentation is common?
	28	Degradation	Is there land Degradation and soil erosion
	29	Terrestrial reserves	Dose terrestrial reserves has damaged in your local community
	30	Marine reserves	Dose marine reserves has damage in your local community
	31	Intensive farming	Is Intensive farming are common?
	32	Fertilizers	Dose application of different fertilizers affect your local area
	33	Pesticides	Dose some application of different Pesticides affect local community
	34	Biotechnology	Dose local community apply Biotechnology?
	35	Productivity overfishing	Is there overfishing?
	36	Fishing efforts	Dose Fishing efforts are affected
	37	Renewable water	Dose Renewable water sources are affected by different projects
	38	Air quality	Dose the air quality is affected?
	39	Waste production	Does your local community has adequate waste management?
	40	Waste treatment	Does your local community has adequate waste treatment institutions?
	41	Industry	Dose Industry and large scale farming wastes and affluent has affecting your community?
	42	Spills	Dose oil and gas spill are is affecting your community?
	43	Mining	Is illegal mining are common in your community
	44	Sanitation	Dose Sanitation of the local community is well protected
	45	Vehicles	Dose vehicles disturbance including noise, and dust are common
	46	Population	Dose population is growing in your local community?
	47	Population growth	Dose Population growth is affecting land size and land management?
	48	Tourists	Does your local community have a tourists attraction place are affected?
	49	Coastal settlements	Coastal settlements are common?
	50	Environmental agreements	Is there environmental protection agreements between your local community and government

Pare 7A. Involvement during the consultation or two way exchange of information

Please answer the following questions	
Consultation: Participate in the stakeholder meeting and views of stakeholders on LSAI and its impacts. canvass the	Yes=1 No=0
Proposal explanation: Did they describe the proposal and its objectives adequately?	Yes=1 No=0
Did they provides an opportunity to gain a better understanding and knowledge about the impacts and risks that may arise?	Yes =1 No=0
Did the project empowers people, providing the knowledge that they can influence decision making and creating a greater sense of social responsibility?	Yes=1 No=0
Increases awareness of how decision-making processes work, who makes decisions and on what basis	Yes =1 No =0
Did they provides an opportunity to raise concerns and influence the decision-making process	Yes =1 No=0
Did consultation process was inclusive – covers all stakeholders?	Yes=1 No=0
Did the open and transparent?	Yes = No=0
Did the consultation process was fair – conducted impartially and without bias toward any stakeholder?	Yes=1 No=0
Did the consultation processes was responsive – to stakeholder requirements and inputs?	Yes =1 No =0
Did the consultation process was credible – builds confidence and trust?	Yes=1 No =0
Exclusion of specific groups from consultations, particularly women?	Yes=1 No=0

Part 7B. Local people affected by a proposal

Part 7C.Local people Dispossession due to the LSAI

Please answer the following questions	
Did local people are affected by a proposal?	Yes =1 No = 0

Part 7D. Causal association between LSAI Loss of crop production, unplanned human

Please answer the following questions	
Communicable diseases as malaria, schistosomiasis, diarrhea and HIV	Yes=1
	No=0
Loss on crop	Yes=1
	No=0
Unplanned human settlements,	Yes=1
	No=0
Social conflicts due to shortage of settlement and communal grazing land, the venue of non-resident workers and migrants land and water disputes.	Yes=1
	No=0

settlements, and

Please answer the following questions	
Dispossession from locality or environment and occupational activities without adequate compensations	Yes=1 No=0
Dispossession from farm land without adequate compensations for losses.	Yes=1 No=0
Dispossession on local grazing land without adequate compensations	Yes=1 No=0
Loss of cultural, religious and historical heritage asset,	Yes=1 No=0
Loss aesthetic resources	Yes=1 No=0

Part 7E. Satisfaction on the overall project by local community

Please answer the following questions	
Ranking	Not good at all
	Poor
	Medium
	Very satisfied

Part 7F. Performance, monitoring and follow-up of LSAI

Please answer the following questions	
Have you heard any measure taken by the government to monitor and evaluate performance of LSAI including?	Yes=1
	No=0
Willing to return compensation	Yes=1
	No=0

Annex II

Checklists for In-depth conversations with Key informant interview

Introduction

The researcher is undertaking this research to investigate Impact of Agricultural Investments on Food Security, Livelihood Improvement and Environment in Shalla and Shashemena Zuria District, West Arsi Zone, Oromia Regional State of Ethiopia.. For this purpose, the researcher would like to know your opinion and your pragmatic view regarding the local trends in land deals and implementations of large-scale agricultural investments. Trends of land identification and transfer to investors and the level of local communities' involvement in the process of large-scale agricultural investments.

The researcher would like first to inform you that participation in the study must be based on your free will. Second, the researcher is very much grateful for the sacrifice you paid to this end and the information gathered will be highly confidential and will only be used for the purpose of this research. Furthermore, any information that you provide is valuable to this study. I would like to extend my appreciation and thanks for your cooperation and committing your precious time.

Thank you in Advance!

Region: _____

District：_____

Village：_____

Gender：Male: _____Female _____

Date of interview: _____ Place of interview: _____

Cmunity/Occupational status: _____

Part One: Questions regarding local trends and the position of local communities in the implementation process of large-scale agricultural investments.

For Government Officials and Experts

1. What are the role of your office in the process of land deals and the entire process of large-scale agricultural investments?
2. What are the major standards to identify the land to large-scale agricultural investment?
3. Are local trends in the process of large-scale agricultural investments encouraging the local communities to participate?
4. What was the level of local communities' participation in the process?
5. What was the role of the local communities in the process?
6. Were there community consultation sessions before and during the implementation of large-scale agricultural investments?
7. What are the agendas of those consultation sessions?

Part Two: Questions regarding the nature of local government relationship with local communities and investors.

For Government Officials

1. Are there changes on the nature of relationship between local communities and local government during and after the implementation of large-scale agricultural investments?
2. If yes! What are those changes? How do you describe the nature of relationships of local government with local communities and investors?
3. What factors are responsible for the change in the relationships among the two parties?

4. What mechanisms are applied to deal with the change in the relationships between local communities, local government and even investors?

For Investors/farm Managers and Community Elders/elders

1. Is there any interaction between local communities and private investors?
2. If yes! How do you describe it? Is it hostile or collaborative?
3. If it is hostile or collaborative, what factors are responsible for its hostile or collaborative nature?
4. Is there local government's intervention in the interaction between local communities and private investors?
5. If yes! What is the role and intents of government's intervention in the interaction between local communities and private investors?
6. How do you generally describe the nature of relationship between local communities and private investors and government's intervention?
7. What and how the ELFORA AGRO-INDUSTRIES P.L.C in particular Shallow-Melge farm was established, the project total area?
8. What crops are you produce?
9. How the project is targeting the beneficiary group from the scheme?
10. How farmer share water?
11. What task is which expert and farmer are expected to participate in irrigation management?
12. What are the challenges that could be a trite for the project sustainability of the system (management problem, water shortage, conflict of interest, drought ….)
13. Could you explain the measures that have been taken to reduce the challenge?

Part Three: Questions regarding the major land uses and covers and their socio-economic and cultural contributions to local communities.

For Community Elders and Workers of Agricultural Extension and Rural livelihoods

1. What are the major land uses and covers in the area?
2. Which land use or/ and cover is more important for your community?
3. What are the socio-economic, cultural and spiritual contributions of land and associated resources for your community?

Annex III.
Interviewing key informants

Checklist for In-depth Interviews with Sample Household Heads

Part One: Questions regarding the Role of local communities in the process of large-scale agricultural investments.

1. Did you get any information on which land is identified and transferred to investors?
2. Did you participate in the process of land identifications to large-scale agricultural investments? If yes in what way did you participate?
3. Were there any meetings? If yes who are participants of the meetings?
4. How do you explain the meetings in terms of their participatory nature?
5. What are the agendas of meetings?
6. What was the role of local community members in the meetings?
7. Do you think they were important for the local communities in protecting land ownership rights access to other resources vital for local livelihoods?Finally, how do you describe the entire process of large-scale agricultural investments in your area?

Part Two: Questions regarding the major land uses and covers and their contribution to local livelihoods.

1. What are the majorland uses and covers in your area?
2. What the major livelihood activities and strategies demanding such land uses and covers?
3. Which land use or/and cover is/are more important for the livelihood of your household and other members of your community?
4. What are the major contributions of such land use and covers for your household and other members of your community?

Part Three: Questions regarding effects on the major land uses and covers

1. Are there effects on your access to land and associated resources after the arrival of investors?
2. What livelihood assets you lost after the establishment of large-scale agricultural investment companies?
3. was there any compensation provided by the government and investors for your lost livelihood assets due to large-scale agricultural investments?
4. If yes, what was provided for u and other community members as a compensation?
5. Do you think it was adequate and sufficient to recompense the livelihood assets that you lost?

Part 10. Focus Group Conversations (FGDs)

C. Guides for Focus-Group Discussions (FGD)

1. What were local processes involved in the large-scale agricultural investments?
2. Level of local communities' involvement in each steps of large-scale agricultural investment from its inception to implementation.
3. Were large-scale agricultural investments based on local consensus between all stakeholders, including local communities?
4. Local land and associated resources ownership and use patterns before the arrival of large-scale investment companies.
5. Legal recognition and treatment of local land and associated ownership and use patterns in the process of large-scale agricultural investments.
6. The major contributions of land and associated resources for the local communities.
7. Effects of the large-scale agricultural investments on local communities' access to land and associated resources and the socio-economic, cultural and spiritual implications to the local communities.
8. The nature of relationships between local communities and government before and after the arrival of private investors.
9. The nature of relationships among local communities, government and private investors and its determinants.

Appendix B

Table B1. Sample households from a directly impacted population.

District	Kebeles	Total Population		Proportional to Size (PPS) Systematic Sampling Techniques	
		Male	Female	Total Population/HD/	Proportional to Size (PPS)
Shasamane adjacent district (treatment)	B/Dannaba	827	113	940	(940 × 153)/2098 = 69
	Toga	540	96	636	(636 × 134)/2098 = 41
	D/Calalaqaa	416	105	521	(521 × 134)/2098 = 33
				Ground total	134

Table B2. Performance, monitoring, and follow-up of the LSAI.

Please Answer the Following Questions		Frequency	Percentage (%)
Have you heard any measures taken by the government to monitor and evaluate the performance of LSAI including?	Yes = 1	88	65.6
	No = 0	46	34.3
Willing to return compensation	Yes = 1	125	93.2
	No = 0	9	6.7

Table B3: Sample of treatment and control households with LSAI and without LSAI area.

District	*Kebeles*	Total Population		Proportional to size (PPS) systematic sampling techniques		%
		Male	Female	Total population /HD/	Proportional to size (PPS)	
Shasemena adjacent District (treatment)	B/Dannaba	964	132	1096	(1096*134)/2446=60	44.7%
	Toga	630	112	742	(742*134)/2446=40	
	D/Calalaqaa	486	122	608	(608*134)/2446=34	
				Sub total	134	
Shala District (control)	Solicha	893	137	1030	(1030*166)/2252=76	55.3%
	Waka	466	116	582	(582*166)/2252=43	
	Bute	530	110	640	(640*166)/2252=47	
				Sub total	166	
				Ground total	300	100%

Sampling producer

The formula that were used to this study was;

k= $\frac{N}{nf}$

Sampling interval (k) = /n (sample size)

Where k is sampling interval, N is total population units and n is the sample size and Select a random number between 1 to k (including k) were Add to the sampling interval (k) to the chosen random number to add the next member to a sample and repeat this procedure to add remaining members of the sample. After Probability Proportional to Size (PPS) systematic sampling techniques: size being the number of household obtained from the list of households registration obtained from the health post of the respective kebeles considered in the study and from the two districts

K = N/n=4698/300 = 16.

So, every 15^{th} were selected until the sample size was completed i.e. the total of 300 of which 134 of kebeles of Agricultural Investment District called Shashemene district or treatment and 166 Non Large Scale Agricultural Investment called Shala District were randomly selected.

Table B4. Descriptive and summary statistics for treatment and control sample households

Independent (Categorical variable)	Control *(f)*	%	Treatment *(f)*	%	Total *(f)*	%	Chi2 (1) (p-value)
Sex of respondent							
Male	161	96.99	126	94.0	287	95.6	1.5651
Female	5	3.01	8	5.97	13	4.33	(0.211 NS)
Education Level							
1	10	6.02	33	24.6	43	14.3	81.5932
2	55	33.13	12	8.96	67	22.3	(0.000)***
3	100	60.24	55	41.0	155	51.6	
4	1	0.6	34	25.3	35	11.6	
Access to market							
No	31	18.67	46	34.33	77	25.67	9.5229
Yes	135	81.33	88	65.67	223	74.33	(0.000)***
Perception on aid							
No	116	69.88	82	61.19	198	66.00	2.4926
Yes	50	30.12	52	38.81	102	34.00	(0.114 NS)
Availability of all-weather road							
No	64	38.55	59	44.03	123	41.00	0.9190
Yes	102	61.45	75	55.97	177	59.00	(0.338 NS)
Availability of at list 20 litter of water person per day form a source within 10 kilometre of the dwelling.)							
No	115	69.28	124	92.54	239	79.67	24.7647
Yes	51	30.72	10	7.46	61	20.33	(0.000)***
Access to nearest health center							
No	53	31.93	39	29.10	92	30.67	0.2780
Yes	113	68.07	95	70.90	208	69.33	(0.598 NS)
Training on Agricultural technology							
No	70	42.17	33	24.63	103	34.33	10.1200
Yes	96	57.83	101	75.37	197	65.67	(0.000)***
Access to credit							
No	85	51.20	38	28.36	123	41.00	15.9992
Yes	81	48.80	96	71.64	177	59.00	(0.000)***

Table B5. Identify several types of land degradation

Variables	Category	Group of Respondents Control		Treatment		Total	
		n	%	*n*	%	*n*	%
Identify several types of land degradation	Yes	165	99.4	133	99.3	298	99.3
	No	1	0.6	1	0.7	2	0.7
	Total	166	100	134	100	300	100
Aware of several type of conservation measure practice	Yes	165	99.4	133	99.3	298	99.3
	No	1	0.6	1	0.7	2	0.7
	Total	166	100	134	100	300	100
Practice several land degradation conservation measures	Yes	164	98.8	133	99.3	297	99.0
	No	2	1.2	1	0.7	3	1.0
	Total	166	100	134	100	300	100

Table B6. Main source of information for conservation measure practice and adoption

Variable	Group of Respondents Treatment(134) Frequency	%	Control (166) Frequency	%	Total %
Lack of government support (Yes=1, No=0)	70	23.3	87	29	52.3
Land scarcity and decline in size and land fragmentation	44	14.6	23	7.8	22.4
Price of conservation equipment (Yes=1, No=0)	15	5	35	11.7	16.7
Availability, access and Lack of income (yes =1, No=0	2	0.6	21	7	7.6
Lack of access to labor (Yes=1, No=0)	3	1	-	0	1
Total	134	44.5	166	55.5	100%

Table B7. The logistic regression model estimate for treatment

DeptV(Pro. intervention)	dy/dx	Coefficient	Std. Err	z	P>|z|
Age	0.27	1.112	0.78	1.41	0.157
Sex	0.00	0.0248	0.01	1.83	0.068*
Education	0.072	0.292	0.21	1.39	0.163
Total family size	0.072	0.293	0.10	2.93	0.003**
Dependency ratio	0.00	0.007	0.00	2.36	0.018**
Farm Land size	0.29	1.187	0.24	4.80	0.000***
Total Livestock amount	0.12	0.496	0.12	3.88	0.000***
Perception on aid	0.03	0.135	0.35	0.38	0.706
Distance to potable water points	-0.18	-0.742	0.45	-1.64	0.101
Availability of all-weather road	-0.06	-.277	0.33	-0.83	0.409
Availability of nearest health centre	-0.00	-0.023	0.38	-0.06	0.952
Availability of nearest market	-0.31	-1.299	0.41	-3.15	0.002***
Training on agricultural technology	0.18	0.774	0.37	2.05	0.040**
Access to credit	0.17	-8.534	2.08	-4.10	0.000***

Note: ***p<0.01,**p<0.05, *p<0.10

Logistic regression Number of obs = 300

LR chi2(14) = 173.52; Prob > chi2 = 0.0000

Log likelihood = -119.47504 Pseudo R2 = 0.4207

Source: Own survey result, 2020

Table B8: Performance criteria of matching algorisms

Matching Algorism	Performance criteria			
	Balancing test*	Pseudo-R^2	%Var	Matched sample
Nearest Neighbor				
Nearest Neighbor 1	11	0.139	38	245
Nearest Neighbor 2	11	0.087	25	245
Nearest Neighbor 3	12	0.084	25	245
Nearest Neighbor 4	12	0.094	25	245
Nearest Neighbor 5	13	0.087	25	245
Caliper				
0.01	12	0.133	38	181
0.1	11	0.139	38	245
0.25	11	0.139	38	245
0.5	11	0.139	38	245
Radius				
0.01	9	0.286	63	245
0.1	9	0.286	63	245
0.25	9	0.286	63	245
0.5	9	0.286	63	245
Kernel				
0.01	14	0.071	38	181
0.1	12	0.090	38	245
0.25	14	0.058	38	245
0.5	14	0.070	50	245

Source: Own survey result, 2020

Table B9. Description of the estimated propensity score in region of common suppor

Estimate of propensity score

	Percentiles	Smallest	Obs and sum of wgt	Mean	Std.Dev	Variance	Skewness	Kurtosis
1%	0.04	0.03						
5%	0.05	0.03						
10%	0.07	0.04						
25%	0.14	0.04	281	0.47	.342	.11	.27	1.46
50%	0.35	Largest						
75%	0.85	0.99						
90%	0.95	0.99						
95%	0.97	0.99						
99%	0.99	0.99						

Table B10. Propensity score and covariate balance test

Variable	Unmatched Matched	Mean		%reduct		t-test		V(T)/ V(C)
		Treated	Control	%bias	bias|	t	p>|t|	
Sex	U	1.05	1.03	14.3		1.25	0.212	1.92*
	M	1.06	1.02	15.7	-10.0	1.10	0.274	2.06*
Age	U	45.56	41.92	29.4		2.53	0.012	0.94
	M	44.30	42.64	13.4	54.3	0.91	0.366	0.75
Education	U	2.67	2.55	13.1		1.16	0.247	3.22*
	M	2.55	2.40	15.9	-21.2	1.03	0.306	2.03*
Total family size	U	5.83	4.88	50.4		4.42	0.000	2.03*
	M	5.5	5.15	18.5	63.3	1.24	0.216	1.51
Dependency ratio	U	125.64	94.89	49.8		4.33	0.000	1.46*
	M	111.04	107.68	5.5	89.0	0.36	0.718	0.91
Farm Land size	U	2.06		1.192	129.0	11.22	0.000	1.45*
	M	1.87	1.86	1.3	99.0	0.08	0.933	0.89
Total Livestock amount	U	6.58	5.12	105.4		9.29	0.000	2.44*
	M	6.19	6.19	0.2	99.8	0.01	0.990	1.01
Perception on aid	U	0.38	.30	18.3		1.58	0.115	.
	M	0.36	.33	7.0	61.6	0.49	0.627	.
Distance to potable water points	U	2.07	2.30	-61.8		-5.18	0.000	0.32*
	M	2.102	2.12	-6.9	88.8	-0.57	0.571	0.82
Availability of all-weather road	U	0.55	0.61	-11.1		-0.96	0.339	.
	M	0.56	0.43	26.1	-134.8	1.81	0.073	.
Availability of nearest health centre	U	0.70	0.68	6.1		0.53	0.599	.
	M	0.67	0.67	-1.4	77.2	-0.10	0.924	.
Availability of nearest market	U	65672	0.81	-35.9		-3.13	0.002	.
	M	0.72	0.81	-20.6	42.6	-1.49	0.137	.
Training on agricultural technology	U	0.75	0.57	37.7		3.23	0.001	.
	M	0.76	0.76	0.4	99.0	0.03	0.977	.
Access to credit	U	0.71	0.48	47.8		4.10	0.000	.
	M	0.67	0.72	-10.5	78.1	-0.76	0.448	.

Source: Own survey result, 2020

Table B11. Test of matching Quality with Pseudo R2 and chi-square test for the joint significance of variables

Sample	Ps R2	LR Chi2	p>Chi2	Mean Bias	Med Bias	B	R	% VR
Unmatched	0.423	174.56	0.000	43.6	36.8	183.2*	1.77	88
Matched	0.058	15.74	0.329	10.2	8.7	57.9*	1.97	38

Source: Own survey result, 2020

Table B12: Result of sensitivity analysis using Rosenbaum bounding approach.

Indicator		$e^{\gamma}=1$	e^{γ}=1.25	$e^{\gamma}=1.5$	$e^{\gamma}=1.75$	$e^{\gamma}=2$
Impact on Natural Capital index.	ATT	0	0	0	0	0
Impact on the Human Capital index		0	$1.0e^{-14}$	$1.5e^{-12}$	$5.5e^{-11}$	$8.1e^{-10}$
Impact on the Financial Capital index		0	0	0	0	0
Impact on the Physical Capital index		$3.5e^{-13}$	$6.8e^{-11}$	$2.3e^{-06}$	$2.9e^{-08}$	$1.9e^{-07}$
Impact on the Social Capital index		0	0	$1.6e^{-15}$	$1.4e^{-13}$	$4.2e^{-12}$

Table B13. Result of sensitivity analysis using Rosenbaum bounding approach

Indicator	Dimension		$e^{\gamma}=1$	e^{γ}=1.25	$e^{\gamma}=1.5$	$e^{\gamma}=1.75$	$e^{\gamma}=2$
The Risk Exposure Index, REI	Exposure	ATT	.999712	.999995	1	1	1
Environmental Degradation Index, EDI	Damage		.194107	.536932	.808882	.938168	.983147
Intrinsic Resilience Index, IRI	Resilience		0	$4.6e^{-14}$	$6.0e^{-12}$	$2.0e^{-10}$	$2.8e^{-9}$

Source: Own computation (2020), γ stands for gamma value

Appendix C

Figure C1: Price increases raise concerns about food security and political stability (Source: UNCTAD[19], 2022).

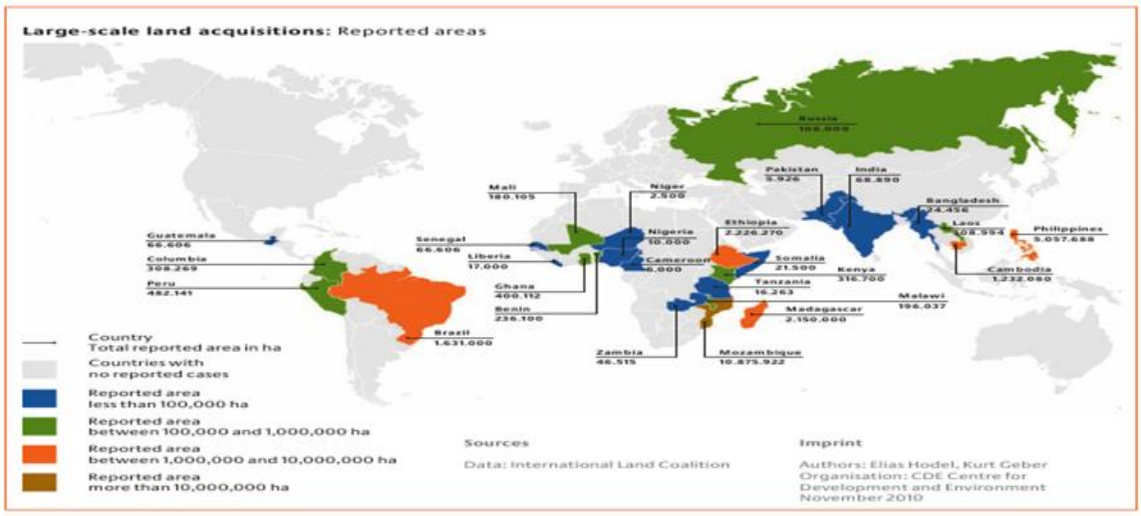

Figure C2: Global Large-Scale Land Transfer Size, Characteristics, Status, and Objectives as of November 2010 (Source: Elias and Kurt[20], 2010)

[19] The UNCTAD report also urges immediate action to address the problem of food insecurity, including spending on environmentally friendly agriculture and food systems, expanding market access, and enhancing trade regulations.Hence, Global food prices increased by 25% in 2021, marking the biggest annual increase in more than a decade. The price of grains, such as wheat and corn, increased by 45% in 2021, while the price of vegetable oils increased by 85%.

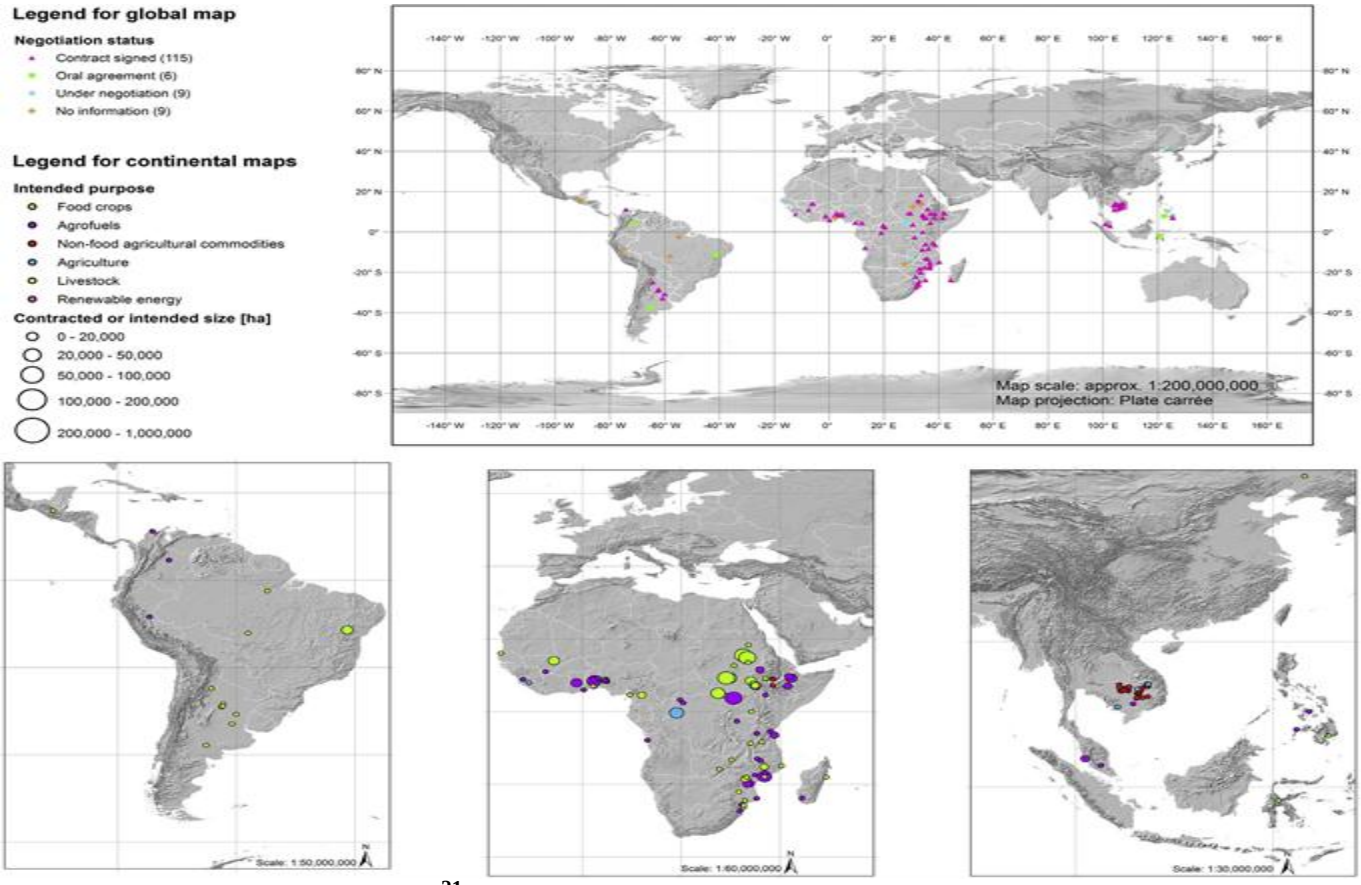

Figure C3: The global map[21] offers a summary of the significant land purchases that are represented in the Land Matrix database (as of April 2013) with a spatial accuracy of roughly 10 km. The status of these land deals' negotiations is represented by colored symbols (Source: Messerli et al., 2014).

[20]Due to varying estimates from various sources, it is difficult to determine the area covered by large-scale land deals worldwide or in Africa. For example According to Elias and Kurt (2010), large-scale land deals are most prevalent in Africa, where approximately 40% of the land acquired globally through such deals is located.

[21] The more thorough continental maps also offer details on the intended uses and financial terms of the deals (https://landmatrix.org/charts/web-of-transnational-deals). Furthermore, according to a 2020 report, since the year 2000, at least 45 million hectares of land have been acquired globally through 1,096 transactions. The Report also notes that Africa remains the most targeted region for LSLAs, accounting for 31.4 million hectares or 70% of the global area acquired since the year 2000. The report also highlights that most of the land acquired in Africa is used for industrial agriculture, particularly for export crops such as palm oil, soy, and sugarcane. The report further indicates that the most targeted countries for LSLAs are Brazil, the United States, and Mozambique.

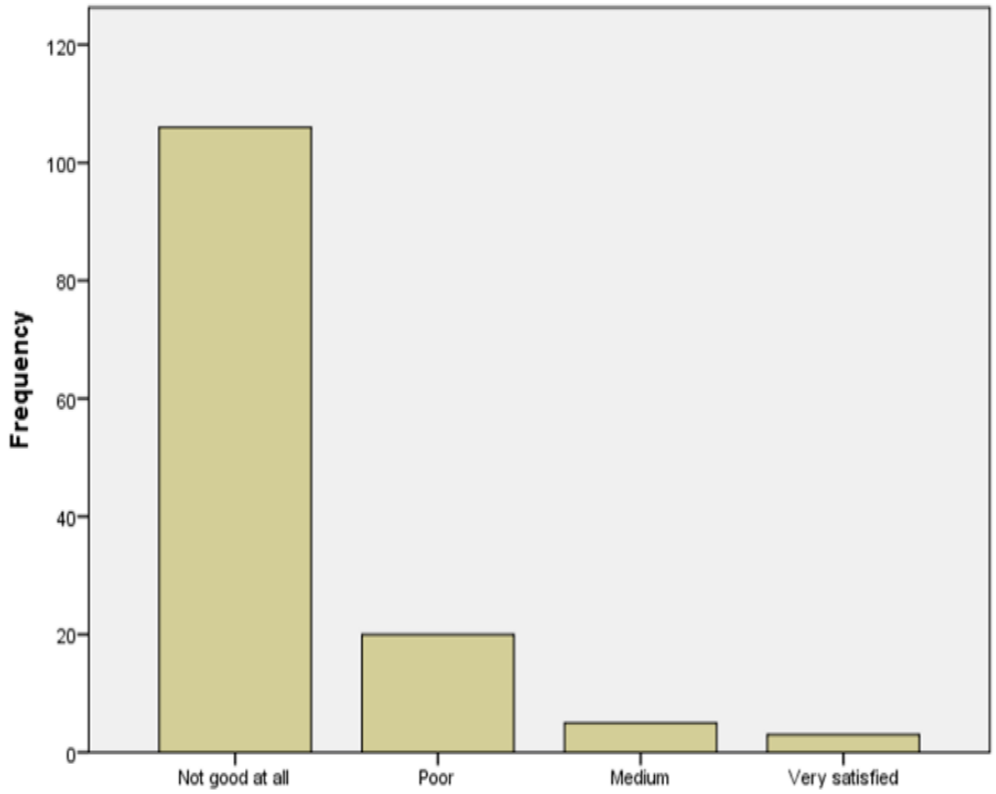

Figure C4. Local Community's satisfaction with the overall project.

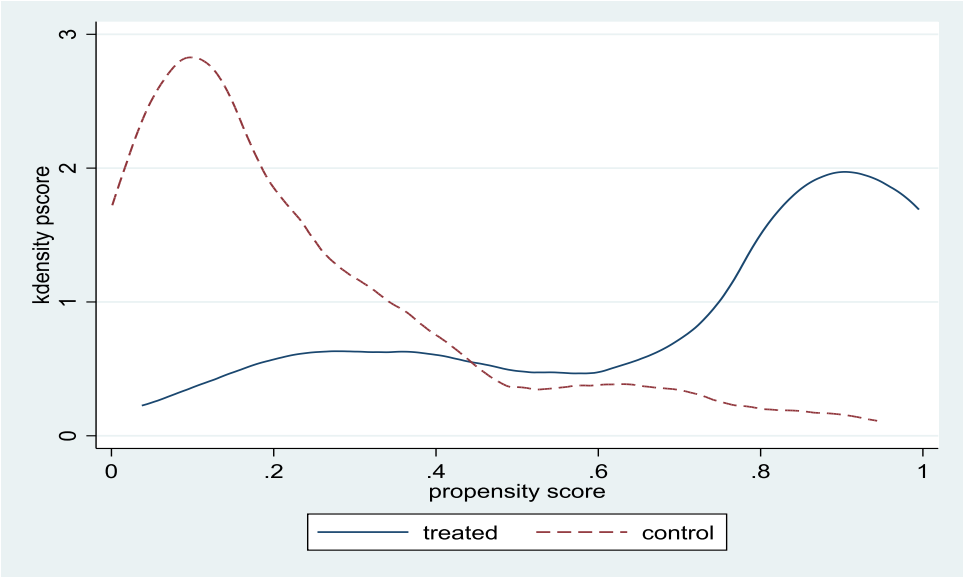

Figure C5. The propensity score distribution.

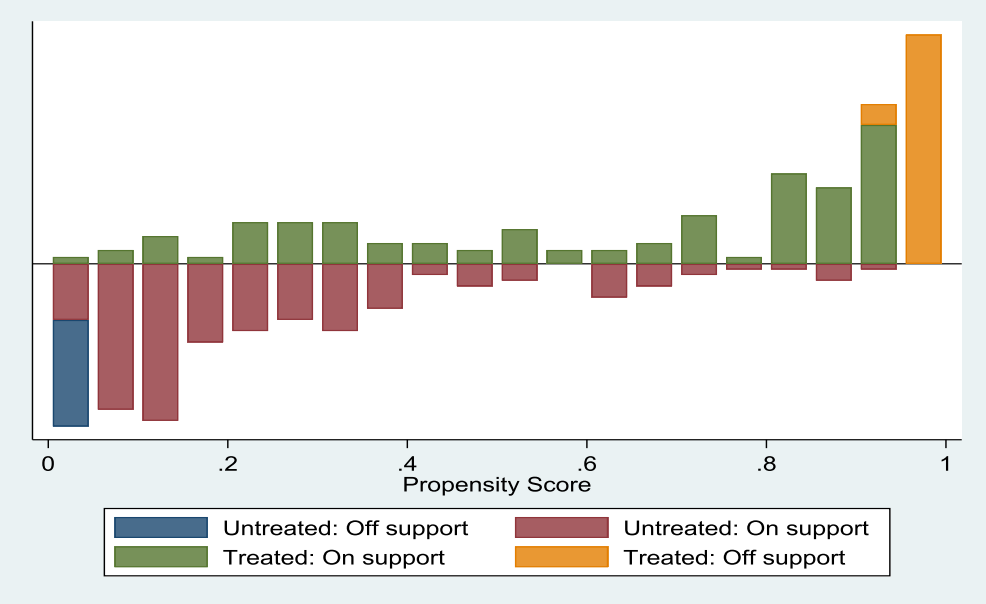

Figure C6: The score estimation of the common support for propensity.

```
Logistic model for DeptV, goodness-of-fit test

  (Table collapsed on quantiles of estimated probabilities)

      number of observations =       300
            number of groups =        10
    Hosmer-Lemeshow chi2(8) =      3.90
                Prob > chi2 =      0.8659
```

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
      FarmLs |      1.49    0.671394
         TLU |      1.39    0.720712
       Educl |      1.30    0.767958
         DPW |      1.25    0.796958
      TFsize |      1.21    0.828234
         ANM |      1.17    0.856240
          DR |      1.16    0.860288
         TAT |      1.14    0.873938
        PAid |      1.14    0.874737
         Age |      1.11    0.901638
        ANHC |      1.11    0.904590
    Acecredt |      1.09    0.913952
         Sex |      1.06    0.943992
         AWR |      1.01    0.986900
-------------+----------------------
    Mean VIF |      1.19
```

Figure C7: Goodness-of-fit test